

# Solar Defense System

## Design Document

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### Concept

Taking inspiration from the timeless film *2001: A Space Odyssey*, as well as the classic space western *Outland*, “Solar Defense System” puts a unique spin on the usual tower defense game. Making use of the DJ Hero Turntable, players will be able to dictate the construction of an artificial solar system by spinning the platter and pressing the turntable buttons to place down and move planets. These planets are brightly colored and heavily detailed to convey their man-made aspect. The purpose of building this system is to protect the central star from incoming alien spaceships while gathering resources to upkeep the system. Some planets will be dedicated to gathering these resources, while others are dedicated to eliminating the aliens before they damage the sun. As such, this game presents itself as attractive to players of resource management games, who also like vibrant, non-dystopian science-fiction art.

### Target Audience

Players who like managing the spending and gaining of resources in games will appreciate the resource management aspect of “Solar Defense System.” In particular, they will appreciate the idea that more expensive resource planets provide more resources over time in return, and more expensive defense planets do more damage to aliens in return. This game presents unique tower defense mechanics, which gives a breath of fresh air to dominant players of the genre. The fact that the planets, which serve as the “towers,” are movable is unique to our game, and it allows for more dynamic gameplay. For example, the fire, volcano, and storm planets perform better while in certain configurations.

Perhaps the DJ Hero Turntable will provide a fanbase that bridges between PC and console gamers. The controller is based off Xbox controls, while the game is built for the PC.

## Monetization

Because our game has a high production cost, we have 3 main ways to achieve revenue besides having our initial budget. First will be our kickstarter. Even though our primary source of income will most likely be through sales, a kickstarter will provide additional funds that we will need to support the game, and it will also push for merchandise such as mugs, t-shirts, and stickers. This merchandise will get us some additional publicity, and it allows for our brand to spread and affect more people. Secondly, we will partner with FreeStyleGames and pay them a portion of our revenue not only to gain rights to use the controller, but also to get the controllers for a lower price and source more marketing help if needed. Thirdly, as for post-production, our game will cost \$15.00 and will be released on Steam.

## Marketing Approach

Our game will be marketed towards PC and Xbox players, with the DJ Hero Turntable bringing Xbox players into the target audience. The game will be advertised through Facebook, Steam, and YouTube, and will be featured in the Steam's "Featured" section. In order for the game to be compatible without a turntable, it will utilize Steam's built-in controller. It includes rotating pads instead of conventional joysticks, which is very compatible with the turning mechanic of "Solar Defense System." Additionally, the Kickstarter will provide a secondary way to market the game as well.

## Content

Humankind has just finished building their first artificial sun; an achievement to behold upon the galaxy. However, an alien race is seeking to destroy it! You must fortify your sun with planets to fend off these unwanted guests! Once a planet has been placed, you can move it around in pursuit of the perfect orbital configuration! As a solar system creator, you must gain energy from the sun and alloy from space rocks in order to fund the further construction of the system. Once a surplus of resources are gained, you can begin to afford more efficient versions of planets! Each of these will help you in your arduous task to defend the system's central sun!

If the new sun is lost, humankind will have lost their greatest creation! Fuel humankind's efforts to defend until the aliens notice the futility of their offense and scam!

## Player Motivation

Not only must the player build a solar system in "Solar Defense System;" they must maintain it. This involves replacing planets with upgraded forms of themselves, or prioritizing the system for offense or resource gathering when needed. This will be mandatory due to the increasing amount of incoming aliens over time. As the player gains more resources, the game will up the stakes, allowing to player to SPEND the resources on upgraded planets. This, in turn, strengthens the system's ability to fend off the aliens. In short, the player is forced to invest in upgraded planets because of the increasing amount of aliens, and vice versa.

## Game States

### Beginning State

The player begins the game with a top-down view of the solar system, which contains a central star, known as The Sun, and 7 empty orbits around the sun (these orbits can host planets). Throughout the game, aliens will begin creeping into view from the edges of the map and head straight to the sun. The goal of the aliens is to destroy the sun, and the player must stop them by placing down planets with different effects in the orbits around the sun.

### End State - Victory

Aliens will spawn in waves, and each wave will last a certain amount of time, each with their own frequency and types of aliens. Once 20 waves have been completed, aliens will no longer spawn, and the game will go to the victory screen, where the player has finally vanquished all of the invading aliens.

### End State - Loss

The Sun has a set amount of health, and if the aliens manage to knock The Sun's health down to zero, the game will go to the lose screen; the player has failed, and the aliens have managed to take down humanity's greatest creation.

## Mechanics & Systems

## Resources

Solar Defense System has two different types of resources available to the player, both of which are used for building planets.

**Energy** - Energy is the more common of the two resources in the game, since The Sun automatically generates energy and since the planets that generate energy are easier to purchase.

**Alloy** - Alloy is the rarer of the two resources in the game, since planets that generate alloy require more resources than planets that generate energy. Alloy is used to build stronger planets.

## The Sun

Everything in the game revolves around The Sun, both figuratively and literally. All the orbits in the game are built around The Sun. The Sun also provides energy to the player. Aliens will try to target The Sun, and when the health of The Sun reaches zero, the game is over. The Sun can also be upgraded to generate more energy at the cost of a lot of resources.

## Orbits

Planets can be placed on orbits, but each orbit can only host one planet at a time. A total of 7 orbits exist around The Sun, meaning the player can have up to seven active planets at a time. Cycling to outer and inner orbits is done by pressing the green and blue buttons on the platter of the controller, respectively.

## Planets

Planets can be placed on any available orbit around The Sun, given that the player has the respective amount of energy and/or alloy necessary for that given planet. Only one planet can be placed per orbit, so players must be sure of the planet they want to place when selecting it. Players can also delete planets, in return getting a small amount of resources and freeing up that orbit for another planet. There are multiple different planets available to the player in the game, each with their own abilities.

**Greenhouse** - Generates a low amount of energy for the player.

**Powerhouse** - Generates a medium amount of energy for the player.

**Uberhouse** - Generates a high amount of energy for the player.

**Mining Outpost** - Generates a low amount of alloy for the player.

**Mining Station** - Generates a medium amount of alloy for the player.

**Earth II** - Generates a high amount of alloy for the player.

**Fire Planet** - Shoots nearby aliens for a decent amount of damage.

**Volcano Planet** - Shoots nearby aliens for a massive amount of damage.

**Ice Planet** - Leaves a trail behind it that gives aliens a substantial slow debuff.

**Blizzard Planet** - Leaves a trail behind it that gives aliens a massive slow debuff.

**Toxic Planet** - Leaves a trail behind it that deals a decent amount of damage to aliens.

**Gas Giant** - Has a gravitational field that sucks in aliens, instantly killing them.

**Volatile Planet** - Periodically breaks off pieces off itself that fly off into space. These pieces will explode when aliens get too close.

**Storm Planet** - Shoots nearby aliens for a mediocre amount of damage. If there is another storm planet on another orbit, every so often a giant beam will appear between the two planets, dealing massive amounts of damage to aliens.

**Medic Planet** - Heals planets in adjacent orbits, but only if those planets are physically nearby this planet.

**Homing Planet** - Shoots a missile at a constant interval that homes in on an alien anywhere in the solar system for a medium amount of damage.

**Energy Geode** - Can be used to slam into aliens, dealing damage to both itself and the aliens. When this planet dies, it drops a ridiculous amount of energy.

**Alloy Geode** - Can be used to slam into aliens, dealing damage to both itself and the aliens. When this planet dies, it drops a ridiculous amount of alloy.

**Asteroid Belt** - Covers the entire orbit with rocks. When aliens come into contact with one of the rocks, the rock is destroyed and the alien is destroyed too. The orbit becomes empty once all the rocks in the belt are destroyed.

## Aliens

Aliens will spawn off the screen and move straight for The Sun. Their goal is to destroy The Sun, but certain planets can fight back against the aliens. As the game progresses, different waves of aliens will appear, each getting more difficult than the last. There are three different types of aliens that the player will encounter.

**Minion** - The most basic alien. They will drive straight into the sun when they get close, destroying themselves and dealing damage to the sun.

**Chief** - These aliens will do the same as the minions when they get close to the sun, but they will also shoot any nearby planets they pass on the way to the sun.

**Mothership** - This alien ship will stop at a random point in the solar system and start shooting nearby planets. The mothership will also spawn Minions every so often.

## Waves

Aliens spawn in waves, and the game has a total of 20 waves. Each wave gets harder and harder as the game progresses, and in between each wave the player will have a bit of a cooldown period to be able to settle down and set up for the next wave.

## Game Engine

The game will be built in Unity. It is a highly documented engine, and it contains all of the features and tools needed to create the game as we envision it, with no restrictions. It also features cross-platform support, which is vital if we decide to target this toward Xbox players as well as PC players.

## Art Direction

The art is based around colorful palettes containing shades of blue, pink, and green. The space background sets an initial theme of dark blue and purple. The UI builds upon this with lighter blues, and it introduces pink, a contrasting color to add interest and focus. Pink is used to denote selection, whereas a neon blue is used to denote interactability. Green is used to represent the aliens, which the ships using both dark and light shades of green. In order to link it with this color scheme, the UI which shows the current wave number is neon green.

The planets exhibit a large amount of detail because they are the primary visual focus of their game. Their abilities are linked to their art:

- The Greenhouse and Powerhouse use yellow to relate it to the thematic color of energy, as well as a dominant contrasting color: blue.
- The Mining Outpost and Station use gray because it is the thematic color of alloy, and it adds light blue as a detail color
- The Fire and Volcano planets look intimidating to emphasize their offensive power.
- The Ice and Blizzard planets communicate the planet's mechanics: they temporarily freeze the aliens.
- The Medic Planet is based off of golden colors, which can be synonymous with miracles, heaven, and healing.
- The Storm Planet has stormy clouds to pair with their defensive lightning chaining mechanic.

## Sound Design

The soundtrack of "Solar Defense System" will be heavily inspired by chill synthwave, which is derived from slow, rhythmic 80's electronic music. This music is often

correlated with retro-futuristic art styles and themes, which were prevalent in similar sci-fi games from the 80s and the 90s.

Sound effects will feature space-y, reverbed background sounds to emphasize the feeling of space. As for gameplay, simple blips and bleeps will accompany placing and removing planets. The aliens will produce a soft whirring sound while they move, and their shots will feature retro-game inspired laser sounds. Fitting sounds will accompany certain events, such as explosions when celestial bodies explode and thick, gloopy sounds when the volcanic planet fires.

Speaking of planets, a high-pitched, almost angelic sound can be used while the healing planet serves its purpose, and zappy, electrical sounds can be used for the static planets. Essentially, the planets will have realistic sounds that accompany their visual style.