

CryptoAssault: World War 2

White Paper v0.3

Table of Contents

1 Economic Changes

- 1.1 Assault (ASLT) Token
- 1.2 Resource Updates

2 Land Value and Distribution Changes

- 2.1 Land Value Changes
- 2.2 Distribution Changes
- 2.3 Satellite Changes

3 Gameplay Changes

- 3.1 Unit Changes
- 3.2 Clans
- 3.3 Salvage
- 3.4 Equipment
- 3.5 Events
- 3.6 Disasters
- 3.7 Levels
- 3.8 Quests

4 New Islands

- 4.1 Battle Royale Island
- 4.2 1v1 Islands
- 4.3 F2P Island

5 Roadmap

1 Economic Changes

1.1 Assault (ASLT) Token

CryptoAssault will be changed so that a new in-game sustainable economy will be created to replace the original one. The new economy will be centered on resources and a new ERC-20 token the Assault (ASLT) Token. In-game marketplaces and decentralized exchanges will be leveraged such that resources can be exchanged for ASLT token and ASLT token can be exchanged for ETH in a p2p manner.

ASLT will be used to purchase special assets from the in-game store (during periods when they are available for sale) as well for speeding up in-game wait times such as deployment and crafting cooldowns.

Crafting recipes for some recipes and units may also require ASLT tokens.

There will be 10 million ASLT tokens initially which is aimed to be distributed to the economy over the course of a year. After a year, ASLT tokens will be created at a rate of 2% per year distributed directly to players via land/salvage dividends and satellites. It will be initially seeded through promotions, bonuses to crate purchasers, land distribution, and satellites in the following distributions:

- 20% reserved for additional promotions and partnership incentives
- 15% reserved for quest rewards when they are implemented
- 25% allocated across random satellites over the course of a year
- 40% allocated in land distribution over the course of the year with 4/7ths allocated in the first 4 months and 2/7ths allocated in the second 4 months and 1/7th allocated in the final 4 months

ASLT will initially be tradeable through an in-game exchange powered by Uniswap with the aim of being added to additional exchanges over time.

Whenever ASLT token is spent for any purpose in game, 90% will be redistributed back in the form of land/salvage dividends, quests, and satellites over the course of the following 30 days. The remaining 10% will be immediately sold on the marketplace as a fee to cover development costs.

This mechanism ensures that there is always an incentive for the developers to continue to create compelling experiences for players to want to purchase ASLT for and it also serves as a balance to the market where if a player attempts to “pay to win” through purchasing and using ASLT tokens, they ultimately provide liquidity for opponents to get ASLT tokens for cheaper to counteract them.

1.2 Resource Updates

The number and utility of resources will be significantly expanded beyond the four that is currently available. In addition, resources will have different rarity tiers. Unlike before when resources only spawned according to the zone they were attributed to, all resources have the potential to be spawned in any zone but rarer resources will spawn more frequently in higher tier zones.

When you mine any particular resource patch, it has the potential to be a higher rarity patch. Visually, all patches of a particular resource type look the same and only someone actively mining will be able to identify which rarity tier the patch is.

New resources with rarity tiering is as follows:

- Oil -> Petroleum -> Fuel Cell
- Iron -> Steel -> Carbon Fiber
- Titanium -> Composite Materials -> Nanomaterials
- Uranium -> Purified Isotope -> Fission Material
- World Essence (No Higher Tier)

Frequency for rarity is the following:

- Tier 1: 89%
- Tier 2: 10%
- Tier 3: 1%

Resources will be used to power up units and fuel special abilities that some units or equipment will have. They can also be crafted into one time use items, equipment, or sold in the in-game marketplace with ASLT tokens. They may be used to craft units as well but this will require significant resource investment and have a long crafting time.

World Essence is a unique resource that is necessary to craft “doomsday weapons”. These are a series of extremely powerful single-use items and destructible units that are capable of completely changing the battlefield and course of a war.

World essence is unique in that it cannot be immediately mined. It only appears surrounded by patches of other resources in layers. Only the outermost layer can be mined at a given time and all surrounding resources must be mined before the world essence patch is mineable.

This means that players who wish to mine World Essence will need to hold territory for long periods of time that is likely to be highly sought after.

2 Land Value and Distribution Changes

2.1 Land Value Changes

The value associated with land will be redistributed to make the various zones in the main island fairer:

- Z1: 20%
- Z2: 20%
- Z3: 25%
- Z4: 35%

All zones will have similar total land value but the inner zones have less area so each block in the inner zones is still worth significantly more than the outer zones.

2.2 Distribution Changes

Distribution will only be 65% dependent on controlled land. It will also be 35% dependent on salvage (see below) which is obtained through destroying units. In addition, there is a clan scaling factor that is dependent on your clan's relative strength to other clans. Members of a totally dominant clan in land value will receive fewer rewards due to this scaling factor in order to incentivize members of the clan to leave and join other clans to keep the game balanced.

The scaling factor is calculated as follows based on ranking:

- Top Ranked Clan by Land: $Scaling = DV * (0.4 - \sigma)/0.4$ where DV is the unweighted distribution value and σ is the standard deviation of all five clans
- Rank 2 Clan: $Scaling = DV * (1 - (1 - (0.4 - \sigma)/0.4)/2)$
- Rank 3 Clan: No penalty or bonus
- Rank 4 Clan: Receives bonus equivalent to the penalty of rank 2 clan

- Rank 5 Clan: Receives bonus equivalent to the penalty of rank 1 clan

In the unlikely event of a tie, the penalty or bonuses are averaged and distributed equally across clans that tie.

Because it's based on standard deviation, this scaling factor will always encourage people to join the weakest clan and leave the strongest clan regardless of the actual distribution among the five clans. Clan changes are limited to once per week to prevent excessive hopping and keep land gains meaningful (at least for a period of time)

It also introduces political friction into the system where the structure may encourage people to leave and betray clan-mates which ultimately increases the tension of the game.

2.3 Satellite Changes

Satellites will now require a unit to move to the dropped location to pick it up. This encourages active play and the potential to steal a satellite from the territory of players that are not paying attention.

Satellites will also drop more frequently, three times a day instead of once every 3 days.

Satellites contain one of the following: ETH, ASLT tokens, resources, equipment, consumables, or units.

3 Gameplay Changes

3.1 Unit Changes

Crate sales for current units will be removed prior to the rollout of the new economy. This will be to combat unit inflation on the map. In the future, new seasons of units will be rolled out with special abilities that affect how units interact on the map. Effects include such things as ranged / area of effect attacks, abilities which decrease movement distance or cooldown for targeted units, deploying traps in particular areas, and many more.

Units from the current crates will be known as Season 0 or Genesis units. While future units will have more abilities which add more strategic options, they will never have the same level of base stats as Genesis units.

Additionally, special islands may be implemented which only accept units from particular seasons. These rotational islands will further keep unit inflation in check. However, Genesis units will always be allowed regardless of the current rotation.

Destructible units will also be implemented which can be crafted using resources. Crafting a destructible unit will produce an ERC-721 but in order for it to be used, it must be attached to the in-game contract. You will be allowed to detach it for trading but it must be re-attached in order for it to be re-deployed.

If a destructible unit is destroyed, it will be lost forever similarly to when units are fused to create a higher star unit.

Destructible units can be used to enter tournaments, but similarly to if they are destroyed in the main island they will also be destroyed if they are lost in the tournament. This will allow for a cheaper alternative for players who wish to enter

the tournament but do not want to buy units, especially when the supply is no longer readily available once Genesis crate sales stop.

Units will have the ability to be recalled if they are deployed. The recalling process takes 24 hours during which time the unit can neither attack nor move but can still be attacked and will defend itself if attacked. Players may cancel the recall process before 24 hours is up but would have to start over with the full countdown if they decide to recall again. Successfully recalling the unit removes it from the map and allows it to be redeployed again.

For destructible units, only recalled or un-deployed units may be detached and traded. This is to avoid player exploiting detaching when faced with a tough strategic position.

3.2 Clans

As stated earlier, gameplay will be rebalanced into clans. There will initially be 5 clans but additional ones can be added as the player base grows. Players will be heavily incentivized to join a clan as players not in a clan will take a 50% penalty on land value. Players in a clan are not able to attack one another nor do their units block the path of their clanmate's units though two units still cannot occupy the same location.

As previously indicated, highly dominant clans will receive a penalty which is distributed to weaker clans in order to encourage switching.

Players may leave their clan and rejoin a new one once per week without penalty. They may do so more frequently by using ASLT tokens.

3.3 Salvage

Salvage is given every time a player attacks regardless of whether they win or lose. If they win, they gain salvage equal to the defender's power. If they lose they will gain salvage equal to half the power of the unit that they attacked with. The amount of salvage an account holds drops by 0.1% every minute. The proportion of salvage drained per player relative to the total amount drained

across all players determines the share of the salvage dividends that this player is eligible for.

This is to encourage combat and discourage excessive camping as 35% of the distribution will be provided to players based on destroyed units.

3.4 Equipment

Equipment will be items that are (with rare exceptions) destructible but can be attached to units. Units will have a certain number of equipment slots and players can attach useable equipment at any time regardless of whether the unit is deployed, repairing, or able to be deployed. When a unit is destroyed, regardless of whether the unit is destructible or not, any equipment attached to it will be destroyed.

Equipment can give units boosts to base abilities, or give them special abilities. Some equipment provide one-time use abilities and when they are used the equipment is destroyed.

3.5 Events

Periodically, special events will occur on the island such as an invasion by NPC units or a boss event where players need to work together to bring down a big enemy.

Players can choose to engage in the event in order to gain potentially valuable drops or take advantage of the chaos in order to gain the upper hand on the map.

3.6 Disasters

High value regions such as the center will be subject to periodic disasters. Disasters occur randomly and during disasters each unit within a specified area will have a negative effect incurred upon them (e.g., temporary inability to move or attack) or be destroyed. Disasters will occur in both Z3 and Z4 with a higher frequency in Z4. The size of the disaster region will be variable with more

frequent disasters occurring on a smaller region but rarely a large region (potentially an entire zone) will experience a disaster.

Players will receive a 4 hour warning that a disaster is imminent in a particular region. After the warning period, the disaster will occur in that region at a random time within the next 2 hours.

This will provide players with some time to prepare for the disaster and opposing clans to strategize a response as well.

3.7 Levels

Players will be able to gain experience for levels by performing actions in the game and completing quests. Levels will unlock harder quests that have the potential to provide better resources.

In addition, levels are necessary to advance in the F2P Island.

3.8 Quests

Players will have daily, weekly, and monthly quests which they can perform in order to obtain resources and ASLT tokens. As they level up, the quests that are available to them will be more challenging but they will be more rewarding as well.

Quests include tasks such as destroying units, deploying/moving units, holding a particular piece of territory for a period of time, gathering a certain amount of resources, etc. During events, special additional quests can appear as well.

4 New Islands

4.1 Battle Royale Island

A new Battle Royale mode will be implemented on a separate island and will be held once every two weeks. Players purchase Command Points in order to enter the event. Command Points can then be used to deploy units on the tournament island once the deployment period begins. Players are also able to purchase Resource Points which would allow them to transfer resources from the main island to the tournament island to be used in tournaments. All purchases will go towards a pool which will be awarded in the following way:

- 20% of total prize pool will go to the account with the final unit(s) on the battlefield
- 10% of the total prize pool will go to the second to last account with active units on the battlefield
- 20% of the prize pool will go to accounts with the final unit in each of the unit types (4% for each of the five types)
- 15% of the prize pool will be distributed based on the amount of the tournament-only Crystal Shard resource that players collect over the course of the tournament
- 20% will be allocated to the player with the most land value at a random points during the tournament (four random time points will distribute 5% each, two during Engagement Phase 1 and two during Engagement Phase 2)
- 5% will be allocated to satellites in the main island

- 10% will be collected for development fees and to pay for costs of tournament hosting

The map will include all four zones initially but will shrink during the later phases of the tournament. All land values are the same regardless of which zone units are in (e.g, every block across the map has the same land value). In addition, spawn frequency for resources are the same across all the zones as well. However, the same rules apply with only four star units able to go into zone 4 and so on for the other star values. This allows higher star units to have access to any resources that spawn towards the center as well as gain protection against lower star units, at least in the initial portion of the tournament, in exchange for a higher cost of Command Points to deploy.

When a unit destroys another unit (regardless of whether on offence or defence), it gains half the power of the destroyed unit. Therefore, even relatively weaker units in the beginning can grow stronger by winning battles and remain competitive to be the last unit standing.

Command Points and Resource Points are spent in the following way:

- Base Command Points requirements are 1 point to deploy a one-star, 3 points to deploy a two-star, 8 points to deploy a three-star, and 22 points to deploy a four-star
- A rarity multiplier is applied on top of that base value with commons being 1x, rares being 3x, epics being 9x, and legendaries being 27x
- Examples: A four-star rare will cost 66 Command Points to deploy and a two-star legendary will cost 81 Command Points to deploy
- One resource point will allow players to carry over 108,000 oil, 36,000 iron, 12,000 titanium, or 4000 uranium

Tournaments will occur in the following phases:

- Purchase Phase: Players may buy Command points and Resource Points for the current week's tournament or receive a discount when buying for multiple tournaments

- Deployment Phase: Players will have 24 hours to deploy their units and decide which resources to transfer using their Resource Points. During this phase, players may deploy units but not attack any units or move units that have been deployed. Units on resources during this period will not be able to mine them. Command Points and Resource Points are purchasable at the regular price.
- Engagement Phase 1 (48 hours following Deployment Phase): Players are able to attack, move, and mine resources. Units that are destroyed may be redeployed using additional command points. Command Points and Resource Points are purchasable at 150% of the price. Note: Players who win the land value drops during this period of time will only be awarded their prize after the period ends. Winners will be identified but the amount won will depend on the final prize pool amount which won't be known until after the purchasing period ends. They will at minimum win the amount that is displayed at the time of the drop but it may be greater.
- Engagement Phase 2 (96 hours following Engagement Phase 1): The map will begin to shrink and any units that are outside the bounds of the map as it shrinks will be destroyed. The inner zones will shrink most rapidly as the island becomes smaller. Over time, all the zones will disappear except zone 1. Destroyed units will no longer be deployable. This will continue until there is only one account remaining which controls deployed units.

Command Points and Resources Points will be sold at a base price of 0.01 ETH each. However, players may purchase points for the current tournament and the next tournament for a 10% discount. So 100 Command Points for the current tournament will cost 1 ETH to purchase. However, 50 command points for this tournament and 50 for the next will cost 0.9 ETH to purchase. The same goes for resource points.

Units that are used for tournaments will be removed from their position in the main island. They enter the tournament with none of their resource bonuses and must be refueled with tournament resources. They will be re-deployable

(assuming they are not destructible) in their original state following the end of the tournament.

Units that are under repair can be used for tournaments. However, during the period they are deployed for a tournament, their repair timer is paused. When the tournament ends they will continue repairing from the point they were used in the tournament.

When new mechanics are implemented (Equipment, etc.) the tournament rules will be updated accordingly to account for new features.

4.2 1v1 Islands

Players will be provided the opportunity to challenge and set up their own 1v1 tournaments. Have a beef with someone on the main island? Challenge them to a duel! Duels will be similar to the Battle Royale tournament system but have additional game modes such as king of the hill, capture the flag, etc. which the players can choose from.

Players will select how many command points / resource points to purchase (must be the same for both players). The winning player will obtain 85% of the prize pool and 5% of the prize pool will be distributed to the main island. 10% will pay for hosting and development fees.

4.3 F2P Island

All players will be provided a set of units that can only be deployed on the F2P island. These will not be tokens on the blockchain. As they level up, they will unlock more and new units that can be used in this island. Units players own on the blockchain will not be eligible to be deployed on this island.

Players playing on this island will be able to fight for a limited pool of resources that they can carry over to the main island. This provides players with the opportunity to spend time playing for free to begin collecting resources that they can either sell or craft into destructible units which can be deployed in the main island, albeit very slowly.

5 Roadmap

The order of development will be as follows:

- Battle Royale Tournament
- 1v1 Island Deployment
- Stopping of Genesis Crate Sales
- Balancing Changes to Main Island (Clan and Land Value Changes)
- Implementation of Salvage Mechanic
- Economic Changes / Introduction of ASLT Coin and New Resources
- Gameplay Changes (Events, Disasters, Quests, etc.)
- New Seasons of Units / Features (Crafting, Abilities, etc.)
- F2P Island Deployment

All of this may be changed as development progresses with community feedback heavily influencing development priorities and decisions.

CryptoAssault

(WhitePaper v0.11)

Rogue Nations Games

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November 26, 2018

1 Introduction

CryptoAssault is a strategy MMO that runs on the Ethereum blockchain. Players will be purchasing units that will be battling in a single world to earn Ethereum. The units will be ERC-721 tokens that will have unique stats and can be traded amongst players.

Through strategic gameplay, strong units and powerful alliances, players will be able to capture territory and earn Ethereum daily. CryptoAssault will be the first MMO on the blockchain where all players will be in one world together. The power of a unit matters but strategy will be important since every unit has strengths and weaknesses. The 3D terrain will also play huge part in contributing to unit strategy. Joining a strong alliance and navigating inter-alliance politics will also be a huge factor in a player's success.

Units will be sold in random unit packs on <http://cryptoassault.io> but ultimately players will want to trade units amongst each other as they seek matching units to upgrade. Although there will be an overall meta, demand will also be unique to players as they search to upgrade their ideal army.

The game is a hybrid on-chain/off-chain dapp. The units are ERC-721 tokens purchased on-chain but the game actions are all off-chain. This ensures that players will be able to move, attack and play the game without having to pay and wait for each action. Players will still need to purchase units and pay a small fee for upgrading units since upgrading is creating a new ERC-721 token.

The game is currently 90% feature complete and is aiming for a Feb 2019 Beta release.

2 Market Forces

2.1 Value of Unit Tokens

Players will be able to earn a percentage of the previous day's revenue from CryptoAssault by holding territory throughout the day. One person a day also has the chance to win a large amount of Ethereum by catching a crash landed Satellite in their territory. The earning power of a player is dependent on how much territory they can capture with their units. The amount of territory they can capture is dependent on a player's strategy and the power of their units. The power of their units is given by their random stats which are generated when the ERC-721 unit token is minted. This earning power is what will give unit's their value for trading on the open market.

2.2 Buying Unit Packs

Units can be bought through the cryptoassault.io website, the game client or from other players. Units can only be bought as random unit packs from the website and game client.

Here are the chances when buying a pack with a COMMON unit or better:

- Common 80%
- Rare 15%
- Epic 4%
- Legendary 1%

The same weighting exists for the other packs but they will sometimes remove a category. So for a pack that has a RARE unit or better, the chances are:

- Rare 75%
- Epic 20%
- Legendary 5%

2.3 Unit Upgrading Relating to Demand

Obviously having high stats will increase the demand for a unit. However the unit upgrade system also plays a big part in the demand of a unit. Upgrading a unit increases its earning power by allowing access to the next inner ring on the map. The map consists of 4 rings and each successive inner ring has higher land earnings and an increased chance for the satellite to crash land. Units will be upgraded by absorbing two other units. Units must absorb units of the same type. I.e. Tanks must absorb tanks, jets must absorb jets, etc. However, if players absorb

the exact same unit, then the upgraded unit will be even better. This should ensure that demand is spread out a bit.

2.4 Gameplay Influencing Demand

Proper strategizing will influence a player's earning power. Therefore, terrain and overall player behavior will also drive unit demand. For example, a map with a lot of rivers might drive the demand for flying units. If flying units become popular, then mechs may become popular since they counter jets and helis. If a strong alliance is fortifying a plateau chokepoint with a lot of artilleries, then flying units may become popular again. This shifting meta will be key to an evolving marketplace.

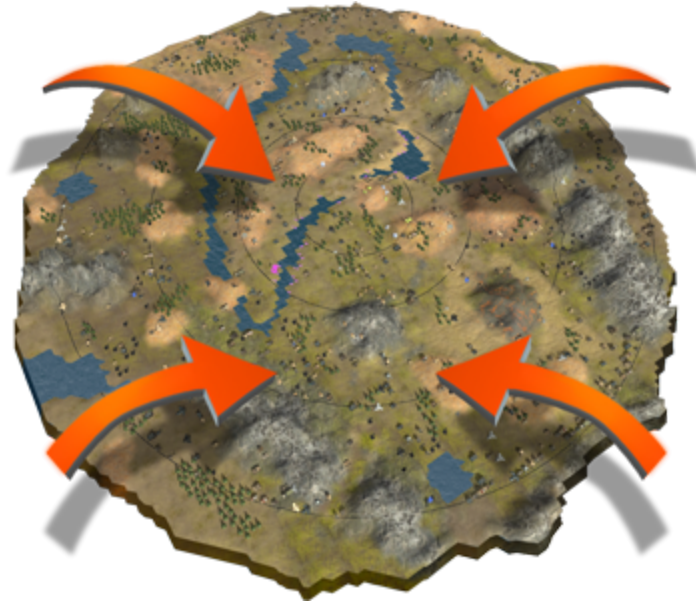
3 Game Design

3.1 Overview



CryptoAssault is a strategy MMO where all players will be battling it out in a single world. We expect 100s (and eventually 1000s) of players to be in one world. Players start with their purchased units in their inventory. Players then click on a tile and a unit that they want to send

to that tile. Units will initially travel from the closest point on the outside edge of the map. Once a unit moves, they cannot move for another 3 hours. A unit can only move a max travel distance. To attack an enemy unit, players simply move a unit on top of an enemy unit. The unit will travel there and after a short battle animation will determine the winner.



3.2 Unit Don't Die!

When a unit loses a battle, they just go back to their owner's inventory and cannot be deployed for another 24 hours while they're being repaired.

3.3 Capturing Territory

Units will own the territory around them in a small radius. Players will earn Ethereum based on the total territory owned throughout the day. We call this Land Earnings. A Satellite full of Ethereum will also come crashing down once a day. If that Satellite falls into a player's territory, then they will receive a large amount of Ethereum that day.

3.4 The World



The world is a circular continent broken up into a grid viewed from an isometric camera angle. It has an approximate radius of 100 tiles. The world is broken up into 4 rings (Technically, it's 3 rings and a center circle). As you move towards the center, the tiles in a given ring has an increased value for the Ethereum you earn through Land Earnings. Each ring also has an increased chance that the satellite will land in it.



3.5 Resources

Resources will spawn in the world occasionally. Players must position their units on top of the resource to begin mining it. The unit will begin mining the resource over time. Eventually the resource patch will be depleted and removed from the world. A new resource of that type will spawn somewhere in that ring soon after. Here are the amounts of each resource in each ring:

resource	ring	max_patches	amount
oil	4	58	100000
oil	3	14	100000
iron	3	42	100000
iron	2	9	100000
titanium	2	28	100000
titanium	1	7	100000
uranium	1	20	100000

Resources are used to purchase enhancements for units.

3.6 Movement & Pathfinding



Currently, a unit can move their max travel distance once every 3 hours. They can travel less than their max travel distance but they still incur the full 3 hour refueling time. Units can move

pretty far in one move (maybe 50–100 grid squares) but they need to pathfind. Each terrain tile will be one of the following:

- Plains
- Mountains
- Forest
- Water

That means they will automatically avoid obstacles when the player selects a destination. Here are the pathfinding rules:

- Ground units will avoid other ground units, mountains, forest and water.
- Helicopters can fly over water, forest and ground units but will fly around other air units and mountains.
- Jets can fly over water, mountains, forest and ground units but still need to avoid other air units.

We've balanced jets and helicopters by making them have very low resource mining rates. Players can move through their own units and alliance mates' units. Creating blockades and protecting your weaker units will be key to survival. Players can upgrade a unit's max travel distance by evolving that unit and increasing its star-rating.

3.7 Battling and the Battle Formula

When a player selects a unit to move, they will be able to see their chances against all the other units on the map. Players can click on units to see their percentage chance to win against an enemy unit. When a unit battles another unit, the game will pick a winner based on that percentage chance. Here is how that is calculated:

$$\text{Attacker's chance to win} = ((A-D)/\max(A,D) + 1)/2$$

Where A is the attacker's damage vs the defender's unit type

And D is the defender's damage vs the attacker's unit type

4 Units

4.1 Stats

A unit is made up of a few different stats. Here are the stats that are unique to a given unit token:

- Damage vs Tanks
- Damage vs Trucks
- Damage vs Mechs
- Damage vs Jets
- Damage vs Helis
- Mining Rate

- Birthdate. Used to calculate the unit's age.

The rarity of a unit defines a range for the damage and mining rate. The actual damage or mining rate is a random number within that range. The birthdate is the purchase date (when the token was minted).

These stats are given by the rarity:

- Territory radius

Here are the stats that are defined the unit type:

- Max travel distance. This is increased as a unit evolves its star-rating.
- Available enhancements. Enhancements are unlocked as a unit evolves its star-rating.
- Special traits like +20% damage to adjacent ground units.

Here are the stat ranges for each common unit type at different star-ratings:

	stars	Damage										Mining	
		min tank	max tank	min truck	max truck	min mech	max mech	min jet	max jet	min heli	max heli	min	max
common tank	1	44	56	61	78	52	67	35	44	26	33	70	80
common truck	1	26	33	44	56	61	78	52	67	35	44	70	80
common mech	1	35	44	26	33	44	56	61	78	52	67	70	80
common jet	1	52	67	35	44	26	33	44	56	61	78	1	5
common heli	1	61	78	52	67	35	44	26	33	44	56	5	10
common tank	2	110	140	152	195	130	167	87	110	65	82	82	94
common truck	2	65	82	110	140	152	195	130	167	87	110	82	94
common mech	2	87	110	65	82	110	140	152	195	130	167	82	94
common jet	2	130	167	87	110	65	82	110	140	152	195	1	5
common heli	2	152	195	130	167	87	110	65	82	110	140	5	11
common tank	3	275	350	381	487	325	418	218	275	162	206	97	111
common truck	3	162	206	275	350	381	487	325	418	218	275	97	111
common mech	3	218	275	162	206	275	350	381	487	325	418	97	111
common jet	3	325	418	218	275	162	206	275	350	381	487	1	6
common heli	3	381	487	325	418	218	275	162	206	275	350	6	13
common tank	4	687	875	953	1218	812	1046	546	687	406	515	115	131
common truck	4	406	515	687	875	953	1218	812	1046	546	687	115	131
common mech	4	546	687	406	515	687	875	953	1218	812	1046	115	131
common jet	4	812	1046	546	687	406	515	687	875	953	1218	1	8
common heli	4	953	1218	812	1046	546	687	406	515	687	875	8	16

Keep in mind that some units have different stats when noted in the description.

4.2 Counters

A given unit type will hard counter a single unit type and then soft counter a second unit type.

Here is a good rule to know:

Tank > Truck > Mech > Jet > Heli > Tank

For example, a tank hard counters a truck, and soft counters a mech. Of course this pertains to when the units are the same rarity and star-rating. The chart below shows the matchups for units with average stats for star-rating 1:

			1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		
			comrn	comrn	comrn	comrn	comrn	rare	rare	rare	rare	rare	epic	epic	epic	epic	epic	legen	legen	legen	legen	legen
			tank	truck	mech	jet	heli	tank	truck	mech	jet	heli	tank	truck	mech	jet	heli	tank	truck	mech	jet	heli
1	common	tank	50.00	78.57	66.67	33.33	21.43	20.00	46.67	30.00	13.33	8.57%	8.00%	18.67	12.00	5.33%	3.43%	3.20%	7.47%	4.80%	2.13%	1.37%
1	common	truck	21.43	50.00	78.57	66.67	33.33	8.57%	20.00	46.67	30.00	13.33	3.43%	8.00%	18.67	12.00	5.33%	1.37%	3.20%	7.47%	4.80%	2.13%
1	common	mech	33.33	21.43	50.00	78.57	66.67	13.33	8.57%	20.00	46.67	30.00	5.33%	3.43%	8.00%	18.67	12.00	2.13%	1.37%	3.20%	7.47%	4.80%
1	common	jet	66.67	33.33	21.43	50.00	78.57	30.00	13.33	8.57%	20.00	46.67	12.00	5.33%	3.43%	8.00%	18.67	4.80%	2.13%	1.37%	3.20%	7.47%
1	common	heli	78.57	66.67	33.33	21.43	50.00	46.67	30.00	13.33	8.57%	20.00	18.67	12.00	5.33%	3.43%	8.00%	7.47%	4.80%	2.13%	1.37%	3.20%
1	rare	tank	80.00	91.43	86.67	70.00	53.33	50.00	78.57	66.67	33.33	21.43	20.00	46.67	30.00	13.33	8.57%	8.00%	18.67	12.00	5.33%	3.43%
1	rare	truck	53.33	80.00	91.43	86.67	70.00	21.43	50.00	78.57	66.67	33.33	8.57%	20.00	46.67	30.00	13.33	3.43%	8.00%	18.67	12.00	5.33%
1	rare	mech	70.00	53.33	80.00	91.43	86.67	33.33	21.43	50.00	78.57	66.67	13.33	8.57%	20.00	46.67	30.00	5.33%	3.43%	8.00%	18.67	12.00
1	rare	jet	86.67	70.00	53.33	80.00	91.43	66.67	33.33	21.43	50.00	78.57	30.00	13.33	8.57%	20.00	46.67	12.00	5.33%	3.43%	8.00%	18.67
1	rare	heli	91.43	86.67	70.00	53.33	80.00	78.57	66.67	33.33	21.43	50.00	46.67	30.00	13.33	8.57%	20.00	18.67	12.00	5.33%	3.43%	8.00%
1	epic	tank	92.00	96.57	94.67	88.00	81.33	80.00	91.43	86.67	70.00	53.33	50.00	78.57	66.67	33.33	21.43	20.00	46.67	30.00	13.33	8.57%
1	epic	truck	81.33	92.00	96.57	94.67	88.00	53.33	80.00	91.43	86.67	70.00	21.43	50.00	78.57	66.67	33.33	8.57%	20.00	46.67	30.00	13.33
1	epic	mech	88.00	81.33	92.00	96.57	94.67	70.00	53.33	80.00	91.43	86.67	33.33	21.43	50.00	78.57	66.67	13.33	8.57%	20.00	46.67	30.00
1	epic	jet	94.67	88.00	81.33	92.00	96.57	86.67	70.00	53.33	80.00	91.43	66.67	33.33	21.43	50.00	78.57	30.00	13.33	8.57%	20.00	46.67
1	epic	heli	96.57	94.67	88.00	81.33	92.00	91.43	86.67	70.00	53.33	80.00	78.57	66.67	33.33	21.43	50.00	46.67	30.00	13.33	8.57%	20.00
1	legendary	tank	96.80	98.63	97.87	95.20	92.53	92.00	96.57	94.67	88.00	81.33	80.00	91.43	86.67	70.00	53.33	50.00	78.57	66.67	33.33	21.43
1	legendary	truck	92.53	96.80	98.63	97.87	95.20	81.33	92.00	96.57	94.67	88.00	53.33	80.00	91.43	86.67	70.00	21.43	50.00	78.57	66.67	33.33
1	legendary	mech	95.20	92.53	96.80	98.63	97.87	88.00	81.33	92.00	96.57	94.67	70.00	53.33	80.00	91.43	86.67	33.33	21.43	50.00	78.57	66.67
1	legendary	jet	97.87	95.20	92.53	96.80	98.63	94.67	88.00	81.33	92.00	96.57	86.67	70.00	53.33	80.00	91.43	66.67	33.33	21.43	50.00	78.57
1	legendary	heli	98.63	97.87	95.20	92.53	96.80	96.57	94.67	88.00	81.33	92.00	91.43	86.67	70.00	53.33	80.00	78.57	66.67	33.33	21.43	50.00

4.3 Rarity

When opening a unit pack, the player has a chance to get a common, rare, epic or legendary unit. All unit types exist at all rarities. Damage stat ranges will be 2.5x higher than a unit 1 rarity lower. Mining stat ranges will be 1.18x higher than a unit 1 rarity lower.

Here's a table to show the average win rate vs a 1-star common and how the different rarities and star-ratings vary.

1-star	2-star	3-star	4-star	win rate vs common 1	power scalar
common 1				50.00%	1
rare 1	common 2			80.00%	2.5
epic 1	rare 2	common 3		92.00%	6.25
legendary 1	epic 2	rare 3	common 4	96.80%	15.625
	legendary 2	epic 3	rare 4	98.72%	39.0625
		legendary 3	epic 4	99.49%	97.65625
			legendary 4	99.80%	244.140625

Increasing a unit's star-rating is equivalent to going up in rarity for the damage stats.

4.4 Special Attributes

10% Plateau Bonus

All ground units get their damage stats boosted by 10% if they are the defending unit on a plateau.

Bonus Travel Distance

Units that have this attribute will be able to travel much farther than any other unit at its star-rating.

2 Attack Range, -20% while defending

Some units will be able to attack a unit 2 tiles away from them. Normally a unit has to move on top of a unit to attack it. However, their stats are lowered by 20% if they are the defender. Be sure to surround and protect this unit.

20% bonus to nearby ground/air units

These units will increase the stats of the units around them. This includes the 4 units directly north, south, east and west. The units can only be 1 tile away.

+20% while attacking, -20% while defending

These units get a 20% boost to their stats when they attack but a 20% penalty when they are defending. Be sure to protect these units.

+50% mining rate, -50% damage stats

These units mine 50% faster but are very fragile. Their damage stats have a 50% penalty.

4.5 Evolving Units to Increase Star-Rating

All units start out at 1-star. A 1-star unit can absorb two other 1-star units to upgrade to a 2-star unit. With Evolution, players select a primary unit to evolve and then select 2 units to absorb. Only units of the same type can be absorb each other. i.e. Tanks must absorb tanks, jets must absorb jets, etc. However, absorbing the exact same unit type will be better. 4-stars is the max evolution. When evolving a unit, the following occurs:

- damage stats increase
- resource mining rate increase
- travel distance increase
- access to the next map ring
 - Access to a new resource for an unlocked enhancement
 - Access to more valuable tiles for land earnings
 - Access to tiles that have a higher chance of the satellite landing
- new enhancement unlocks

Evolving a unit will increase its battle stats by 2.5x so a 4-star unit will be over 15x more powerful than a 1-star unit. The resulting unit will also keep the age of the oldest unit. Remember that older units can collect up to 4x more ETH land earnings.



4.5.1 Accessing a New Area

The biggest reason to evolve is to give your unit access to the next ring in the world. The tiles in the center are worth 12x more than the outer ring when you collect your daily land earnings. Units will also want to be in the center of the map to have the best chance at catching the daily Ethereum-rich satellite. The satellite has a 60% chance of landing in the center as opposed to the outer ring, which only has a 5% chance. Each ring also gives you access to a new resource to enhance your units.



4.5.2 Evolution Formula

Here is the formula used to determine a damage or mining stat for the evolved unit:

Resulting stat = Avg * Rand * Match * Rarity

Where Avg = average of the 3 unit stats together,

Rand = a random value between 0.97 and 1,

Match = if no unit matches the parent unit exactly this will be 0.9, if 1 unit matches this will be .94, if all units match exactly this will be 1,

Rarity = if the resulting unit 3 rarities higher than the lowest rarity this will be 0.85, if it's 2 rarities higher then this will be 0.89, if it's 1 rarity higher this will be 0.95, otherwise this is 1.

The resulting rarity is determined based on the 3 units. If there is a mix of rarities then the evolved unit's rarity has a chance to change. The table below shows the probability given the 3 input units. This is not an exhaustive table but the probabilities are symmetric and can be flipped when the inputs are flipped:

input				result			
common	rare	epic	legendary	common	rare	epic	legendary
			3				100.00%
		1	2			33.30%	66.70%
	1		2		22.20%	33.30%	44.50%
1			2	16.50%	22.20%	27.80%	33.50%
1		1	1	16.60%	27.80%	38.90%	16.70%

4.5.3 Selecting the Rights Units to Evolve

There is a lot of strategy in evolution. The ingredients matter! For the best results, players should try absorb the exact same unit with the same rarity. i.e. Legendary Stormstriker jets should try to absorb other legendary Stormstriker jets. Absorbing units of the exact same type will give your resulting unit a boost in stats. However, absorbing commons into a legendary unit will drag down your result. The resulting unit's stats are also influenced by the 3 original units. You should select units that have high desired stats. It's up to you what you want to "breed" for.

4.6 Enhancements



Every unit has a set of enhancements that can increase a unit's stats. The player spends a certain amount of resources to activate the enhancement. The enhancement then has a set of charges. These charges are spent every time the unit attacks or is destroyed. Once these charges run out, the enhancement must be repurchased with resources.

Players should be constantly mining resources to supply their units' enhancements. Every time a unit evolves, it will unlock a new enhancement. This unit will now be able to travel to the next inner ring which contains the resource needed for their new enhancement. A fully enhanced unit will be over 2x stronger!

There are 4 resource types. Each ring in the world contains a more advanced resource as you move towards the center. Resources can be mined by placing a unit on top of the resource. Every resource patch has a limited amount inside. When it is mined out, the resource will disappear. New resource patches will spawn into the world at a certain rate. There should be quite a few battles over the rarer resources. Be sure to protect your miners while they are harvesting a precious mineral!

5 Earning Ethereum

5.1 Satellite Reward



The satellite reward will reward one lucky player per day with a ton of Ethereum. Everyday a satellite drops from the sky and lands somewhere in the world. A percentage of every sale made the previous day goes to filling up that satellite with Ethereum. If that satellite lands in a player's territory, then they will win the entire amount of Ethereum for that day.

5.1.1 Claiming Territory

Players begin by deploying their units from the outer edge. The world is divided into a large grid where a single unit can fit on 1 grid square. A unit will own all the grid squares around them in a radius.

5.1.2 Rarity Matters!

Higher rarity units have a larger radius. Here are a unit's territory radius for each rarity:

- Common 10

- Rare 14
- Epic 18
- Legendary 20

When 2 opposing units have intersecting radii, they will split the territory. For a given unit, each grid square has a weight applied to it. That weight starts at 1 and drops to 0 as you move from the center to the edge of a unit's territory circle. When there are intersecting radii, a unit will own a grid square if they have the higher weight. Basically, a higher rarity unit will be able to have more territory "pushing" power since they have a larger radius. For all you mathematicians, it's a weighted Voronoi diagram!

5.1.3 Increasing your Chances to Catch the Satellite



The satellite is most likely to land in the center of the world and least likely to land on the outer edge. The world is divided into 3 rings and a circle in the center. The chances for the satellite to land in each area from the center is 60%, 25%, 10%, 5%. Getting units to the center is important! You must evolve your units to travel to the center.

5.2 Land Earnings



We know that catching the satellite will be tough. Therefore we want to provide rewards for all players. They of course, won't be as large as the Satellite Reward but should still be meaningful. All the same territory that you own for the satellite is also relevant in land earnings. Each tile that your units' own has a land value. The land value is the same numerical value as the chance that the satellite will land there. Every minute, we take a snapshot of the world. At the end of the day, we take a look at all those snapshots and figure out an average of how much a player owned throughout the day. We take this and reward the player a percentage of the previous day's sales. We basically want to figure out how well a player is doing in the game. Holding onto tiles in the center will be hard but the most valuable while holding onto tiles in the outside will have less land value.

5.2.1 Older Units are Better

A unit's age matters. Before we sum up a unit's contribution to a player's land value, we multiply that unit's land value by a scalar. That scalar grows with the unit's age. A unit can 4x their land value if they are a year old. A new unit will 1x their land value but as that unit gets older, that unit's land value scalar will grow to 4x. Once a unit is a year old, the scalar is capped at 4x. Presale units will get a great head start!

When fusing 3 units together for evolution, the resulting unit will inherit the oldest age.

5.3 Referral Bonus

We also want to reward players who invite other players directly. Players will be able to send a url to their friends. Every time their friend purchases, they will receive 5% of that purchase. This is done directly through the smart contract.

6 Team

Dan Chao, Game Design

Dan has been an engineer, producer, and game designer for console, PC and mobile games for the past 20+ years. He has built and led many teams and was the lead designer at Funzio on the multi-million dollar mobile titles: Crime City, Modern War, Kingdom Age and War of Nations. Funzio was sold to GREE in 2012 for \$210M. Prior to that, he worked on titles such as Cooking Dash, Legacy of Kain: Defiance and Tomb Raider: Legend.

Greg Maxey, Engineering

Greg has been in engineer for the past 15+ years on many successful titles including Cars, Destroy All Humans and War of Nations at GREE with Dan. He was an early engineer at OpenFeint which sold to GREE for \$104M. He also worked in the blockchain space with Eric on a mining pool.

Eric Maxey, Engineering

Eric has worked in the gaming and blockchain space since the early days. In 2013, he created a highly successful and innovative mining pool that pioneered on-the-fly coin mining. That mining pool mined over \$100M in today's value and had 10k concurrent users. Prior to that, he worked in the gaming space on titles such as the Incredibles Wii U and Family Guy: Back to the Multiverse.

Pierre Roussel, Art

Pierre was an early artist at Funzio that lent his 2D concepting skills to Crime City, Modern War, Kingdom Age and War of Nations. He has worked in gaming at Funzio, GREE, Tinyco and Juicebox. He designed and concepted all the military units in CryptoAssault and has directed the overall look.

Jack Balingit, Art

Jack is a veteran artist in the gaming space having worked at Funzio, GREE, PlayFirst and Chobolabs. An amazing concept artist, Jack has contributed to most of the prop design in CryptoAssault.

7 Links

Follow CryptoAssault here:

- Website <https://cryptoassault.io/>
- Discord <https://discord.gg/dKRpAfx>
- Medium <https://medium.com/cryptoassault>
- Twitter https://twitter.com/crypto_assault
- Facebook <https://www.facebook.com/cryptoassault/>

CryptoAssault

(白皮书 v0.11)

Rogue Nations Games

Dan Chao, dan@roquenationsgames.com

2018年11月26日

1 介绍

CryptoAssault 是一款运行在以太坊上的MMO策略游戏。玩家通过购买的战斗单位在一个大世界里战斗，以获取ETH为目标。战斗单位是符合 ERC-721 标准的通证，每个单位有独一无二的数值，并能在玩家间自由交易。

玩家可以通过策略选择、武装部队和强大的联盟来夺取领土并每天获得ETH奖励。 CryptoAssault 会是第一个所有玩家在同一个大世界里进行游戏的区块链上的MMO游戏。部队的战斗力很重要，但谋略同样重要，因为每个单位都有自己的优势和缺陷。3D地图也会对策略有重要影响。此外，联盟会是影响玩家成功的巨大因素，玩家需要加入一个强大的联盟并在联盟内获得支持。

战斗单位会在 <http://cryptoassault.io> 上通过随机开包的方式销售，但最终玩家会为了匹配并升级战斗单位而相互交易。游戏会存在宏观上的战术方向，但每个玩家会有对战斗单位的特别需求，因为他们需要升级自己理想中的部队。

游戏是一个混合了链上和链下的 dapp。战斗单位是在链上购买的 ERC-721 资产，而游戏行为发生在链下。这点保证了玩家可以在游戏内自由行动，不需要支付交易费用和等待。玩家在升级战斗单位时仍然需要支付少量交易费，因为升级时会创造一个新的 ERC-721 通证。

游戏现在已经完成了90%的功能并计划在2019年2月进行发布 Beta 版本。

2 市场需求

2.1 战斗单位的价值

玩家通过占有领土获取 ETH 奖励，奖励总额是 CryptoAssault 前一天收入的一定百分比。另外，每天会有一个幸运玩家因为领地上掉落了一个卫星而获得大量 ETH。玩家的获奖能力取决于他们用军队占据了多少领土。而玩家占据的领土数量取决于玩家的策略选择和军队实力。战斗单位的实力在 ERC-721 通证被创造出来时随机确定。战斗单位的创收能力是它们在公开市场上交易的价值所在。

2.2 购买战斗单位

战斗单位可以通过 cryptoassault.io 的网站、游戏客户端或向其他玩家购买。战斗单位也可以通过在网站或客户端随机开包的方式购买。

当购买“普通”单位包时，会有概率获得“普通”或更高级的单位：

- 普通 80%
- 罕见 15%
- 英雄 4%
- 传奇 1%

类似的权重会出现在其他单位包里，高级单位包里不会开出低级品质的战斗单位。比如“罕见”单位包里只会开出“罕见”或更高级别的单位：

- 罕见 75%
- 英雄 20%
- 史诗 5%

2.3 单位升级影响市场需求

显然拥有更强数值的单位会更受欢迎。但是，单位升级系统也对单位的需求有影响。升级一个单位会提高它的创收能力，因为它将能进入地图的更中心区域。地图被划分为4个环，靠近中心的环有更高的单位土地收入，同时会有更高的卫星降落概率。战斗单位通过吸收另外两个单位升级。单位只能吸收相同类型的单位，比如说，坦克只能吸收坦克，战斗机只能吸收战斗机。但是，如果玩家吸收型号一样的单位，升级效果会更好。这点会保证市场对战斗单位的需求有一定层次的分散。

2.4 游戏行为影响市场需求

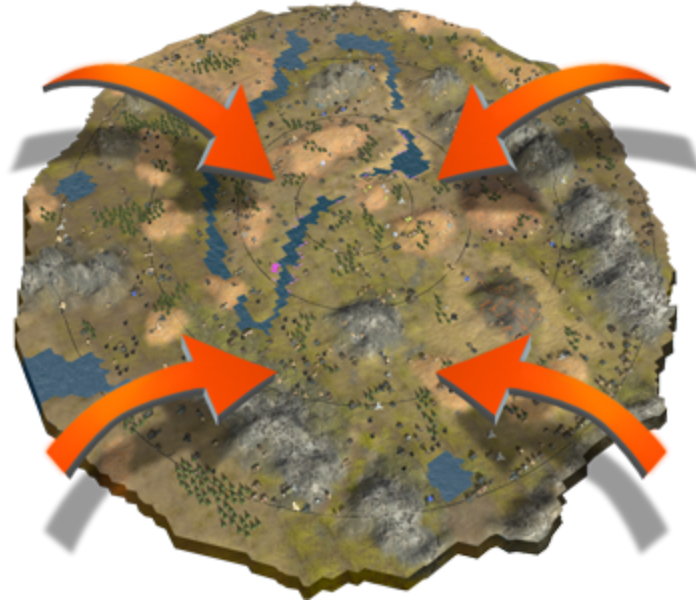
策略选择会影响玩家的创收能力。所以，地形和玩家整体的行为会影响单位的市场需求。例如，一个有很多条河的地图会提高对飞行单位的需求。如果飞行单位变得流行，机甲单位会相应的受到欢迎，因为机甲单位能针对战斗机和直升机。如果一个强大的联盟用火箭炮驻防了一个战略高地，那么飞行单位就会变得流行起来。主流战略的演化对一个持续发展的市场很关键。

3 游戏设计

3.1 概览



CryptoAssault 是一个所有玩家在同一个大世界里战斗的 MMO 策略游戏。我们期待有数百个（甚至数千个）玩家在一个世界里战斗。玩家用仓库里的军队开局。玩家点选一个自己想要占领的格子，并确定派遣哪一个战斗单位。战斗单位会从距离目标格子最近的地图边缘出发。一旦单位发生移动，他们就会有3个小时不能再行动。单位有最长移动距离。想要攻击一个敌方单位时，玩家只需要把自己的单位移动到敌方单位所在地。部队会移动到敌方位置，并在短暂的战斗动画之后反馈胜败。



3.2 部队永不死！

当一个单位输掉了战斗，他们会直接进入所有者的仓库，并在未来24小时内处于修理状态，期间无法部署。

3.3 领地

部队占有他们附近一小圈的领地。玩家通过一天中占领的总领地大小确定 ETH 收益。我们把这种收益叫做“领地收益”。此外，每天都会有一个满载 ETH 的卫星坠落在地图上。如果卫星落入了某个玩家的领地，他就会收获大量的 ETH。

3.4 世界地图



世界地图是一个网格状的圆形大陆，半径方向上有大约100个格子。地图被分成4个环形（严格地说，是3个环形和一个中心圆）。当你往中心移动时，给定格子上将能够产出更多来自“占领收益”的 ETH。卫星也更有可能会掉入靠近中心的格子。



3.5 资源

资源点会在地图上随机出现。玩家需要把单位移动到资源点上才能开始采集。单位会持续采集资源。最终资源会被采集干净，资源点从世界地图上消失。一个同样类型的资源点随后会在地图上的某个位置出现。下表展示了各个环状区域上会出现的资源数量。

资源	存在区域	资源点最大数量	可采集数量
石油	4环	58	100000
石油	3环	14	100000
铁	3环	42	100000
铁	2环	9	100000
钛	2环	28	100000
钛	中心圆	7	100000
铀	中心圆	20	100000

资源被用于强化战斗单位。

3.6 移动和寻路



一个单位可以每隔3小时移动他们的最大行动距离。他们也可以移动少于最大行动距离的里程，但这之后他们还是休息需要完整的3小时。战斗单位每次可以移动较长的距离（估计会有50到100格），但他们需要寻路。每一个格子会属于下面几个地形中的一种：

- 平原
- 山地
- 森林
- 水域.

这意味着单位在移动时会自动回避障碍物。寻路规则如下：

- 路面部队会避开其他路面单位、山地、森林和水域。
- 直升机会飞过水域、森林和路面部队，但会避开其他飞行单位和山地。
- 飞机可以飞过水域、山地、森林和路面部队，但需要避开其他飞行单位。

为了平衡，我们给飞机和直升机设定了很低的资源采集速度。玩家可以穿过他们自己的单位或者联盟成员的单位。制造屏障和保护你的弱势单位是生存的关键。玩家可以通过进化单位的方式提高单位的最大移动距离。

3.7 战斗和战斗公式

当一个玩家选择移动单位时，他们能看到这个单位跟地图上所有其他单位发生战斗时的获胜概率。玩家可以点选某个敌方单位以查看跟这个敌方单位发生战斗的获胜概率。当一个单位跟另一个单位战斗时，游戏会根据这个获胜概率确定一个胜者。以下是胜率计算公式：

$$\text{进攻者的获胜概率} = ((A - D) / (\max(A, D) + 1)) / 2$$

其中：A是进攻者的伤害 vs 防守者的单位类型

D是防守者的伤害 vs 进攻者的战斗类型

4 战斗单位

4.1 数值

一个单位的参数由几个数值组成。每个战斗单位通证都会有如下参数：

- 对坦克的伤害
- 对装甲车的伤害
- 对机甲的伤害
- 对飞机的伤害
- 对直升机的伤害
- 资源采集速度
- 生日，用来计算单位的年龄。

单位的稀有度决定了伤害和资源采集速度的范围。实际伤害和资源采集速度是给定范围内的随机数字。生日是购买日期（通证被制造出来的日期）

下列数值通过稀有度确定：

- 领地半径

下列数值由单位类型确定：

- 最大移动距离。单位提高了星级后会获得提升。
- 强化道具。单位提高了星级后解锁强化道具。
- 特别能力，比如对地面单位有20%的伤害加强。

下面是普通单位不同星级时的数值范围：

	攻击力											采集速度	
	星级	对坦克		对装甲车		对机甲		对飞机		对直升机		下限	上限
		最小值	最大值	最小值	最大值	最小值	最大值	最小值	最大值	最小值	最大值		
普通 坦克	1	44	56	61	78	52	67	35	44	26	33	70	80
普通 装甲车	1	26	33	44	56	61	78	52	67	35	44	70	80
普通 机甲	1	35	44	26	33	44	56	61	78	52	67	70	80
普通 飞机	1	52	67	35	44	26	33	44	56	61	78	1	5
普通 直升机	1	61	78	52	67	35	44	26	33	44	56	5	10
普通 坦克	2	110	140	152	195	130	167	87	110	65	82	82	94
普通 装甲车	2	65	82	110	140	152	195	130	167	87	110	82	94
普通 机甲	2	87	110	65	82	110	140	152	195	130	167	82	94
普通 飞机	2	130	167	87	110	65	82	110	140	152	195	1	5
普通 直升机	2	152	195	130	167	87	110	65	82	110	140	5	11
普通 坦克	3	275	350	381	487	325	418	218	275	162	206	97	111
普通 装甲车	3	162	206	275	350	381	487	325	418	218	275	97	111
普通 机甲	3	218	275	162	206	275	350	381	487	325	418	97	111
普通 飞机	3	325	418	218	275	162	206	275	350	381	487	1	6
普通 直升机	3	381	487	325	418	218	275	162	206	275	350	6	13
普通 坦克	4	687	875	953	1218	812	1046	546	687	406	515	115	131
普通 装甲车	4	406	515	687	875	953	1218	812	1046	546	687	115	131
普通 机甲	4	546	687	406	515	687	875	953	1218	812	1046	115	131
普通 飞机	4	812	1046	546	687	406	515	687	875	953	1218	1	8
普通 直升机	4	953	1218	812	1046	546	687	406	515	687	875	8	16

注意有些单位在文字描述里会有不同的数值。

4.2 克制关系

给定一个单位类型，它会对某一个类型强克制，对另一个类型弱克制。这里是个简单的规则：

坦克 > 装甲车 > 机甲 > 飞机 > 直升机 > 坦克

例如，坦克强克制装甲车、弱克制机甲。当然这只适用于同种稀有度和星级的情况。下表展示了1星单位在平均数值下的对战情况：

		普通坦克	普通装甲车	普通机甲	普通飞机	普通直升机	罕见坦克	罕见装甲车	罕见机甲	罕见飞机	罕见直升机	英雄坦克	英雄装甲车	英雄机甲	英雄飞机	英雄直升机	传奇坦克	传奇装甲车	传奇机甲	传奇飞机	传奇直升机
普通	坦克	50.0%	78.6%	66.7%	33.3%	21.4%	20.0%	46.7%	30.0%	13.3%	8.6%	8.0%	18.7%	12.0%	5.3%	3.4%	3.2%	7.5%	4.8%	2.1%	1.4%
普通	装甲车	21.4%	50.0%	78.6%	66.7%	33.3%	8.6%	20.0%	46.7%	30.0%	13.3%	3.4%	8.0%	18.7%	12.0%	5.3%	1.4%	3.2%	7.5%	4.8%	2.1%
普通	机甲	33.3%	21.4%	50.0%	78.6%	66.7%	13.3%	8.6%	20.0%	46.7%	30.0%	5.3%	3.4%	8.0%	18.7%	12.0%	2.1%	1.4%	3.2%	7.5%	4.8%
普通	飞机	66.7%	33.3%	21.4%	50.0%	78.6%	30.0%	13.3%	8.6%	20.0%	46.7%	12.0%	5.3%	3.4%	8.0%	18.7%	4.8%	2.1%	1.4%	3.2%	7.5%
普通	直升机	78.6%	66.7%	33.3%	21.4%	50.0%	46.7%	30.0%	13.3%	8.6%	20.0%	18.7%	12.0%	5.3%	3.4%	8.0%	7.5%	4.8%	2.1%	1.4%	3.2%
罕见	坦克	80.0%	91.4%	86.7%	70.0%	53.3%	50.0%	78.6%	66.7%	33.3%	21.4%	20.0%	46.7%	30.0%	13.3%	8.6%	8.0%	18.7%	12.0%	5.3%	3.4%
罕见	装甲车	53.3%	80.0%	91.4%	86.7%	70.0%	21.4%	50.0%	78.6%	66.7%	33.3%	8.6%	20.0%	46.7%	30.0%	13.3%	3.4%	8.0%	18.7%	12.0%	5.3%
罕见	机甲	70.0%	53.3%	80.0%	91.4%	86.7%	33.3%	21.4%	50.0%	78.6%	66.7%	13.3%	8.6%	20.0%	46.7%	30.0%	5.3%	3.4%	8.0%	18.7%	12.0%
罕见	飞机	86.7%	70.0%	53.3%	80.0%	91.4%	66.7%	33.3%	21.4%	50.0%	78.6%	30.0%	13.3%	8.6%	20.0%	46.7%	12.0%	5.3%	3.4%	8.0%	18.7%
罕见	直升机	91.4%	86.7%	70.0%	53.3%	80.0%	78.6%	66.7%	33.3%	21.4%	50.0%	46.7%	30.0%	13.3%	8.6%	20.0%	18.7%	12.0%	5.3%	3.4%	8.0%
英雄	坦克	92.0%	96.6%	94.7%	88.0%	81.3%	80.0%	91.4%	86.7%	70.0%	53.3%	50.0%	78.6%	66.7%	33.3%	21.4%	20.0%	46.7%	30.0%	13.3%	8.6%
英雄	装甲车	81.3%	92.0%	96.6%	94.7%	88.0%	53.3%	80.0%	91.4%	86.7%	70.0%	21.4%	50.0%	78.6%	66.7%	33.3%	8.6%	20.0%	46.7%	30.0%	13.3%
英雄	机甲	88.0%	81.3%	92.0%	96.6%	94.7%	70.0%	53.3%	80.0%	91.4%	86.7%	33.3%	21.4%	50.0%	78.6%	66.7%	13.3%	8.6%	20.0%	46.7%	30.0%
英雄	飞机	94.7%	88.0%	81.3%	92.0%	96.6%	86.7%	70.0%	53.3%	80.0%	91.4%	66.7%	33.3%	21.4%	50.0%	78.6%	30.0%	13.3%	8.6%	20.0%	46.7%
英雄	直升机	96.6%	94.7%	88.0%	81.3%	92.0%	91.4%	86.7%	70.0%	53.3%	80.0%	78.6%	66.7%	33.3%	21.4%	50.0%	46.7%	30.0%	13.3%	8.6%	20.0%
传奇	坦克	96.8%	98.6%	97.9%	95.2%	92.5%	92.0%	96.6%	94.7%	88.0%	81.3%	80.0%	91.4%	86.7%	70.0%	53.3%	50.0%	78.6%	66.7%	33.3%	21.4%
传奇	装甲车	92.5%	96.8%	98.6%	97.9%	95.2%	81.3%	92.0%	96.6%	94.7%	88.0%	53.3%	80.0%	91.4%	86.7%	70.0%	21.4%	50.0%	78.6%	66.7%	33.3%
传奇	机甲	95.2%	92.5%	96.8%	98.6%	97.9%	88.0%	81.3%	92.0%	96.6%	94.7%	70.0%	53.3%	80.0%	91.4%	86.7%	33.3%	21.4%	50.0%	78.6%	66.7%
传奇	飞机	97.9%	95.2%	92.5%	96.8%	98.6%	94.7%	88.0%	81.3%	92.0%	96.6%	86.7%	70.0%	53.3%	80.0%	91.4%	66.7%	33.3%	21.4%	50.0%	78.6%
传奇	直升机	98.6%	97.9%	95.2%	92.5%	96.8%	96.6%	94.7%	88.0%	81.3%	92.0%	91.4%	86.7%	70.0%	53.3%	80.0%	78.6%	66.7%	33.3%	21.4%	50.0%

4.3 稀有度

玩家在开包时有机会得到普通、罕见、英雄和传奇级别的单位。各个稀有度下有所有类型的单位。每提高一个稀有度，伤害数值范围会比低等稀有度的高2.5倍，资源采集速度的数值范围会高1.18倍。

下图展示了各个稀有度和星级的单位对战一个1星普通单位的平均胜率。

1星	2星	3星	4星	对战普通1星单位的胜率	战斗力系数
普通1星				50.00%	1
罕见1星	普通2星			80.00%	2.5
英雄1星	罕见2星	普通3星		92.00%	6.25
传奇1星	英雄2星	罕见3星	普通4星	96.80%	15.625
	传奇2星	英雄3星	罕见4星	98.72%	39.0625
		传奇3星	英雄4星	99.49%	97.65625
			传奇4星	99.80%	244.140625

提高一个单位的星级获得的伤害范围提升相当于同样星级下提高了一个稀有度。

4.4 特殊属性

10% 的高原加成

所有地面单位在高原地带作为防守方时，获得10%的伤害加成。

移动距离加强

拥有这个属性的单位能比同星级下的其他单位移动更远距离。

2格攻击距离, 防守时削弱20%

有的单位能够攻击两格之外的敌方单位。一般情况下单位必须移动到敌方单位上发动攻击。拥有2格攻击距离的单位在防守时会损失20%的攻击力。记得要保护好这些单位。

加强周边单位20%

这些单位能增强附近单位的数值，包括东南西北4格的单位。被加强单位只能相距1格。

进攻时加强20%，防守时削弱20%

这些单位在进攻时获得20%加强，但在防守时会数值会降低20%。注意保护好这些单位。

增强50%资源采集速度, 减少50%攻击力

这些单位有50%的采集速度加成，但很脆弱，他们的伤害数值会削弱50%。

4.5 进化单位能提高星级

所有战斗单位开始时都是1星。一个1星单位可以通过吸收两个1星单位进化成2星单位。在进化时，玩家选择1个主要单位来进化，并选择2个单位来吸收。只有同种类型的单位能相互吸收，例如，坦克只能吸收坦克，飞机只能吸收飞机。不过，吸收型号完全一样的单位会更好。单位最高只能进化成4星。进化时会发生如下变化：

- 攻击力增加
- 资源采集速度增加
- 移动距离增加
- 能进入下一个地图区域
 - 能采集新强化需要的新资源
 - 能进入领地收益更高的格子
 - 能进入卫星掉落概率更高的格子
- 会解锁新的强化方式

进化一个单位会让它的战斗力提高2.5倍，所以一个4星单位会比一个1星单位强大15倍。进化后的单位会保留最老单位的年龄。注意：老单位能获得4倍于新单位的领地收益。



4.5.1 进入一个新的区域

进化单位的最大动力是让你的部队能进入更靠近中心的环状区域。中心区域的格子每天能带来12倍于最外部格子的领地收益。部队想进入中心区域的另一个原因是，满载 ETH 的卫星有更大概率在中心区域掉落。最外部的区域只有5%的卫星掉落概率，而最中心区域的掉落概率高达60%。每进入1个新区域都让你能采集一种新的资源，用来增强你的单位。



4.5.2 进化公式

这个公式用来确定进化单位的攻击力和资源采集率：

进化后数值 = Avg * Rand * Match * Rarity

其中 Avg = 三个单位的平均攻击力，

Rand = 介于0.97和1之间的随机数

Match = 如果没有单位跟原单位完美匹配，这个数值是0.9；如果有1个单位完美匹配，这个数值是0.94；如果所有单位完美匹配，这个数值是1，

Rarity = 如果进化后的单位的稀有度比三个单位中最低等单位的稀有度高3个等级，这个数值是0.85；如果高2个稀有度，这个参数是0.89；如果高1个稀有度，这个参数是0.95；如果完全是一样，参数是1。

进化后单位的稀有度由3个单位一起确定。如果把稀有度不同的单位一起进化，进化后单位的稀有度有可能发生变化。下表显示了给定3个单位用于进化时，进化后单位的稀有度概率。这个表格并不完整，但这里的概率是对称的，所以调转了输入单位后，把结果部分的概率调转就可以了。

初始单位				进化后单位			
普通	罕见	英雄	传奇	普通	罕见	英雄	传奇
			3				100%
		1	2			33.30%	66.70%
	1		2		22.20%	33.30%	44.50%
1			2	16.50%	22.20%	27.80%	33.50%
1		1	1	16.50%	27.80%	38.90%	16.70%

4.5.3 选择合适的单位来进化

进化单位也有很多策略性。配方很重要！想获得最好结果的话，玩家应该选择吸收稀有度一样且型号一样的单位，例如，传奇级别的 Stormstriker 飞机应该跟另外两个传奇级别的 Stormstriker 飞机合成。吸收相同型号的单位会给进化数值一个加成。如果让一个传奇单位吸收两个普通单位，则会让进化结果变差。进化后单位的数值也受到原先3个单位数值的影响。你应该选择数值较高的单位来合成新单位。你能够决定自己想要“培育”出什么样的单位。

4.6 强化



每个单位都有一组能增强战斗力的强化选择。玩家支付一定数量的资源来激活强化。每一个强化选项都有一定充能次数。充能次数在每次单位反动进攻或被打败时发生消耗。一旦次数用完，这个强化必须用资源重新购买。

玩家应该持续采集资源以保持他们军队的强化状态。每次单位进化，都会解锁一个新的强化形式。并且这个单位能进入更中心的环形区域，新区域内会有这个新强化需要的新资源。一个完整强化的单位的战斗力会提高超过2倍！

一共有4种资源。每一个新区域都会有一种新的更高级的资源。资源采集可以通过把单位移动到资源正上方进行。每一个资源点存在有限数量的资源。当资源被采集干净，资源点就会消失。新的资源点会在地图上以一定频率出现。玩家会为了资源点而发生一些冲突。当你的军队在采集贵重资源时，记得要保护好他们！

5 赚取 ETH

5.1 卫星奖励



卫星会每天奖励一位幸运玩家大量 ETH。卫星会随机掉落到地面上的某个位置。前一天销售额的一定百分比会被装进卫星里。如果卫星降落到某个玩家的领地，他就会获取当天的 ETH 大奖。

5.1.1 争夺领土

玩家从最外围开始部署军队。世界地图被分成许多格子，1个单位可以放进1个格子，并占有其周边一定半径内的格子。

5.1.2 稀有度很重要!

稀有度高的单位有更大占领半径。下面是各个稀有度的占领半径：

- 普通 10
- 罕见 14
- 英雄 18
- 传奇 20

当2个敌对单位的领土重叠，他们会瓜分中间的领土。每个单位辐射下的领土会有一个权重。权重从单位中心到占领半径边缘逐渐降低，在单位中心是1，在单位领土范围的最外部是0。当存在领土重合时，权重高的单位会占据这块领土。基本上，稀有度高的单位会有更强的占领能力，因为他们的领土半径更大。如果有寻根究底的数学家的话，这是个加权 Voronoi 图啦！

5.1.3 增加你抓住卫星的概率



卫星有更有可能降落在地图的中心，降落在地图边缘的可能性较小。地图被划分成3个环状区域和1个中心圆。卫星降落在从中心到外环各区域的概率分别是60%，25%，10%，5%。让部队去到地图中心很重要！你必须升级你的单位才能进入中心。

5.2 领地收益



我们知道抓住卫星会很难。所以我们想让所有玩家都能获得收益。这些收益当然不会像卫星奖励那么大，但也会有意义。你获得卫星奖励的领土也能够获得领地收益。每一个你占领的格子都有领地收益。领地收益的数值跟卫星掉落概率一样。我们会每分钟对世界地图做一次快照。一天结束后，我们会通过所有的快照计算出玩家在一天中平均占据了多少领土。我们用这个数据作为奖励玩家领地收益的依据。我们希望能评估一个玩家在游戏里做得多好。在地图中心占据领土会很难，但收益也很高，相比之下，在地图边缘占据领土的收益就会比较低。

5.2.1 越老的单位越好

战斗单位的年龄很重要。在我们计算一个单位对玩家的领地收益贡献之前，我们会给这个单位的收益乘以一个常数。随着单位年龄变大，这个常数也会变大。如果单位达到1年的年龄，这个单位就会让领地收益乘以4。一个新的单位只能让收益乘以1，但随着单位越来越老，最终能够让领地收益的价值乘4。一旦单位达到了1年的寿命，这个乘数就固定在4了。所以预售的单位会让你先人一步！

当合成3个单位以进化单位时，进化后的单位会继承最老单位的年龄。

5.3 推荐奖励

我们也想鼓励直接邀请了其他玩家的玩家。玩家可以把一个URL发送给他的朋友。每次他的朋友购买时，他就能获得购买数额5%的收益。这点直接通过智能合约实现。

6 团队

Dan Chao, 游戏设计师

Dan 有20多年的行业经验，曾经作为工程师、制作人和游戏策划为主机、PC和移动游戏开发游戏。他曾经组建和领导了许多团队。他曾在 Funzio 担任若干款数百万美元级游戏的首席设计师，这些游戏包括：Crime City、Modern War、Kingdom Age 和 War of Nations。Funzio 在2012年以2.1亿美元的价格被 GREE 收购。在那之前，他曾经参与过的游戏包括：Cooking Dash、Legacy of Kain: Defiance 和 Tomb Raider: Legend。

Greg Maxey, 工程师

Greg 作为游戏开发工程师有15年以上的经验，曾经在 GREE 公司与 Dan 合作过 Cars、Destroy All Human 和 War of Nations 等成功的产品。他曾作为早期成员为 OpenFeint 工作过，OpenFeint 日后被 GREE 以1亿美元收购。他也在区块链行业的公司与 Eric 共事过。

Eric Maxey, 工程师

Eric 从很早开始涉足了游戏和区块链行业。在2013年他就创立一个成功的创新矿池，在技术上是即时矿池的先行者。这个矿池后来挖掘了市值超过1亿美元的加密货币，曾有超过1万同时在线用户。在那之前，他曾经在游戏行业开发过的产品包括 Incredibles Wii U 和 Family Guy: Back to the Multiverse。

Pierre Roussel, 美术设计师

Pierre 是 Funzio 的早期美术设计师，他曾经为 Crime City, Modern War, Kingdom Age 和 War of Nations 贡献自己的 2D 才能。他还曾为 Funzio, GREE, Tinyco 和 Juicebox 的游戏开发工作。他构思和设计了 CryptoAssault 里的所有战斗单位并确定了整体的美术风格。

Jack Balingit, 美术设计师

Jack 有多年游戏美术设计经验，曾为 Funzio, GREE、PlayFirst 和 Chobolabs 工作。作为一个出色的概念设计师，Jack 是 CryptoAssault 的道具设计的主力人物。

7 链接

了解更多关于 CryptoAssault 的信息：

- 网站 <https://cryptoassault.io/>
- Discord <https://discord.gg/dKRpAfx>

- Medium <https://medium.com/cryptoassault>
- Twitter https://twitter.com/crypto_assault
- Facebook <https://www.facebook.com/cryptoassault/>