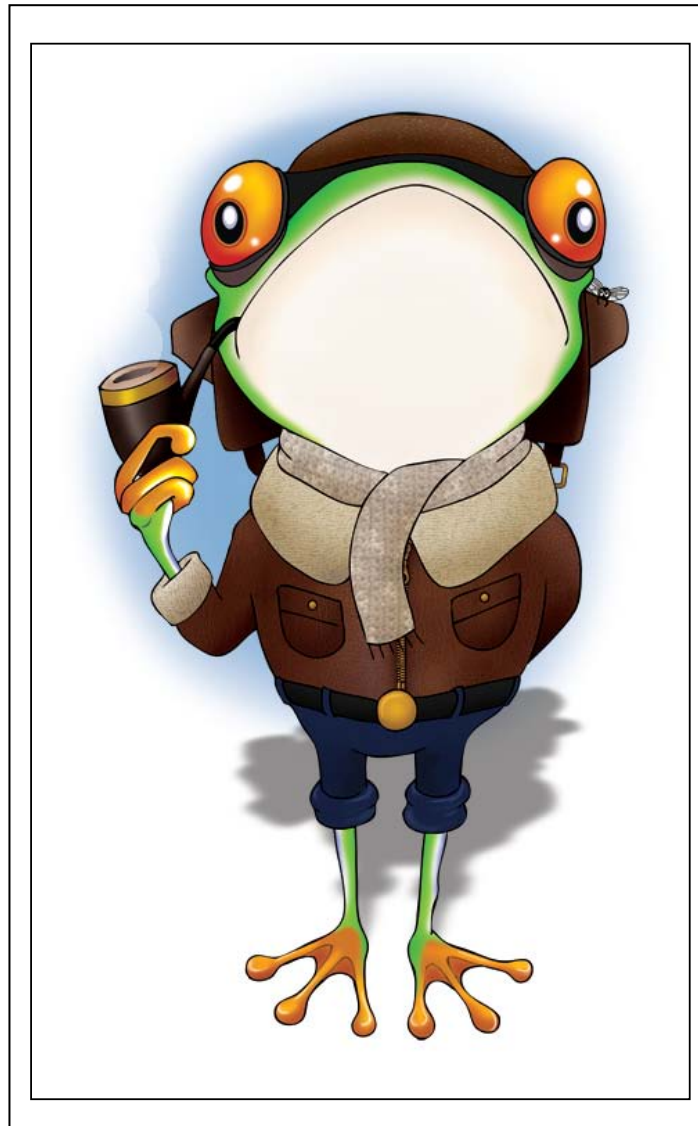


# CODE NAME: CROAKE



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## INTRODUCTION

## GAME SUMMARY



Codename: Croake is a vehicular shooter where the player has to fight their way through waves of enemies. In between the waves the player is given the opportunity to upgrade their ship with various components to prepare for the next stage.

The game executable can be downloaded from [http://www.designogre.com/Codename\\_Croake.exe](http://www.designogre.com/Codename_Croake.exe) .

## BACKGROUND STORY (BY ALEX WRIGHT)

Devolved by pollution and too swift mechanization, the surface of the world has been scarred and blackened, forcing the population to move into the sky. A scant few remain on the surface, either carrying out risky mining work for the fuels that power all of the worlds engines, or engaging in nefarious purposes of their own. A small group of renegades protect this world, flying off on daring missions in their fabulous airships. This group is known as the Merciel Alliance, and its greatest hero is one frog, known only by his secret identity. He is Codename: Croake!

Croake normally operates in the Western sky region, but adverse weather conditions and severe engine problems have led to Croake ending up stranded in the Eastern Sky area. On picking up some gossip at

Eastern Sky Station Primus, Croake realizes that something is very wrong in the region, and makes it his mission to investigate the trouble.

## GAME FEATURES

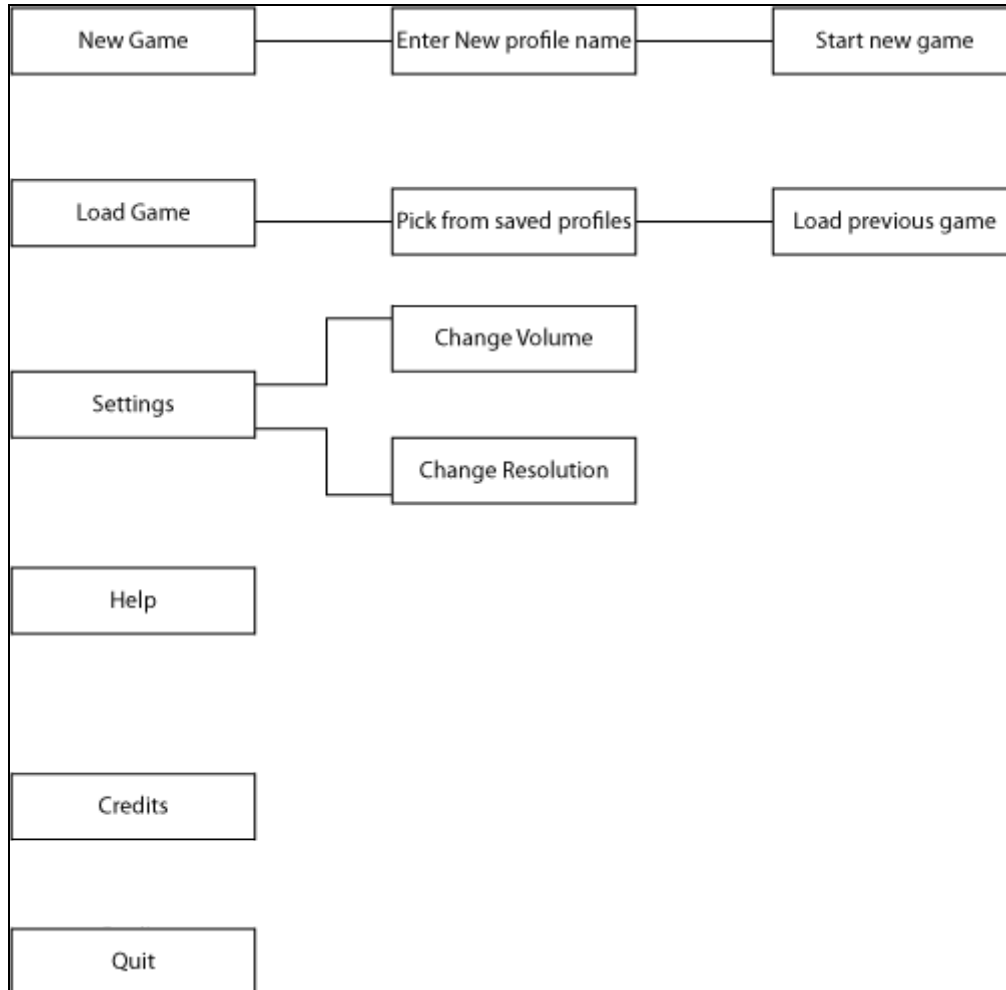
- Intense Vehicular combat with multi-directional shooting.
- Supports both keyboard and the Xbox 360 gamepad, for players more comfortable with console games.
- Ship customization.
- Unique and distinctive art style.

## OBJECTIVES

- Defeat all the enemies on the screen to finish the Level
- Play through 8 action packed levels to face off against the final boss.

## FRONT END

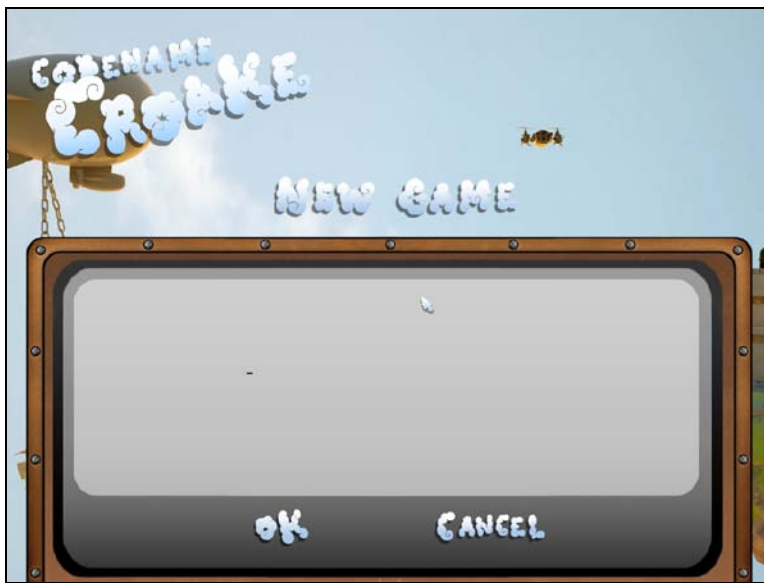
The Front end structure is as follows-



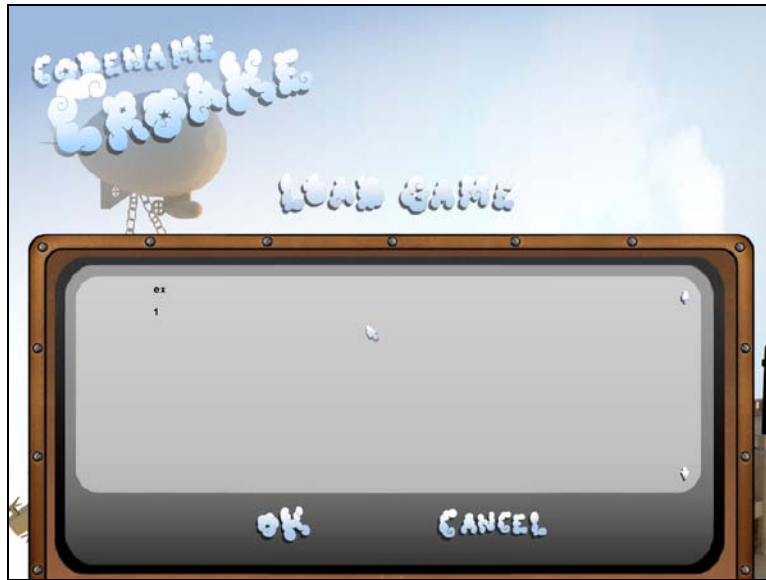
MAIN MENU



NEW GAME



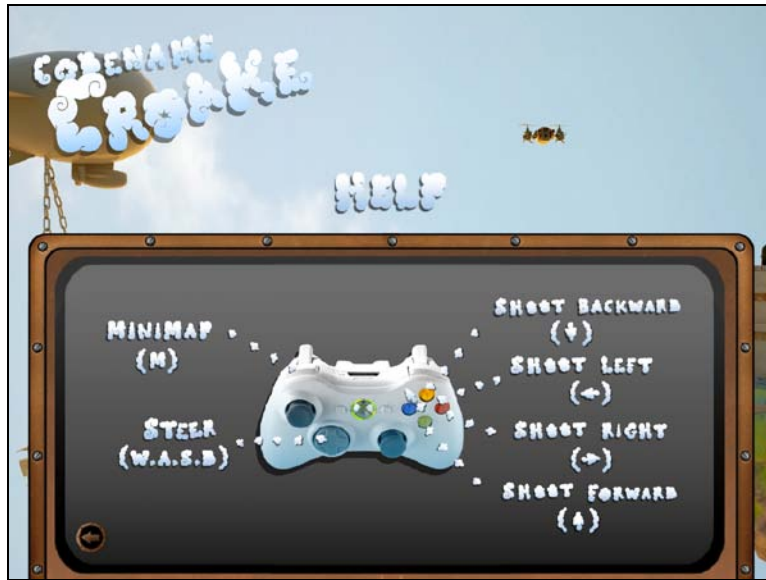
## LOAD GAME



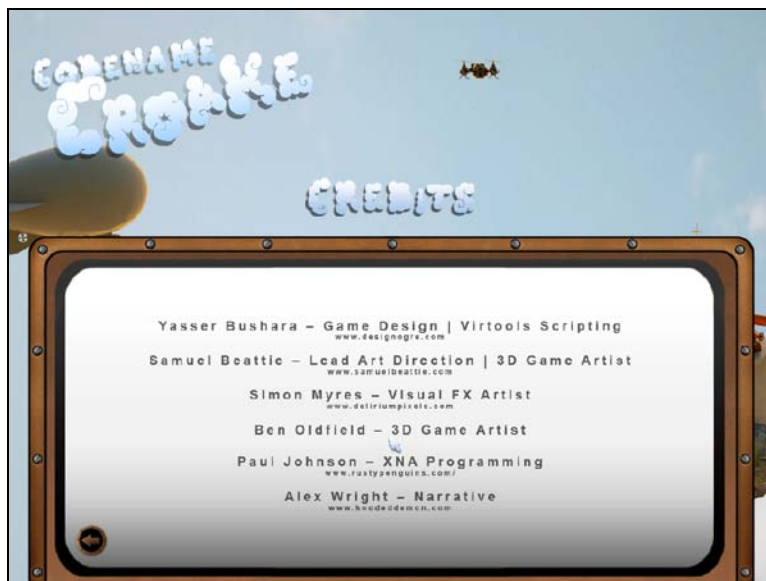
## SETTINGS



## HELP



## CREDITS



## CUSTOMIZATION

Ship customization gives the player the ability to play the game in different ways and to customize their ship to better suit their play style. Players can opt for weapons that require greater skill to use, in turn dealing more damage, or easier weapons that require less aiming but do less damage. The same applies for the chassis options, the slow speed and maneuverability of the large vessel is balanced out by its extra health and firepower.



To keep things simple and user friendly, players are presented with a top trumps style stat overview of the current ship which displays the ships speed and total firepower.

## WEAPONS

### WEAPON LIST

There are three basic types of weapons in the game; each with a very different effect to provide players with variety on how they equip their vessels.

The player can choose from the regular “cannon” type weapons which have a slow fire rate but deal a lot of damage when the cannon ball collides, these weapons require a bit of aim to hit their target and are meant for players who like to “snipe” their enemies.

Another option are the machine gun type weapons which have a fast fire rate but the individual shots don’t do as much damage, these are good for players who like to fire a stream of bullets at their opponents over a period of time rather than rely on a single shot like with the cannon.

Alternatively the player can opt for the splash damage weapons which explode on proximity to the enemies doing damage to any within range. These act like Flak shells and have two advantages over the other two types of weapons, firstly they can damage more than one enemy at a time (splash damage) , secondly they blow on proximity so don’t require as much aiming. To balance the strength of this type of weapon it has certain drawbacks, the damage done decreases the further away the enemy is from the center of the splash and the fire rate is equivalent to the rate of the cannon type weapons.

On the following page are the weapons available to the player in the game along with a brief description (In game descriptions by Alex Wright).

---

## LEVEL 1 WEAPONS

---

### BARREL GUN



#### Effect -

This weapon fires a steel barrel that explodes on proximity to enemy ships, damages all enemy ships nearby.

#### In Game Description -

'Anyone in proximity to you, won't be for too long' - That is the tagline for the main product from the Northern trading company's Boom in a box line of offensive weaponry. Fill a barrel with explosives, drop in a BIAB proximity fuse, and fire!

---

## ORGAN GUN



### Effect –

This weapon fires a stream of lead shots at enemies. Individual the shots don't do as much damage as a cannon but the rate of fire makes up for its short comings.

### In Game Description –

Invented by failed musician Leonardo "Ribald" Quinn, the organ gun is based on the design of the pipe organ. Leonardo would play at all hours of the day and night, and his mother would describe his music as being like an offensive weapon.

---

## STEAM CANNON



### Effect –

This weapon fires a lead ball at the enemy causing large amounts of damage on impact.

### In Game Description –

Steam Cannon - Friend of pirates and pioneers alike, the steam cannon keeps many a sky trader company at night. Some began to give the guns nicknames as they spent so much time with them, leading to them commonly being called 'the lady' by older skymen.

---

## LEVEL 2 WEAPONS

---

### FLAK CANNON



#### Effect -

This weapon fires a Flak Shell that explodes on proximity to enemy ships, damages all enemy ships nearby.

#### Description -

'For a ripping good time, add a can of Flak' - The Northern trading company's tagline for their Flakinacan product. But this product line began to drop in popularity once people realized they could just add nuts, bolts and other junk.

---

## GATLING GUN



### Effect –

This weapon fires a stream of lead shots at enemies.

### Description –

Based on the organ gun, some unknown engineer placed the barrels in a circular design for more efficiency. Due to the tighter focus, some highly skilled gunners have been known to fire their name into the side of a ship in bullet holes.

---

## MAGNETRON CANNON



### Effect –

This weapon fires a large lead ball at the enemy causing large amounts of damage on impact.

### Description –

One of the most fearsome weapons known in the skies. The distinctive noise of the magnetrons warming up is known to sound like the cry of a particular species of eagle, leading to many a false alarm during mating season.

---

## LEVEL 3 WEAPONS

---

### SPIKE GUN



#### Effect -

This weapon fires a stream of metal spikes at enemies. The spikes are larger than the led shots in both the Gatling gun and the organ gun.

#### Description -

Developed from Brun Mcalpin's original design, the gun was originally a tool for building ships faster. However, the tool was too strong and instead of firing spikes into the wood to hold it together, it blew a hole through the side of the ship...and Brun.

---

## HARPOON CANNON



### Effect –

This weapon fires a large harpoon at the enemy causing large amounts of damage on impact.

### Description –

Fishermen had been using the harpoon for years, but it wasn't until an attack by the Dread Pirate Roberts that its use as a weapon was fully realised. The projectile snapped the mast which subsequently fell over and crushed half of the pirate crew.

---

## MINE LAUNCHER



### Effect –

This weapon fires a mine that explodes on proximity to enemy ships, damages all enemy ships nearby.

### Description –

'If your launcher isn't working, why not try mine' - The latest NTC innovation is an all-in-one product that requires no extra parts. Simply pop a BIAB mine into your cannon and fire. No fuss, no mess...except for the scattered debris of your enemies.

## WEAPON VARIATIONS

The game has [nine](#) standard weapons. Each weapon has 4 variants creating a total of 36 in game weapons for the player to use.

### Regular

No change, just the regular version.

### Incendiary

The ammunition is coated in a burning substance. If a weapon takes away  $x$  amount of health from a target (damage) then an incendiary version will apply  $x$  damage per second for two seconds after the hit in the form of burning damage. This effect is not stackable and the two second timer on the burn is reset back to zero if the target is hit again with an incendiary weapon while burning, the burn will continue until the timer reaches the required two seconds. If more than two incendiary weapons strike the enemy in that time frame the last hit's damage value will be used for the subsequent 2 seconds.

### Teslatized

The ammunition is charged with static. There is a chance that the target will get electrocuted for 2 seconds. Electrocutation doesn't do any damage but instead prevents the target from moving or firing its weapons (Stunned). The chance depends on the rate of fire i.e.  $(30/\text{rate of fire})\%$  chance of electrocution.

### Motorized

The gun has a fast(er) motor attached to improve reloading speed. Increases existing rate of fire by 50%. For the purpose of calculating the damage the rate of fire is modified only after the weapon's damage stat is calculated (See [stat](#) section for damage formula).

The Organ gun, Gatling gun and Spike gun are the fast weapons in the game. Their individual shots are weak but due to their high rate of fire they do as much damage as the other weapons at their respective levels. The fast guns are good for focusing fire on an enemy. A decent aim is required but a few missed shots won't have too great an effect.

The Steam Cannon, Magnetron Cannon, and Harpoon Cannon are slow guns. They require a good aim but the benefit is they deliver a lot of damage in a single shot.

The Barrel Gun, Flak Cannon, and Mine Launcher are also slow weapons but they have the advantage of doing splash damage. Due to the fact they explode on proximity instead of colliding with the target they don't do as much "real" damage as the other weapon types. The damage they do degrades the further away the target is to the center of the explosion. These weapons are useful for groups of ships as they can damage more than one ship at a time, they also make aiming a lot easier as the player doesn't have to target the enemy perfectly due to the proximity fuse.

## WEAPON STATS

This section gives an in depth explanation of the various stats and how they affect the weapons in the game.

### THE BASE GUN

Base Stats-

$$\text{Level} = \text{Bl} = 0$$

$$\text{Slow Rate of fire} = \text{Bsr} = 1 \text{ shot/second}$$

$$\text{Radius of Splash (for splash damage weapons)} = r = 40\text{m}$$

### BASE GUN'S DERIVED STATS

$$\text{Fast Rate of fire} = fr = \text{Bsr} * 10 = 10 \text{ shots/second}$$

$$\text{Damage done with each shot with a fast weapon} = d = \text{Bl}/fr * 10$$

$$\text{Damage done with each shot with a slow weapon} = d = \text{Bl}/\text{Bsr} * 10$$

The damage done by splash damage weapons degrade the further away the objects are from the center of the explosion. To get the correct damage we use -

$$\text{Splash damage} = d = d/r * (r - \text{distance from center of splash})$$

In this formula the “distance from center of splash” is the distance between the center of the object and the center of the splash. All “bullets” that do splash damage have a proximity fuse as Flak shells would and explode when in range of 30m from enemies; the following page contains an illustration describing the two possible situations with splash damage in the game.

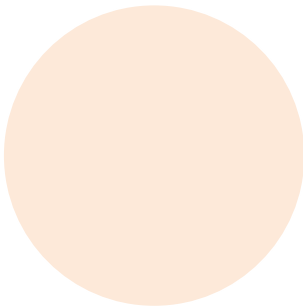
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## SPLASH DAMAGE

Proximity (30m)



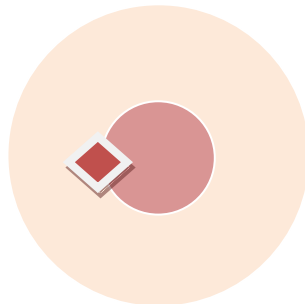
Splash Damage (80m)



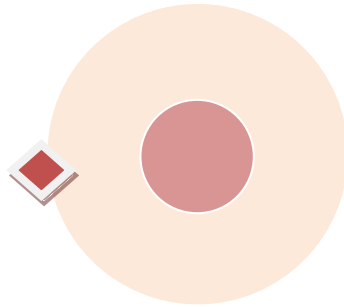
Enemy Ship



In the first splash damage scenario the enemy ship's center is within the damage radius, this could be either because it was this enemy itself that triggered the flak shell or it was another enemy ship near to it.



In the second splash damage scenario the enemy ship's center is outside the blast radius but part of its body is within. This could occur because another enemy ship triggered the proximity fuse on the flak shell while this enemy was just on the boundary of the damage radius, or because although this enemy triggered the proximity fuse, it is so large that its center is still outside the blast radius (as in the case of the Octobot final boss)



In the second scenario the “distance from center of splash” is always set to a value of 79 which would cause a low amount of damage, the reasoning behind this is that if the center of the object is outside of the splash damage area it is expected that the majority of its body would be outside. This makes the final battle with the Octobot boss more challenging as its outstretched tentacles trigger the proximity fuse on flak shells before they get near to the main body forcing the player to engage the boss from close or with different weapons.



## WEAPONS SPREADSHEET

Sub-Weapon type	Weapon Name	Level	Health per shot (d)		Shots per second	Health/second (average)	Radius of Splash
			0	1			
Regular	Barrel Gun	1	10	1	10	10	80
Incendiary	Incendiary Barrel Gun	1	10	1	10	10	80
Teslatized	Teslatized Barrel Gun	1	10	1	10	10	80
Motorized	Motorized Barrel Gun	1	10	1.5	15	15	80
Regular	Organ Gun	1	1	10	10	10	n.a.
Incendiary	Incendiary Organ Gun	1	1	10	10	10	n.a.
Teslatized	Teslatized Organ Gun	1	1	10	10	10	n.a.
Motorized	Motorized Organ Gun	1	1	15	15	15	n.a.
Regular	Steam Cannon	1	10	1	10	10	n.a.
Incendiary	Incendiary Steam Cannon	1	10	1	10	10	n.a.
Teslatized	Teslatized Steam Cannon	1	10	1	10	10	n.a.
Motorized	Motorized Steam Cannon	1	10	1.5	15	15	n.a.
Regular	Flak Cannon	2	20	1	20	20	80
Incendiary	Incendiary Flak Cannon	2	20	1	20	20	80
Teslatized	Teslatized Flak Cannon	2	20	1	20	20	80
Motorized	Motorized Flak Cannon	2	20	1.5	30	30	80
Regular	Gatling Gun	2	2	10	20	20	n.a.
Incendiary	Incendiary Gatling Gun	2	2	10	20	20	n.a.
Teslatized	Teslatized Gatling Gun	2	2	10	20	20	n.a.
Motorized	Motorized Gatling Gun	2	2	15	30	30	n.a.
Regular	Magnetron Cannon	2	20	1	20	20	n.a.
Incendiary	Incendiary Magnetron Cannon	2	20	1	20	20	n.a.
Teslatized	Teslatized Magnetron Cannon	2	20	1	20	20	n.a.
Motorized	Motorized Magnetron Cannon	2	20	1.5	30	30	n.a.
Regular	Mine Launcher	3	30	1	30	30	80
Incendiary	Incendiary Mine Launcher	3	30	1	30	30	80
Teslatized	Teslatized Mine Launcher	3	30	1	30	30	80
Motorized	Motorized Mine Launcher	3	30	1.5	45	45	80
Regular	Spike gun	3	3	10	30	30	n.a.
Incendiary	Incendiary Spike gun	3	3	10	30	30	n.a.
Teslatized	Teslatized Spike gun	3	3	10	30	30	n.a.
Motorized	Motorized Spike gun	3	3	15	45	45	n.a.
Regular	Harpoon Cannon	3	30	1	30	30	n.a.
Incendiary	Incendiary Harpoon Cannon	3	30	1	30	30	n.a.
Teslatized	Teslatized Harpoon Cannon	3	30	1	30	30	n.a.
Motorized	Motorized Harpoon Cannon	3	30	1.5	45	45	n.a.

The weapon spreadsheet contains a column representing damage done over time

$$\text{Damage per second with a fast weapon} = f \cdot d$$

$$\text{Damage per second with a slow weapon} = B \cdot s \cdot d$$

Damage per second is a useful tool to measure how powerful a weapon is as opposed to damage per shot, as damage per shot does not take into account the rate of fire. However, damage per second does have two shortcomings, namely it doesn't take into account the degradation of damage over distance for splash damage weapons, along with the extra damage done over time by incendiary weapons. It is a stat tweak tool though and plays no part in the actual weapons implementation within the game.

---

## EXAMPLES

To get the values of the other weapons we simply change the base level (**Bl**) to whatever level the weapon is at.

---

### E.G.1 BARREL GUN

The player buys a Barrel Gun that deals splash damage. Being a Barrel Gun it uses **Bsr** (1) for its rate of fire. It is picked up fairly early in the game so it is a level 1 weapon.

$$\text{Level} = l = 1$$

$$\text{Radius of Splash} = 40 \text{ meters}$$

$$\text{Damage of each shot at center of splash} = l / \text{Bsr} * 10 = 10 \text{ health points}$$

$$\text{Damage taken by ships 10 meters from center of explosion} = (10/40) * (40-10) = 7.5 \text{ health points}$$

---

### E.G.2 ORGAN GUN

The player buys an Organ Gun. Being an Organ Gun it uses **fr** (10) for its rate of fire. It is picked up fairly early in the game so it is set to be a level 1 weapon.

$$\text{Level} = l = 1$$

$$\text{Radius of Splash} = \text{n.a.}$$

$$\text{Damage of each shot} = l / \text{fr} * 10 = 1 \text{ health points}$$

---

### E.G.3 STEAM CANNON

The player buys a Steam Cannon. Being a Steam Cannon it uses **Bsr** (1) for its rate of fire. It is picked up fairly early in the game so it is set to be a level 1 weapon.

$$\text{Level} = l = 1$$

$$\text{Radius of Splash} = \text{n.a.}$$

Damage of each shot =  $1 / \text{Bsr} * 10 = 10$  health points

There is no splash as the weapon does damage on impact so the full amount of damage is done every time.

---

## CONCLUSION

The damage done by the Organ Gun seems like a smaller amount than the Steam Cannon but the rate of fire makes up for it. If the player shoots the weapon at an enemy ship for a second (Damage per second) they rack up 10 points of damage. Firing the Steam Cannon would deal the same amount over a second. It all comes down to how the player wants to play the game.

---

## NOTE ABOUT PROXIMITY

Although in terms of game play only the splash damage weapons' shells blow on proximity, in reality proximity checks are done for all weapon's "bullets". This is done to avoid having to use collision tests which would cause frame rate issues as a bullet could pass through another object in between frames and would go undetected. The proximity radius for non splash damage weapons is set much lower (5 m).

## CHASSIS

The weapons have the most stats and calculation associated with them. In comparison the chassis types are far simpler and only have a few stats. The chassis have two base stats -

$$\text{Level} = \text{BI} = 0$$

$$\text{Weight} = \text{predefined constant (either 2000, 5000 or 10,000 kilograms)}$$

Unlike the weapons, not all the other stats are derived from the base stat's, instead look up tables are used in certain situations (see below).

## WEIGHT

The weight of the ship has two roles in the game, it determines the movement of the ship and as its directly proportional to the size of the ship, it determines the maximum damage it can take (health). There are three size groups in the game, namely small, medium and large. Below are the weights of the chassis size groups.

Chassis Size	Weight (in kg)
Small	2000
Medium	5000
Large	10,000

---

## WEIGHT'S RELATION TO MOVEMENT

The movement of the ship consists of linear speed and its rotational speed.

---

### LINEAR SPEED

In Virtools the linear speed is determined by the impulse applied to the ship in that direction. To avoid large differences in the speeds of the ships the impulse is selected from a tweaked table based on the level of the engine used and the chassis size. Please see following table (repeated in the "Engines" section).

In kg*m/s	Small	Medium	Large
Level 1	200	125	55
Level 2	225	150	65
Level 3	250	175	80
Level 4	275	200	100
Level 5	300	225	125

---

#### ROTATIONAL SPEED

Rotational speed is determined in a similar fashion to linear speed. Instead of an impulse a torque is applied. Below is the selection table for the rotation.

In n/(m*m)	Small	Medium	Large
Level 1	55	40	25
Level 2	57.5	42.5	27.5
Level 3	60	45	30
Level 4	62.5	47.5	32.5
Level 5	65	50	35

---

## HEALTH

Health is derived from the weight (size) of the chassis. The health is obtained through the following formula-

$$\text{Health} = \text{Weight}/5$$

The lower health of the smaller ships is balanced out by their faster movement and agility. Health is always replenished at the start of a new stage.

## HARD-POINTS

Not directly a stat but more a ship layout, nevertheless has a major impact on how the player uses the ship. The hard points are placed on the chassis by the artists in various configurations and allow the player to attach weapons to it. Generally the more hard-points the better as it means more firepower and damage dealing potential. Hard point placement is determined primarily based on aesthetics but as a rule of thumb the bigger the ship the more hard points available.

## ENGINES

The engines, along with the chassis weight determine the ships movement, there are five types of engines in the game. Below are the tables that can also be found in the chassis weight section. The higher the level of the engine the faster the ship moves and turns.

---

### IMPULSE

In kg*m/s	Small	Medium	Large
Level 1	120	60	30
Level 2	135	75	37
Level 3	150	90	44
Level 4	160	105	51
Level 5	170	120	60

---

### TORQUE

In n/(m*m)	Small	Medium	Large
Level 1	30	20	10
Level 2	32.5	22.5	12.5
Level 3	35	25	15
Level 4	37.5	27.5	17.5
Level 5	40	30	20

## ENEMIES

Enemies in Codename: Croake come in three varieties. Similarly to the player ships there are small, medium and large enemy ships. Each category has different levels with level 1 having the weakest weapons and lowest health and level 4 having the strongest and highest. With four levels of enemies in the game and each containing 3 sizes the total number of enemies is twelve excluding the final boss. All stats discussed in this section exclude the final boss which is a special case.

## ENEMY HEALTH

Small enemy ship =  $10 \times \text{level}$

Medium enemy ship =  $10 \times \text{level} \times 2$

Large enemy ship =  $10 \times \text{level} \times 4$

Based on the above figures a level 1 cannon that does 10 damage takes two shots to kill a medium sized level 1 enemy, it takes 4 for a large level 1 enemy and 1 for a small level 1 enemy.

## ENEMY WEAPON(S)

The damage done by the enemy ships' weapons is calculated in the same manner as the [player's weapons](#), but instead of using the level of the weapons the level of the enemy ships themselves are used for the calculation.

Ships of the same size use the same type of weapon irrespective of level. The small ships have collision based slow weapons (e.g. steam cannon), the medium ships have machine gun type weapons and the large ships have the splash damage weapons (e.g. flak cannon). They all use the regular version, the only enemy that has a non regular weapon is the Octobot which uses incendiary guns.

## ENEMY MOVEMENT

Enemy movement is not determined the same way as the player's movement. Instead of using a table the movement is determined by its weight through Virtool's physics engine. All enemy ships have the same amount of impulse and torque applied, but have differing weights. The weights for small, medium and large ships are the same as the player chassis (i.e. 10000 kg, 5000 kg and 2000 kg respectively), and since the enemies have no engines affecting their movement all enemies of the same size have the same movement speed irrespective of level.

## ENEMY AI

The enemies' A.I. is divided into two sections; the first section controls its movement, the second its gun firing. Both sections use rule sets that determine the enemies' actions with conditions. The terms below are used to describe the enemy ships' conditions-

Home: This is the position where the enemy ships start of and return to.



Patrol area: This is a circular area that the enemy ship is confined to; it can chase the player until the edge of this area.



Engage area: This is a circular area around the enemy ship. Once the player is within this area the enemy ship will engage the player.



Shot range: This is a circular area around the enemy ship. Once the player is within this area the enemy ship will start firing its guns.



Enemy Ship: The enemy ship itself



Player Ship & Nearest Available Attack Position (NAAP from here onwards): The player's ship is surrounded by a 5 by 5 grid of points that moves with the player. When an enemy engages the player it is allocated the nearest point to move to. Each attack position can be used by only one enemy ship at a time thus limiting the number of enemies that can attack at once to 24 (center grid spot reserved for the player ship itself). The grid covers most of the screen so more than 24 would be unnecessary.



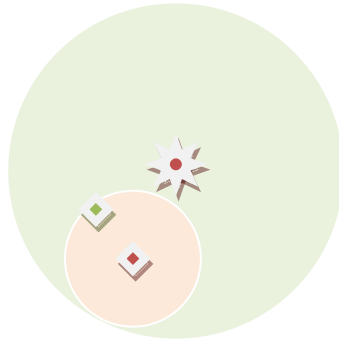
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## MOVEMENT

The Enemies movement is based on a simple rule set that uses conditions based mainly on positioning. An Enemy ship can have four states (and further sub states) depending on its conditions. The rule set would not allow an enemy ship to have more than one state at a time.

---

### STATE (1) PLAYER SHIP INSIDE PATROL AREA AND INSIDE ENGAGE AREA



Actions-

- Allocate enemy ship the NAAP
- Lock allocated NAAP to prevent other ships from getting it.

Description-

The player is in the enemy ships engage area so will be attacked. The enemy ship is allocated an attack position (provided one is available) to move toward. As long as the enemy is in this state it will try to remain in its attack position by moving towards it.

This state has two sub states

---

#### STATE 1.1 ENEMY IS NOT "NEAR" ITS ALLOCATED ATTACK POSITION

Actions-

- Turn to face attack position
- Move toward attack position

#### Description-

The enemy ship is not near to its allocated attack position either because it hasn't gotten near enough after beginning to engage the player or because the player has a faster ship and moved further away. The enemy will turn towards its attack position and move towards it. "Near" in this case is a couple of meters in the game.

#### STATE 1.2 ENEMY IS "NEAR" ITS ALLOCATED ATTACK POSITION

---

#### Actions-

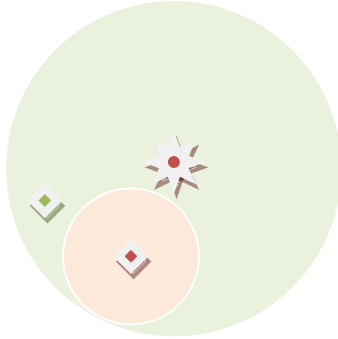
- Turn to face player
- Move toward attack position

#### Description-

The enemy ship is near to its allocated attack position so will turn towards the player while trying to remain in the attack position even while the player is moving. This will involve a bit of side strafing to maintain the position.

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## STATE (2) PLAYER SHIP IS OUT OF ENGAGE AREA



### Actions-

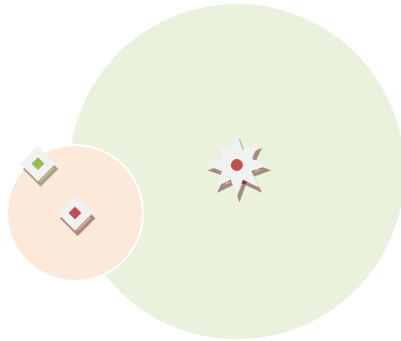
- Un-allocate the NAAP from the enemy ship (i.e. if one was allocated in the first place)
- Unlock NAAP to allow other ships to get it. (i.e. if one was allocated in the first place)
- Turn to face home
- Move to Home

### Description-

The player has either left the enemy ship's engage area or has never entered it, so will not be attacked. The enemy ship will go/stay home and ensure it is not using any attack positions.

---

### STATE (3) PLAYER SHIP OUTSIDE PATROL AREA BUT WITHIN ENGAGE AREA



#### Actions-

- Turn towards Player

#### Description-

The enemy ship has followed the player out of its patrol area but the player is still within shooting range. The enemy ship will hold its current position and keep facing the player. This would be a border skirmish behavior where neither side wants to retreat or move into the other's territory.

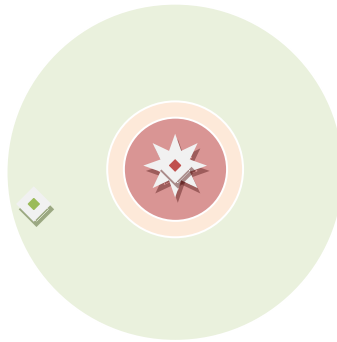
---

## GUN FIRING

The rule set that controls the enemies' shooting is simpler than the movement's rule set, the only two actions available are turning the guns on and off. The movement AI takes care of the aiming as the enemies' guns are always forward pointing, additionally the bullet directions are randomized between a threshold of fifteen degrees left and right to stop the enemies from having pinpoint accuracy.

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### STATE (1) PLAYER SHIP OUT OF SHOT RANGE



Actions-

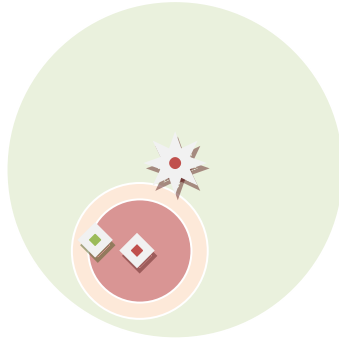
- Turn Guns Off

Description-

The player is out of the enemy ship's shot range so guns turned off.

---

## STATE (2) PLAYER SHIP IN ENGAGE AREA BUT ENEMY SHIP NOT FACING PLAYER SHIP



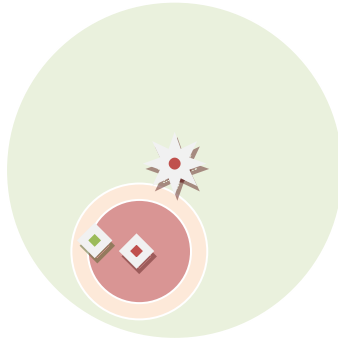
### Actions-

- Turn Guns Off

### Description-

The player is in the enemy's engage area but the enemy ship is not facing the right way so guns are turned off.

STATE (3) PLAYER SHIP IN ENGAGE AREA AND ENEMY SHIP FACING PLAYER SHIP



Actions-

- Turn Guns On

Description-

The player is in the enemy's engage area and the enemy ship is facing it so guns are turned on.

## THE OCTOBOT

The Octobot is the final boss of the game and uses its own A.I. and has different stats from the other enemies.

## MOVEMENT, SHOOTING AND A.I.

The Octobot's A.I. is actually much simpler than the other enemy ships. It has two states for its movement –

- The player is 300 m (or more) away from the Octobot
  - Turn towards the player
  - Move towards the player
- The player is less than 300 m away from the Octobot
  - Play arm retracting animation
  - Start rotating around on axis

Due to its heavy weight and high speed it builds up quite a lot of momentum, often ramming into the player. The player can't out run it, but it can easily out maneuver it. The movement of the Octobot is controlled using Virtool's physics engine in the same ways as the other ships. Unlike the other ships however it uses a much greater amount of impulse to move ( five times as much) which enables it to build up a lot of speed.

The Octobot's guns are firing all the time and hitting the player with a stream of cannonballs as it passes by. The player can stop the Octobot's movement with teslatized weapons but its guns would continue to fire. The cannon balls are all incendiary so will also deal the standard incendiary damage to the player. The gun is a level 10 weapon with a fast rate of fire, so the damage each shot deals would be –

$$\text{Level} = l = 10$$

$$\text{Radius of Splash} = \text{n.a.}$$

$$\text{Damage of each shot} = l/\text{fr} * 10 = 10 \text{ health points} + \text{an additional } 20 \text{ health points fire damage over } 2 \text{ seconds.}$$

## HEALTH

The Octobot has 2000 health so is a lot harder to kill than anything else. In comparison, the next most durable enemy which is the level 4 large enemy ship has a health of 160.

## STAGES

The game consists of nine stages in total, each containing enemies of greater difficulty. All nine stages in the game take place near Croake's home base, which consist of a collection of floating islands. As the player finishes each level, new weapons are made available to help deal with the increasing difficulty of the enemies encountered in subsequent levels.

## WEAPON AVAILABILITY CHART

Weapon Name	Level	Stage 1	Stage 2	Stage 3	Stage 4	Stage 5	Stage 6	Stage 7	Stage 8	Stage 9
Barrel Gun	1	x	x	x	x	x	x	x	x	x
Incendiary Barrel Gun	1		x	x	x	x	x	x	x	x
Teslatised Barrel Gun	1		x	x	x	x	x	x	x	x
Motorized Barrel Gun	1		x	x	x	x	x	x	x	x
Organ Gun	1	x	x	x	x	x	x	x	x	x
Incendiary Organ Gun	1		x	x	x	x	x	x	x	x
Teslatised Organ Gun	1		x	x	x	x	x	x	x	x
Motorized Organ Gun	1		x	x	x	x	x	x	x	x
Steam Cannon	1	x	x	x	x	x	x	x	x	x
Incendiary Steam Cannon	1		x	x	x	x	x	x	x	x
Teslatised Steam Cannon	1		x	x	x	x	x	x	x	x
Motorized Steam Cannon	1		x	x	x	x	x	x	x	x
Flak Cannon	2			x	x	x	x	x	x	x
Incendiary Flak Cannon	2				x	x	x	x	x	x
Teslatised Flak Cannon	2				x	x	x	x	x	x
Motorized Flak Cannon	2				x	x	x	x	x	x
Gatling Gun	2			x	x	x	x	x	x	x
Incendiary Gatling Gun	2				x	x	x	x	x	x
Teslatised Gatling Gun	2				x	x	x	x	x	x
Motorized Gatling Gun	2				x	x	x	x	x	x
Magnetron Cannon	2			x	x	x	x	x	x	x
Incendiary Magnetron Cannon	2				x	x	x	x	x	x
Teslatised Magnetron Cannon	2				x	x	x	x	x	x
Motorized Magnetron Cannon	2				x	x	x	x	x	x
Mine Launcher	3					x	x	x	x	x
Incendiary Mine Launcher	3						x	x	x	x
Teslatised Mine Launcher	3						x	x	x	x
Motorized Mine Launcher	3						x	x	x	x
Spike gun	3					x	x	x	x	x
Incendiary Spike gun	3						x	x	x	x
Teslatised Spike gun	3						x	x	x	x
Motorized Spike gun	3						x	x	x	x
Harpoon Cannon	3					x	x	x	x	x
Incendiary Harpoon Cannon	3						x	x	x	x
Teslatised Harpoon Cannon	3						x	x	x	x
Motorized Harpoon Cannon	3						x	x	x	x

## ENEMY PLACEMENT

Enemies are placed by using gather points stored in an array. Each gather point has an x, y location on the map, and a stat to represent what level enemies it should contain. Most stages in the game contain five such gather points. The game decides what kind of enemies it should place into the gather points based on the following rule set-

1 small ship = 1 base ship

1 medium ship = 2 base ships

1 large ship = 3 base ships

Each gather point can have a maximum of 10 base ships, using that rule the game will randomly select between the three types of enemy ships and create a suitable collection for the gather point. An example of a gather point setup would be-

Two large ships and Four small ships =  $2 * 3$  base ships +  $4 * 1$  base ship = 10 base ships

Or

One large ship, Three medium ships and One Small ship =  $1 * 3$  base ships +  $3 * 2$  base ships +  $1 * 1$  base ship  
= 10 base ships

## GAME PROGRESSION AND SAVES

The current stage reached by the player is always stored away in the profile when entering the ship customization screen at the start of each level. The player can resume where they left off by loading the appropriate profile.

## MINIMAP

In order for the player to find the enemies needed to complete the level a mini map is provided. The mini map is translucent so the player should be able to see what is happening while it is active.