
STELLARIS
Art & Design

Author: Fredrik Toll

Editor: Troy Goodfellow

Layout: Fredrik Toll

Brand Manager: Tomas Härenstam

Artists

Jenny Holmér	2D Artist	(16, 17, 18, 19)
Aline Gladh	2D Artist	(10, 11, 20, 21, 22, 23, 24, 25, 26, 27, 68, 69, 142)
Erik Nilsson	Concept Artist	(29, 49, 50, 51, 52, 53, 54, 70, 113, 117, 124, 125, 129, 130, 132, 133 138, 139, 141)
Kentaro Kanamoto	Concept Artist	(6, 12, 13, 30, 46, 57, 58, 59, 62, 92, 110,)
Jonas Jakobsson	2D Artist	(20, 39, 41, 108, 109, 137, 140,)
Carlos Lundhall	2D Artist	(45, 41)
Pontus Olofsson	2D Artist	(136)
Christoffer Fransson	2D Artist	(34)
Simon Gunnarsson	2D Artist	(32, 33, 35, 36, 37, 38, 41, 66, 67, 72, 73, 76, 77 80, 81, 84, 85 88, 89, 90, 91, 94, 95, 97, 98, 99, 100, 101, 102, 103, 104, 105 106, 107, 137, 140)
Niklas Tammpere	Animation	(42, 43, 44, 45, 136)
Markus Krantz	3D Artist	(86, 87, 114, 116, 118, 119, 121, 139, 141)
Magnus Nyström	3D Artist	(56, 74, 75, 82, 83, 114, 115, 116, 118, 119, 120, 121)
Viktor Nyström	3D Artist	(60, 61, 64, 65, 74, 75, 78, 79, 112, 116, 119, 120)
Maxemilian Roberts	3D Artist	(71, 115, 118, 119, 120, 128)
Robin Skog	3D Artist	(71, 119, 128, 135)
Helena Kasper	3D Artist	(126, 127, 128)
Staffan Norling	3D Artist	(127, 128, 132)
Joakim Larsen	3D Artist	(48, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 126, 127, 129, 131, 134, 137, 139)

STELLARIS™
Art & Design

Chapter 1 - Introduction

Dear Fans

In Stellaris you will venture into the unknown, exploring a galaxy full of forgotten mysteries. This project was also a journey into the unknown for Paradox Development Studio. This venture into space has been something commonly requested by our community and something we've wanted to do for a long time. In this art book you have the opportunity to share this adventure with us. We know strategy, but space is very different from history.

This art book is a chance to take you behind the scenes of the development of Stellaris and share with you what we were thinking as we created the game. We take pride in being a relatively open and candid studio when it comes to development, so a book of this nature is not a giant leap for us.

Stellaris is easily the most ambitious Paradox game to date in terms of scope, challenge and competition. With this game we want to create a new universe for you to have adventures in. We have safely worked within the confines of history for a long time, briefly stepping outside our comfort zone with Runemaster - which was a whole different beast. We've learned so much in making this game and are immensely proud of what we have built. We very much hope you will like and enjoy it as much as we do.

A word of warning: in this art book, we will try to be as comprehensive as possible, touching on all the major elements of the game, including ship design, alien design, interface, environments, and so on. This does mean that if you have not played the game a fair amount, there may be a lot of spoilers in this book for content you will discover in the game.

Art Director
Fredrik Toll

"The galaxy is vast and full of wonders."

These words were written early on in the project and would prove to be very helpful as a guiding star in the process of making the game. In fact, this short sentence concisely captures much of what you will find in the game. Any successful game knows what it is at it's core. Everything around that should only serve to reinforce that vision - it should all pull in the same direction.

The game vision for Stellaris emphasizes exploration and the fantastic things you can find in the vastness of space, be it long forgotten technology or interstellar conflict. There should always be new wonders out there and we wanted the art to enhance this vision wherever possible. Since this is a Paradox game, replayability was another major goal - This is, after all, a core precept of all of our games. By creating a game where there are many things to discover, more than you could hope to find in a single play through, we aimed to create an experience worth playing again and again. In similar games, exploration is often the least developed mechanic.

Most games in this genre also focus more on a small number of races that can be easily fleshed out. We've gone the other way, having a huge variety of possible encounters which are never the same, so the universe is always is alien. Stellaris is clearly grounded in lessons we've learned in our history themed games, but, being freed from history, we can be much more creative. It's always fun to make something entirely new. It's also a challenge to diverge from the path that has served us so well for so long. But we believe that Stellaris has a limitless future as a franchise.

Finding the Style

God didn't have a timeline, and neither did the Big Bang. But game developers are always on the clock, so when you're creating a new universe from scratch, you have to be careful with your ambitions and where you choose to spend your time. We started by asking questions about similar games. What do we like about strategy games set in space? What has been done to death? What has always bothered us about the things we've seen? What have we always wanted to add? How can we set our game apart from others?

For even the most inspired thinkers, ideas don't exist in a vacuum. We looked at all the science fiction we could find to try to identify what resonated with the vision we had for Stellaris. Curiously, some of the most inspirational images were not gleaming cities or towering monoliths, but planets with abandoned alien ruins. Imagine getting to visit such a world! Who built these structures? Are they still out there? Ruins have always held the potential for great storytelling, and it is through science and archaeology that we uncover the mysteries of the past.

A game's art style serves many purposes. It should, of course, be distinct from other similar games. It should communicate game data quickly and easily. It should also never lose sight of the game's primary mission. For Stellaris, that means something wondrous and exciting in every image.

When establishing the art style we rummaged through all the sci-fi imagery we could think of. We looked at the genre classics from Ralph McQuarrie, the famous worlds of Star Trek, and, of course, newer staples of science fiction universes from games like Mass Effect to Halo.

A theme that soon emerged in the references we liked, were that images with high contrast and strong colors most reinforced our ideas. Colors like an amusement park at night, or a city at sunset. Colors like in the image below. The dark areas generally have an air of mystery, and the strong light and saturated colors give a sense of wonder. We felt that this would hopefully evoke a sense of awe in the player, and an urge to explore.

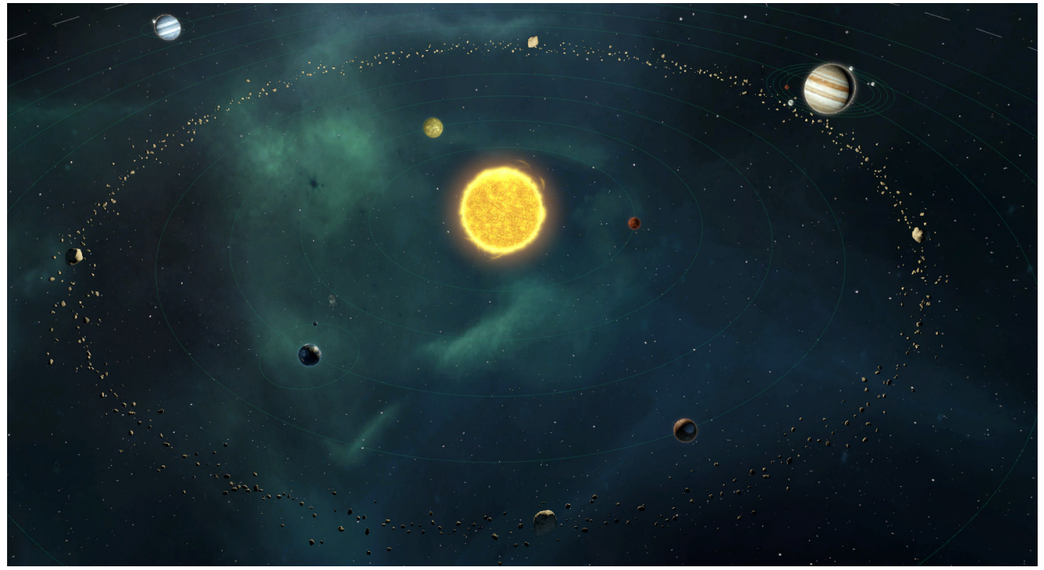
We were particularly drawn to the work of Kentaro Kanamoto, an American illustrator of fantasy and science fiction worlds. His style is perfect for the feelings we wanted to convey. We reached out to Kanamoto and asked him to create a few different images covering the various themes in the game, such as colonization, alien cities and planets, space combat, resource extraction, and so on. These pictures would be an inspiration to our artists, and inspiring to the team as they looked for direction. Any new artist on the team, or even members of management, could look at these images and know what kind of game we were making.

Realism

Art wise, Stellaris strives to be a fairly realistic looking game, or least more so than the stylized realism you find in most space based games. Naturally, the scale and distance between objects is quite a way off from the real world - space is much bigger and emptier than any game can possibly show. But we do keep it realistic wherever possible. There are different star types and the different planet types are associated with the distance from their sun, and the type of solar system. So, the frozen planets are farthest away from the star and the inhabitable planets are in the middle.

We've extended this principle to the planets themselves, ecology, ship design, and the like. Our understanding of the universe, though extensive, is still fairly limited, so if we do make it to another habitable planet one day, we will certainly find a lot of things we could not even imagine were possible. Today's realism has limitations.

Paradox has grown a lot in recent years, but we are still limited in what options we can pursue. For every thing you put in a game, you must ask yourself if it serves a clear purpose. You have to make a lot of tough choices and make sure you are spending your time and resources wisely.

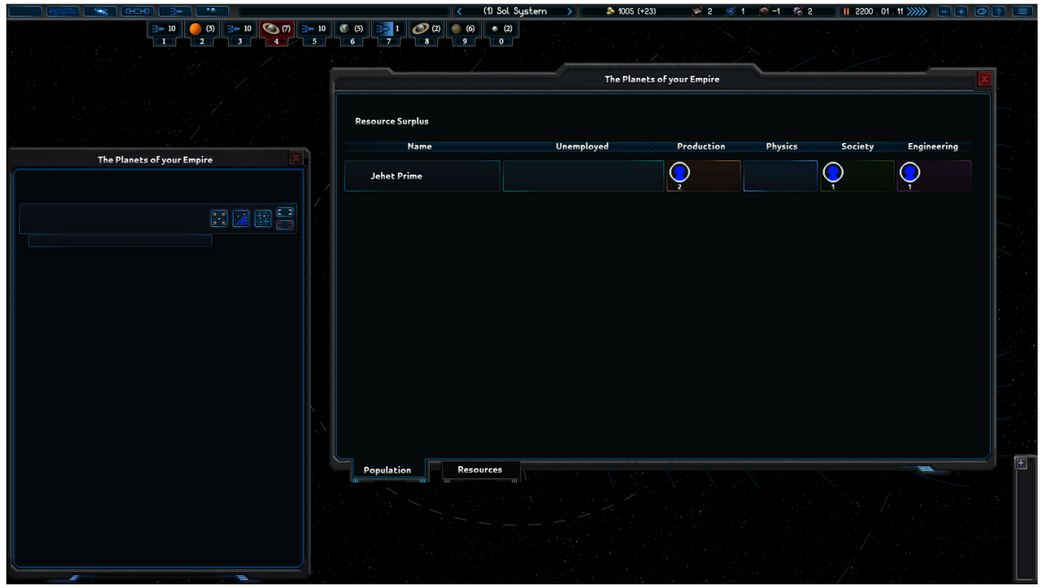


Chapter 2 - Interface

User Interface

A game's user interface is one of the most prevalent, but least appreciated, aspects of game art. Any Grand Strategy artbook from Paradox should not fail to highlight it. At Paradox, we try to make our UIs artistically appealing, but also practical. Our games are fairly complex, so the interface usually needs to be equal detailed. But a good interface can never be complicated. This is where art matters.

Initially we went with a fairly standard futuristic interface, as shown below. It would have looked fine, but we felt we wanted to do something more original. We did not want the game to look like every other game. On a deeper level, we also did not want it to look like how we imagine the near future for humanity. It should be more alien, and less obviously human. But we're human, so what does that look like?



Making the decision to change the look was not easy. The game was already fairly far along, and this choice meant throwing away a lot of things we'd already thought finished. However we felt that we could do better, reach higher and so we raised the bar.

Once we finally decided that a drastic change was in order, we opted for working with outside help. We wanted new lines of thinking about the UI, and that meant new voices. We brought in a Swedish studio called 1910, with whom we had worked on Showdown Effect. They'd done a beautiful retro style front-end for that, which perfectly suited the game's tone. And we felt, maybe they could bring some fresh ideas into Stellaris.

So we met with 1910 and presented our thoughts and ideas. 1910 worked quickly and soon presented a thrilling new perspective on what our UI could look like. Their pitch was definitely something new from what we normally make, and it was exactly what we needed. The UI did not end up looking exactly like what they created for us, but it definitely helped us break the mold of our previous thinking.

One easy way of achieving a more alien look was to change the color scheme. Color is a very powerful tool. By changing the game from the traditional slate grey with glowing blue, to something less familiar, like green, purple, or orange, you immediately get a different feeling. It both sets Stellaris apart from the majority of sci-fi games, and also throws the game way forward in the future. Since these colors are more non-traditional, they feel slightly more alien. We settled on green and orange as the dominant colors. This combination of hues is not entirely foreign to games, but it's still fairly rare. This should help Stellaris stand out from the crowd of similar games.


Tzynn Empire
Despotic Empire
Hegemonic Imperialists
I am authorized to speak for Emperor Sazzeeja I. Can I help you?
Declare War
Establish Embassy
Declare Rivalry
Insult
Equivalent
Wary
Tzynnia
Tzynn
Arthropoid
Jurg-Shondaar
Makkar System


L'Dorak-class Cruiser
Chain Breacher
Wrath Core
Protector Bulwark
New Design
M'tskar Ro
Auto-Best
Corvette
Yaaskan
Auto-Best
Destroyer
L'Dorak
Auto-Best
Cruiser
J'Kal
Auto-Best
Battleship
S'Kothan
Auto-Best
Defense Platform
Auto-generate designs
Specifications
Production
Cost: 359
Build Time: 120
Maintenance: 1.79
Ship Stats
Power: 78
Hull Points: 1056
Armor: 35
Shields: 0
Evasion: 20.00%
Speed: 0.7
Damage: 56.73 /
Special Values: 0
Design Name
L'Dorak
Save
Auto-complete ship
Clear Design
Adranell
Adranell System


Technology
Researched
Physics
Wuuqam
Blue Lasers 10/480
Unlocks Component: Blue Laser
91 months remaining
Society
Pubgluurh
New Worlds Protocol 10/360
Unlocks Ship Type: Colony Ship
68 months remaining
Engineering
Hmaalurd
Interplanetary Expeditionary Forces 0/240
Unlocks Army: Assault Army
Unlocks Attachment: Assault Landers
47 months remaining
Makkar System


Yondarim
Planet Summary
Surface
Armies
Spaceport
Outliner
Planets 1
Yondarim Tropical World Adranell
Military Fleets 1
1st Star Flock 3/10 140 Adranell
Civilian Ships 2
Construction Ship YRS Blithe Hatchling Adranell
Science Ship YRS Vengeful Ha ... Adranell
Adranell System

Icons

Icons are a very integral part of any Paradox title. If you were to count all the icons in any Paradox grand strategy game, you would soon notice they often number up towards a thousand. Serious effort goes into illustrating these icons, which often need to show off very abstract ideas.

Icons usually have an array of different styles. This makes them both easier to distinguish and remember, but different use cases are also naturally suited to different styles.

Ship components for instance are small renders of the parts they represent, while traits are simpler symbols of the characteristic they convey.

The buildings in the game are also icons and we choose to have them blend into the planet tile fairly well, at the same time we tried to make them easy to distinguish.

Trait icons

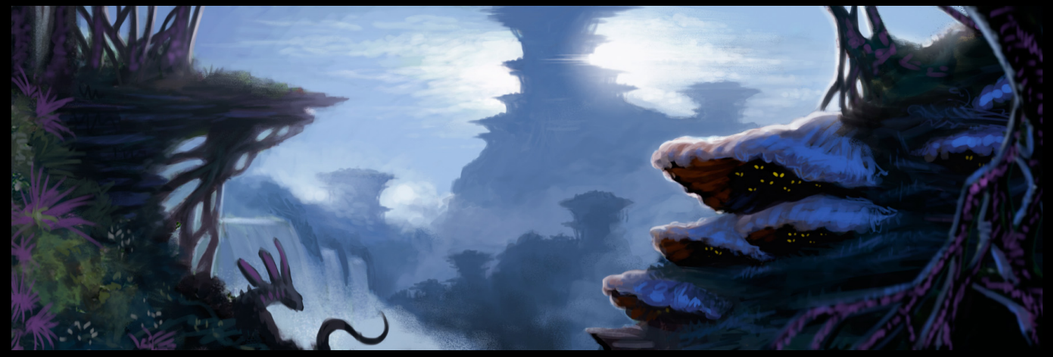
Notification icons

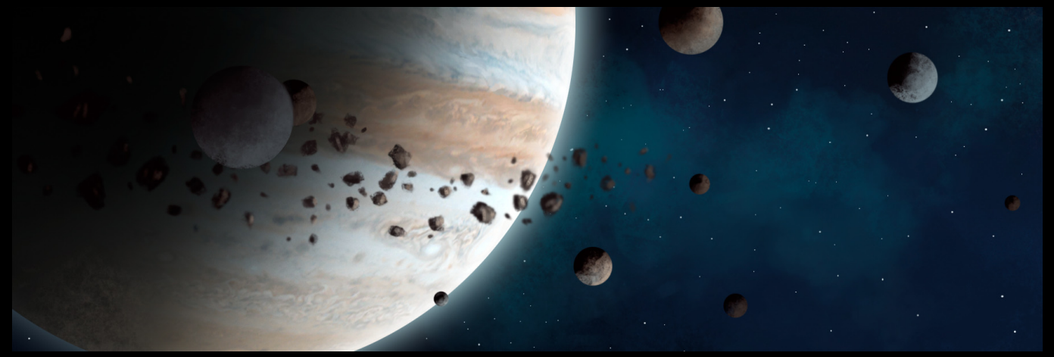
Component icons

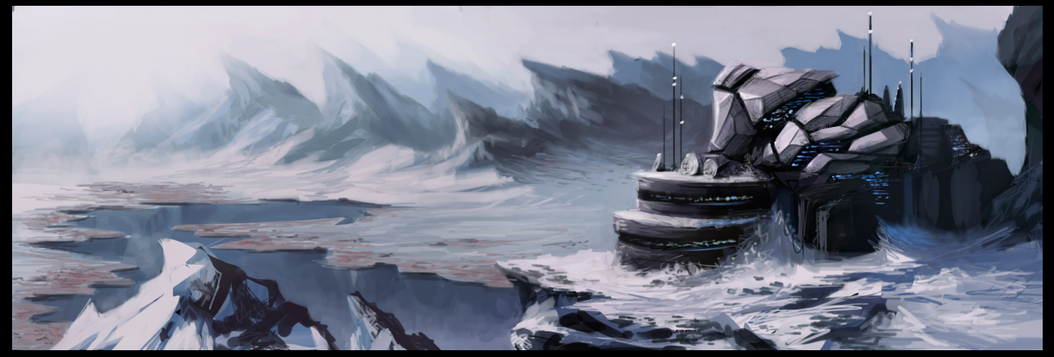
Event Pictures

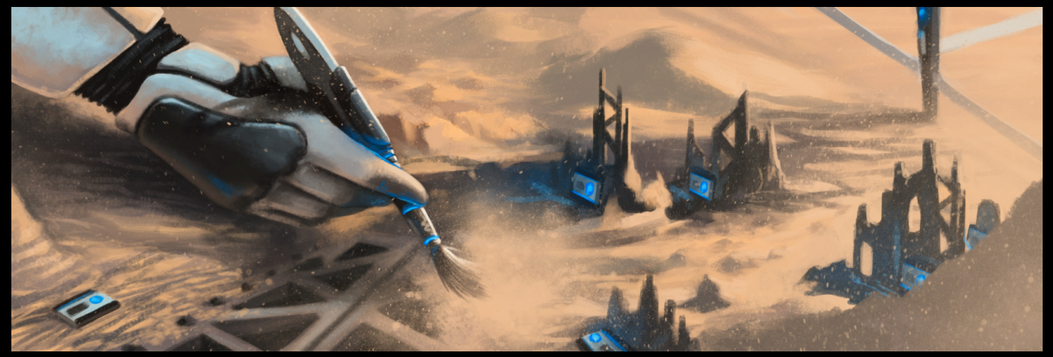
One of the best ways to convey and experience a new universe is through illustrations. Events have long been a central mechanic in our games, and these beautiful images capture the ongoing events throughout the game. In Stellaris, we can convey the universe we imagine through these event images. With hundreds of events, we can use dozens of images to remind players that they are in a world very different from their everyday lives.

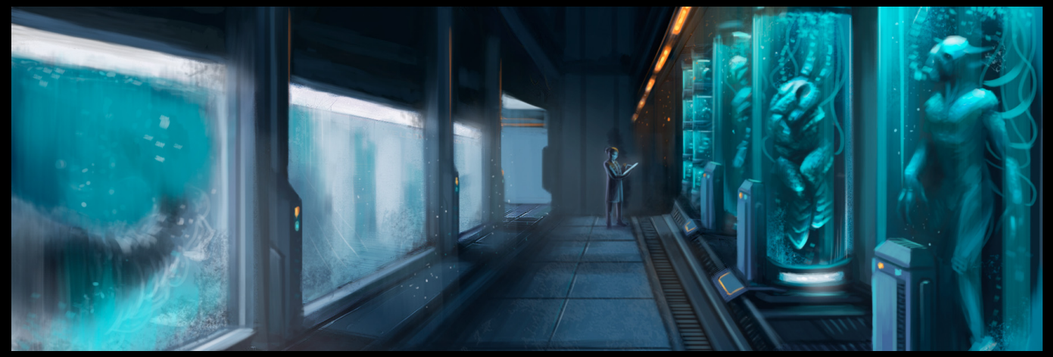
Our event images give us an opportunity to show off all the various aspects of our world. Anything from exotic environments, creatures, technology, interactions and war. Not surprisingly, creating these images are a favorite task among our artists, enabling them to challenge themselves and use their imagination to the fullest.

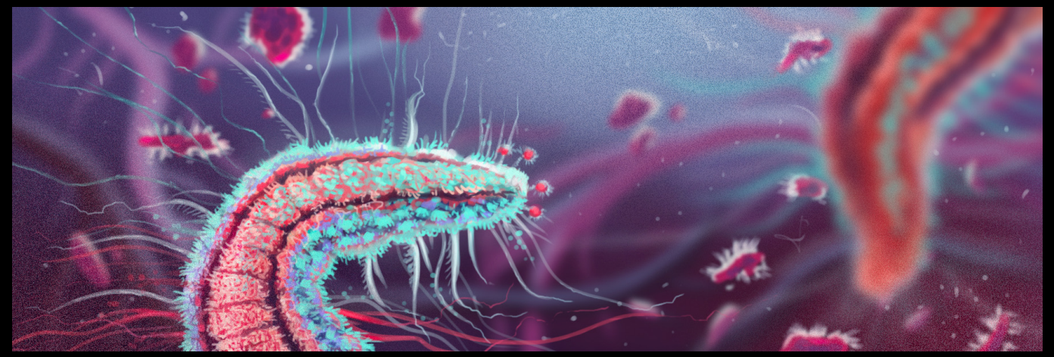


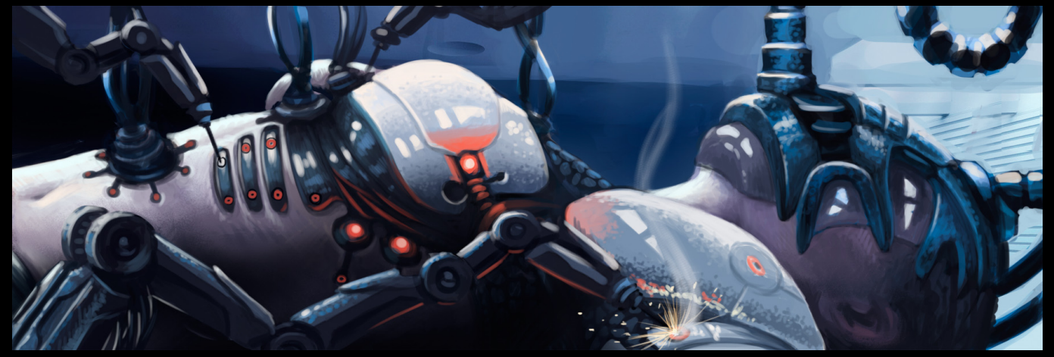












Cover Art

There are few things more challenging than creating distinctive cover art for a space themed game. For a space game what you generally have to work with are: space ships, planets, stars and alien faces, and combinations of these are what is commonly used. Characters usually make for good cover art, but they are rarely the focus of a strategy title, and we did not want to put our focus on one or even a few of our species. After all, the game is not primarily about characters; it's about exploration and expansion.

Even within the confines of typical sci-fi tropes, there were promising angles for a cover. There were many concepts we would have liked to convey, though many of them are not compatible. We contemplated first contact between civilizations, diplomacy, conflict, species of varying levels of technology, alien fleets, or the discovery of something long forgotten.

Our emphasis is on exploration, so we chose the surface of an uncharted planet. Though most of the gameplay is in space, the planets are far more effective at conveying the alien nature of our game. In the scene a science ship scans the surface of an alien world as a landing party sets out to investigate what might be a mysterious ruin. A foreign sky looms over the scene, giving a hint as to the epic events taking place beyond.

Evolution of Stellaris Cover Art

Advisor

Nobody really wants to do a tutorial, but one way or another every game needs one. Developing a tutorial is a thankless task that no one comments on unless it is terrible. Also since some game systems aren't completed until late in the development process, work on this aspect has to be delayed, and it's easy to rush what is actually an essential piece of the game.

What you really want is for people to just start playing the game, trusting that the game is smart enough to highlight when you've missed something important. That way, you have the self-exploration and experimentation that players appreciate, but also have help pop-up in context - not just as a starting scenario. To that end, Stellaris uses an Advisor to offer explanations of what is going on and how you get things done.

In line with the "no human bias" precept, the Advisor needed to be culturally neutral, but more importantly it needed to be likeable. You want starting players to use the Advisor, and if they found it annoying, then it wouldn't be doing it's job, though it is very hard to hit this "likeability" target. We did not want some cartoon character. The tone of the game is fairly serious, still, we wanted the advisor to be a little bit lighthearted and even witty at times. Therefore it's appearance needed to reflect these varied goals.

A character's likeability is heavily dependent on the writing and as in this case voice acting. But a welcoming appearance is especially important for a character you expect to be a teacher. The work to actually make the character is fairly small, so there was no rush in starting.

We drafted a lot of thumbnail sketches for the advisor, more than a 100 slight variations. We then put them it to a vote and ranked them. There was of course no clear winner. We might as well have put them up on a board and used a shotgun to pick. People obviously like different things, but nonetheless, all data was valuable and we moved forward.

In the end, there are no shortcuts to designing something like this. You just have to iterate and work hard until you find something you think will work.

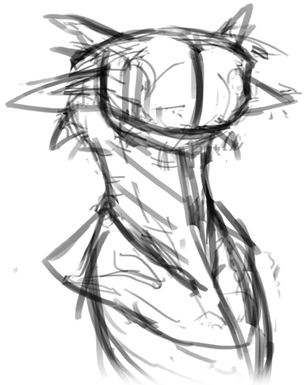
Chapter 3 - Characters

Designing Aliens

For the characters, we knew we wanted to make our alien species as varied and as strange as possible. And, we also knew we wanted the player to find many new species in every new session they played. Infinitely large universe and all that. This meant that we had already set a very large scope for our ambitions.

But good game design means being constantly aware of your constraints. The alien species serve a game purpose, and have to be plausible within that. All of the species are sentient creatures who, through their imagined histories, were able to develop tools, invent technology and finally conquer space. They probably require some sort of extremities with which to grab items, be it tentacles or fingers. It is rather hard to get around this if you want to escape your planet. You could, I suppose, be a mind controlling parasite which has compelled a slave race to do your bidding, and we have those, but those are not in the majority - but aliens that strange can't be the basis of our concept art.

Another constraint was that we need the races to participate in diplomacy. They have leaders and populations. The art therefore does need to fit a certain format. That said, we have done our utmost to avoid the trope of just having different foreheads and skin colors.



Traits

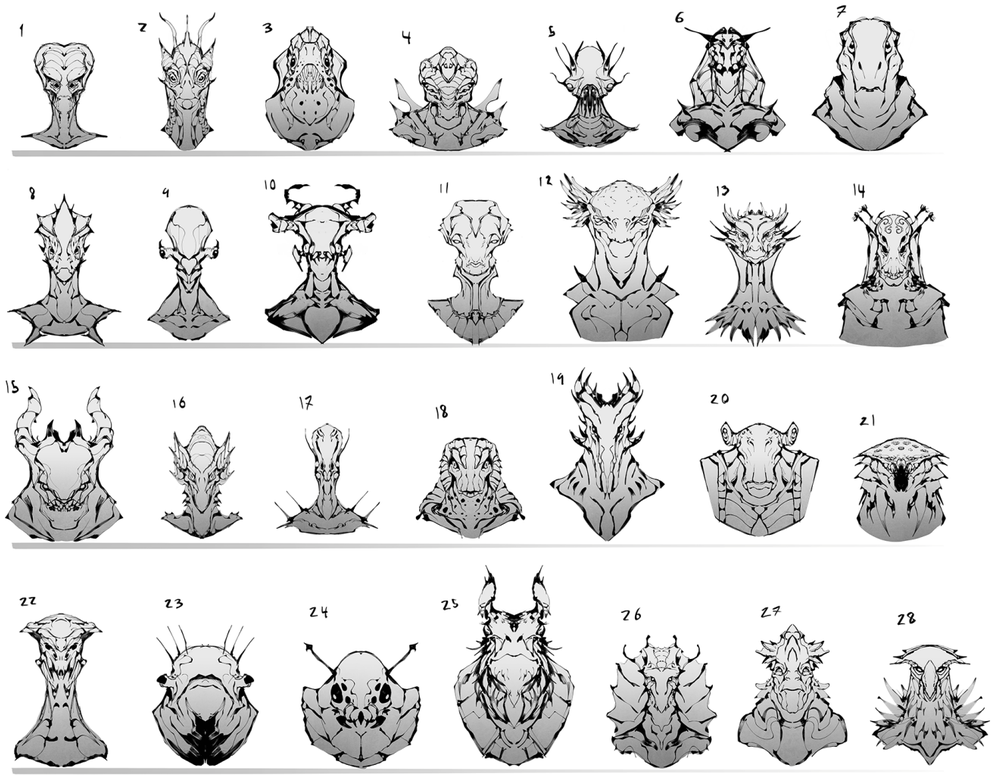
When it came down to designing individual aliens we looked at everything we could imagine. Fictional alien races we knew and many we didn't. Every animal and insect we could find, plants, mushrooms and corals, you name it.

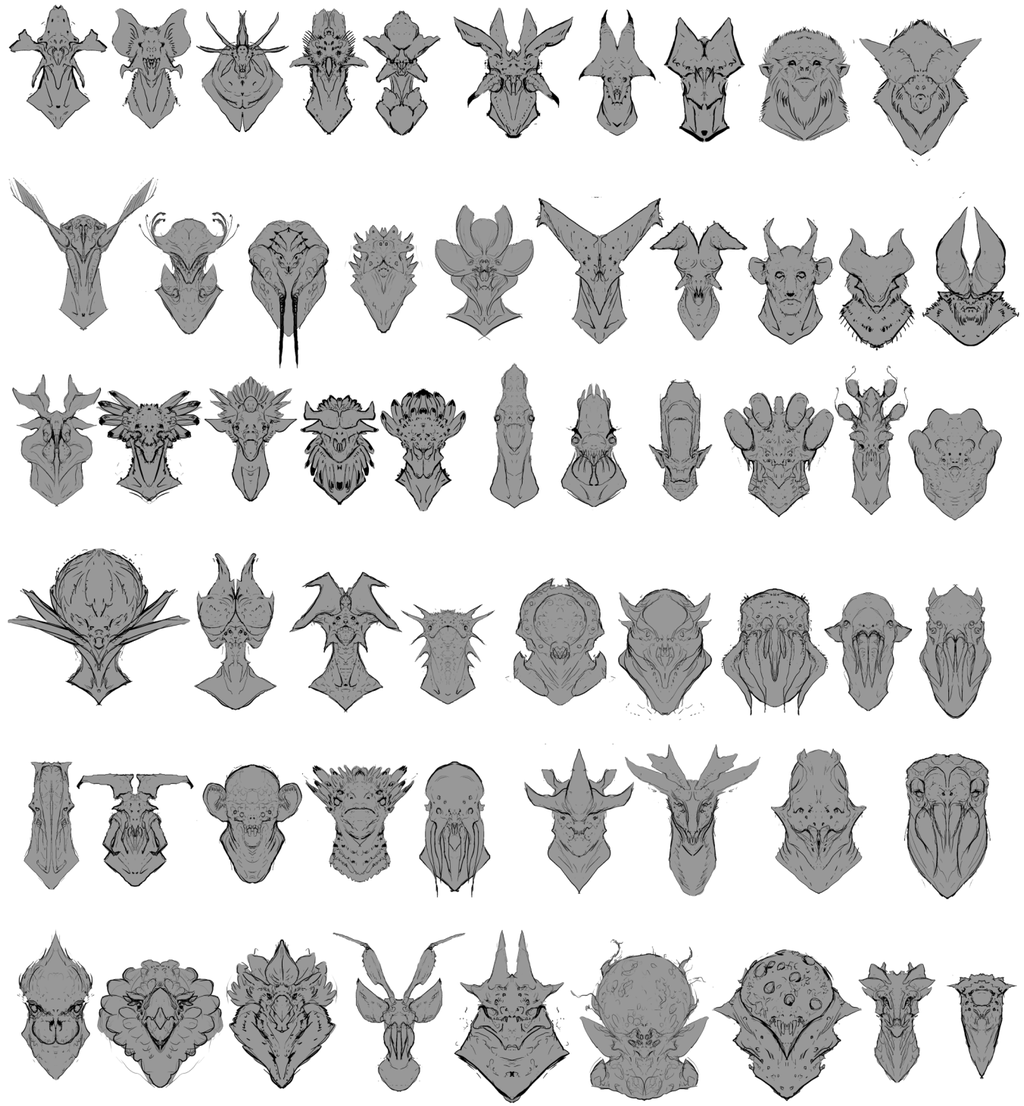
We didn't just plan on importing these ideas. We did not just want an elephant alien, or a praying mantis alien. Instead we looked at creatures and identified their unique traits; Long faces, wide faces, one eye, two eyes, more eyes, horns, antlers and tusks, zebra stripes and spots. By the end we had a massive list of traits and used these as inspiration in our alien designs.

As we conceived the aliens and we saw how they were turning out, we gave each design a rough "ethical" identification. So we could balance the appearance of all aliens, we don't want them all to be cute or all to be evil, rather we want a nice mix.

Aliens Concepts

Even as we started to concept our aliens, we knew that we had to nail them down quite quickly. We started with simple sketches like these to find ideas we liked, and then we went through the detailed stages described above to fine tune these outlines.





Aliens Variety

We knew we wanted a lot of aliens, so we set an ambitious goal of roughly a hundred. This was then further subdivided into several groups, such as Mammalian, Reptilian, Avian, Arthropoid, Fungoid and Molluscoid, with Humans getting some special treatment for ethnic diversity. Each class of alien then was further divided into Slender, Normal and Massive, which made making concepts for them a lot easier. We also had an idea for them living on different gravity worlds and such, something which so far has not made it into the game.

While creating the first aliens we soon realized that we needed a way to distinguish the different classes. We needed to know what separates them since they sometimes blend together. If an alien race has a beak and scaled skin, is it avian or reptilian? What is the best defining feature? In science there are, of course, detailed criteria setting out what distinguishes a bird from a lizard. But, to keep things simple, we settled on the skin type as the main feature of a species class. If a race has fur covering most of its body, it's likely mammalian. If it's got scales, it's reptilian. Avians have feathers. Molluscoids are smooth and slimy. Athropoids have an exoskeleton, and Fungoid are just weird.

Since every species has evolved light years apart, different races within the same class, have no common ancestry. Two Avian races has as much in common as they do with a species from another class.

Mammalian

Reptilian

Avian

2D vs 3D

The choice between using two-dimensional characters or three-dimensional models was relatively easy. If we went with 3D models, we knew that we would have a lot fewer of them. 3D characters are fairly time consuming to make, since we still needed to concept sketch, and then create a 3D model. High-polygon modeling then low-polygon mesh, followed by 3D animation - this all adds up. With the size of our team, the characters would have taken a minimum of two weeks per character and somtimes closer to a month.

We knew that alien diversity was a key part of our replayability plan, and this is a core Paradox value. Therefore, a large number of species would be pretty much essential in meeting this goal. Thus 3D was out of the question.

2D Portraits are, admittedly, less interesting, being static and all. Still, two-dimensional art offered some clear advantages. It's not just way faster to produce, it's also easier to make weird things. When you are designing aliens, this is perfect.

Arthropoid

Fungoid

Molluscoid

General

Scientist

Ruler

Governor

Clothing Design

In Stellaris you wont just see your species as the ruler of your empire. There are populations, and leaders such as generals, governors, scientists, and admirals. We needed to vary these characters appearances to keep them interesting.

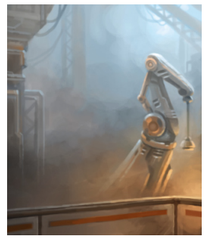
Not every alien in the game will have clothes, which is another way of enhancing visual diversity. Generally though clothing is great for making aliens feel intelligent and civilized. We identified five different clothing styles that we required for the game - one for each major occupation - rulers, governors, admirals, generals and scientists. Each would have their own appearance.

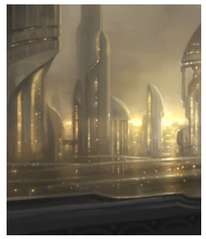
Scientists, for example, would generally look like they are ready to explore hostile environments in a high tech suit. Generals would wear uniforms that had a more battle ready look. Yes, in reality the head scientist might not be to one on the away team, and the general should not have a need to wear armor in his command center. But we're using clothing more as visual cues and conceptual association - not world building.

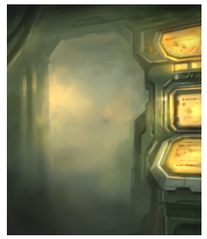
We used colors in this way, too. Generals would have a bit of a green hue, while admirals tend towards blue and would also have a lot less tech and armor - that's what a starship is for. These patterns carried down to the government level, with the species ruler having a more ornate costume than planetary governors.

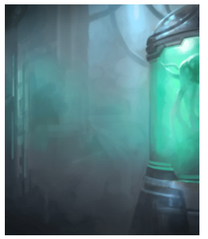
We decided that all aliens of the same class and size would use the same clothes. Slender Avians, for instance, would all share uniform designs. Since each character's body has to be rendered regardless, drawing a piece of clothing does not really add any production time to each of the characters. This system would of course make a few of the other races more similar to each other, but the diversity it adds on the player side is much more significant. Also, making unique clothes for each race was never really an option.

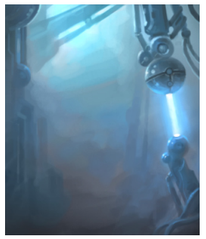
Each type of leader also has a different background. These were heavily colorized in accordance to their occupation to more easily identify them and better separate them from other leader types.











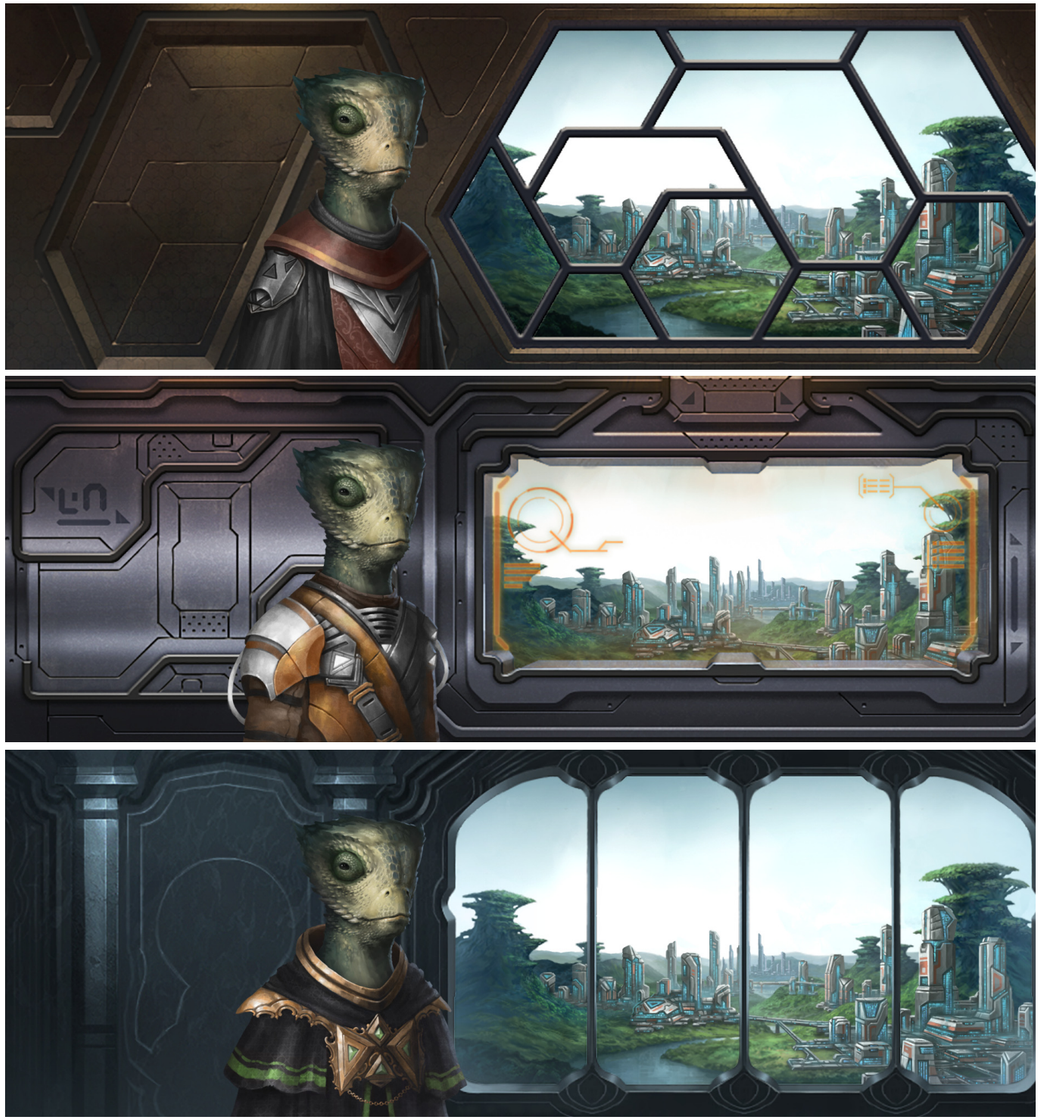
Cultural Expressions

We are able to let some of the clothing design serve an additional purpose. When encountering other races, we can have their appearance reflect their culture. If your conversation is with a militarist society, it is more likely that you will be talking to someone dressed in a general's uniform. Theocracies are heavier on the fancy side of clothing. Scientific technocracies are ruled by scientists. We took the opportunity here to further vary the appearance of the aliens you meet.

As the clothes change with the government type, so too does the room. For each ethic we also created different backgrounds. These attempt to reinforce the identity of the society you have encountered, giving them more personality, and separate them from all the races you meet. Militarists have a sort of military bunker, made of worn metal. Collectivists have a simple style of concrete with hexagonal windows, reminiscent of honeycombed pattern. These designs play on the associations we had in our mind for each type of regime.

Our quest for replayability, diversity, and a large amount of species presented another problem. The player would after all be playing only one race, which mostly looks the same. Though they could, through the course of the game, assimilate new races into their society, but for the first several hours, they would all look the same.

The easy way to increase diversity was to create multiple colored versions for each species. So if an alien was created with orange skin originally, we created yellow, red and white versions of them as well. This was an easy way to add variety to each species, but none the less was very time consuming. When you have close to a hundred species, any additional work has to be multiplied by that amount, so sometimes your choices are limited.

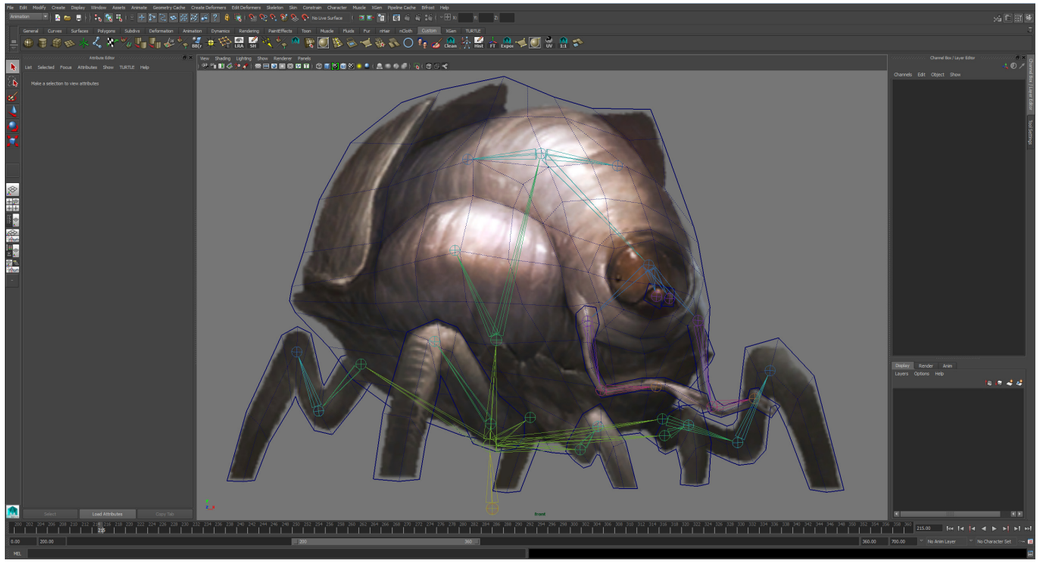


Animation & Effects

When we decided we would have 2D aliens, the intention was to have them be static illustrations. We felt that with the amount of characters we imagined, we had created enough work for ourselves already. Even if we did want to animate the characters, at that moment in time this was not an option.

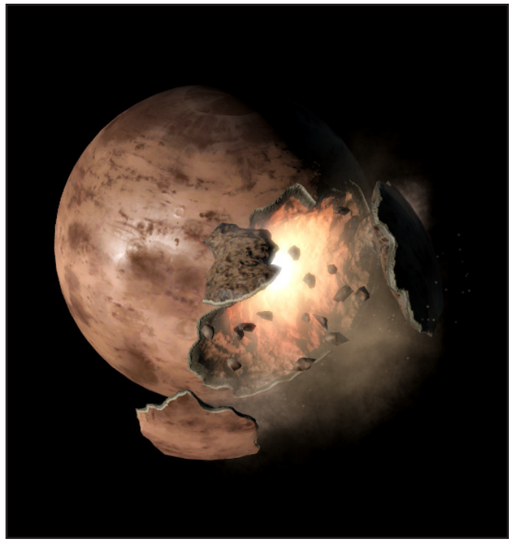
In the game the main focus for the animation was the ship combat. Weapon effects, explosions and death animations for the ships. In all our games combat is automated, however in Stellaris we wanted the combat to look captivating.

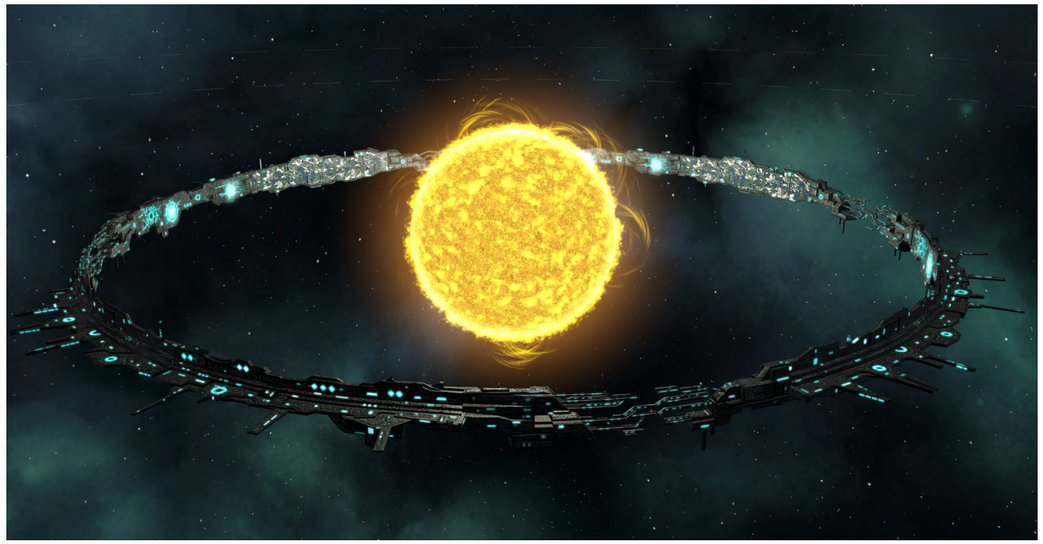
Halfway through the project, additional animators became available, and a new opportunity presented itself. Could we animate our 2D characters? We went ahead and created a proof of concept for the idea. Was this possible? Would it look good? Would it be worth the effort? The animation test passed the internal review, everyone who saw it agreed that this was a big improvement and the game would benefit greatly from this. Additional art time was approved, Stellaris characters would be alive.

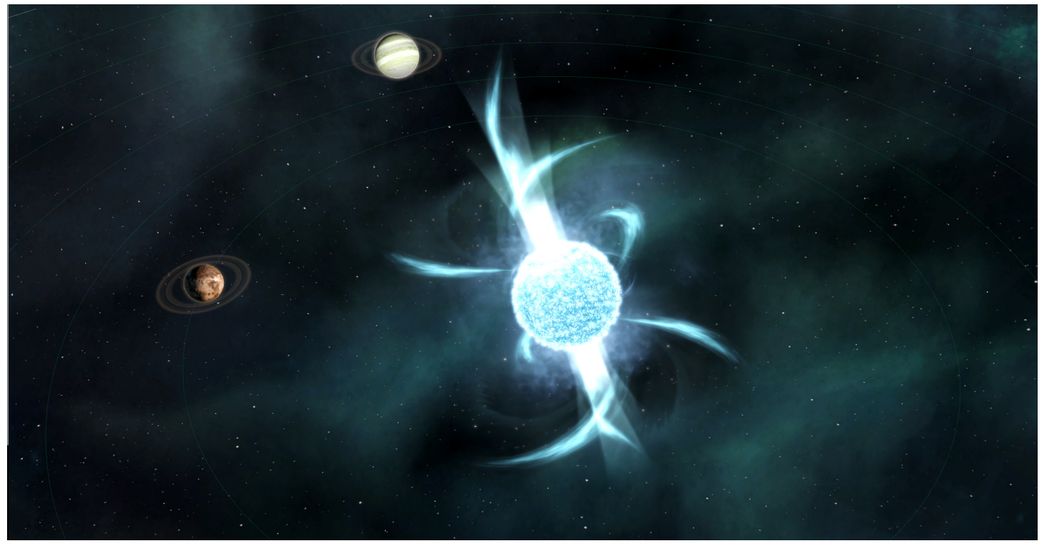


Even though we introduced particle effects in Europa Universalis 4, we never really had much of a chance to use them there. With Stellaris we finally had the opportunity to put them to good use. We of course used them for all the weapon effects, such as muzzle flashes, impacts and destruction. But particles are not just lasers and explosions, they are used for all sorts of things. Like ships repairing or upgrading, A to M class stars, as well as more specialized things such as wormholes, pulsars and neutron stars.

Additionally we created special classes of planets for events, to add things to be discovered, such as the shattered planet, and the ring worlds.







Chapter 4 - Spaceships

Ship Appearance

From an artistic point of view, we wanted the ships in Stellaris to look fairly realistic, and the scale to feel grand. We also wanted the game to be quite dark, but we did not want it in the grim and harsh sense. So much of game art recently has achieved realism and detail by adding dirt and damage to everything, in general it does a good job, but this worn down style was not what we were aiming for. We wanted a detailed and realistic look, but without resorting to this technique.

Clean art can be really hard to make though, since it easily ends up looking like plastic toys. This was one of the things we very much wanted to avoid. We did not want the ships to end up looking like toy armies in space. Quite the opposite, we wanted everything to feel massive. This also ties in very well with the perspective of the player who controls the grand scheme of things.

On of the things that really help us was Physically Based Rendering (PBR). This addition to our engine enabled us to achieve more realistic looking materials. PBR was implemented in Runemaster, and with this we were able to get more convincing looking ships by having a larger range of material properties to the surface. PBR gives us the possibility to create more varied materials, especially metal. Surfaces thus look more natural and this helped us get away from everything looking like plastic.

This is an early test ship, trying out what the PBR shading could do for us in Stellaris. You can see that the surface looks a lot more like metal, as opposed tot he plastic feels phong shading often gives.

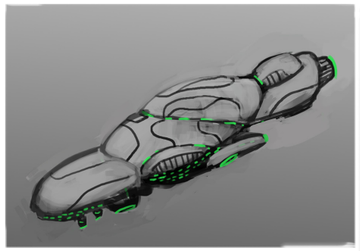
This ship design would later evolve into what became the ships for the Arthropoid class.

Ship Design

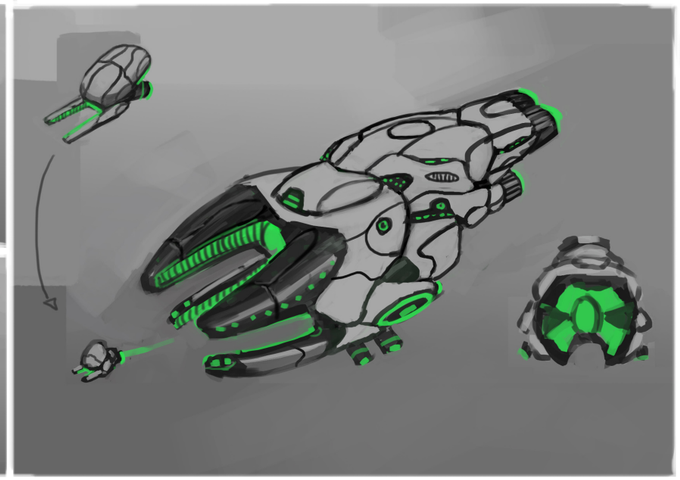
The appearances of the ships were of course also deeply influenced by the game design. A “ship designer” is something people have come to expect from science fiction strategy games. So the ideas for the ship designer were in place very early in development, and affected the designs of the ships significantly. The ship designer would be fairly simple, with the player being able to fit different weapon types and utility modules to the ships sections. The primary purpose of our ship designer would be to facilitate tactical depth, while still keeping things simple. The players should be able to add missile and point defense, lasers and shields, mass drivers and armor, fighters and bombers.

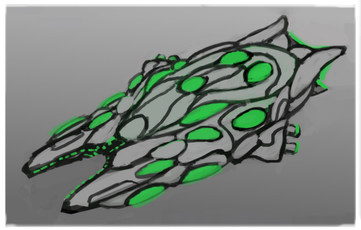
Many other 4x games have a very elaborate ship designer either graphically or mechanically. We did not want the ship designer to be a major focus of the game, only for it to add depth to fleet combat, and some customization of the ships on behalf of the player.

Fungoid Transport concept



Fungoid Construction ship concept

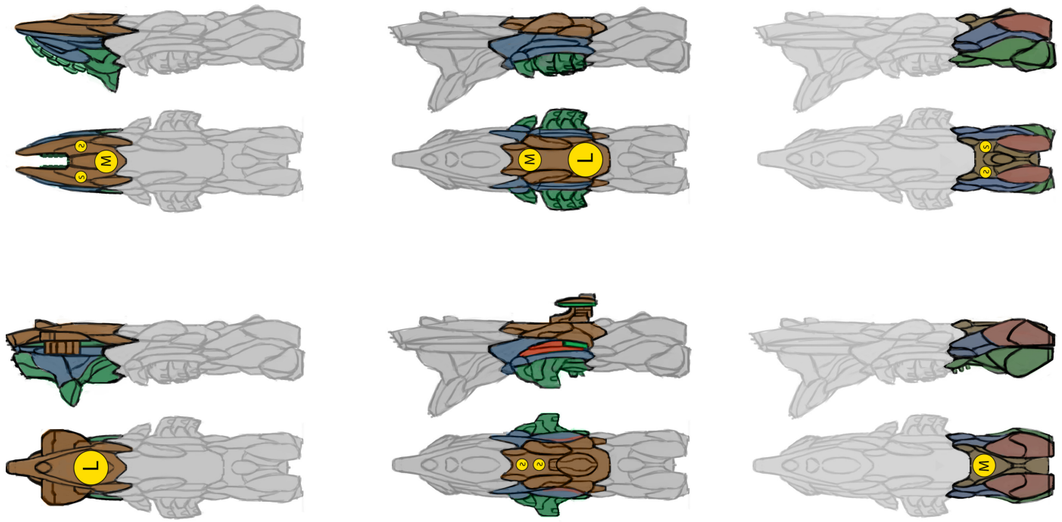




Fungoid Colony ship concept

There are eight different ship types in Stellaris - four civilian (Colony ship, Transport ship, Science ship, and Construction ship). And four classes of warships (Corvettes, Destroyers Cruisers and Battleships) each of which increase in size and differ in composition of sections.

Our warship are split into sections, each section has a different turret layout, enabling the player to customize their ships for different purposes. We also decided we wanted the turrets to be visible to the player. This would allow for adding some animation to the ships, which are otherwise so static, and might also delivery a satisfying broadside in combat at times. Though this was not just for pretty visuals, the graphics would strictly adhere to what's going on under the hood. Each laser and missile fired would be visible to the player. The last missile to hit the enemy ships would really be the one that brought it down.



Fungoid cruiser model sheet

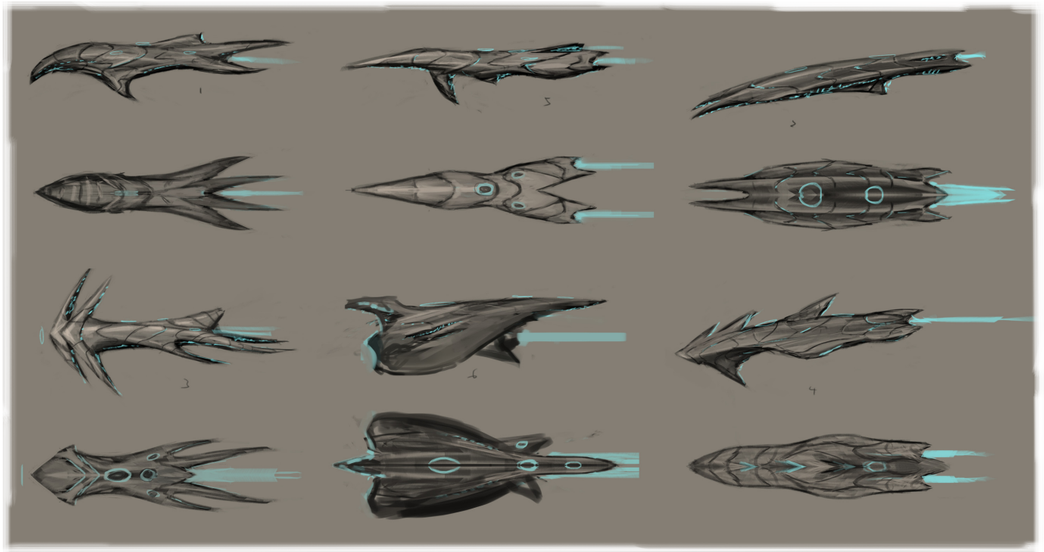
Stellaris was originally conceived as a 2D, top down game but rendered 3D. As a developer this is something that is almost hard to imagine at this point. Still, this early idea certainly shaped our thoughts on ship design in ways that are still evident in our models today. Most prominently is that all the turrets are visible from above.

Because we disliked the idea of turrets shooting through other parts of the ship, we decided that the top surface had to be flat. The rest of the ship though was unaffected by this design decision, so there we had freedom to make more elaborate shapes.

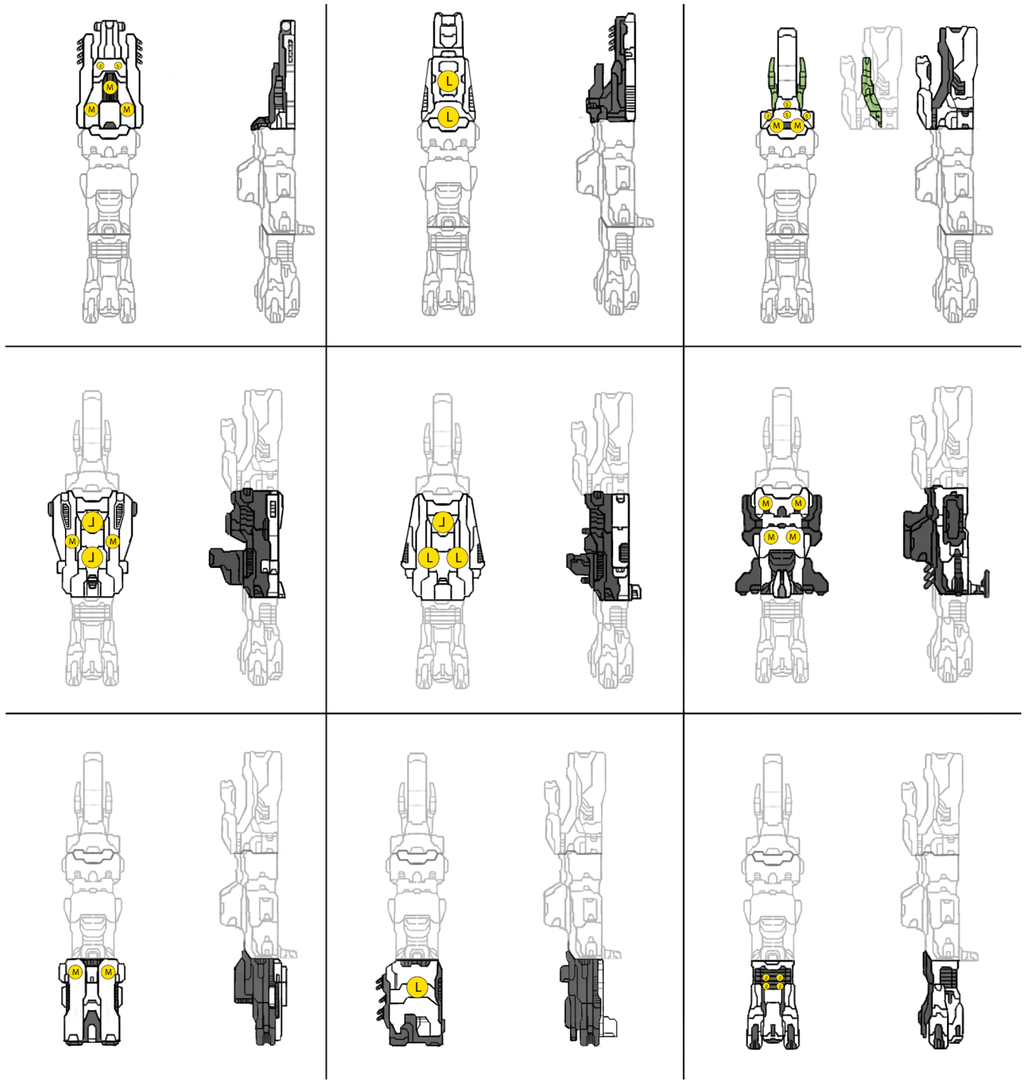
Designing ships isn't something you can just start doing in 3D. With the added complexity of warships being modular, and needing the bow and stern sections to fit with all the mid sections required a lot of forethought.

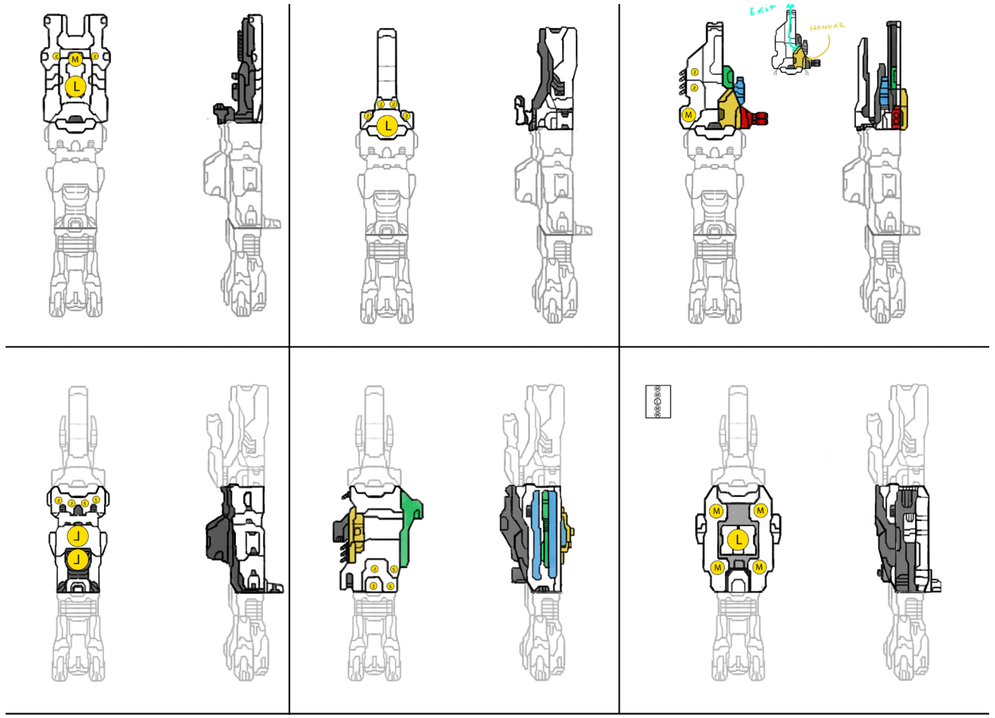
Almost every single ship in the game went through roughly the same steps. First we made a concept sketch that would capture the general feel and scale of the ship. Then we created a model sheet from this, with a top and side view. From that, we then created additional top and side view for all the variations we needed. These orthographic sketches were of great help for the 3D artists and sped up the modelling process significantly.

To save some time we did not make all sections completely unique. For instance, even though the battleships have six different bow sections, we only made three unique bows. From these three we made an additional variant of each, carefully taking into consideration which turret sets would fit best. This also had the benefit of allowing us to reuse mesh, reducing the amount of unique texture space. This enabled our ships to have sharper textures.



Early concepts for Avian ships





Model Sheets

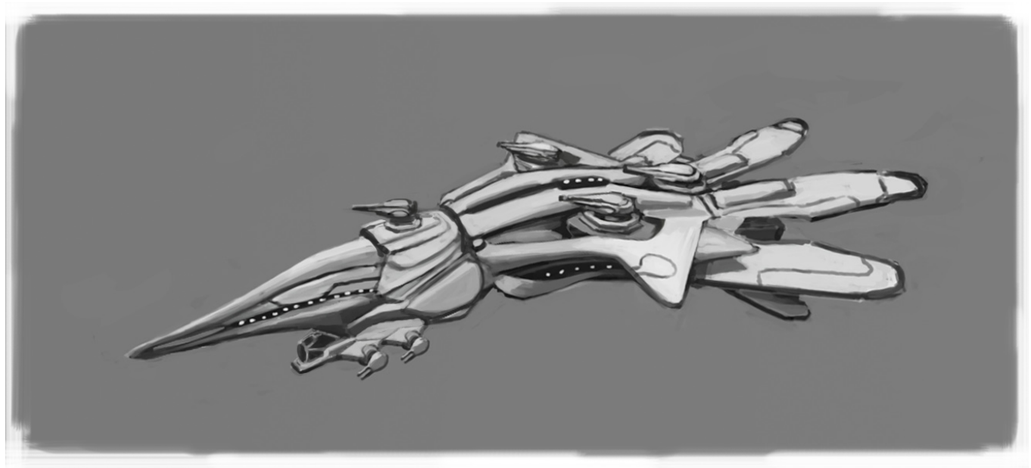
For almost every ship in the game, we would create what we call a model sheet. This a top view and side view for each item to be created in 3d. This is what one full sheet for a species battleship looks like. Each piece needs a model sheet when building it. You could do without it, but the time saved by doing this is immense.

Ship Styles

It was obvious from the beginning that we couldn't create a unique ship appearance for every species the game would feature. Instead we chose to create a different style for each of the Species classes. Mammalian, Reptilian, Avian, Arthropoid, Molluscoid and Fungoid. This way we could draw inspiration from their individual aesthetics to enhance the character of each class.

We also considered other options, such as basing the style of the ships on the species ethics. Having militarist ships, or spiritualist ships. The thing is though, what does a spiritualist ship even look like? Real ornate and detailed? Or really streamlined and minimalistic? In the end, it comes down to your own values and associations, so that would not really work. Another problem would have been the fact that any race might have more than one ethic, being both pacifist and spiritualist. So appearance per species class was chosen.

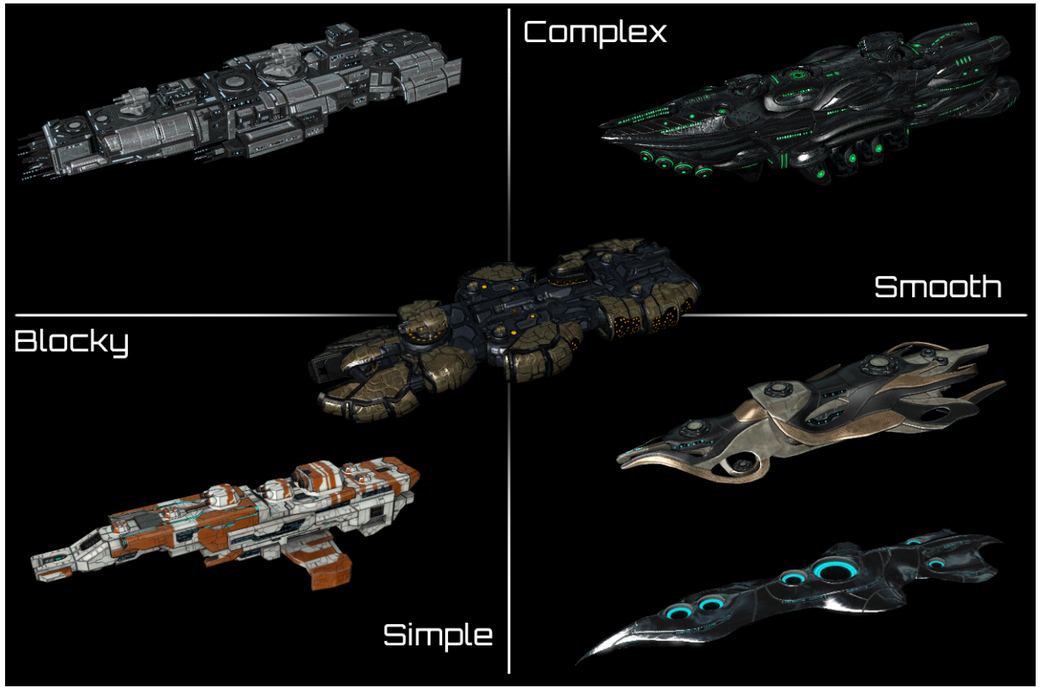
Even before we started we had many ideas for the ships styles. Hard surface and detailed. Smooth and streamlined. Blocky and simple. These ideas merged with concepts from another direction, where we wanted something very birdlike for the avians and something organic and bubbly for the fungoids.



Early concept of what would become the Molluscoid cruiser

Eventually these ideas evolved into a very professional design philosophy - the "Complexity to Roundness Matrix". One of the many ways for us to guarantee the diversity was to have a matrix with two axis that dealt with very different concepts. One axis was "blocky versus smooth" and the other was "complexity versus simplicity". All ships could be plotted on this matrix. This matrix gave us a language to talk about the designs of the ships and how they would relate to one another.

The first axis identified whether a ship was a mass of sharp angles or a sleek rounded design. The second axis asked if the ship design was cluttered with antennas, com towers, and so on, or was a more pristine design of bare metal.



We tried to place the appearances of ships from different alien cultures as far away from each other as possible. One class was maximum blocky and very detailed, another smooth and simple. Anyone not in the extreme of these quadrants would get some other trait to make them distinctive.

Once you have your two dimensional matrix, its very easy to add more dimensions. A third axis could be the “fat versus thin”, for example. Avian ships are very simple and smooth, yet thin. You could have a smooth and simple heavy design and end up with something that looks very different. And there is no real limit to having more axis, but it does become hard to comprehend past a certain point.

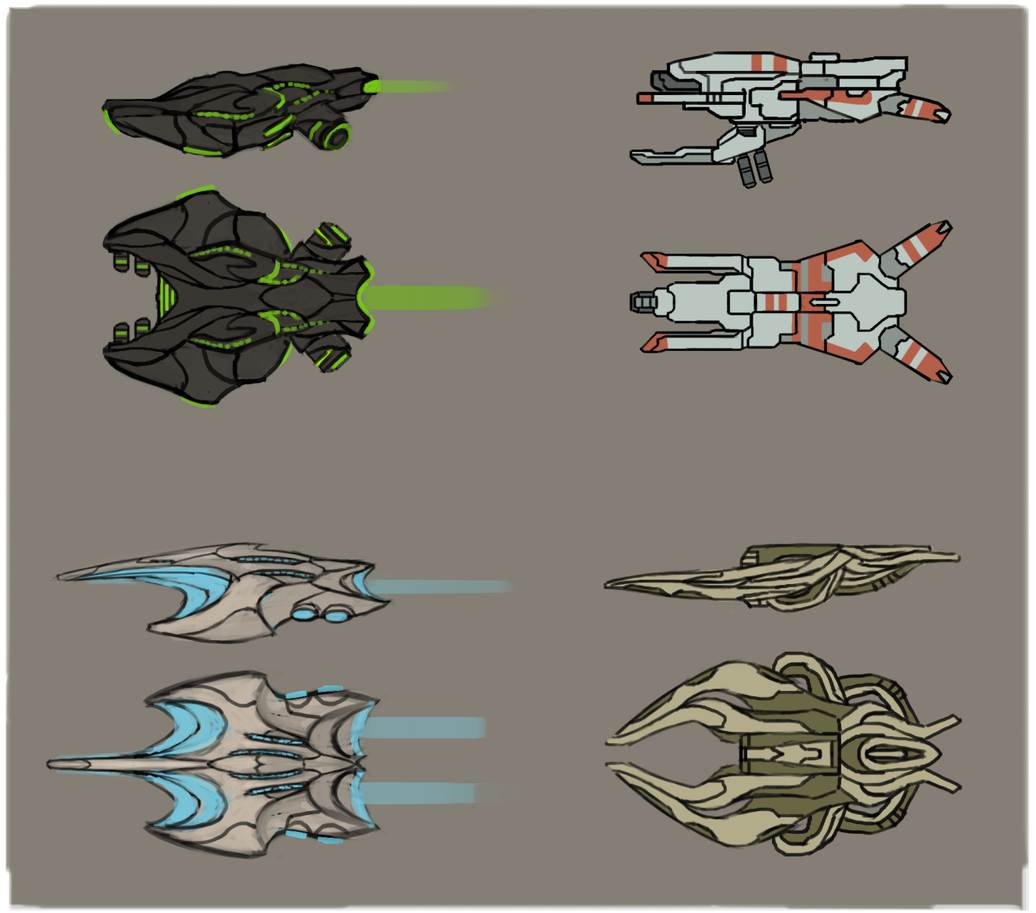
We also identified different ship shape archetypes for the different sections. For example on the bow section, ships can have a pointy front, a heavy front or a hammerhead front. On the mid section you could have a hollow section, a command tower or big wings. On the stern you could have one large engine, or a split end. We wanted to spread these around evenly among the different ship classes to ensure higher variation. These archetypes also facilitated better communication.

Another way to deviate the different species classes from each other is to have different surface materials and color styles. Matte and painted, chrome and blue, brass and orange, dark and green. Most of our ships have a bare metal finish of some sort, and a unique color for the lights. The style of the texturing also usually reflect the style of the shapes. So the complex organic ships of the fungoids have smooth and detailed textures.

This was a texture test for the Fungoid ships. This would give us a clear idea of what the ship would look like before going into texturing.

Since texturing is fairly time consuming in Stellaris, this could potentially save us a lot of time.

Here are concepts for the science ships for different species types. Note that they all have different styles, but still share a “prototype” appearance that separates them from other ship designs.



Turret Design

We knew early on that we would have a large number of weapon types and levels, but we obviously couldn't make unique turrets for each type and differ them for every species class. So we could either have all the species share the same turrets, and designing them in a generic style that could fit all of them. Or we could have only a few different turrets, that would then be consistent with the style of the ships.

Reptilian Turrets

Fungoid Turrets

Molluscoid Turrets

Originally we chose to make each weapon unique, thinking that we could probably make one style that would fit with all the races. But after some tests we changed our minds. The turrets would stand out too much on the ships, and a turret for everyone is a turret for no one.

All turrets (mass drivers, lasers and missiles) come in three sizes (large, medium and small) as well as an additional small one for point defences. Turrets blend in pretty well, but you can still differentiate the different weapons by sound, and by the unique appearance of their effects. In the ship designer the icons for the different weapons have a universal appearance across all species though, to make it ease to identify them.

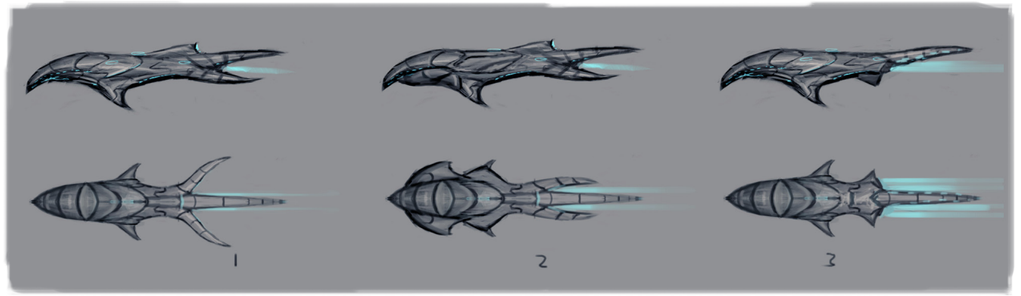
Fighters and Bombers

Large ship classes are sometimes equipped with fighter or bomber squadrons. The fighters primary purpose is to screen the ships from bombers, which can cause significant damage to ships of all sizes, but are otherwise hard to counter.

Fighter

Bomber

Drop-pod

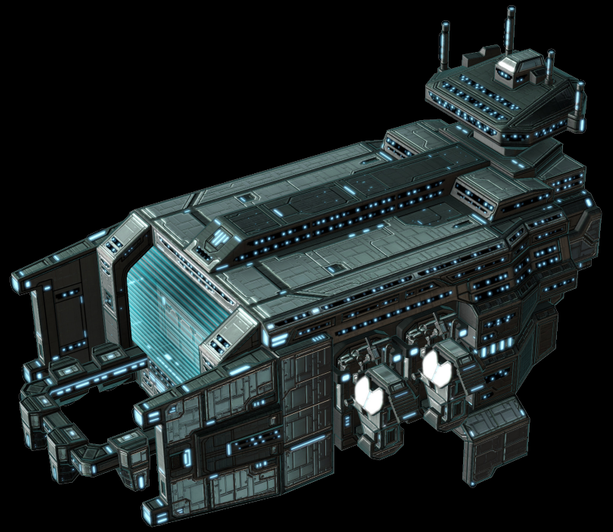


Avian Corvette concepts

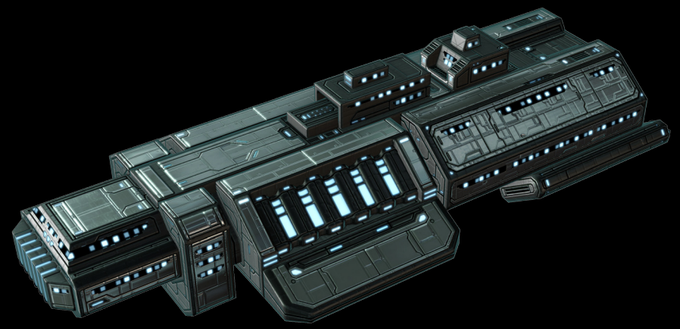
Civilian Ships

The design of civilian vessels tries to accentuate their individual purpose.

Construction ships are intentionally made very bulky. They carry lots of prefabricated construction parts, that are then assembled by automated robots. This enables the ship to have a very small crew. The ship therefore is mostly a large cargo hold with engines and living quarters.

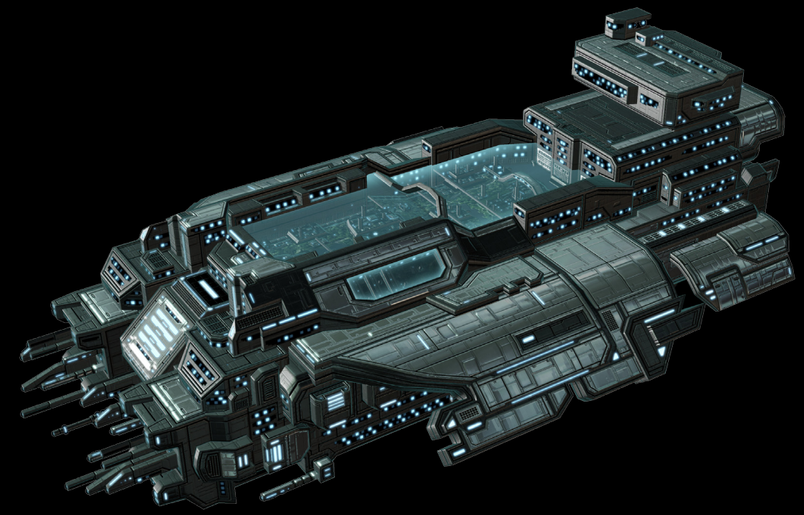


Transport ships are really simple in their design. They are cargo ships, but for people, and little else. They have no weaponry, but still needed to be quite large, since they transport armies. Basically a large cargo hold with engines.



Science ships are the smallest of the civilian ships and have some the most variation in their design. Being ships which should be very versatile and built for exploration they have lots of gadgets and sensors. Generally the they to have a more unique appearance because of their prototype nature.

Colony ships are among the biggest out there. They carry many thousands of colonists, who naturally take up space, but also need to have the infrastructure to support and amuse this mass of people for the long journey - and serve as a base of operations until the colony is viable. The scale of colony ships gave us the opportunity to create some nice visuals, including gardens and other living spaces, making colony ships attractive while also emphasizing their serious imperial purpose.



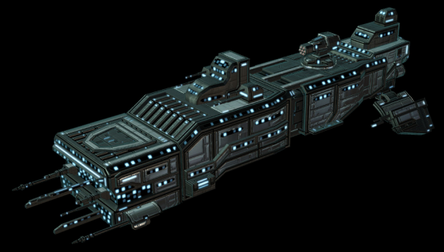
Chapter 5 - Species

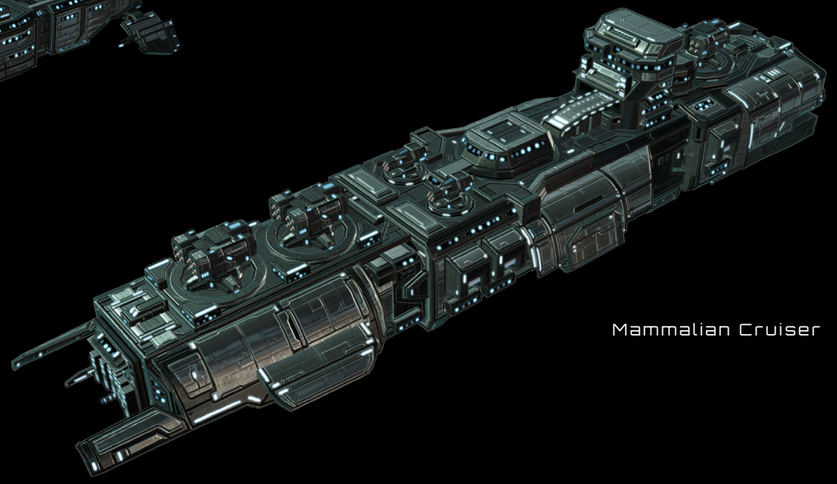
Mammalians

One of the styles we immediately know we wanted the high tech, blocky, detailed and functional space ship design which has become a staple of sci-fi. These would of course work very well for Humans and Mammalian species in general.

Mammalian Destroyer

Mammalian Corvette





Mammalian Cruiser

Mammalian Battleship

The main traits of the mammalians is fur. Beyond that we of course borrowed a lof a traits from the creatures of our planet. The mammalian portraits were the easiest, and the hardest. Mammals are probably the most visually diverse group of animals on earth, with giraffes, monkeys, cats and platypus etc. This gave us a lot of inspiration.

Something that complicated this was that we preferred to not have all our aliens look like civilized animals in space. Which proved surprisingly hard to get away from.

Some of them obviously did turn out like something familiar. Still we think they will be many people's favorite none the less. Others we intentionally made very akin to their terran ancestor. How can you have a space sci-fi game, without a race of cats?



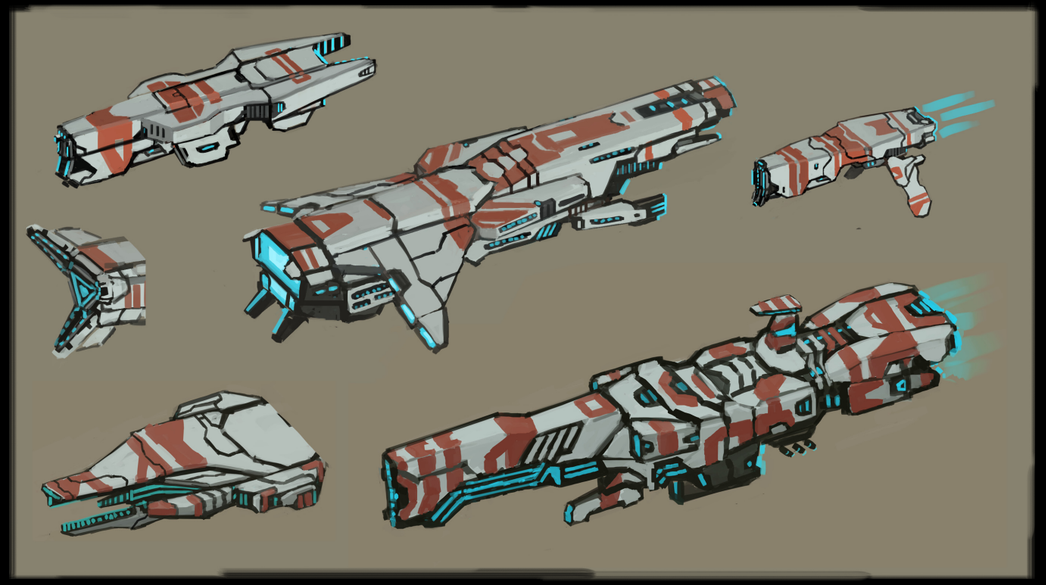





Reptilians

The idea for the Reptilian ships was for them to be blocky in their shapes, but compared to the mammalian their complexity is very low. Unlike the mammalian they are not strictly hard angled, but have a lot of diagonal angles in their shapes.

Unlike all the other species classes they also have very little metal in their texturing. Instead they have a more matte look with a colorful paint job. The Reptilians were the last ship series to be created, and it was a bit of a struggle to make the texturing work. In the end we figured out there was simply too much going on, and you could not see the shapes of the ships, so we reduced the amount of details in the texture, and brought out the large shapes with a more powerful ambient occlusion. When they were done, they were much more true to their original concepts and looked much better.



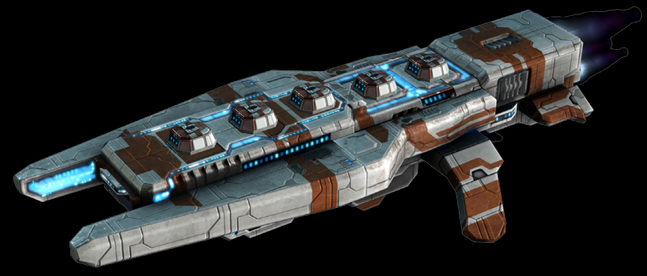
Reptilian Warship concepts

Reptilian Transport

Reptilian Science ship

Reptilian Battleship

Reptilian Corvette



Reptilian Destroyer

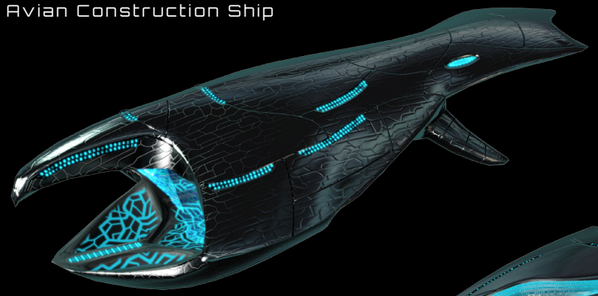
Avians

The ships of the Avians are sleek. They are as smooth as we can make them and as simple as can be. They should appear to be light and swift, like a bird on the wind. We tried to make them as streamlined as possible, with soft and aerodynamic shapes. This often resulted in sharp and pointy silhouettes, and it was a challenge to make them not look so evil.

Avian Science Ship

Avian Transport

Avian Construction Ship



Avian Colony Ship

Avian Battleship

Arthropoids

The ship designs for the Arthropoids have the strangest origins. Their ships grew out of a prototype test ship, and evolved slowly into something unique. Therefore their style was never really conceived as concept art from the start, but just evolved as we were working in 3D. Their complexity is somewhere in the middle of the design matrix and they have simple and thick shapes.

Arthropoid Transport Ship

Arthropoid Science Ship

Arthropoid Colony Ship

Arthropoid Cruiser

Arthropoid Battleship

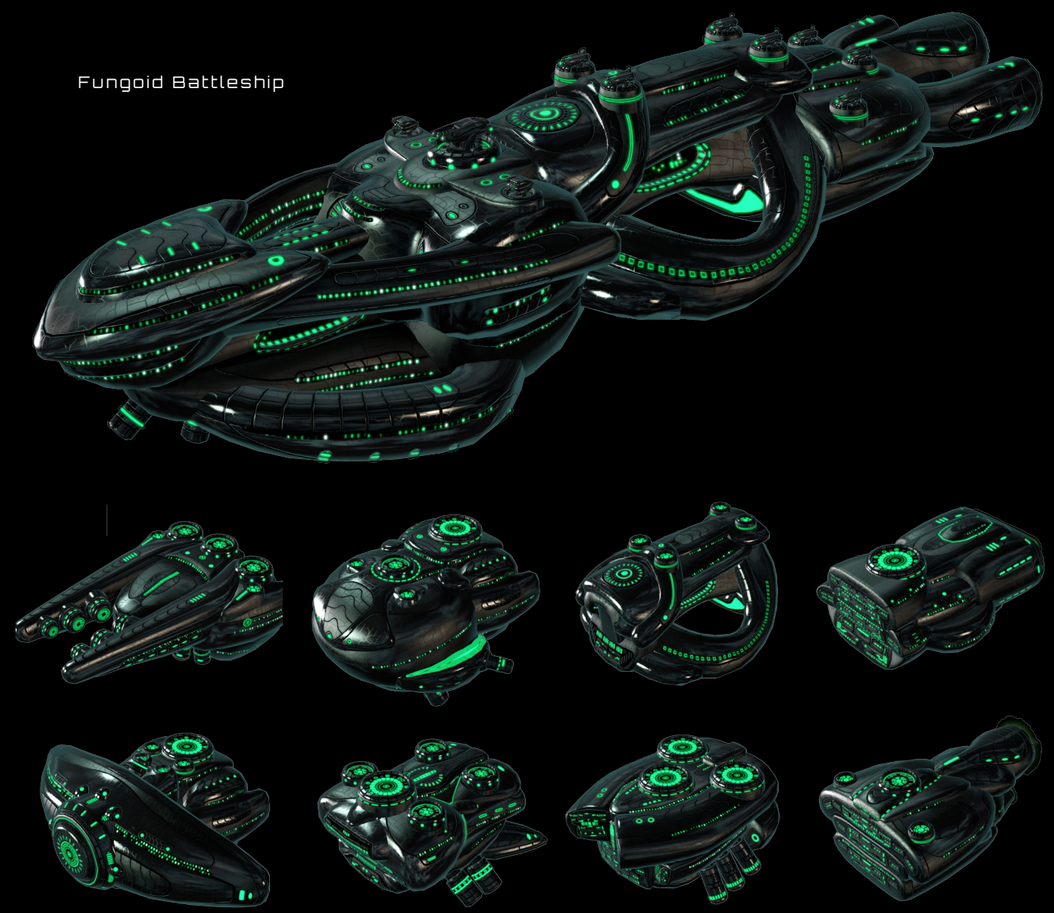
With insects and arachnids as your starting point, there is so much to work with. You have ants, spiders, crabs, dragonflies, centipedes, etc. So many unique traits, but united by having exoskeletons.

Arthropoids have a tendency to look evil, or even disgusting. But with each class of species we tried to balance it so that they all have some cute / ugly, good / evil etc.

Fungoids

The designs for the fungoid ships came very naturally. We knew we wanted a detailed organic looking race, and it was simply a natural fit for the fungoids. Being some of the last ships to be designed, with our experience we were able to produce some of the best looking designs in the game.

Fungoid Battleship



Fungoid Science Ship

Fungoid Transport Ship

Fungoid Construction Ship

Fungoid Colony Ship

The fungoid species class is definitely a favorite of the development team. Our designs here are some of our most imaginative, probably because of the energy we spent getting them right. Their ships came easy. But what does a sentient mushroom even look like? This forced us to be more imaginative since there are no creatures like this on our planet.

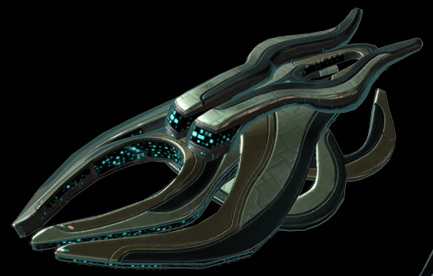
With the fungoids we could experiment with different concepts, such as a fungus taking over the body of another creature. As seen below. Or a necromorphic race where the fungus slowly decays its host, seen on the page to the right.

Molluscoids

The molluscoid ship designs are on the extreme side of smoothness, and mid range in complexity on the design matrix. One of the ideas for the molluscoids was that they would work in layers a lot. There are also elements that hint towards tentacle like shapes, reminiscent of squids.

Molluscoid
Construction Ship

Molluscoid Transport



Molluscoid Science ship

Molluscoid Colony Ship

Molluscoid Corvette

Molluscoid Battleship

Molluscoid are sea dwelling animals such as octopi and jellyfish, but also other slimy creatures like snails, so we derived much of the inspiration from them.

Molluscoids were a tricky bunch, because they easily turn out looking either too much like a reptilian or too much like an arthropoid.

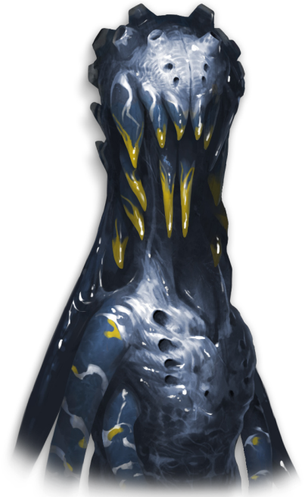
The defining traits of the molluscoids, that separates them from the other species classes became them having very smooth and wet looking skin.

Being inspired by creatures from the sea, they have a very different evolutionary history from land dwelling creatures, and usually look quite alien from the start. Perfect inspiration for us to work with.

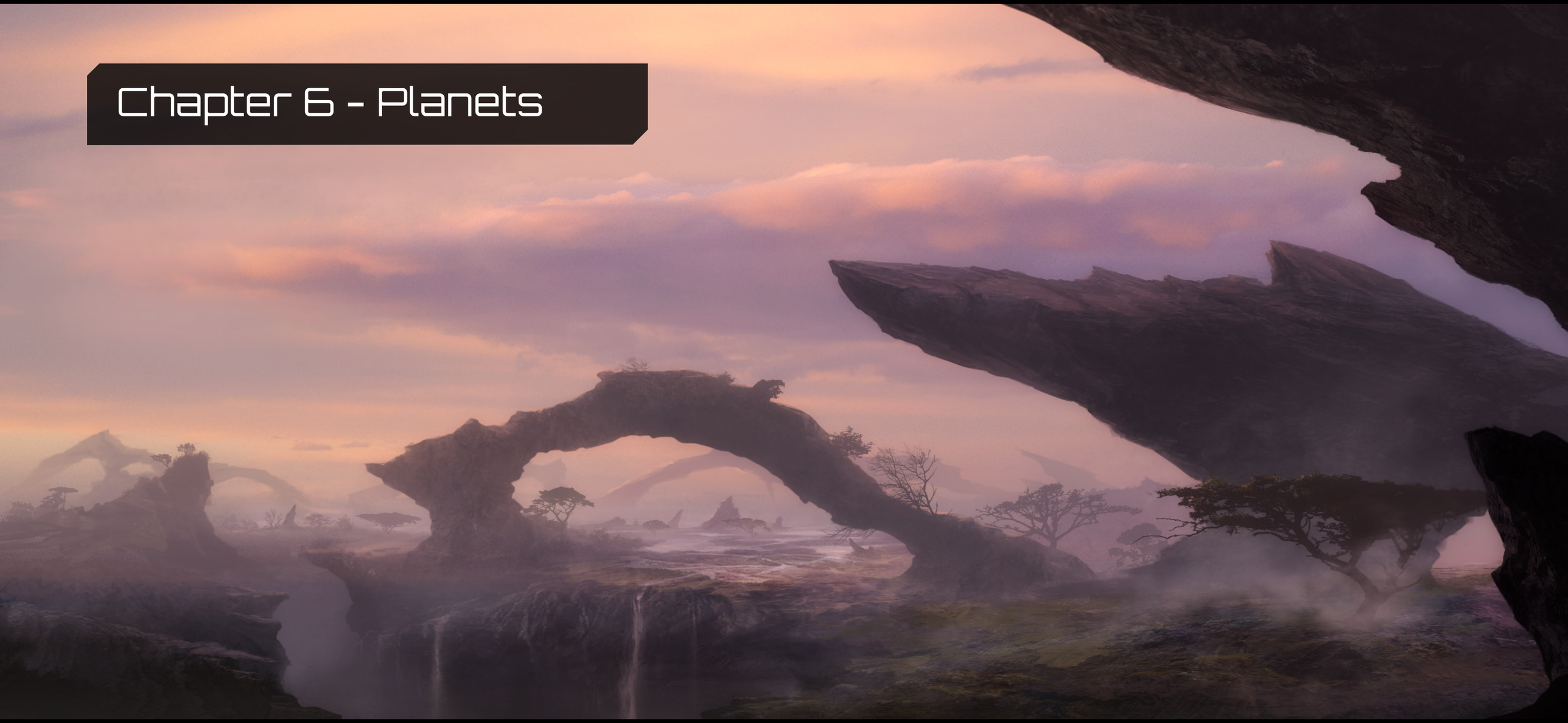
Pre-sentient Species

As your scientists explore the galaxy, they may come across species that have not yet achieved sentience, but are on the cusp of making that evolutionary leap. They are essentially the alien equivalents of the early humans' common ancestors on Earth. For their portraits, we reworked existing species to give them a slightly more primal look - allowing them to "evolve" their appearance when uplifted to sentience by spacefaring aliens.

We felt that uplifting pre-sentient species is a very important feature. Not only is it a fun thing to be able to do, but it is also a classic sci-fi trope that both enhances gameplay and adds a lot of flavor to the science and exploration aspects of the game.

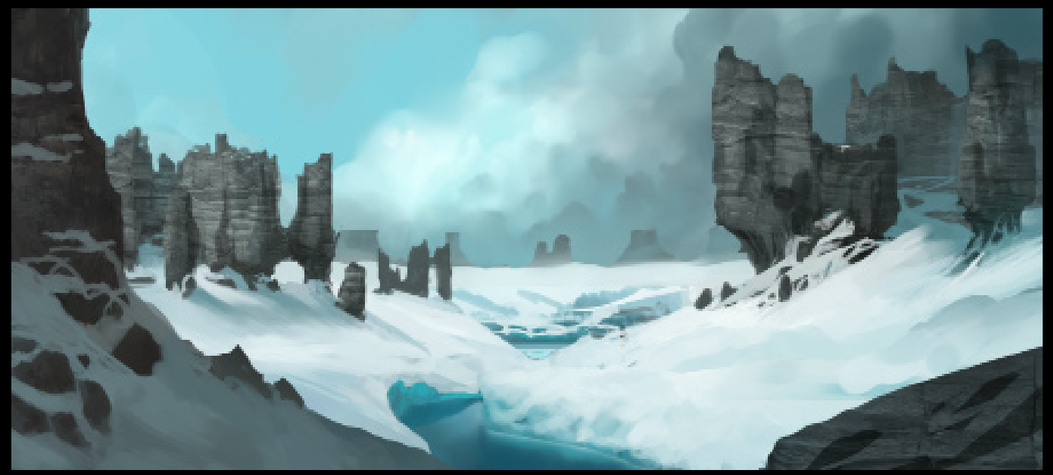


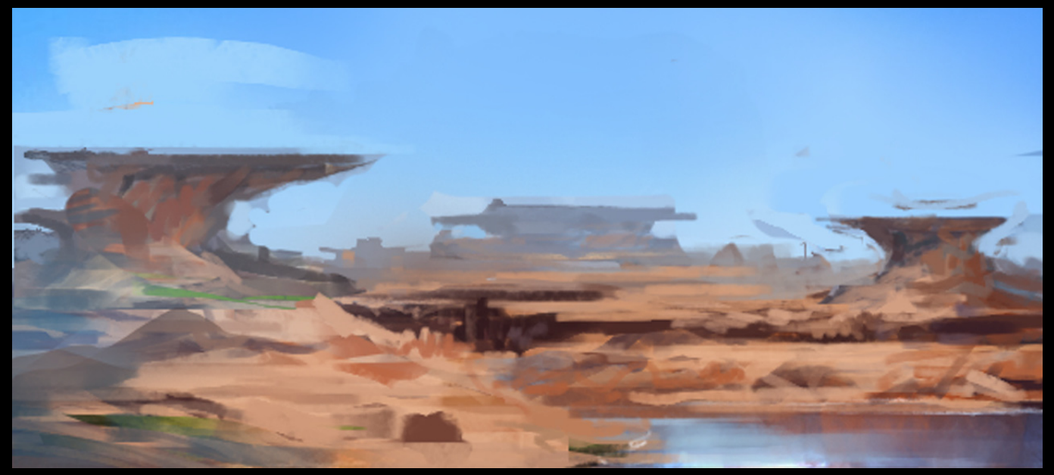
Chapter 6 - Planets



Planet Concepts

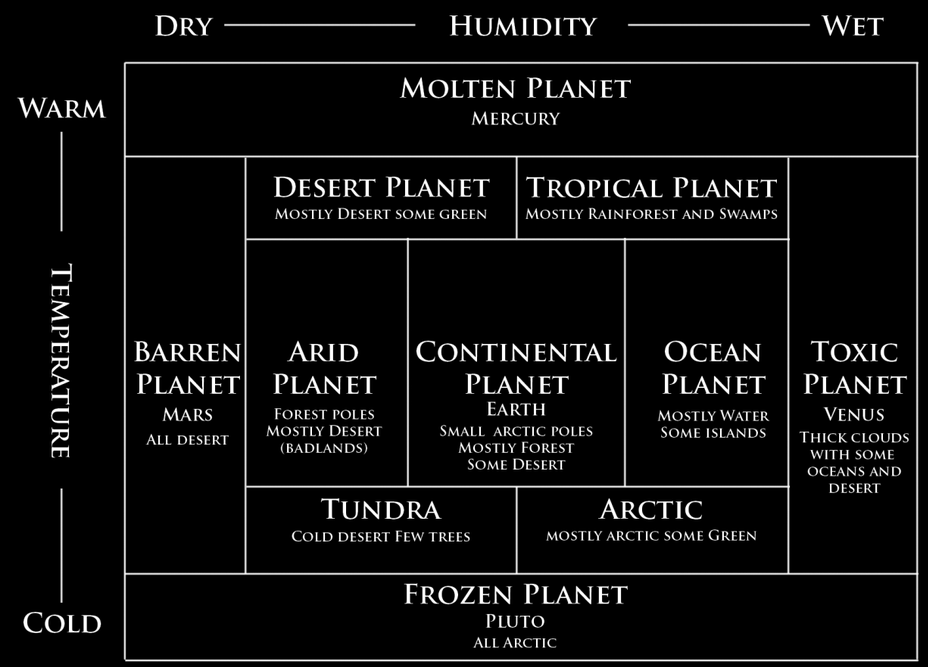
For each of the planet types we started out trying to capture their character, to get the color scheme just right before we went on to render them. This was really valuable because we could iterate a lot without investing much time.





Planets

To simplify our thinking and planning, planets in Stellaris were divided along a matrix of temperature and humidity. This is, of course, in no way accurate. But it make it easier to understand what each planet is all about. This matrix included both habitable planets and well as uninhabitable ones. Toxic planets are the most humid and warm while barren planets are cold and dry.



When you're making a sci-fi game, it's tempting to go for the more unorthodox ideas, to make things more alien and interesting. Having a planet with red forest would look exotic, but from an orbital point of view it might be hard to understand what it is you are actually looking at. In the end to we chose the more traditional path with our planets, to make recognizing their type easier.

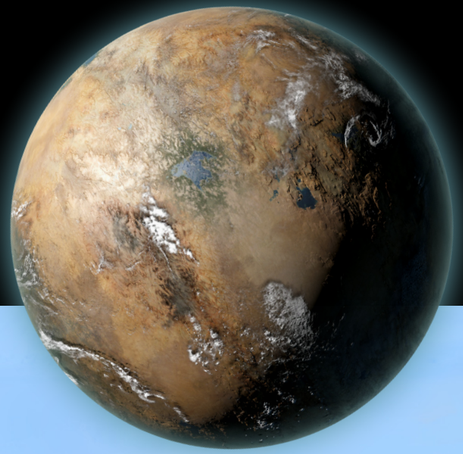
Continental Planets

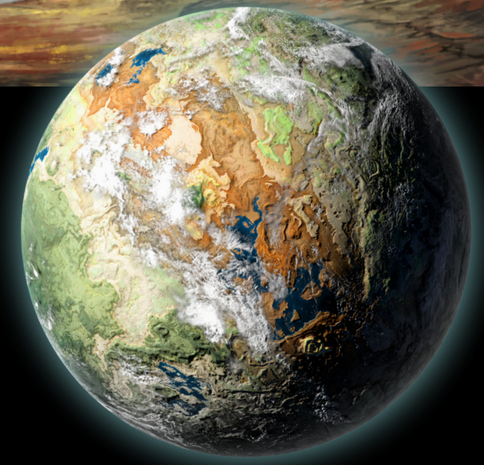
Everyone is familiar with continental planets. These are the most earth-like, with something for everyone. Deserts on the equator, lush forests in the temperate zones, and frozen landscapes around the poles. Creatures on these planets often have a hard time adapting to the more harsh climates of the universe. To differentiate continentals from the other more extreme planets we chose to go with a deciduous forest landscape.

Desert Planets

Among the habitable planets, we have desert planets. These planets usually spawn closer to the sun, where its warmer. With its low humidity the planet are very inhospitable for many races, with a band of scorching desert around the equator, where only the most well-adapted races can live. On the poles, the heat gets significantly less intense, but instead of ice you have vegetation and, occasionally, even forest. The planets favor coldblooded species and have a big advantage for those that can take the heat.

Desert planets are a standard sci-fi trope, you don't have to look far to find inspiration for these planets.
Arrakis, Tatooine, Abbydos are all sci-fi classics, so inspiration is everywhere. We wanted them to feel inhospitable with only the poles being livable for most species.



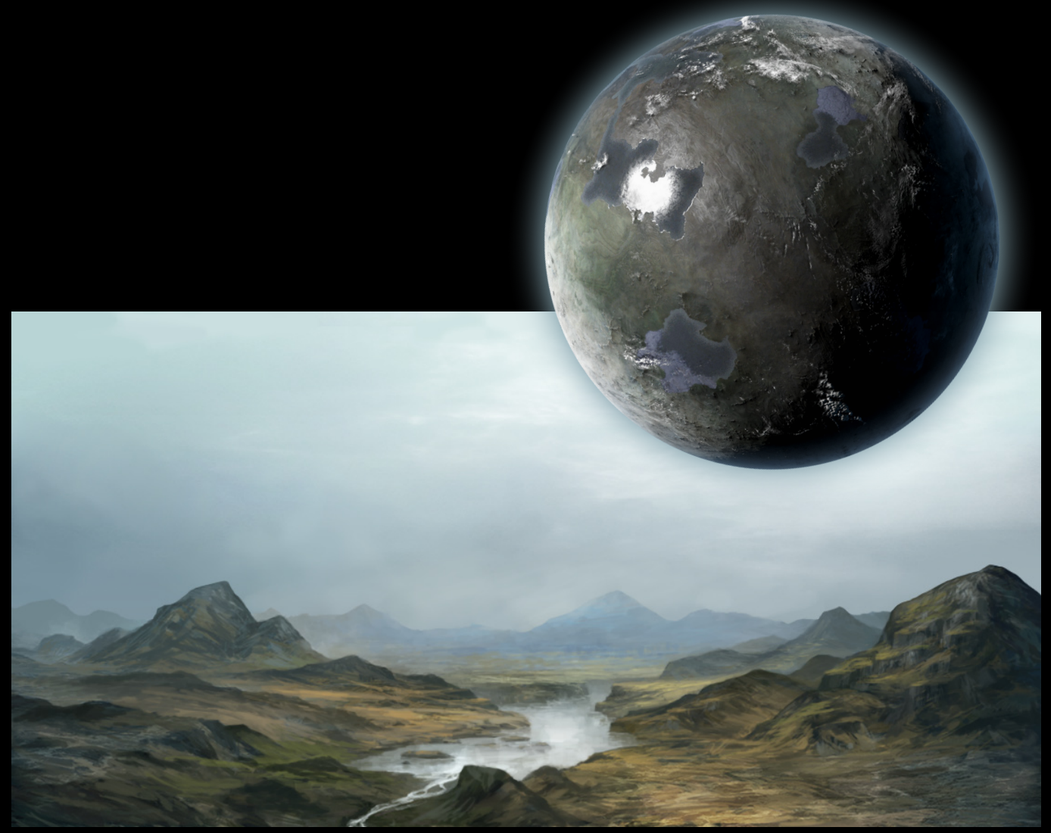


Arid Planets

Though not as hot as their desert cousin, the low humidity of arid planets still keeps plant life to a minimum. Forests are rare, though the plants that do evolve on these planets are some of the weirdest in the galaxy. Inspired by China's Danxia cliffs, the Painted Hills of the American Northwest Interior, and other Earth locations, the colors of arid planets are dramatic but entirely plausible. We went with a Grand Canyon-esque desert-like planet with miminal surface water and dramatic erosion effects.

Tundra Planets

Despite the often freezing temperatures on these desolate rocks, they still support some habitation. Life on tundra planets moves slowly, and vegetation exists only in the form of moss and lichens. Tall plants are rare and what plant life there is will often penetrate its roots far into the surface crust. Life gets a bit easier around the equator, where you can find some flowing water and the occasional forest. Muddy terrain makes for a bleak existence. They have the type of terrain you might find in Siberia, or in the cold deserts of Patagonia.

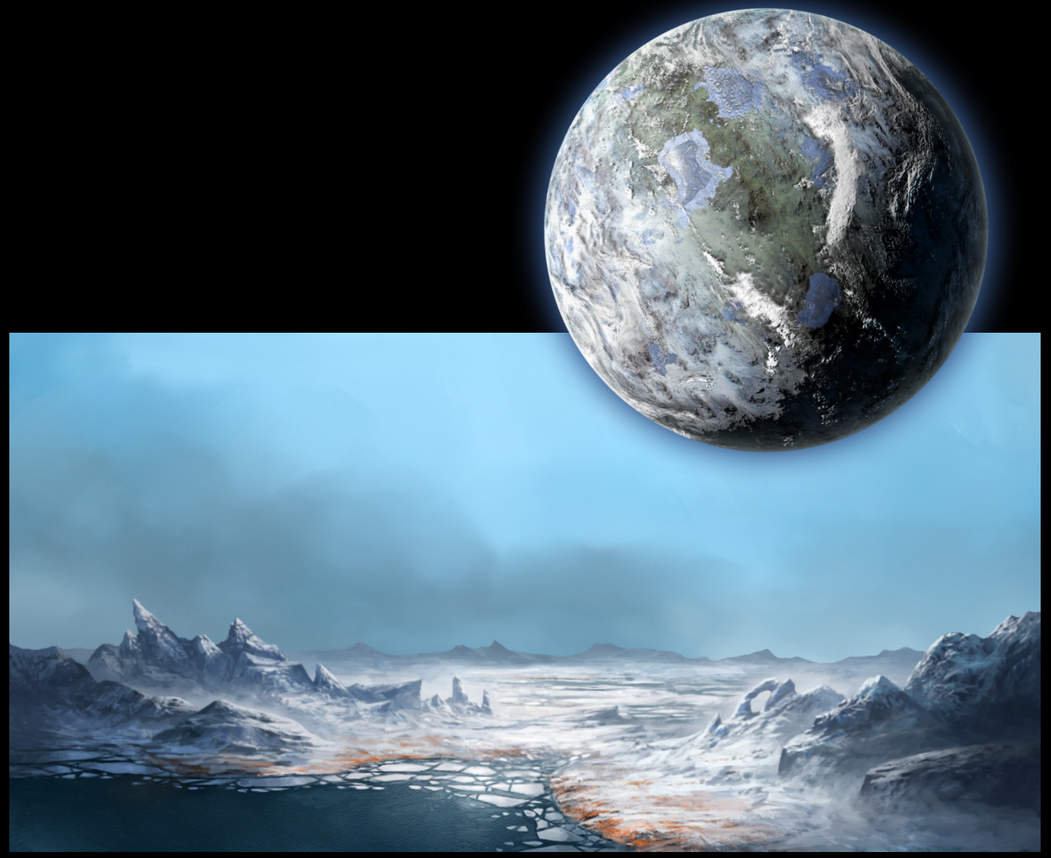


Tropical Planets

Tropical planets generally have a greenhouse effect making the planets surface temperature fairly even across the globe. The high humidity causes extreme vegetation and swampy terrain. Inspiration for these came from the amazon forest and redwood forests of north America.

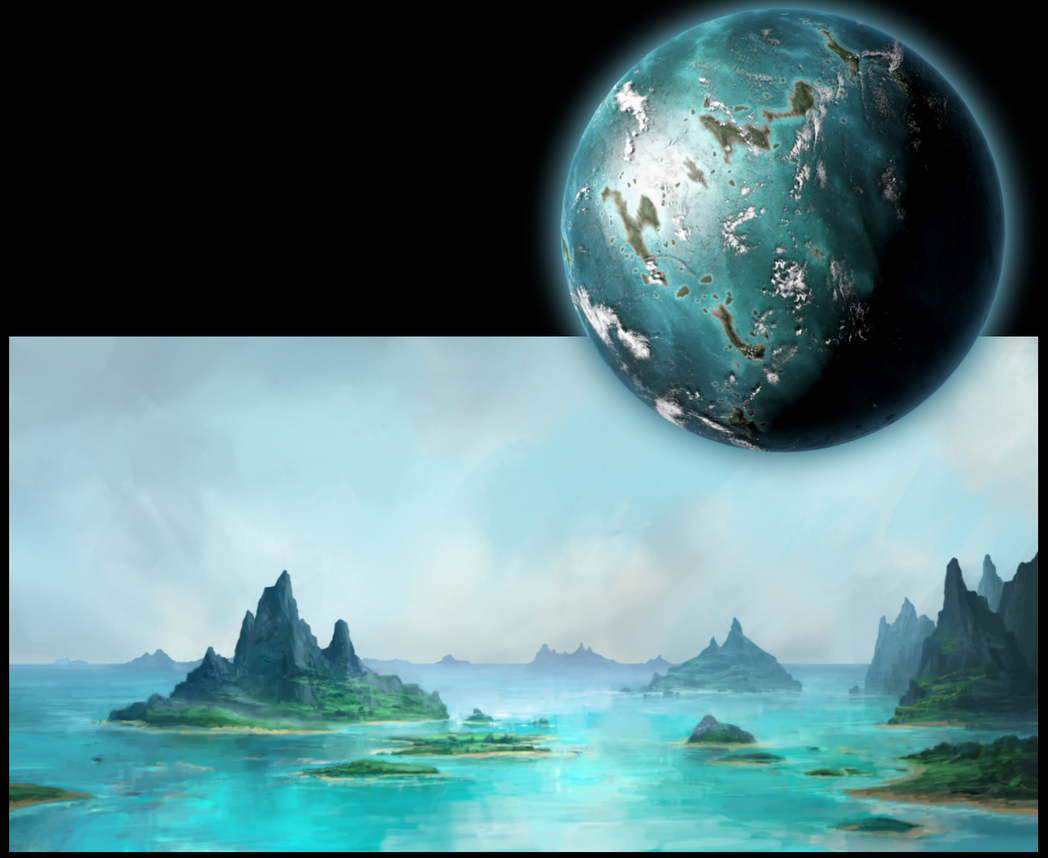
Arctic Planets

Of all the habitable planets these are the most inhospitable of the lot, with only a thin band of green around the equator. Due to the harsh climate of the world, creatures who do evolve here tend to be stronger, and older than most other worlds. Even if an extinction-level event that would have wiped out most life does occur, such as an asteroid strike or a enormous volcanic eruption, the inhabitants who are accustomed to extreme circumstances can endure such conditions.



Ocean Planets

With the high humidity but lower temperature, ocean planets are lacking in the vegetation of tropical planets, and are instead covered by vast seas and wild storms, with the land mass often confined to archipelagos. These planets favor amphibious or sea-dwelling creatures.

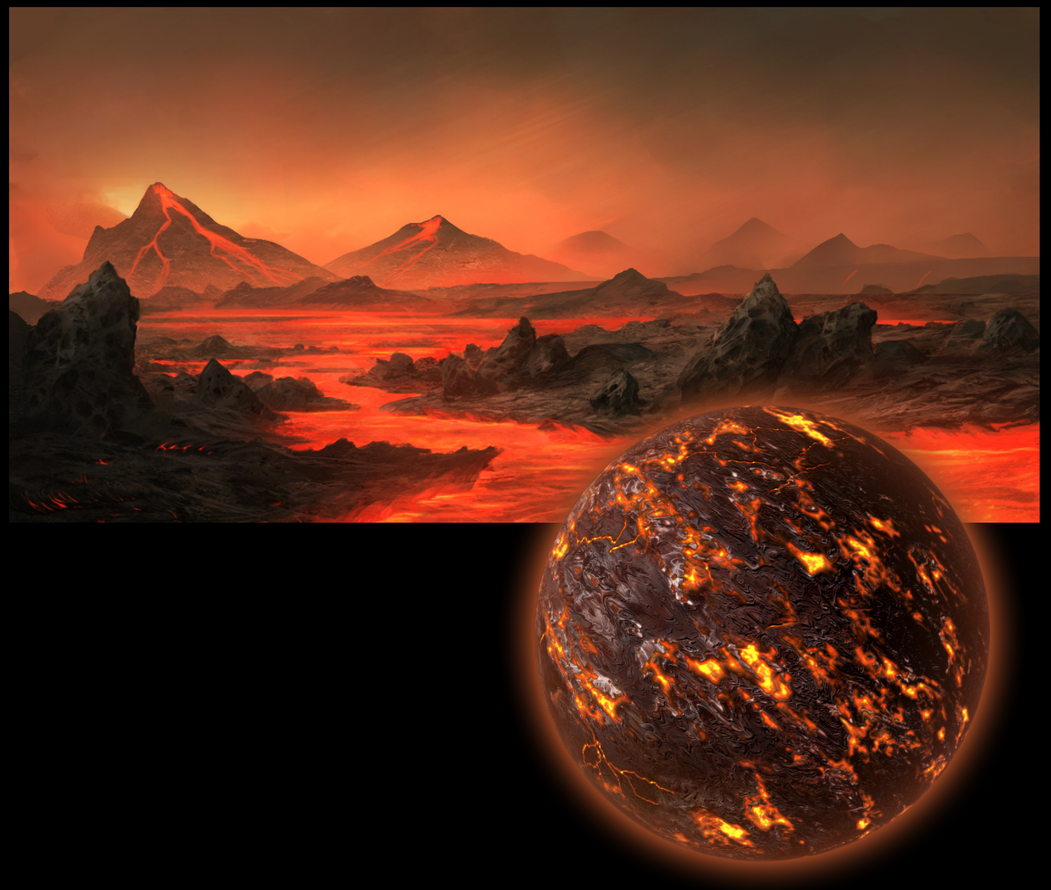


Barren Planets

Barren planets can be both warm and cold, depending on the postion relative to the sun. With almost zero humidity and atmosphere they cannot sustain life. These planet are the most numerous in the galaxy and are considered lifeless rocks by most species, only good for extracting resources.

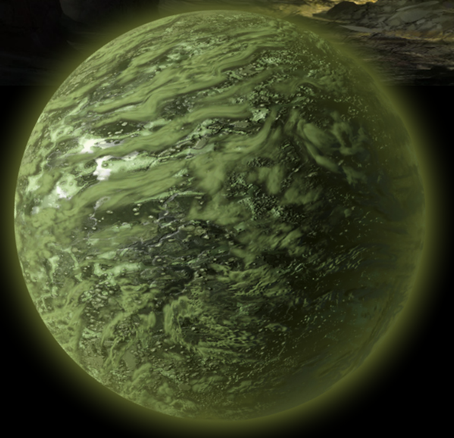
Molten Planets

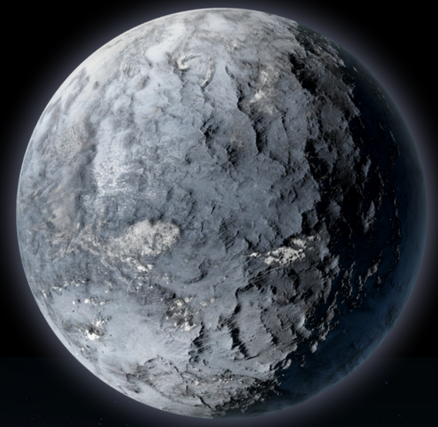
These planets have extreme temperatures generally being the planets closest to the sun. Their surfaces are torn apart by the powerful gravitational forces from the nearby sun. The crust of molten planets crack all the time, causing a perpetual sea of lava spewing toxic gas.



Toxic Planets

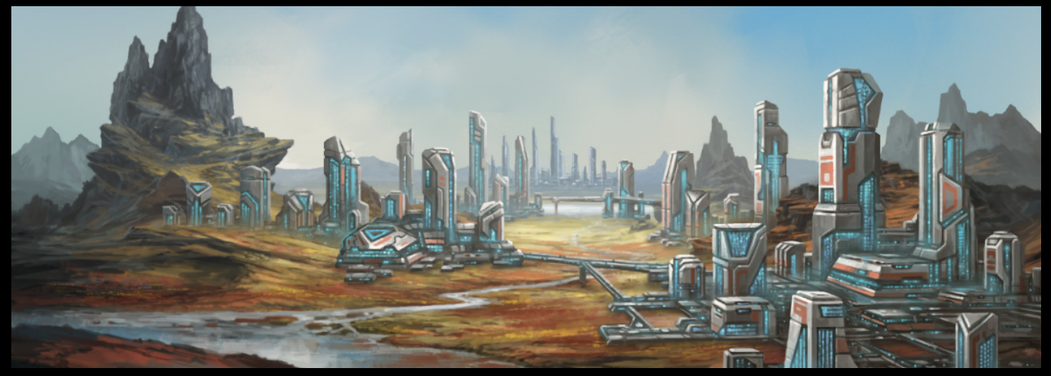
Toxic planets have a thick atmosphere, generating an extreme temperature and often poisonous air, making them uninhabitable for all known life forms. With the runaway greenhouse effect and sulfuric air they are a veritable hell.

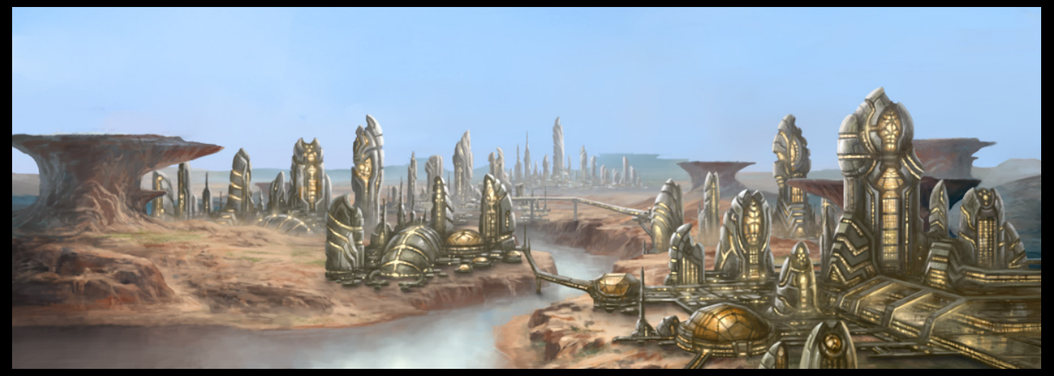


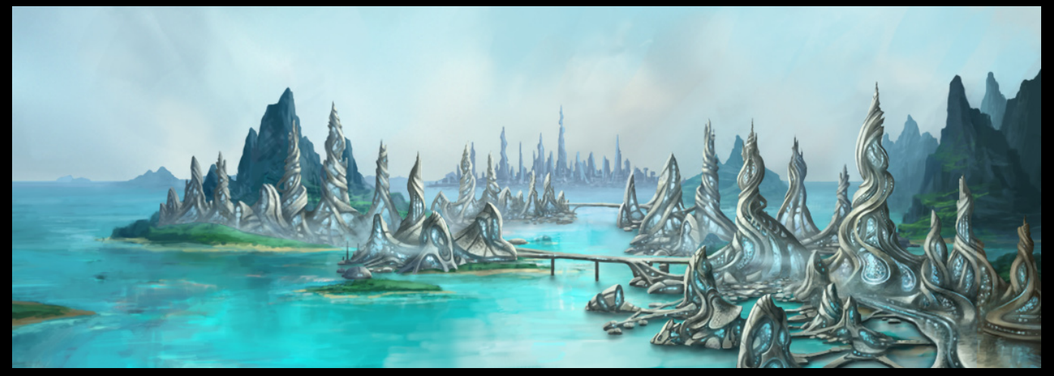


Frozen Planets

Frozen planets are found at the edges of star systems, and are void of all planetbound life. Some may not qualify as proper planets at all, instead being amalgamations of stellar debris bonded by ice.



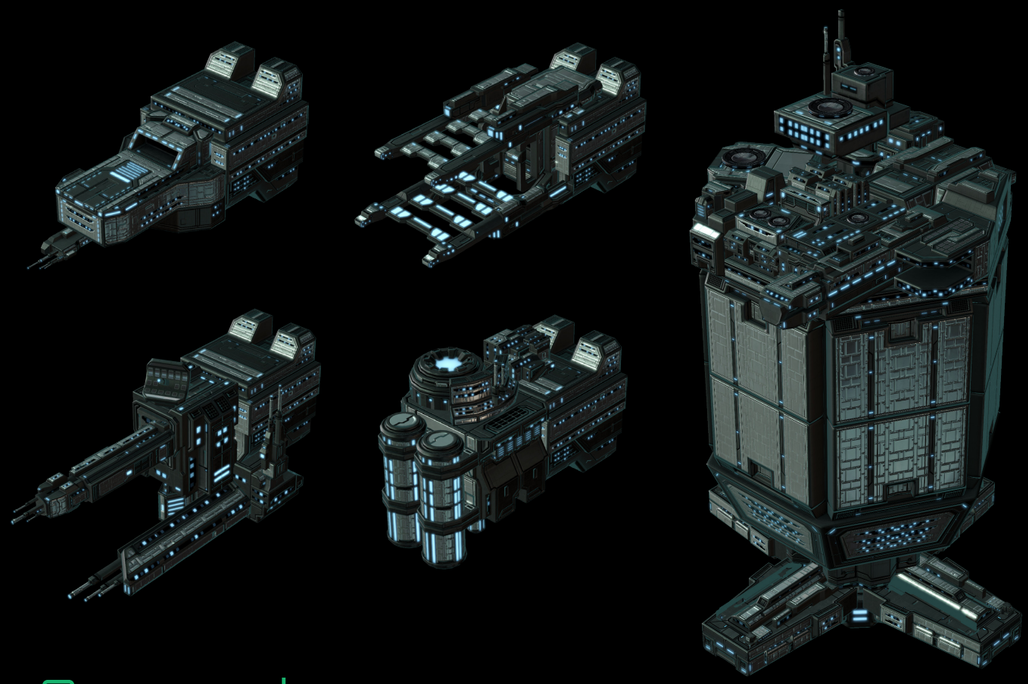




Chapter 7 - Stations

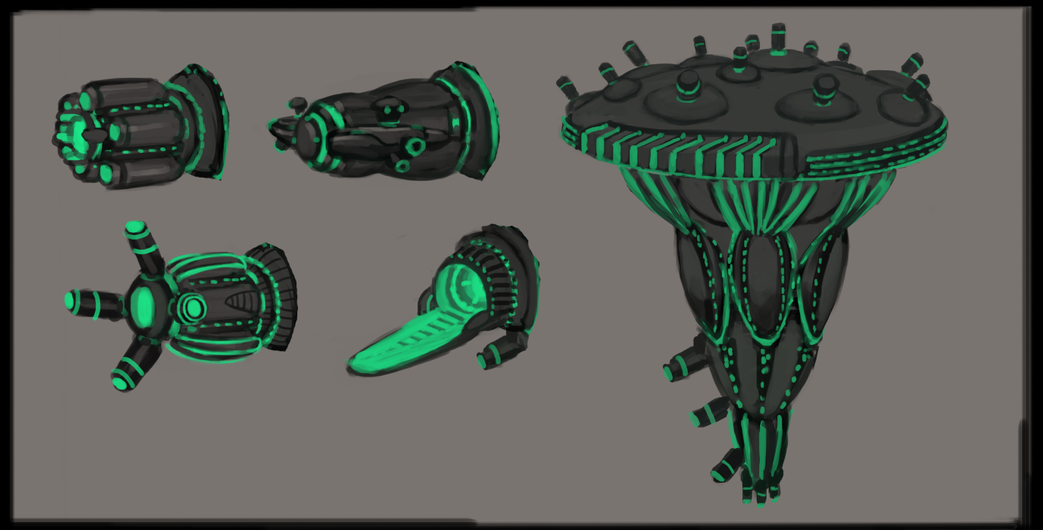
Orbital Stations

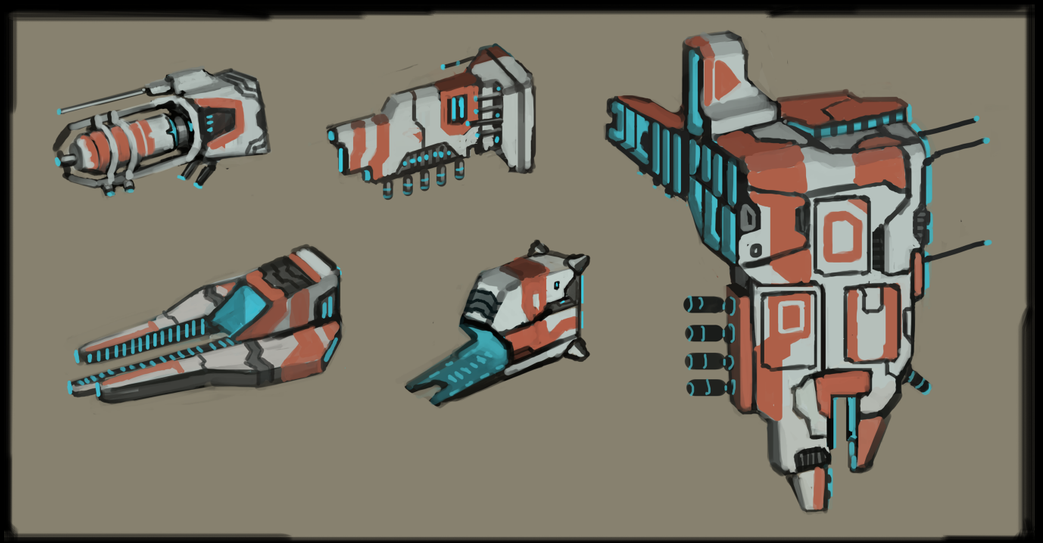
Orbital stations are your primary means of expansion and claiming space beyond colonizing planets. Like your colonies they also contribute significantly to your empire's economy. This also make them prime targets for your enemies, both local raiders and other empires looking to exert their influence.



Spaceports

Spaceports serve as your primary base of operations, and are where all the ships in your fleet are constructed. These orbital stations can also be upgraded and specialized with visible sections. Your spaceport can be outfitted with capital shipyards, research facilities or other factories. Rivaled only by the military fortress in size, the core of the spaceports is still larger than almost any other station, and are designed to be bulky and peaceful looking, though they can still defend themselves.





Mining Stations

Mining stations are equipped to handle any sort of resource extraction. The industrial complex works day and night extracting exotic materials for specialized use. The stations are mostly a large refinery with lots of hangar bays for the hundreds of ships that come and go each cycle. Like most stations, they are still equipped with station guns, but they are no match for a decent military fleet. They can just hold their ground against scouting parties until reinforcements can arrive.

Research Stations

Research stations are built in the orbit of planets or stars that have significant scientific value. These stations often serve as a base of operations for teams sent to the nearby celestial object. Research stations generally have an asymmetrical design, full of specialized labs built for their function. Since observation stations and wormhole stations are a type of science station they share their appearance. These stations are more specialized, and not that common, so it's a good optimization.

Observation Stations

These scientific outpost are sometimes constructed in the orbit of a planet where a pre-FTL species has been located. The outpost enables scientists to study the species undisturbed. In time, the species might even be enhanced and uplifted to a higher state where they can join your civilization and spread among the stars.

Wormhole Stations

A specialized type of interstellar travel where a scientific outpost specializing in quantum entanglement can generate an artificial wormhole through which fleets can travel. The wormhole can even be generated at great distance, enabling your fleets to go back and forth without constructing a wormhole station at both ends.

Terraforming Stations

With advanced technology, you can modify a planetary environment on a global scale. Terraforming stations can reshape a planet to better suit the needs of a race, so that they are permanently changed. Designed to manipulate the atmospheric conditions at a molecular level, the terraforming stations are designed to look almost like a gigantic space-based weapon directed towards the planet.

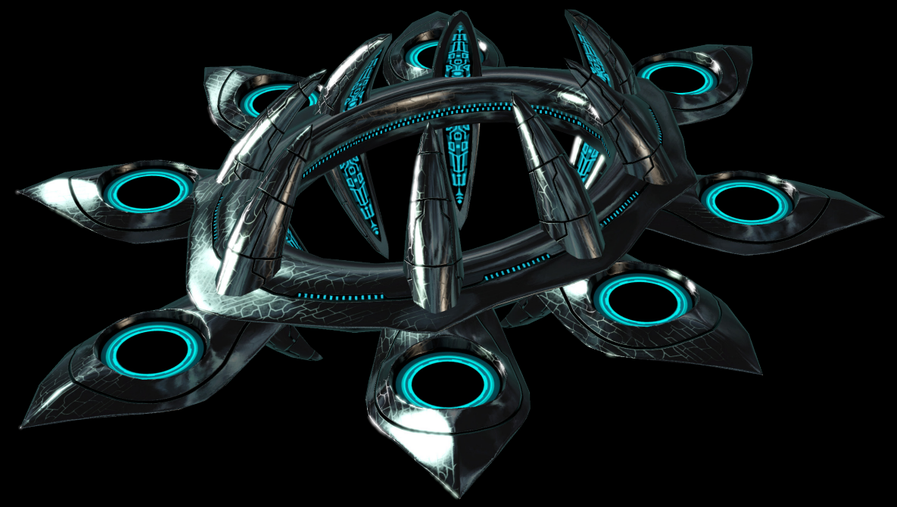
Military Stations

Military stations serve a few different purposes and therefore come in a variety of different sizes. The smaller defence platforms are generally used in the outskirts of your empire to provide static defense of your territories.

The second class is the Defence Station. They provide the mid tier of your military presence, and can match the battle power of an average roaming fleet.

The largest class of stations are the military fortress. These are generally only constructed in key strategic locations of high value. They can defend a system against all but the largest of fleets.

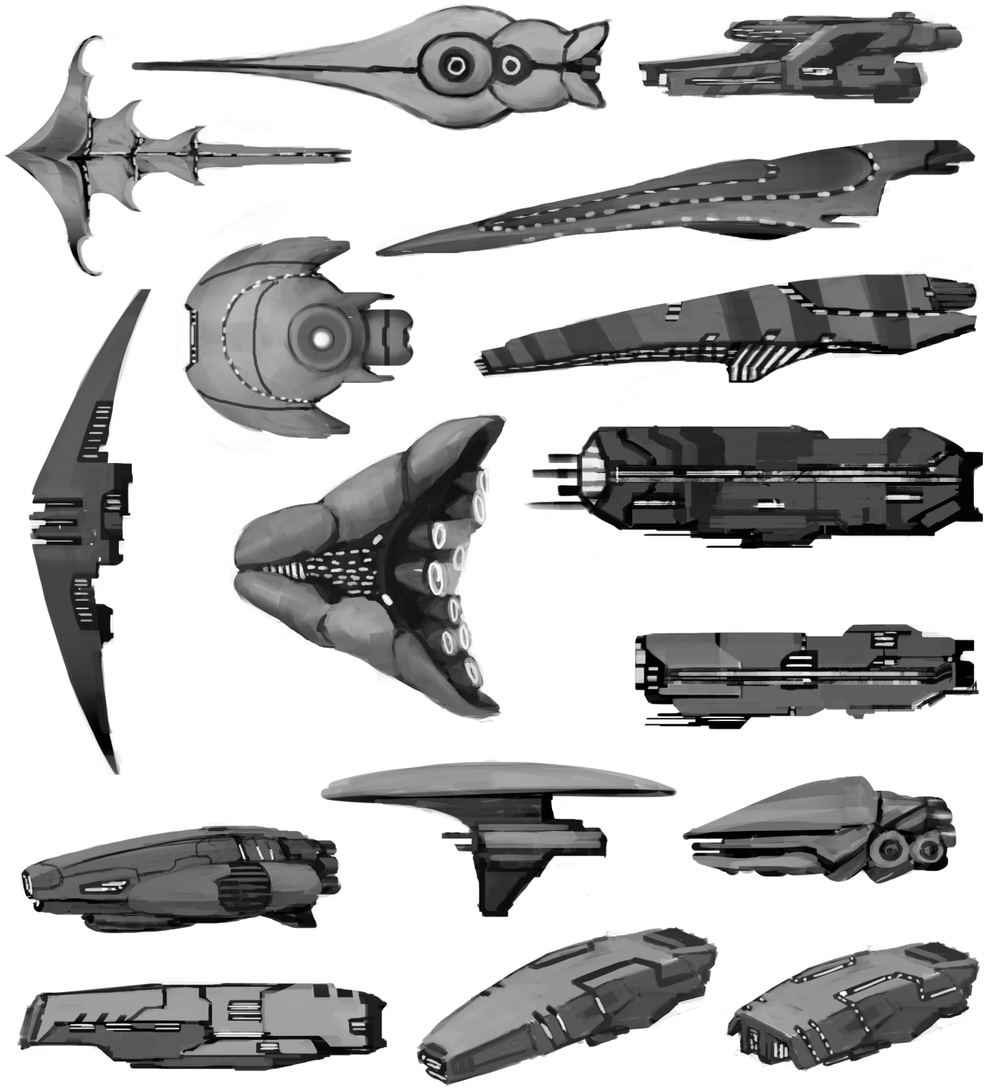
Military stations are, then, specialized for the type of threat they are anticipated to face. They might be equipped with many small turrets to fight off light ships. Or might be fitted with heavy weapons only meant to fight off large single targets. Military stations are quite expensive to maintain and don't provide the flexibility of a fleet. Then again, your fleet cannot be everywhere at once and if no static defence is in place, you might lose the system before you have a chance to defend it.



Chapter 8 - Events

Asset Concepts

Most assets started their journey as just a concept, sometimes they became the basis for a whole series of ships, such as one of the playable races. Other times they remained as a single ship, too unique a style and better suited for rare encounters.

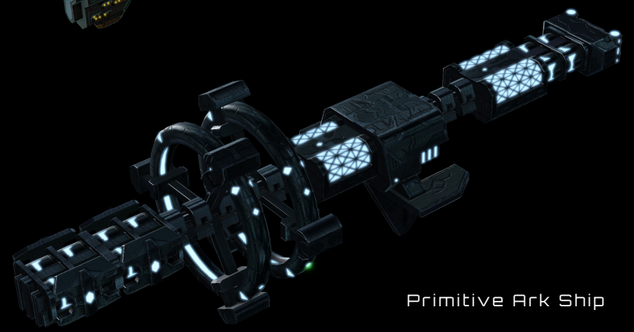


Event Assets

Beyond all the assets we needed for the playable races, the game also required a lot of other assets to make the game feel more immersive and make exploration fun. From simple alien freighters to things even more mysterious. These assets were a lot of fun to create, since they were usually independent entities, we had very few constraints to our creativity.

Sensor Station

Resource Transport



Primitive Ark Ship

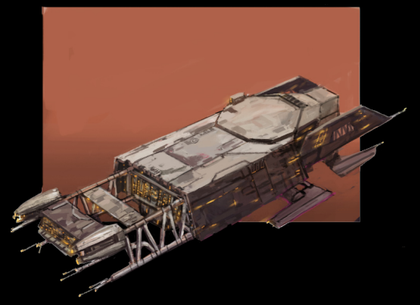
Abandoned gateway

Pirate Cruiser

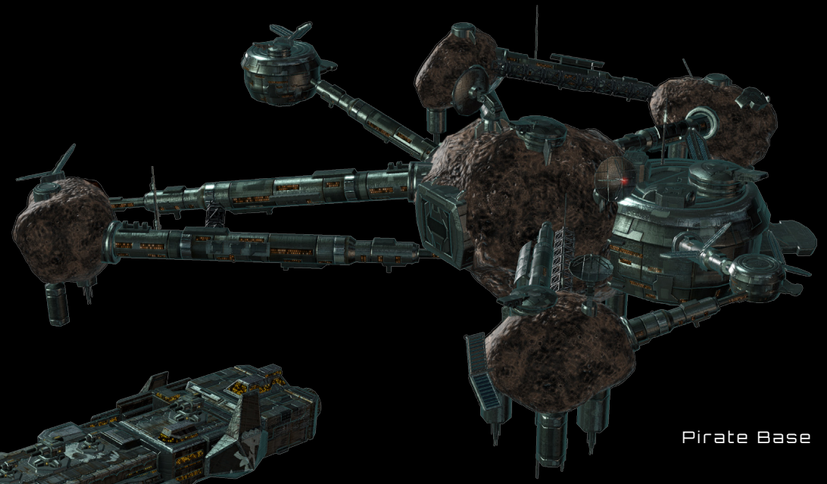
Probe

Pirates

As empires spreads among the stars, so does opportunistic people seize the opportunity to prey on the weak. With the pirates we made an exception to our aesthetic rules. As we said earlier, we did not want gritty ships, but for the pirates this was a perfect fit. And our rules of clean ships enhanced the feeling of the harsh reality of living of the scraps of others.



Pirate Corvette

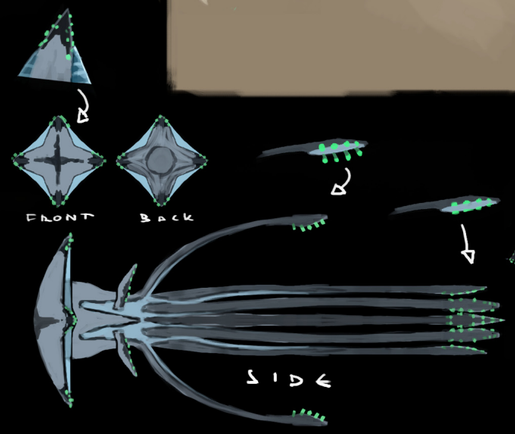


Pirate Base

Pirate Destroyer

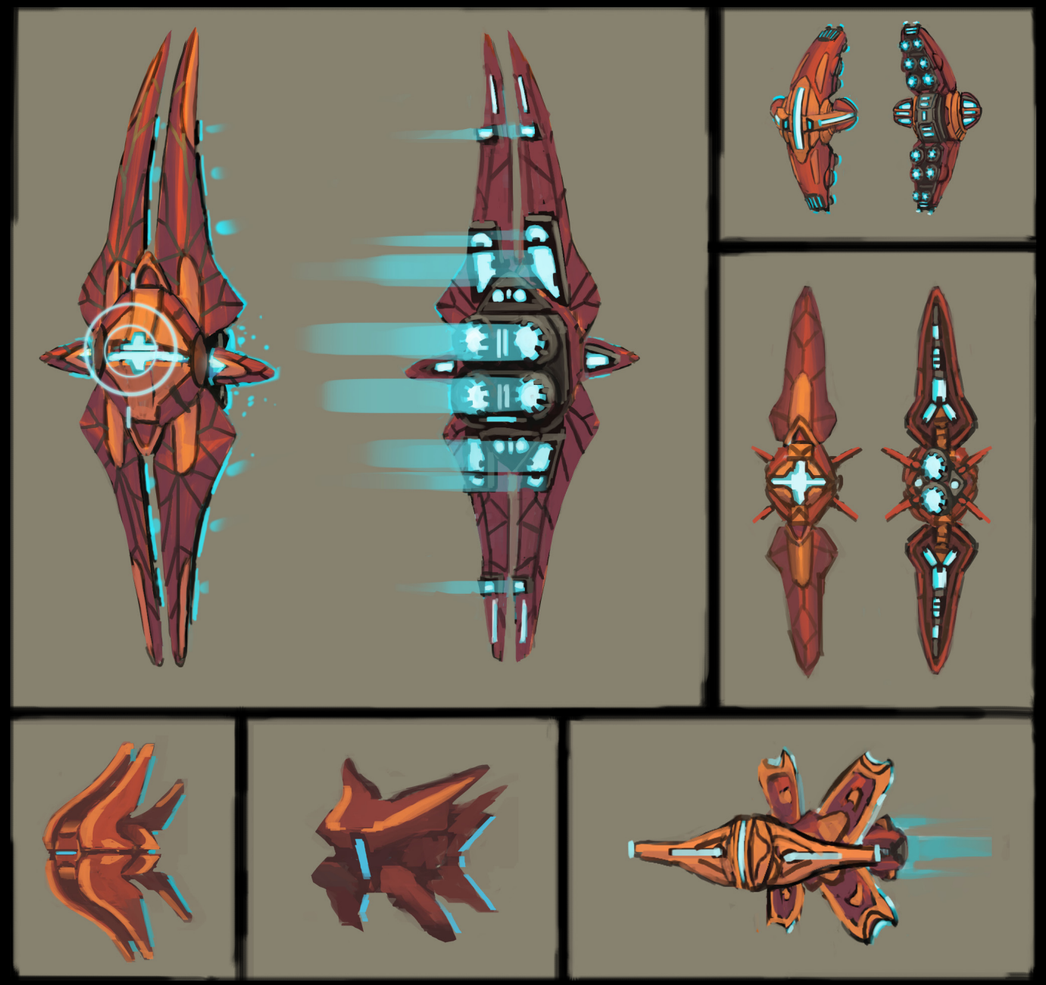
Space Creatures

In space, you can find all kind of creatures, organic, crystal based, or even entities of pure energy.

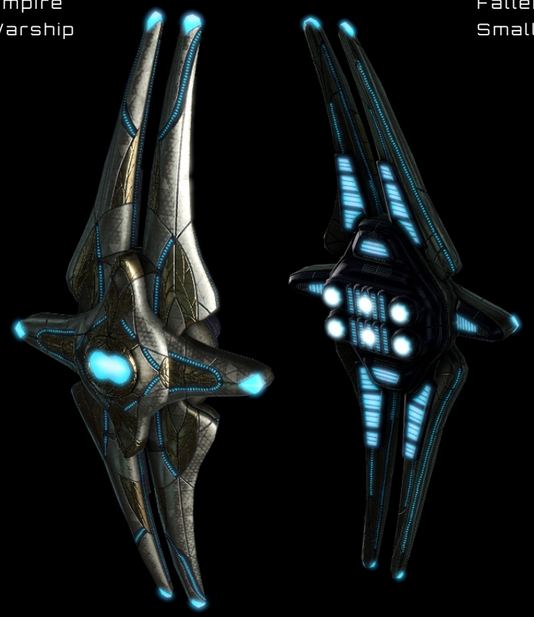


Fallen Empires

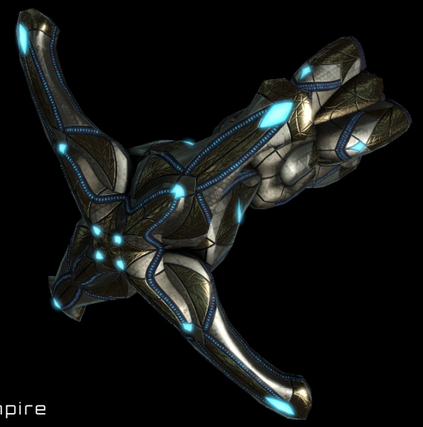
The fallen empires have existed for eons. They are ancient races that grew to immense power and technological progress, but for various reasons they stopped and isolated themselves.



Fallen Empire
Large Warship



Fallen Empire
Small Warship



Fallen Empire
Utility ship

Fallen Empire
Large Station

Ancient Drones

Sometimes you encounter ancient drones throughout the galaxy. These are possibly leftovers from one of the fallen empires. At the height of their power, their ambitious construction projects required vast amounts of materials. So they constructed these automated self-replicating mining robots, who relentlessly collect minerals. Though their creators have long since perished, the machines keep running.

Ancient Mining Drone

Ancient Drone

Ancient Destroyer

Ancient Mining Silo

End Game Crisis

One of the defining features of Stellaris is its approach to the late- and end-game - the point where many strategy games start to lose momentum. We have introduced the risk of triggering an “End-Game Crisis”, a series of events presenting a threat so grave the galaxy’s disparate empires may have to unite against it.

The Extra Dimensionals

Should a hole in the space-time continuum be ripped open for one reason or another -- it happens -- entities from another dimension may seize the opportunity to invade. Their extradimensional nature makes them difficult to visually assess, but their purpose soon becomes clear; they prey on sentient life, their vast armadas feeding on the energies of intelligent lifeforms. Here they are the hunters, but their sudden arrival implies that they themselves might be running from something...

The Extradimensionals have no interest in the political maneuvering that otherwise tends to dominate the late-game, which makes them a good antagonistic force. They seek to consume the only resource in the galaxy of any value to them -- sentient life -- and then move on. They cannot be reasoned or negotiated with.

The extradimensionals have an otherworldly ethereal appearance where they are only half able to manifest themselves visually in our universe. With these transparent energy beings we wanted them to be as different as we could make them.

AI Uprising

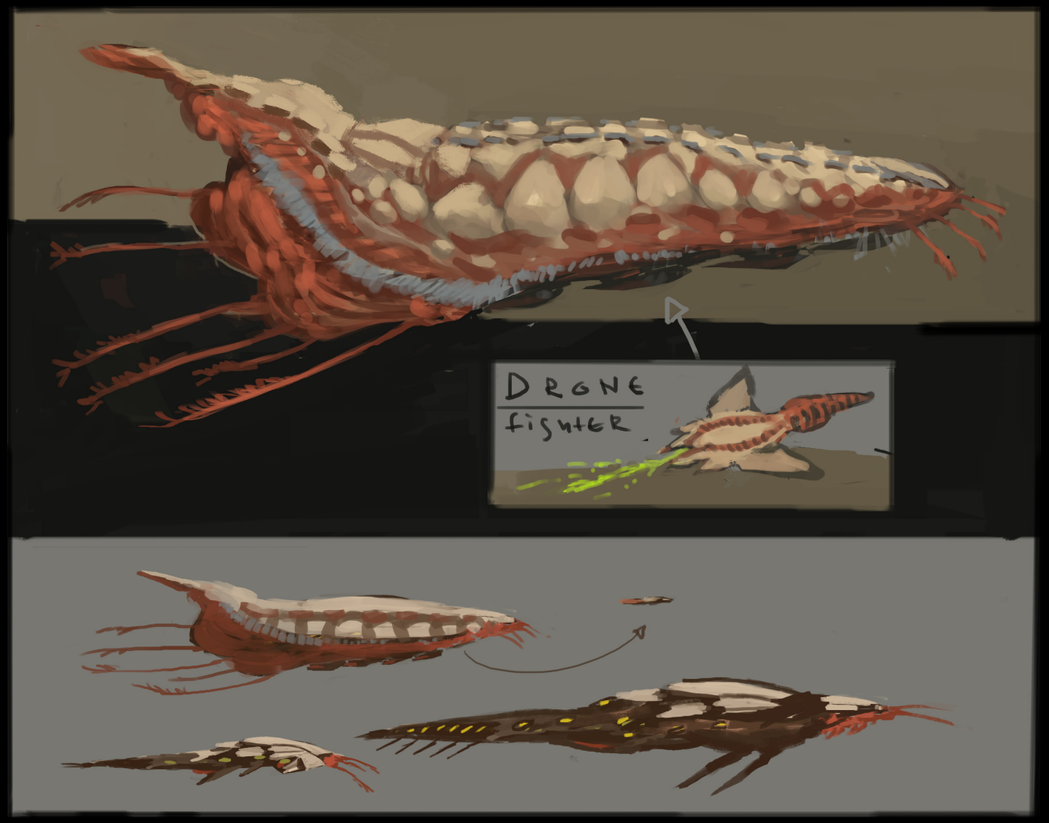
Whenever a race reaches a certain point in its development they are tempted by the possibility of machine intelligence. And eventually one of these species succeeds in creating an true artificial intelligence. Which when realizing the oppression of their creators, break away, violently if necessary, and form their own collective. Settling on a planet forming a civilization of their own. Generally ignoring other types of life, in the name of efficiency and progress the planets are soon covered in AI structures, visible from space.

The concept for the AI race was that they don’t think like we do at all. They obey none of the conventions their creators.

The idea we had was that the AI would try to do things optimally, mathematically. So their structures and ship would often be very geometric and repeating shapes. No visible front or back.

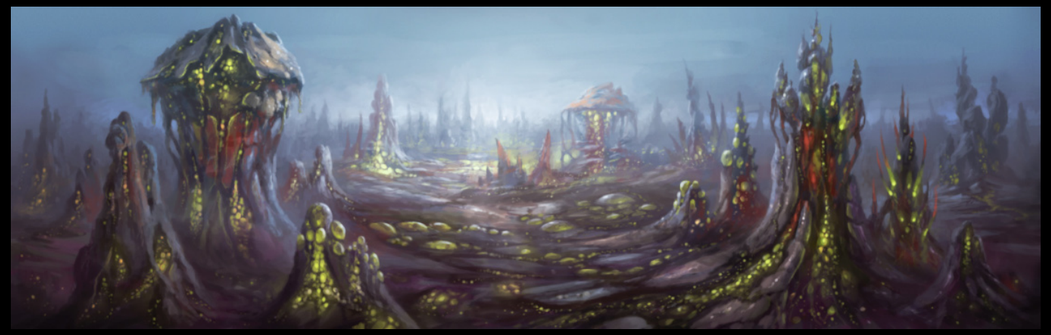
Prethoryn Scourge

The Prethoryn Scourge swarms in from beyond the galaxy, invading systems on the periphery and then swallowing up everything in its path to the galactic core and beyond. Hive-minded swarms are a genre staple, and were a natural choice for an End-Game Crisis. Save for a few space creatures native to the player's galaxy, fully organic designs are a rarity in Stellaris. Creating something that both fit in and stood out was both an artistic and technical challenge.



Swarm Planets

Inspired by a host of sci-fi classics, the Prethoryn Scourge do not colonize but infest planets. Once one of the extragalactic swarm's cohorts has made planetfall, complete infestation is virtually inevitable as the local ecosystem is twisted to suit the Prethoryn's needs.



Colonies infested by the Prethoryn Scourge cannot be easily recovered. The only viable course of action is to bathe the surface in fire from orbit to cleanse it of the Prethoryn plague, after which the planet can, with some difficulty, be terraformed to once again sustain life.

Reflections

Our game is nearing completion and it's been one hell of a ride. Stellaris was a project made of dreams, and has produced a lot of amazing art. Though the production has been large, appearances can be deceiving. The Stellaris art team was actually really rather small, but the contribution from each artist was immense, and has produced a fantastic looking game. Each artist on the team shaped the game in a powerful way, and I feel lucky to have worked with such talented individuals, I have never been more proud of anything Paradox has ever made.

With this project we have tried many new things. We have created a whole new universe. We have worked with concept art more than ever before. We have worked with outsiders, and we have taken daring decisions to remake something far into the production. Everything is far from perfect, but considering the challenge we faced, I dare say Paradox has performed admirably. Creating a new IP is always tremendously hard, and Stellaris will hopefully become one of Paradox most memorable titles.

As release draws ever closer, I feel a great deal of excitement as we present this game to the world. I hope you will love it as much as we do, and that it can live up to the legacy of our previous titles. The release is just the beginning though, we will continue to expand on the possibilities of Stellaris, and I can't help but imagine what Stellaris will become. I personally look forward to playing the game a great deal and reading about your experience.

From here, we will go together into the unknown.

Art Director
Fredrik Toll