RTS-GAME

Design Document

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## Setting

This game is set in a sci-fi world where faster-than-light interstellar space travel and extraterrestrial life exists. Some of these life forms pose an existential threat to each other and therefore nations continue to pursue conflict amongst the stars.

## Gameplay

### RTS

This game is built around an RTS battle mode where you control units in a 3D bird’s eye view of a battlefield. Units are small, and the maps are big (eg. Wargame, not Starcraft).

#### Weapons

###### Weapon Types

Weapons types are the classes of weapon a unit can wield. This table describes each weapon type intended for implementation and what behaviour it should have.

|  |  |
| --- | --- |
| **Name** | **Description** |
| Small Arms | Ranged weapons that are fired at enemy units, limited damage potential (ex: assault rifles, sniper rifles, pistols, shotguns, etc...) |
| Melee Weapons | Close combat weapons that are swung at enemy units in CQC, limited damage, very effective against infantry, but not infantry armour. |
| Rocket | An unguided self-propelled explosive that hits a point and explodes dealing damage to everything in the radius. |
| Missile | A guided self-propelled explosive that follows a target based on heat/manual guidance and damages the target and everything in a very limited radius. |
| Cannon | A direct attack weapon (such as a railgun or 120mm smoothbore) that fires at long range with anti-armour purpose. Can load AP and HE shells, the latter doing damage to everything in the explosive radius. |
| Shell | A non-propelled object that arcs and explodes on contact with the ground damaging everything in the radius. |
| Guided Shell | A non-propelled object that arcs and explodes on contact with the ground damaging everything in the radius, but can track and follow a network-visible target to hit it. |
| Drone | A drone with an explosive warhead that can be used as a loitering munition, once a target is spotted it can engage, but is much slower and more vulnerable than a missile.. |
| Recon Drone | A drone that orbits around the controlling unit extending it’s spotting capabilities. |
| Electronic Warfare | Weapons that target the electronic links of networked units. |

All units will be equipped with one or more of these types of weapons, each one with it’s own statistics specific to that nation and weapon system.

Weapons are able to target certain types of enemy units. Some weapons are able to target several of these targets. These targets are categorised as follows () :

- Infantry

- Vehicle

- Aircraft

- Ballistic missile (guided or unguided)

- Missile (guided or unguided)

- Shell (direct or artillery, guided or unguided)

- Electronic communication system

- Guidance system

Note that the first three categories are split in two subcategories, soft and hard. Soft targets are those that do not have any armour, such as light vehicles and infantry. Hard targets are heavily armoured targets that remain mostly unaffected by light weapons like small arms, such as tanks and larger mech suits.

Units will have weapons that can target one or more of these targets, but are often specialised for damaging either soft or hard targets. Explosives are better at damaging soft targets, though large enough explosives will still damage hard targets. In the same way, penetrating weapons like 120mm railguns, will be highly effective against larger and harder targets like tanks, but can still be fired to kill and suppress infantry, but will not be effective.

###### Weapon Statistics

Each weapon will have a statistic sheet that like the following :

These statistics are described in the following way:

- Name (String) : the name of the weapon

- Type (Enum) : the type of the weapon (Small Arms / Cannon / Missile / etc…)

- Range (int) : the range of the weapon in metres

- Shot types (ShotType) : the shot types of the weapon

- Type name (String) : the name of the shot type (AP / HE / Smoke)

- Ammunition (int) : number of shots for each shot type

- Damage (int) : the amount of damage dealt by the shot

#### Unit

###### Unit Types

This table describes the types of units available in the game for all factions organised by role. So a unit of one type for one faction will not necessarily look like a unit from another faction of the same type, but they will perform a similar operational role.

|  |  |
| --- | --- |
| **Category** | **Description** |
| Command & Control | These units coordinate their surrounding units and act as comms network nodes. |
| Logistics | These units transport supplies for combat units. |
| Reconnaissance | These units spot and identify enemy units, sending that information to the comms network. |
| Infantry | These units are individual squads of soldiers that can ride in transport vehicles to help deployment. |
| Mechanised | These units are individual squads of soldiers using advanced combat gear such as mech suits who can ride in specialised transports to help deployment. |
| Armour | These units are heavily armoured vehicles that cannot carry infantry. |
| Fire Support | These units provide mobile weaponry support to the rest of the force, but are not battle-line units such as artillery. |
| Air Defence | These units provide coverage for friendly units from airborn threats such as aircraft, drones, larger missiles/rockets and dropships. |
| Electronic Warfare | These units disrupt enemy EW and communication, and also can act as comms network nodes for friendly units. |
| Aircraft | These units traverse through the sky at altitude and can spot and attack units that are either in the air or on the ground below them. |

#### Unique Mechanics

The unique mechanics are individual abilities and gameplay mechanics that allow units and maps to provide interesting situations. These are split into several categories.

**Deployment :**

- Orbital drop : units drop in from orbital ships, arriving quickly and accurately to the drop site.

- Parachute deployment : units parachute out of aircraft that have to travel to the drop site with relative accuracy.

- Burrow deployment : units explode from the ground within a few seconds, but can only be used on natural terrain like grass or forests.

- Ground deployment : units drive in from offmap bases.

**Mobility :**

- Jump pack (range) : allows rapid movement in a arcing trajectory to a target location within range.

- Transport (capacity) : allows infantry units to board the transport up to the transport capacity.

- Landing / Takeoff : this unit can VTOL.

- Direct move (target) : moves in the shortest possible path to the target (distance).

- Fast move (target) : moves in the fastest possible path to the target (time).

- Hidden move (target) : moves in the most covered path to the target, and takes cover at the target.

- Combat move (target) : moves in the most covered path to the target, stopping to fire weapons if enemies are spotted. And takes cover at the target.

**Combat :**

- Fire position (target) : unit fires weapons at the target location, or will direct move to range and fire. Fires one load of ammunition.

- Smoke position (target) : unit fires smoke rounds at the target location, or will direct move to range and fire. Fires one load of ammunition.

- Turn on/off (weapon) : allows the unit to use or not use a weapon depending on the setting, useful for stopping stealth units from revealing their positions.

- Optimal shot (weapon) : toggles the unit to only use their weapon against optimal targets (120mm railgun VS tanks rather than infantry), unless fired upon.

- Effecient shot (weapon) :

**Spotting :**

- Deploy light recon drones (range) : improves recon in forests and buildings within range.

- Deploy heavy recon drone (range) : deploys a new unit that can fly around within range of the base unit, improves recon in open spaces.

- Electronic detection (range) : improves detection of units with EM emissions.

### Campaign (TBD)

This section defines the behaviour of the campaign mode (TBD).

## Factions

### United Nations

The UN are humans from Earth in the 2220s. They explore the galaxy using wormhole technology in the form of gateway cannons, that project a tunnel from the cannon to another system for vessels to traverse, or expensive jump ships that create a gateway that other vessels can pass through and then pass through itself. Famed for their ranged combat, vehicles and complex logistics chains.

The United Nations represent the combined nations of Earth and the Colonies. Each nation collaborates with the UN, providing divisions to the total United Nations Army Command

### Naëmu

Naëmu are a historically omniscient race of humans that once seeded Earth with life but whose empire was collapsed by a genetically engineered virus in a cataclysmic war with the Sprats. They travel through the galaxy using teleportation which transports people or vessels to where they’re needed, but their resources and availabilities are low due to their relatively crippled economy. Famed for their close combat, individual short distance teleportation and anti-gravity vehicles.

### Sprats

The Sprats are a strongly communal race that were contained by the ancient Naëmu empire and fought a war to escape their influence. This resulted in the annihilation of both nations’ industry and many of their settled worlds. They travel using warp drives to squeeze time and space ahead of them to travel across the galaxy. Famed for their powered infantry suits and walker-based machinery.

## Alvearium

The Alvearium, or the Hive, is a race of chemically controlled hive-mined ant-like creatures that traverse the galaxy in huge numbers of sublight ships. Their warfare relies on key units commanding hordes of lesser units that cannot be individually controlled. These lesser units are however high in numbers and effective at multi-axis assault tactics, as well as very high-stealth units in natural terrain and burrowing assault units.

## The Network

The Network is a race of networked robotic peoples that function together as one thanks to a permanent network link. They traverse the galaxy in ships that use short-distance teleportation to hop across the galaxy from planet to planet. They are famed for their mechanised units, drones and powerful electronic warfare, but are also vulnerable to strong counter-electronic warfare and electronic detection equipment.

## Game scene organisation and hierarchy

## Scene Organisation

In order to organise the scene tree, for each major scene function (loading, battle, main menu, campaign, etc…) the following nodes must be present in the scene for it to be functional. All these scenes are managed by a GameManager Node that handles game startup, menu, load transitions and scene instantiation/deletion.

Battle scene :

The battle scene must be contained within a Node3D root node as the scene is three dimensional. This scene acts as the container of the battle scene and all the battle scene components are children of this node. This node is instantiated by the game manager when a battle scene is launched.

A battle scene must contain a Terrain (or Map) scene containing the terrain geometry for the level as well as all functions the terrain must fulfil. These fall under five main categories :

* level geometry
* collision geometry
* navigation geometry, navigation links (bridges, tunnels, etc…)
* Unit spawn points
* Control or capture points (can be inactive based on game mode)
* foliage
* environmental particle systems (birds, rain, snow, etc…)
* environmental FX (fog, fires, etc…)

The Terrain scene must be completely interchangeable so that any other function in the battle scene is not dependant on a particular level being present. The other scenes in this hierarchy must be able to operate with any loaded level.

It must also contain all of the logic used for creating the navigation maps and initialising the navigation server. It must at minimum contain a “land”, “helicopter” and “naval” navigation map that units can be assigned to.

The battle scene must also contain a PlayerInterface. This scene acts as the player’s interaction point so that they may influence the game state. The interface must contain the UI, camera system, and actions system. This scene should be able to be added to any scene to immediately have a UI, camera controller and interface with which to select and order units around.

The battle scene must also contain a Factions register : Multiple nodes organising the unit scenes that have been spawned per faction and per unit type. Each unit must be registered to a particular navigation map initialised by the Terrain scene with a bitmask indicating traversable region types defined by the navigation server.

Each faction can be controlled by a different player and multiple players may control the same faction. Each player (AI included) must have their own branch of the tree.

Finally, the battle scene must contain an environment node which details all post-processing and lighting settings used for the entire scene. The settings of the scene will differ based on the quality settings chosen/defined by the player/programmer. This scene only affects the rendering engine and should not be used by any of the gameplay elements.