# SPACE MINER: SPACE ORE BUST

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## TO DO

- Determine stat blocks the user sees for each item
- Figure out the alien tech upgrades
- Define hard mode, and how repeat plays work
- Create achievement list

## OVERVIEW

*Space Miner: Space Ore Bust* is a new take on the classic game of Asteroids and the first entry in our Venan Arcade initiative.

The game opens with the player, a boy or girl, arriving at the Gritstone Mining Station. They received an urgent message from their Uncle Jebediah that he's dying and needs help. Upon arriving, what they find is that their Uncle just wants some help mining his asteroid field since he's getting old.

After deciding to help for a bit, the player soon gets embroiled in a larger plot, as the diabolical Mega Space Corporation enters the scene to try to muscle Uncle Jeb out of the asteroid field for their own nefarious purposes. Soon the relatively calm asteroid sectors are overrun with various mining drones that become increasingly hostile to the player.

The game is an arcade shoot-em-up married to a simple wealth building mechanic and a tongue-in-cheek narrative. Destroy ore to earn money to upgrade ship to enable better ore retrieval, and along the way reveal the hilarious interactions of the various characters at the Space Station.

## GAMEPLAY

The player starts a new game by entering a name for themselves and creating a save progress file. Once they begin they will enter the game "hub", which will be the Gritstone Mining Station, where their Uncle Jebediah has set up shop. At the station, the player will have a few different options. They will be able to start a mission, manage their ship, enter the store, change the game options or exit their current game. The hub, as well as all the environment in the game, will be represented with 3D scenes that have touchable areas that take the player to different areas of the game.

At the store, there will be different upgrades they can buy for their ship. The upgrades will use up credits that they earn from their mining expedition. Everything can be upgraded, including the hull. They can also sell back equipment at a discount for anything outdated they might have.

Going mining will take them to the sector map. Here they can choose which sector they wish to explore next. This mechanism is explained more fully below. Once they choose a sector, they will then go into the main game play area where they can mine and engage the mining drones. Once they leave the sector, they return back to base. When they arrive, their cargo will be cashed out for credits.

If the player dies in a sector, they will restart with the sector resuming the state it was in prior to their arrival. There is also consideration being given to a hard-core mode that will require the player to return to base and buy a new ship.

Sectors can be visited multiple times. They are persistent, so if the player destroys half the asteroids in a sector, when they return, only half will remain. As a result, the player is able to completely clear a sector, and when they do, it will be tagged with a special icon on the sector map. Clearing the entire sector map will earn some sort of completion bonus or achievement.

In addition to normal sectors, there will also be special sectors that contain a mission. These missions are used to advance the story line and provide access to special items in the game. They also mix up the gameplay to keep things fresh for the player.

Difficulty is largely based on distance from the space station. The further away a sector is, the value of the ore will increase, but it will also contain more difficult asteroids as well as more enemies.

## WINNING THE GAME

The goal for the game is to eliminate Mega Space Corporation from Uncle Jeb's corner of space.

The way to do this is not immediately apparent, but is revealed to hinge upon finding a mysterious Alien Artifact. In one of the four corner sectors, there will be an ancient Alien Artifact that the player can find. By completing all the missions in the game, they will obtain the necessary information to open this artifact and discover the secrets within. This artifact is also the secret goal of Mega Space Corp and they have expended significant resources to obtain it. By getting to it first, you have ruined their plans in the sector and successfully chase them away.

A secondary win condition is also being considered to promote replay value, but will likely be cut from the game. It consists of achieving an "economic victory" by buying out enough shares of Mega Space Corporation to get Bancroft fired and getting them to leave. These shares serve two purposes. One is they are an additional money sink for the game, and buying these shares will contribute to the player's final score. The second is that they can get a controlling interest in Mega Space Corp, and then run it into the ground.s

Economic victory would be long term… *very* long term. In order to achieve it, the player will need to finish the game multiple times. Their stock will be retained between play sessions though. Finishing the game this way will be difficult, but will serve as a reward to tenacious players of the game.

## SECTOR MAP

The sector map represents the play area of the game. It is composed of a 7x7 grid, with each square representing a playable region of space, called a sector. When the player leaves the base, they are able to select a sector to travel to and mine. Travel between the sectors is instantaneous, and the player will always return to base when they are done mining.

When the game begins, most of the sector map is undiscovered, except for the region around the base. The player can only travel to areas they have information on, so only the squares in the immediate vicinity of the base are selectable. When a player goes to a sector, they are able to uncover the sectors adjacent to the one they are in. This mechanic adds a minesweeper-esque mechanic that lets the player discover the world as they play the game. The sectors are placed randomly and have some random factors in them so that the game doesn't play exactly the same way twice. But each sector is unique in the game to provide a nice, varied experience for the player.

### NAV BUOYS

Discovering adjacent sectors is not automatic. This would enable a player to travel to a sector, immediately leave, and then uncover the whole map. To prevent this, in each sector there will be an object called a Nav Buoy. These handy satellites float in space and are used to provide information on the ever changing landscape of the asteroid field. The player needs to find these buoys to get the information they need to visit neighboring sectors. Once the player finds one, they merely tap on it to initiate a download that gives the player required information.

The download of the information should take 10 seconds, during which time the player can't move. If they move their ship, or they get knocked away by an asteroid, the download is interrupted and they have to do it again.

### DIFFICULTY

The sector map also provides the mechanism for scaling the difficulty and economy of the game. Basically, the further away you get from the base, the more "wild" the territory gets and the more difficult the sectors get. But with risk comes reward, so the value of the ore deposits will increase as well.

### SECTOR LICENSE

With the above mechanisms, it is feasible (and likely) for the player to keep going further and further from the base, possibly running into sectors that are more difficult than they can handle. To help prevent this from occurring, the game will utilize a gating system called a Mining License (may use different terminology for this). The Mining License basically limits how far the player can travel from the base, so they are unable to rush out into the super hard areas right off the bat.

The licenses will start at Level 1, and end at Level 6. The level represents the distance the number of squares they have to move to get to the sector. Moving up/down or left/right is one square of movement, and diagonals would be two squares.

Earning their sector license is basically like earning a level in an RPG, but instead of experience, it is gained through credits. Each license will have a credit threshold that the player needs to reach to receive it. The threshold is not something the player must pay, but is merely a running count of how much money they've earned so far through mining. Utilizing money is an appropriate counter, since it reflects how much the player would have been able to spend on improving their ship.

| License Level | Credits Required |
|---|---|
| 1 | 0 |
| 2 | 5000 |
| 3 | 10000 |
| 4 | 25000 |
| 5 | 50000 |
| 6 | 100000 |

Although intended as a gate, the fringe benefit here is it gives the player something additional to earn in the game. Like gaining a level, getting a new Sector License should be rewarding. There will be a special screen that appears after the return to base screen whenever the player reaches the next level, with appropriate happy sounds effects and graphics.

Utilizing the above method, the sector counts break down as follows:

| License Level | # of Sectors |
|---|---|
| **1** | 4 |
| **2** | 8 |
| **3** | 12 |
| **4** | 12 |
| **5** | 8 |
| **6** | 4 |

## SECTOR TYPES

Sectors are the heart and soul of the gameplay in Space Miner. Ultimately this will be where the player spends most of their time, so the goal is to make sure the player gets rewarded for their effort.

Each sector will have a template which defines how it should be generated. The templates will contain a number of different parameters that customize the appearance and gameplay found therein. The following lists the different parameters found.

- Background Image
- Presence of fog
- Asteroid type distribution (seven ore types, two special asteroid types)
- Asteroid size distribution (small, medium, large, mega)
- Enemy types and location
- Mission parameters (for mission sectors)

Each sector in the game is going to be unique. For many, it will just consist of selecting unique parameters for how they are generated. Others will be specific mission sectors, which will feature unique gameplay that specific to the goals of the mission.

The missions serve a few different purposes.

- Mix-up the gameplay, to keep things fresh for the player.
- Provide something to "find" on the sector map
- Create some experiences that tie directly to the story in a non-trivial way.

As it stands currently, missions cannot be "failed" per se, and the player will have to restart it should they die.

## SECTOR GAMEPLAY

Once in a sector, the player will enter an area of space with their ship located at the origin, or center, of the map. The level is a large region that is bigger than the screen and wraps in both directions. In this region, objects will be spawned based on parameters in the sector template that define the number of objects of each type occurring in the region. Any unique objects in the sector will have a set coordinate location. The user will also have the option of using their long range sensors to see the entire area, which will be enabled by touching a button on the screen somewhere.

Collecting ore will be the primary activity. This is conducted similar to the game of Asteroids, where the player will destroy rocks that break up into smaller and smaller pieces. When the smallest pieces are destroyed, there is a chance that small chunks of valuable ore will be revealed. If there are, the player needs to fly their ship to the area they are in, and they will use their ore collector to retrieve it. The ore collector operates in a range around the player, sucking the ore into the ship if it is close enough.

In addition to the asteroids, the player will frequently run into MSC mining drones. These run the gamut from relatively annoying mining bots that just steal ore to fully armed monstrosities that attack other miners with impunity. Destroying them is also a big part of their job.

### ASTEROID MINING

The asteroids are large chunks of rock floating in space. Whereas in the game of Asteroids, dodging them was the primary goal, here the threat of death by asteroid debris will be markedly less, mostly due to the larger playing area. However, if the player is sloppy about doing this, it may become somewhat of a hazard.

When the level starts, asteroids will be scattered about the level, tumbling lazily in space. They should move, but it should be *very slowly*. Sitting still and watching an asteroid cross the screen should take 20-30 seconds or so. Shooting at the asteroid will affect the physics of it depending on the type of weapon used – kinetic weapons will push it around more than energy weapons will. The merits of doing so will be for the player to discover, but some drones don't appreciate running into asteroids.

The asteroids will break into multiple pieces as they are destroyed. These pieces will either be destroyed or divide again into smaller pieces, depending on their size. The general pattern is that an asteroid will break into three of the next lower size. In addition, the smaller sizes may pre-break as well to give more random patterns.

Destroyed asteroids may release ore, or some other nifty resource for the player to collect. The ship will automatically collect the ore with its ore collector attachment based on its range and suction power. Ore that is not collected will eventually disappear as it disperses into pieces too small to be tracked by the ship's sensors. So being able to collect the ore quickly is rather important.

### MISSIONS

Missions are described in a separate document.

### DERELICTS

When exploring a sector, there will likely be various derelicts the player will run into. These will be the remains of space faring objects or containers that contain special items or info for the player to uncover. In game design terms, these are basically treasure chests.

Depending on the derelict type, a different type of treasure will be uncovered.

**Alien Matrix:** A cube shaped, futuristic looking object that has information critical to the alien artifact or other Alien Technology. These will lead to Alien Tech enhancements that can be used on the player's ship.

**Satellites:** These will contain navigation information for a sector on the map, making it eligible for travel.

**Ships:** These will contain things that are normally on ships, such as ship parts or ore. The drop tables for this are on a separate Excel worksheet.

Derelicts will be placed randomly at the beginning of the game when the sector map is being created. The rules for creating them are as follows:

| Type | Count | Rules |
|---|---|---|
| **Alien Matrix** | 6 | Randomly placed in sector levels 2-5 |
| **Satellite** | 8 | Randomly placed in sector levels |
| **Ships** | 32 | 20 placed randomly in any sector, 12 appear in the Graveyard sector. |

The derelict sequence is basically identical to the one for nav buoys. The player needs to stop their ship near the derelict and tap it to start exploring it. Once ten seconds have elapsed, whatever item or information they contain will be revealed.

Progress for discovering treasures will also take place in their apartment, so they can keep track of their tally while playing the game (to satisfy the completionist).

## ENEMIES

Mega Space Corp has an implacable army of drones it deploys to mine all the valuable ore from the sectors. These robots not only steal your ore, but are known to fire on any space miner bold enough to attempt to mine near them. Left untouched, they will eventually consume all the ore around the base, so beating back these drones will be one of the player's primary activities.

A key signature of all the enemies in the game is that they have electronic eyes that are used to convey their mood. They are meant to be somewhat playful even though they are dangerous.

### MINER

Miners are all about chewing up asteroids and collecting ore. The Miner enemy is mostly there for ambiance, but will attack the player if they are fired upon.

- If the player is not nearby (within short-range scanner range) the Miners will remain still and 'sleep'.
- Once the player travels within the Miner's radius, it will wake up and pick a random location 300m away within its area and begin moving towards that area.
- As the Miner travels, it will periodically (every 5 seconds) search for an asteroid within its awareness radius. Once it finds an asteroid, it will tag the asteroid to prevent other Miners from approaching it. The Miner will set a preference for ore first, then small asteroids, then medium, then large.
- Once an asteroid is tagged, the Miner will travel towards the asteroid and begin mining it. When the asteroid breaks apart, the Miner will send out a search and target the closest asteroid with the highest preference level.
- If the Miner spots ore, it will break away from whatever it is doing and collect it.

- If the Miner is attacked by the player, it will flash its angry eyes and chase the player for 5 seconds. If the Miner cannot attack the player within those 5 seconds, it disengages, returns to its normal eye expression, and begins hunting for asteroids again.
- If the Miner manages to attack the player, it will deal damage for a maximum of 2 seconds before disengaging and returning to its asteroid hunting. If the player manages to escape from the Miner before the 2 seconds are up, the Miner will still disengage from the conflict and resume asteroid hunting.

## SENTRY

The Sentry is very simple. It does not move. It simply looks for a target in its radius and fires at it. If there is no target, it doesn't fire.

- When the player enters the Sentry's range, Sentry flashes angry eyes and begins tracking the player (rotating on its axis)
- After 2 seconds of tracking, an audio/visual tell will play that lasts about .25 seconds. Immediately after this tell, the Sentry will fire its weapon at the player position.
- As long as the player is within range, the Sentry will continue to target/tell/fire every 2 seconds.
- Level 2 Sentry fires two projectiles at once
- Level 3 Sentry fires three projectiles at once

## HUNTER

The Hunter looks for enemies to encounter. There is no real rhyme or reason to how they move, they simply go around randomly hoping to find something in their scanner radius (that being you). When they find you, they start chasing you around and fire their guns at you.

- If there is no target, set a destination
    - Choose a location 300 m away from their current position (pick a random angle)
- Travel towards destination
- Check for the player within an awareness radius.
    - If their target has two tags already, then don't bother chasing
- If they see the player within their awareness radius
    - Tag enemy
    - Flash angry eyes
    - Chase the player down until they are within attack radius (approx. size of screen)
    - Play tell animation and fire projectile as soon as player is within attack radius
    - If player is still within attack radius after shot is fired, Hunter will travel around the player on a curve, circling them for 2 seconds. After this 2 second pause, the Hunter will 'tell' again and fire its weapon.
    - If the player exits the Hunter's attack radius, it will give chase until it is within its attack radius or the player exits the Hunter's awareness radius. If the player exits the Hunter's awareness radius, the Hunter will disengage from the conflict and return to their area of origin and start their routine from scratch.
    - If the player is seen by the Hunter while it is en route, it will engage the player once again.

## SHREDDER

The Shredder acts like a combination of the Hunter and the Miner, chasing down the player and using its close-range mining skills to deal DPS before disengaging temporarily.

- Idle movement is identical to the Hunter: pick a destination 300m away within assigned area, move towards destination, then repeat. While doing this, the Shredder is searching for the player.
- If the player enters the Shredder's awareness radius, it will begin chasing the player.

- When the Shredder attacks the player, it deals damage for a maximum of 2 seconds before disengaging for another 2 seconds. While disengaged, the Shredder will remain at a fixed distance from the player while circling them, similar to the Hunters.
- After 2 seconds, the Shredder will re-engage the player and repeat its attack pattern.
- If the player escapes from the Shredder before it deals its full amount of damage, the Shredder will disengage for 2 seconds regardless.
- If the player moves away from the Shredder, the Shredder will give chase until the player is outside their awareness radius.

## HOLO-STROID

The Holo-stroid is similar in function to the Sentry, though it sports a unique shield/disguise behavior that helps it blend into the environment.

- Spawn similarly to the Sentry, protecting a set area.
- The Holo-stroid has two phases: asteroid and firing.
- Asteroid phase:
    - Looks like an asteroid! Plays a rotating animation, but has no movement velocity and cannot be budged.
    - Shooting it results in sparks emanating from the asteroid.
    - The asteroid form activates a shield that protects the enemy from damage. When enough damage is dealt to the asteroid form, the shield disappears permanently, leaving the enemy exposed.
- When player enters the Holo-stroid's attack radius, it will morph into its Firing phase.
    - Asteroid form fades out, revealing the enemy within. The enemy fires a quick series of four shots, updating the player's position for each subsequent shot.
    - After the attack, the enemy will remain in this state for 2 seconds before morphing back into its Asteroid phase.
    - The enemy is vulnerable in this phase to player attacks.
- After 4 seconds, the Holo-stroid will morph back into its Firing phase and fire another four-round burst, repeating the attack/pause/switch back to asteroid cycle.

## KAMIKAZE (NAME TO BE CHANGED)

The Kamikaze is our mobile mine, chasing players and exploding when touched.

- Spawn similarly to Sentries, staying in a fixed position until the player enters their attack radius.
- When the player enters their attack radius (about half the size of the screen vertically), the Kamikaze activates, lighting up and turning towards the player from whatever position it spawned in.
    - The Kamikaze's eyes will be slightly different than the other enemies. Instead of having angry (.\ /.) eyes, the Kamikaze chases the player with (^^) happy eyes.
- It will immediately begin moving towards the player's position, updating its knowledge of the player's position every 1 second. This delay allows the player to pull a 'crazy ivan' and spin around quickly to lose the enemy.
- The Kamikaze accelerates at a rate that allows it to catch the player after approximately 5 seconds of straight bee-line chasing. The exact value is TBD, since it will be based on the available engines and their speeds relative to the enemy's.
- The Kamikaze will chase the player until the player can escape from the enemy's zone of awareness (an area slightly larger than the screen).
- If the player manages to drain the Kamikaze's HP, it will explode when its health reaches 0. If the Kamikaze touches the player at any point, it will play a brief 1 second animation of its eyes flickering to the red angry eyes, then explode.

## BANCROFT BOSS /ROGUE AI MISSIONS

Like Death Blossom from "The Last Starfighter", this large version of the Hunter enemy is capable of firing projectiles rapidly as it spins around in a circle, requiring the player to avoid its attacks in order to deal damage.

- Is always aware of the player's position – it will hunt down the player to begin its attack routine.
- When the player enters the boss' attack radius, the boss begins charging his weapon with a tell animation (lasts 2 seconds)
- After the 3 second charge, the boss begins firing and spinning simultaneously. Every 20 degrees it turns, the boss should fire a single shot. It should take the boss 2 seconds to complete a full rotation.
- After a single rotating, the boss will be vulnerable to attacks for 3 seconds as it circles the player as a normal Hunter would do during its disengage/attack idle animation.
- After 3 seconds, the boss will charge up again and complete another shooting/rotation. It will repeat this cycle until the player either escapes from its attack radius or the boss is defeated.
- Rogue AI Missions 1 and 2 feature harder versions of this enemy with higher HP and more damaging damage values.

### FINAL BOSS

This boss character is essentially a giant Shredder enemy, but with some new unique behaviors. Also, this boss cannot be defeated by ordinary means – just shooting it will result in temporarily deactivating it, but it will always re-animate itself with full health.

- Is always aware of the player's position – it will hunt down the player to begin its attack routine.
- Normally will hunt the player down, deal damage for 2 seconds, then disengage for 2 seconds before moving in to attack once more. Like the other actively-offensive enemy types, the Final Boss Shredder will circle the player while waiting to re-engage after an attack.
- After the player deals X amount of damage to the boss, the camera will pull out (similar to what is proposed for the Black Hole Gun) and the boss' saw blades will begin to spin very quickly over a period of about 3 seconds. The top of the boss' head opens during this 3-second warm-up time and, after the 3 seconds are up, the player, enemies, and asteroids within a large radius (about 2 screens'-worth in all directions) begin to get pulled towards the boss' spinning saws.
- The pulling effect lasts 7 seconds, then the boss' saw blades resume spinning at their normal speed, the head closes, and the boss resumes its normal attack routine.
- If the player is pulled into the boss' blades, they are dealt DPS for as long as they are trapped there.
- When the player deals enough damage to the Final Boss Shredder, it will stop moving, its eyes will flicker, and it will seem to power down for 5 seconds. After 5 seconds, however, it will re-activate and resume its normal 'chase/attack/disengage/super-suck' routine.
- After two cycles of 'powering down' the boss and having it re-animate, Anti-Dimensional Buoys will be materialized into the sector. Once the player activates these, a scripted scene takes place: the camera pulls out, a wormhole opens, and the bomb from earlier in the game travels through it. The Shredder Boss begins sucking everything in, and sucks in the bomb immediately. The bomb explodes, taking the Shredder Boss with it.

### LOOT

When enemies or the mining station are destroyed, there is a chance that it will leave behind ore for the player to pick up. In general, the chance is 50% for a unit of ore to survive the explosion and be usable by the player. What that means is that for miners, there is a 50% chance any ore it may be carrying will drop when it is destroyed. For the mining station, it means that each ore unit that is currently being stored inside it has a 50% chance of dropping for the player to pick up. The ore being carried or the ore stored in the station should be tracked accurately.

## DYING

When the player dies, they will restart their current level, with it being reset to the state it was in when they arrived. Deaths will be tracked by the game, and will be used when computing the final score.

## RETURNING TO BASE

To prevent the player from instantly fleeing battles, returning to base will not be instantaneous. Once they decide to return, they will experience a sequence similar to that for nav buoys, where they need to prepare to exit the sector. Once six seconds have elapsed, they will return to base. If they move around while trying to return, or get hit by an asteroid, then like the others the sequence will be aborted.

## CONTROLS

After much iteration of the controls, we are finally down to two schemes. These are both based on having a virtual joystick, or vstick, that the player controls with their thumb. To summarize why we went with this approach:

- Touch based controls always had the players finger in the way of the gameplay
- Accelerometer based controls work poorly for controlling a ship in 360 degrees
- This method gives the most “spacey” feeling of the bunch

The vstick controls have two ways of working:

**Method A:** The vstick controls the direction and velocity of the ship. There is a fire button on the other side of the screen.

**Method B:** The vstick controls the direction of the ship only. There is a dual thrust/fire button on the other side of the screen that can be used to fire, thrust or do both at the same time.

Most casual testing has shown B to be the preferred method, but it is highly probable that we may make this a user configurable setting on the options menu.

That being said, the control mechanism is definitely “unfriendly” to someone just picking up and trying the game. Every attempt will be made to make these controls work as accurately as possible, but ultimately the control scheme will turn away casual gamers.

## SHIP

The ship the player uses is basically their avatar, so there is a large focus in customizing, upgrading, and in general, tweaking out their ship. The goal is to make this system as rewarding as possible, and to keep it simple enough that it is relatively simple to do.

The initial ship is a bucket of bolts, with barely functional parts. The engines sputter, the hull is blocky, beat up and worn, and everything works just well enough to get the job done. Some equipment, like scanners and shields, may even be missing altogether. Think the space equivalent of being equipped with a rusty dagger and a leather jerkin.

### COMPONENTS

The ship is made up of seven different components. The base is the hull, which determines its appearance, upgrade capabilities and hit points. The hull contains slots for each component type, and is similar to outfitting a character in an RPG. Hulls do not all have the same slot configuration, and nicer ones will allow for extra reactor and weapon slots as well as special weapon mounts and turrets.

The following sections describe the different upgrades available for the ship. An actual list of the components for the game will be in an accompanying Excel document, for easier manipulation.

#### HULL

The hull is the basic shape of the ship and determines how it looks on the screen as well as the number of slots it will have for the various components. As hulls increase in versatility and size, they will have larger cargo storage for ore as well as more slots for weapons systems and power generation. Hulls will also get heavier, so upgrading to a new hull will make the ship less responsive unless the engines are upgraded as well. The hulls in the game will likely follow two templates, one focused more on cargo size and the other more on combat.

## ORE COLLECTOR

When the ship is in range of ore, the collector automatically deploys to retrieve it. There is only one slot of this type, and all ships have it.

The ore collector operates by attracting ore in a defined radius. Any ore that is in this radius start to accelerate towards the ship. Once the ore hits the ship, it disappears and is retrieved.

The ore collector will increase in its radius and it attraction power as you buy more sophisticated systems. The attraction power will require the ship to slow down less so it doesn't out run the ore it is attracting, and the increased range will save the player the trouble of having to chase ore.

## ENGINES

The engines control how quickly your ship accelerates and stops. The top speed will be limited so that the player is never going too fast to control their ship.

Engine output will be defined in Newtons. This, when combined with the mass of the hull, will determine the acceleration value of the ship. The braking value will be double the acceleration value.

There are two families of engines in the game. One is the equivalent of the gas guzzler, which will output more power but also be less power efficient. The other is a smoother more efficient model, which uses less power but doesn't provide quite as much power.

## REACTOR

The reactor determines how much power is generated by the ship. Each component, besides the Hull and Reactor itself, requires power. When outfitting the ship, there needs to be enough power to feed all the systems. If the power required exceeds the power generation, then the player will not be able to finalize their modifications until this is corrected.

Reactors can work in series, and larger hulls will accommodate the use of a second reactor to help provide power on the ship.

## SCANNER

Scanners provide useful information about the area of space surrounding the ship. Scanners have two functions they provide which get better via upgraded.

The first function is determining what is around you. At level 1, it can identify asteroids only. At level 2, it can also pick out enemies and at level 3, it will also show special objects such as derelicts and ore.

Scanners can also have a long range add-on. This feature operates by adding an outer ring around the normal scanner. This outer ring acts as a compass, showing the direction of objects in a large radius around the player. Like the short-range function, the long range function also has three levels which can be upgraded to discern types of objects better.

## SHIELDS

The shield system protects the ship from damage. It will absorb hit points of damage that would normally apply to the hull. Over time the damage the shield absorbs will regenerate. Some shield systems will favor a higher regeneration speed while others will favor a higher damage absorption value.

There are three families of shield – balance, recharge and shell. Recharge shield have the highest recharge rate, but their maximum absorption is fairly low. Shell shields have the highest damage absorption, but take a long time to recharge. Balance shield are basically a middle ground between the two.

### WEAPONS

Weapons shoot stuff – pretty much what you expect. There are basically two types of weapon systems in the game – kinetic weapons and energy weapons. Kinetic weapons will be the superior weapon for asteroids. It will be more power efficient and do high damage per shot, but fire relatively slowly. Energy weapons will be the weapon of choice against drones. They will be less efficient, but will fire more quickly and not affect the momentum of objects.

There is also an additional special weapon slot. This slot can be used for normal weapons, but can also hold one of the special weapons in the game as well. There is only one slot of this type on any hull, mounted in the front of the ship.

### ALIEN TECH

As described earlier, the player will be able to find an Alien Matrix object which contains information about new technology the player can discover. Once discovered, these items will become available in the shop.

There will be two types of items available, weapon systems and Alien Tech. The weapon systems go in the special slot mentioned earlier, but the other items will go into a special Alien Tech slot. In general, the Alien Tech acts as a "rule modifier" and gives special abilities not normally found. These items are always optional, and finding them is a bonus and not a necessity to complete the game.

Alien Tech, in order to avoid cluttering the interface, needs to be a passive upgrade that doesn't require user input. So these will either give some sort of passive bonus (increase kinetic weapon damage), or triggers on an event (repairs ship when it is damaged).

## VALID SHIP CONFIGURATION

Before the player can leave on a mission, they need to have a valid ship configuration. A valid ship configuration contains the following:

- Engine
- One weapon
- Ore Collector
- Reactor with enough power to make these things work

When going through the process of buying and selling goods, and managing your ship, it is easy to enter a state like this as a temporary step while new parts are being purchased, so you don't want to be too draconian about checking for a valid ship status in several places. To that end, the check for a valid ship configuration should take place when they attempt to leave the hub to start a new mission. If at that point the ship isn't valid, we'll notify the user via a dialog that they need to update their ship.

As one more safeguard, the initial items that a player starts with in those four categories will be unsellable. So even if they sell everything they can, they should still be able to put together a valid ship, albeit a not very good one.

## SHIP MANAGEMENT

Managing the ship consists of three different actions – buying equipment, selling equipment and outfitting the ship from your stock of ship parts.

The inventory system's reason for being is simplicity. If we only allow for one type of equipment in each slot at any point in time, we can get some weird fringe cases when the user does things like buy a smaller hull. Keeping inventory also allows for things like having multiple special weapon systems to choose from as well as salvaging parts during a mission.

There will be no limit to the amount of inventory the player has, but selling off old equipment will be a good way to raise funds for the newer, more powerful equipment.

## SPACE TRADER GALACTUS

Space Trader Galactus is your one stop shop for buying and selling ship parts. The player will frequent Galactus' shop frequently over the course of the game to upgrade their ship in their quest to boot Mega Space Corp out of their mining sector.

### GALACTUS

Galactus is the colorful alien character that runs the shop. Unlike his epic sounding name, he is rather unimposing and homely looking, kinda like the alien in American Dad. The player will interact with him during the game to uncover some of the mysteries behind the aliens. In addition, the player will be able to provide alien schematics to Galactus to create some special weapon systems.

There will not be any special action required by the player to enable these systems to be made. Once the player has the appropriate information, Galactus will inform the player on their next visit that he's been able to decode the alien schematics and it will appear in the "Alien Gear" section of the shop.

### SHOP INTERFACE

When entering the shop, the player will be presented with different categories of item they can purchase. In addition to the normal categories described above, there will also be an "Alien Gear" category that opens up the first time the player unlocks a schematic. In addition to the categories above, there will also be a sell category that the player can use to unload excess gear that they no longer need.

#### BUYING

Upon selecting a category, the list of available items they can purchase will be presented.

For most categories, the players will be able to scroll through the list, select items, and choose to purchase it if they have sufficient funds.

Hulls will be a special category however, since the player can only have one at a time. For hulls, the cost listed will be the "upgrade" cost, or in some cases "credit", if they decide to downsize for some reason. Once they purchase a new hull, all the items on their current hull will be placed into their inventory.

*To Do: Determine how higher level items are gated, or if they are.*

#### SELLING

The sell screen will not contain any categories, but will just provide a list of all the equipment currently not in use. Certain items cannot be sold however.

- Hulls – these can only be upgraded, as described above
- Level 1 reactor, weapon, engine and ore collector – These will have no resale value, and will be kept as insurance that the player cannot be in a position to not have a valid ship configuration.

When items are sold, they will go into a special "recently sold" pool commonly seen in recent games. This pool will allow the player to buy back the item they sold for the exact price they sold it for, in case they have second thoughts. The player will be able to do this until they leave the base for another mission, at which point the sales are final.

The sell price for items will be 50% of their purchase price.

# STORY AND CINEMATICS

The basic story is your Uncle owns the family Mining Company but it's fallen onto hard times. Mega Space Corporation has had their eye on his claims for awhile, but he has resisted selling it, as he wants it to stay in the family. Unfortunately, he recently mortgaged it in order to finance a new sign that he is sure will make business increase (the sign is very big and very neon.) Not to be deterred, MSC has bought the bank that held the mortgage and is summarily changing the terms on his mortgage to force him to repay the bank in 90 days. Your job is to go out and mine the asteroid field to raise enough money to pay off the bank and keep the mining station in the family.

Once this goal is completed, through various machinations, MSC has managed to maintain their foothold in your section of space and furthermore, they are starting to get increasingly violent in their attempt to locate a mysterious alien artifact. As the stakes heat up, you are forced to try and beat MSC to the bunch by discovering what this artifact is and harnessing its powers for yourself.

### PRE-MISSION CINEMATICS

When the player leaves base for a sector, we'll show a real-time cinematic of the station leaving the base and whooshing into the foreground. When we have something to tell story-wise, we'll change to a view of the ship flying through space with stars-whooshing by and have a "radio chatter" exchange between the player and another character in the game. We'll probably create a number of camera angles so that this will vary from mission to mission.

### MISSION CINEMATICS

During the mission, you'll occasionally get communication from people in the sector or from the base. These will utilize a smaller, unobtrusive window with a small portrait of the character. These will dismiss after a short period of time or will automatically dismiss when you touch it. When designing these, it will probably require the player to be out of combat so as not to disturb them overmuch. Alternatively, we may want to consider having a blinking symbol that the player touches when they want to hear the message.

### SPACE STATION CINEMATICS

These cinematics will be done in a fashion similar to what we did with Ninjatown. It will feature larger graphics of the characters, showing a significant amount of their body as well. The text will be displayed along the bottom of the screen, and if multiple parties are involved, they will slide in and out as appropriate.

## END OF GAME

Once the player completes the game, they will be scored on their performance. The following outlines how the final score should be calculated.

| Category | Points |
|---|---|
| **Money Earned** | 1 per spacebuck |
| **Enemies Killed** | 1000 per enemy |
| **Discovery Bonus** | (Derelicts + satellites + sectors revealed) * 5000 |
| **HardcORE Win** | 1,000,000 |
| **Alien Tech** | 50,000 per Alien Tech (cumulative) |
| **Achievements** | 20,000 per achievement (cumulative) |
| **Number of Deaths** | -50,000 per death (max of 20) |

## REPLAY

Once the user finishes the game, the user will have the option to play a new game with that same profile. When they do so, a number of options will open up that were not available on the first play through.

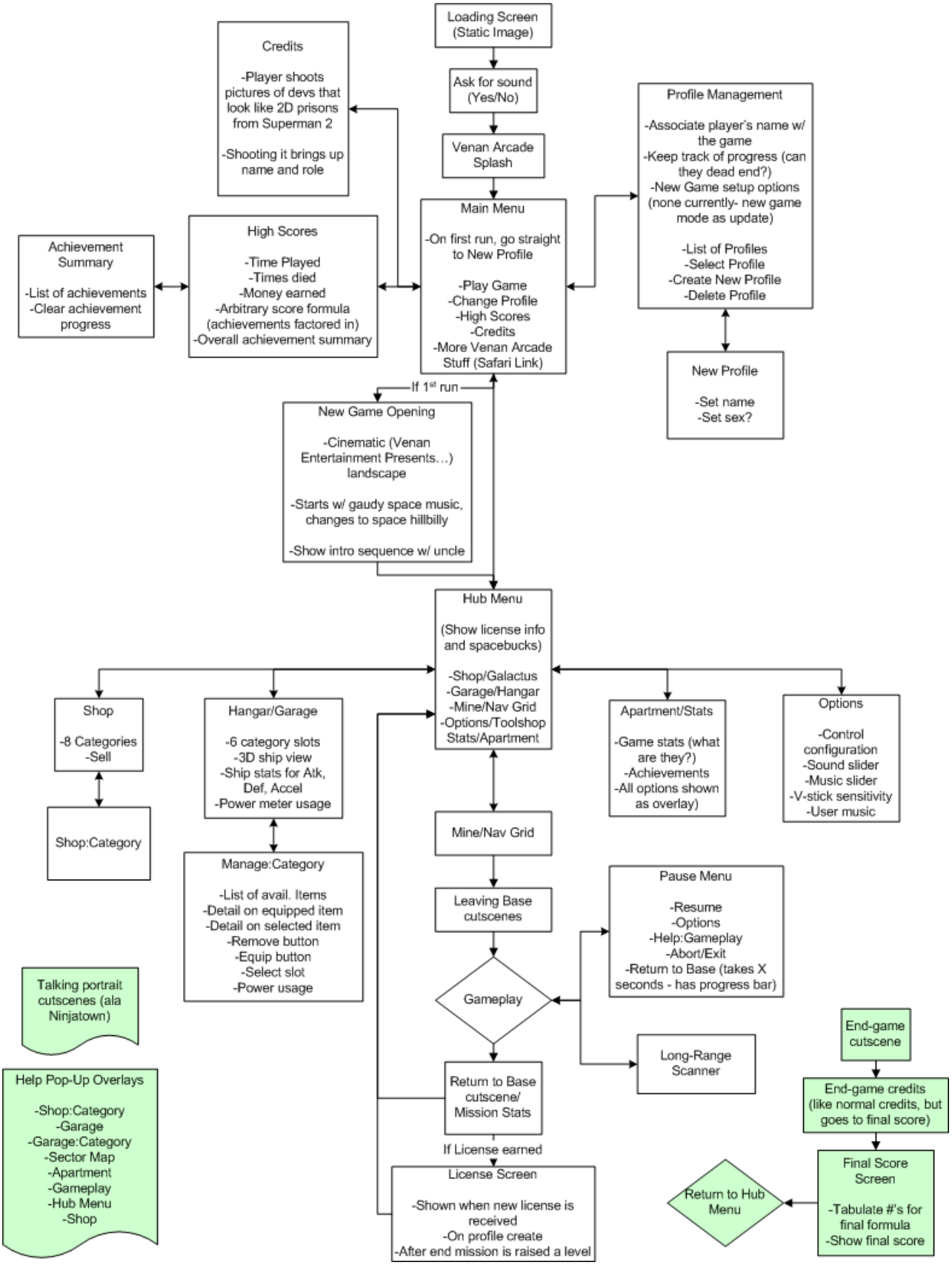
**HardcORE Mode:** In this mode, when the player's ship blows up they won't be able to restart. Instead they will be taken back to base, and they will have to put together a new ship with any money they have. If they don't have the money to do so, the game will be over. Finishing the game in hardcore mode will give the player a big score boost once they finish the game.

**Alien Tech:** Alien Technology that the player discovers will be persistent between replays and purchasable in the shop at the beginning of the game. In addition, since the Alien Technologies are randomized each game, replay will be the only way to unlock them all.

**Achievements:** Achievements will be tracked and persist in the profile across games as well. In order to unlock all of the achievements, multiple playthroughs will be required.

***Economic Victory (will probably remove):*** *A first in the spectrum of computer games – an alternate victory condition only possible through replay! Any stock the player purchases in Mega Space Corp will persist between games. At the point they have purchased a majority of the shares of the corporation, the player will immediately win the game, receiving a huge score bonus in the process. Once an economic victory is achieved, the player's stock amounts are reset for the next game.*

## USER INTERFACE



## EQUIPMENT DATA

When the player is looking at the various systems and upgrades available, they will need to see information they can use to compare the effectiveness of one system versus another.

Ship Overview

Hull
- Health: number
- Cargo Capacity: number of tons
- Reactors: {1,2}
- Weapons: number total
    - Turrets, Special: second line that breaks out these from the total
- *This will need to be a special case, since it is an upgrade they will need to see info on their current hull somehow*

Ore Collector
- Power Usage
- Range
- Attraction

Engine
- Power Usage
- Thrust

Reactor
- Power Generation

Scanner
- Power Usage
- Short Range Detection
- Long Range Detection

Shields
- Power Usage
- Strength
- Regen Rate

Weapons
- Power Usage
- Damage
- Reload
- Speed

# GAME DATA

This section describes the data points required for the different systems in the game. The actual items will be editable in text files, likely XML based, so the design team can tweak the without editing the code.

## SHIP PARTS

All parts will have the following fields in common:
- ID: unique ID of the part
- Name: String identifier for the part

- Description: String identifier for the description
- Price: Price to purchase the item.

The following describes the data fields particular to each part.

Hull
- HP: damage it can take
- Weapon Slots: The number of normal weapon slots. These are linked.
- Extra Reactor: Has an extra reactor slot
- Turret: Has a weapon turret
- Special Weapon Slot: Has a special weapon slot

Ore Collector
- Power: power units required
- Range: radius in meters it will try to gather ore
- Suction: acceleration value of ore to the collector in $m/s^2$

Engines
- Power: power units required
- Acceleration: basic acceleration. This may be replaced by a table of acceleration curves.
- Deceleration: basic deceleration.
- Top speed: how fast the ship can go. This may be unnecessary.

Reactor
- Power Gen: number of power units generated by the reactor

Scanner
- Power: power units required
- Type: Boolean detector or specific
- Range: How far an asteroid can be for it to be scanned
- Detection Speed: How long it takes to determine the asteroid type in milliseconds

Shields
- Power: power units required
- Strength: How much damage it can absorb
- Regen Rate: Rate it recovers from damage

Weapons
- Power: power units required
- Type: Kinetic, energy, or one of the special ones
    - Physics gun – pushes objects like half life 2 gun
    - Black hole gun – creates a singularity a set distance from the ship
    - Laser cannon – deals high DPS while it touches whatever is in its path and can sweep around the screen as you turn
    - Tesla Ball – Fires electrical energy at everything in the vicinity of the ship, dealing DPS
    - Drill – lets you ram for damage.
- Damage: Damage done by a hit
- Rate Of Fire: Time between successive fires of weapon in milliseconds
- Velocity: Speed of projectile
- Mass: Used to determine kinetic impact of weapon

There may also be additional data required for things tying specific graphic and sound effects to the item.

## ASTEROIDS (INCOMPLETE)

- Type
- HP

- Ore Value
- 8 types of ore, in increasing value
- Specials
- Gasteroid – expels gas occasionally that pushes it in a direction. May just keep this one and make it blow up.
- Fasteroid – quick moving asteroid
- Blasteroid – blows up when it is shot

### ENEMIES (INCOMPLETE)

- All have multiple levels
- Dumb miner that just destroys asteroids
- Higher level ones deploy shield around asteroid
- Kamikaze drone that chases player (has angry face)
- Becomes faster, does more damage
- Pirates/magnetic mines that attach to ship
- Stationary turrets and weapon platforms
- Higher level ones disguise themselves as asteroids
- Defender
- Attack drone that chases player, firing at them
- Mining truck
- Works with drones to collect ore

### MISSION DESCRIPTION

Determine what defines a mission in terms of the data fields.

### SECTOR DESCRIPTION

Determine what defines a sector in terms of the data fields.

## UNCATEGORIZED IDEAS

Some ideas that have been thrown around but not fleshed out in the doc yet. Some of these could be used for a sequel.

- Stock market – the prices of the various ores fluctuate, and the player decides where to mine based on the market conditions.
- Missile systems
- Pirates that interrupt you in mid flight
- Tether and special missions associated with it (asteroid hurling)
- When you collect ore, you get a “Cha-Ching!”-like sound effect and floating text saying “+X Spacebucks!” or a smaller variant of that.
- When you return to base after mining in the first half of the game, you get a “TAXED!” stamp on your screen after it’s finished tallying the numbers, complete with screen shake.
- Super valuable asteroids that sparkle – these have a higher drop rate and release ore on every break.
- Treasure sector where every asteroid is super valuable