JUMP POINT

ISSUE: 06 12

FROM THE COCKPIT

GREETINGS, CITIZENS!

Happy New Year (almost)! 2018 has been a truly astounding year for *Star Citizen*. When I first started working for Cloud Imperium Games back in 2012, I asked a co-worker and veteran of many long projects how he thought we were going to do everything we wanted. At the time, we had the game plans we'd shared with the community and plenty of internal dreaming about how to go even bigger. It seemed like a monumental task and I wanted to talk to someone who had been through this scale of project before. Without missing a beat, he told me that yes, at the start, every game seems like an impossible challenge and that *Star Citizen* was going to feel that way for a time. But, there would come a very particular point when we would understand how it was all supposed to come together. He likened it to riding a roller coaster: the trip up might seem interminable, but there's a point where you can clearly see the route ahead and the real excitement begins. I didn't quite understand what he meant at the time, but now I think 2018 was exactly what he was describing. It really feels like this was the year that the pieces we saw in our head early on became not just possible, but real, tangible products that we can load up and engage with. There's plenty of work to be done, for sure, but I don't think anyone doubts that it's possible anymore.

Before we move forward down the track, though, we thought it would be a good time to look back on the year that was. There's a Kurt Vonnegut quote that's passed around the internet quite a bit where he urges people to notice when they are happy "and exclaim or murmur or think at some point, if this isn't nice, I don't know what is". Our feature article does just that and looks back at some of the incredible accomplishments from the *Star Citizen* team this past year and celebrates what they mean for the future. From entire planets to pocket carriers, this year was certainly nice.

We also have a pretty neat feature on the new Anvil Arrow. For the past year, we've shown you how our ships are built. Readers surely know the process now and mostly want to see all the ideas and little challenges that come up in that framework. Well, the Arrow is something different, something we all imagined back at the start: a ship built for immediate release instead of a concept presentation. That might not seem like a big deal in and of itself... but trust me, it's the future!

I will close the year thanking you all very much for your support. I hope you've enjoyed the past few months of **Jump Point**. I'm excited to announce that we'll be making some changes to the format to introduce new and better types of articles next year, the first of which you'll see in January. Until next time, I wish you all the happiest possible holidays and I will see you... in the 'verse!
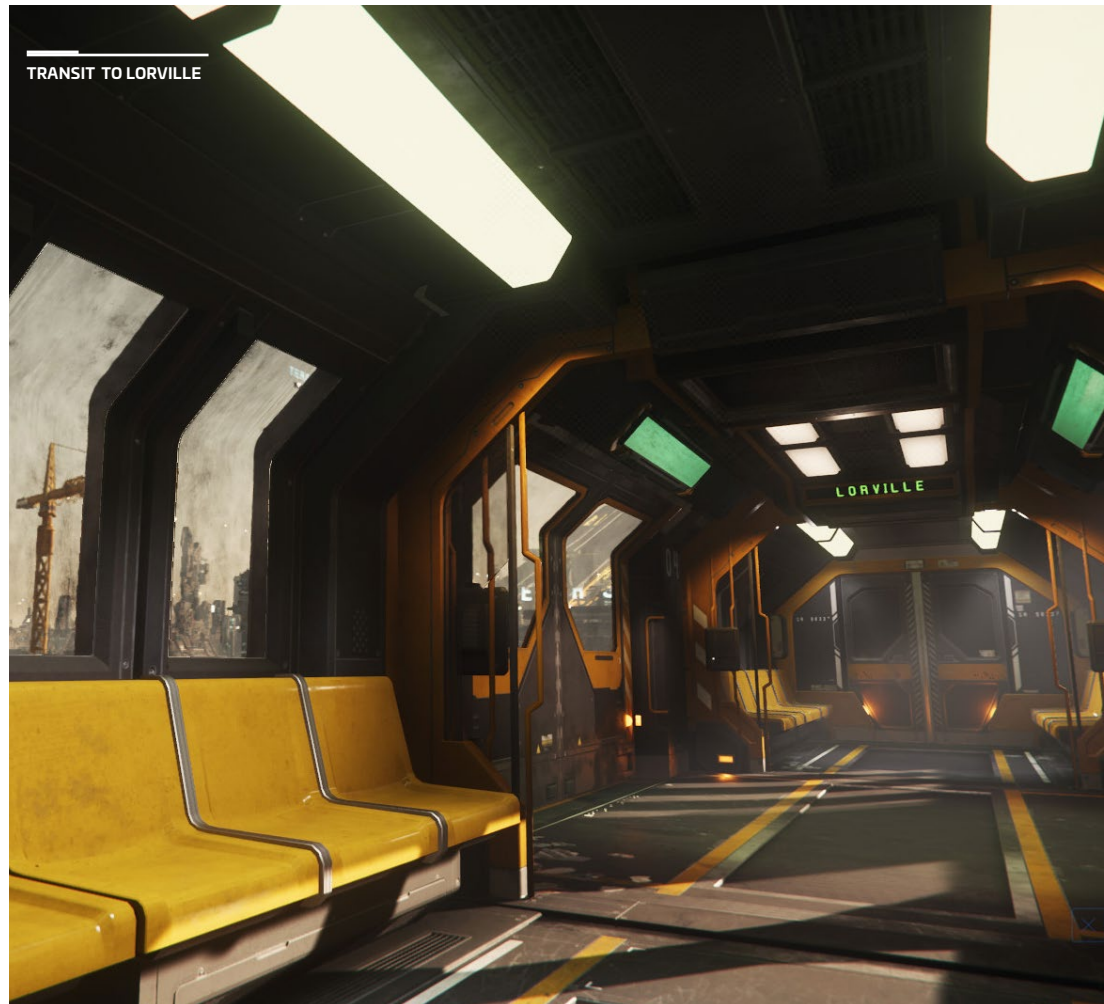
Ben

ACES GUIDE:
YEAR IN REVIEW

There're no two ways to say it: 2018 was *Star Citizen*'s biggest year yet. From introducing an entire planet to finding new ways to share the development process with the community, the project has had a banner year. In honor of all this, we're taking a short look back at five of the big changes that made this year so wonderful...

BEGIN TRANSMISSION →

3.4 MISC FREELANCER

CHRIS ROBERTS ON THE MAIN STAGE AT CITIZENCON

TRANSIT TO LORVILLE

3.3 AEGIS HAMMERHEAD

DRAKE KRAKEN CONCEPT IMAGE

CITIZENCON DRAKE VIRTUAL TRAINING CENTER

STAR CITIZEN · Updated Dec. 14th 2018

Live Version: 3.3.7 (more info) • PTU Version: 3.4.0 - All Backers

Collapse all categories —

RSI ROADMAP

Released March 31, 2018 — 3.10

3.2.0
Released June 30, 2018

Gameplay

Groups System
Status: **Released**
Ability to team up with and identify friends, travel in groups, coordinate and share location information, and chat within different groups.

Quantum Linking
Status: **Released**
Adding the ability to link with other players ships, allowing group Quantum Travel.

Ship Persistence Improvements

3.3.0
Released November 9, 2018

Characters
2 Entries

Mission Giver: Recco Battaglia
Status: **Released**
Creation and implementation of a mission giver character.

RSI Odyssey Flightsuit Rework
Status: **Released**
Revising the existing RSI Flightsuit.

Locations
1 Entry

Small Rest Stops

3.3.5
Released 20 November, 2018

Locations
6 Entries

Hurston Planet •
Status: **Released**
Creating the planet Hurston.

Lorville Landing Zone
Status: **Released**
Creating the city of Lorville on Hurston.

Hurston Moons: Aberdeen
Status: **Released**
Building and populating Aberdeen.

3.4.0
Q4 2018

Characters •
3 Entries • 3 completed

Mission Giver: Constantine Hurston •
Polishing
Creation and implementation of a mission giver character.

Mission Giver: Wallace Klim •
Polishing
Creation and implementation of a mission giver character.

Shipjacker Armor •

3.5.0
Q1 2019

Gameplay

Status: **Scheduled**
The ability to collect material from ship hulls.

Service Beacon: Escort
0/1 tasks completed
Status: **In Development**
Pay another player to escort you to a different location.

AI
2 Entries

FPS Combat: Stealth

CAVEATS >

FPS Combat: Smooth Locomotion Improvements •
Category: AI   Status: Polishing
Updated Dec. 8th 2018
General improvements to Smooth Locomotion for Combat AI and the network synchronization related to that. This includes a more reliable animation triggering and updated strafing animation.

Mission Giver: Constantine Hurston •
Category: Characters   Status: Polishing
Updated Dec. 14th 2018
Creating a new mission giver to add to the Lorville location. This includes concepting with the character team, creation of the character's clothing/props and environment, capturing performance/lines, solving the animation and audio files for implementation into the engine, creating the Behavior tree, and hooking up mission content for this character. This task will also include the creation of any text needed to accompany their mission.

Hurston Planet •
Category: Locations   Status: Released
Updated Dec. 14th 2018
The creation and implementation of the planet Hurston, including points of interests positioned around the planet. This feature is dependent upon implementation of Object Container Streaming.

1) LOOKING FORWARD: UPDATING THE ROADMAP

The efforts of 2018 weren't just limited to improving and expanding the game itself: one of the biggest changes this year was the Production Team's concentrated effort to make sure a public-facing version of their internal schedule was available and regularly updated. The *Star Citizen* Team has always aimed to be as transparent as possible in letting the community know what's in the works and how much progress is being made, but for 2018, Chris Roberts wanted to try and share even more. The result is a complex production schedule made easily readable that shares exactly what the team has been working on. Gone are the captures of confusing internal charts, replaced by an easy to understand but comprehensive production

schedule. This has given the community a better understanding of how much work goes into a project like *Star Citizen* and lets everyone understand why a simple feature can sometimes rely on a dozen other milestones coming together before it can be released.

Producer Matthew Webster explains the work that went into this change: "We knew that we wanted a better way to represent our development goals and ongoing progress to the community than the weekly development updates (the ones with the screenshots of charts). We felt that a good way to do this would be to pull information directly from the Epics in our project management software, JIRA, and present it on

the website. We worked with our web developers Turbulent to create a method and build the new hosting page. At the start of 2018, there was a big push to organize our development Epics by their relevant releases and to begin scoping out work for the rest of the year, which also tied into our aim of releasing a new patch each quarter. There were many meetings to make sure that what we were seeing on our Epics was being properly represented on the website, but we got there in the end."

Why is this milestone so important for *Star Citizen*? Webster continues: "This roadmap represents a great step for us, not just

because it's now a more automated process where the website is representing information directly from development, but because we're able to show the community our future intentions. We've seen some great feedback from the community and excitement generated from seeing a feature or improvement that won't even be in the game as far as a year out. Seeing the buzz from this is a really good engagement point for us."

The production team is dedicated to continuing this level of openness throughout 2019 and even plans to expand the process further, aiming to show further into the future when possible.

2) HURSTON AND BEYOND THE INFINITE

In late 2017, *Star Citizen* Alpha 3.0 introduced three fully explorable moons, Cellin, Daymar, and Yela. This was a huge milestone for the game, adding something that the team had considered a distant possibility when the project began: massive, realistic environments that put to shame the simple gameflow navigation screens that would've been utilized in earlier games. So where do you go from literally creating and populating moons? Why, you build planets, of course! 2018 is the year *Star Citizen*'s Environment Team truly became Magratheans. Using the procedural technology that had allowed the construction of moons, they constructed Hurston, an entire planet in the Stanton System.

Hurston is the home planet of Hurston Dynamics and one of several corporate planets imagined early in the game's development. The thought was that the Stanton System would be the 30th century's equivalent of an enterprise zone, playing host to many of the mega-corporations that form the backbone of human commerce in 2948. But where developers early on imagined only a small map that would allow players to explore a spaceport, access their housing, and make necessary ship upgrades, they had now created an entire world to populate and explore. The final effect is stunning and so perfectly encapsulates what Chris Roberts has always believed was possible for the game. Hurston launched in *Star Citizen* Alpha 3.3, enabled by recent enhancements to Object Container Streaming that would allow the game to effectively move the incredible amounts of data required to simulate the world.
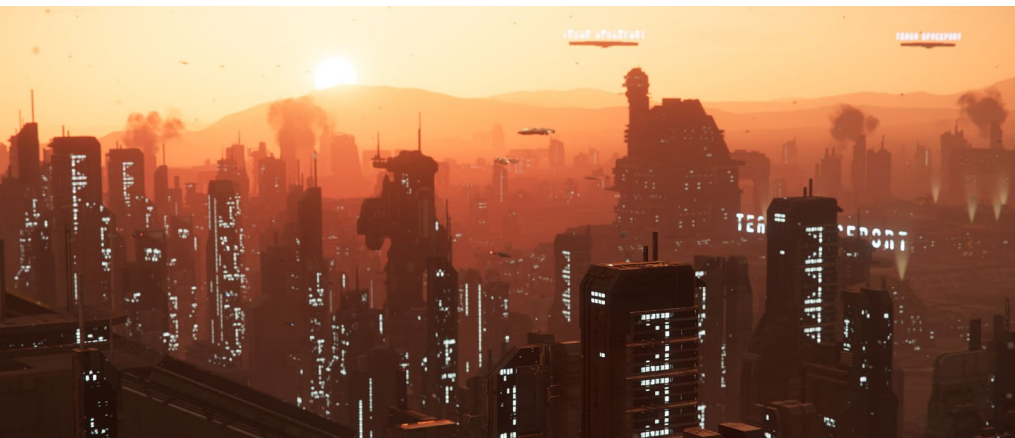
The crown jewel of Hurston is Lorville, a company town set up by the planet's namesake. Lorville has all of the early features imagined for the planet and then some, including a working mass transit system. The city is full of diverse, consciously created environments and is populated by NPCs. It's an example of exactly what *Star Citizen* aims to do around the galaxy: points of interest that are natural hotspots for gameplay and interaction that fit naturally into larger worlds that have near-infinite possibilities for emergent gameplay. In the case of Lorville, designers opted to make it the main import/export point for the planet, a logical place for players to land and interact. Then, they might travel into the vast expanse of Hurston itself to explore mining operations, other settlements, crash sites, and the natural wonders spread around the planet.

While Hurston and Lorville are impressive accomplishments on their own, they're they're glimpses of even bigger things to come. Just as the ship pipeline began by perfecting individual ships and the style books that go with them, building Hurston and Lorville has allowed the team to prototype the next wave of locations that will be built to the same standard and beyond. Processes, materials, designs, artwork, and more that took months to develop for Hurston can now be repurposed, adapted, and expanded upon in countless ways to build more planets and settlements around the 'verse.

3) UNDER THE HOOD

If you were following any other game, you would probably never even hear a phrase like "Object Container Streaming" (OCS). That's one of the big reasons *Star Citizen* is so different: the game's supporters have been following not only the final bullet point features they'll someday play, but also the incredible technical challenges that go into making them possible. Anyone following production throughout 2018 is well familiar with OCS, the technology that makes such a massively complex game world function as it should. 2018 saw the launch of a major technological overhaul, which built a new foundation on which to expand the game and created significant improvements in how it runs.

Producer Luke Hale explains the need in everyday terms: "Think of a computer's memory as being like an empty tub. The more available memory, the bigger the tub. As you play a game, objects you interact with are taken from storage and then dropped into it. In this case, objects are things like level maps, 3D objects, textures, audio, pre-rendered video… all the individual parts that make up the game experience. It takes a little time to move objects into the tub, which is what you experience as loading. As long as the object you need has already been dropped in, though, you can make use of it immediately."

OCS is the process by which all the pieces of the game world are made available to the end user without any pauses for loading. The game predicts what every player will need at any time and makes sure those assets are prepared in memory. With a game as complex as *Star Citizen* with countless environments, textures, ship models, audio clips, and more, building a system to manage everything without inconveniencing the player has been a true effort…and thankfully, a successful one!

What's next for the programmers and other developers working under the hood? The third phase is "server-side OCS", which will come online closer to when the overall shape of the world is finished. The challenge is to create a system that allows the game to use multiple servers to create one shared game universe for all players - a long-held dream for the project. The work that has gone into regular OCS is the foundation for the server-side effort that will take place once more planets and systems have been populated. While the team started from scratch with OCS, they now have a strong understanding of what is needed going forward and work has already begun on the web of dependencies that will allow this final iteration to happen. You might not hear much about OCS in 2019, but there are still developers hard at work preparing it to reach its final form!

4) SHIP IT!

Let's face it, you can't celebrate *Star Citizen*'s accomplishments without taking a look at one of the elements everyone can agree is truly exciting… the spaceships! The year's accomplishments can typically be divided into two distinct categories: the always exciting slate of new concept ships developed for the first time and shown to the community, and the ships that have been implemented in the game itself. This year, however, there's a third category thanks to the recently released Anvil Arrow. Ships that have gone straight into the game!

On the concept side, it would be hard to match the Drake Kraken for sheer excitement. The long-awaited civilian carrier finally materialized in the form of a Drake design that's as much seagoing flattop as it is starship. It's a ship so impressive that the team needed to develop a new kind of Idris to counter it! The rest of the lineup was more diverse than ever before, too, and included the job-focused Drake Vulture salvage ship and RSI Apollo medical craft. Crusader Industries finally had their portfolio expanded with the development of some of the long-promised industrial craft, including the Mercury data runner and the Hercules starlifter; an enormous craft capable of transporting ground vehicles around the surface of the game's moons and planets. Smaller ships were celebrated too, including the Origin 100 budget luxury craft, the Anvil Arrow light fighter (more on why it's so important in this issue), and the big brother to the Xi'an Scout, the San'tok.yāi.

Planning ships is one thing, but making them a reality is another. This year, the ship implementation teams broke all records and again proved that concepts will always lead to awesome working vehicles, with the added bonus of the time required to make them happen decreasing with each new release. With twelve significant patches in 2018, *Star Citizen* introduced a range of finished ships well beyond the fighters and bombers that filled out the schedule in earlier years. From the luxurious Origin 600i and massive Reclaimer to any number of smaller ground vehicles that allow new gameplay in a new setting, *Star Citizen*'s 3D

artists and designers put countless hours into making sure the scope of the game's active fleet increased with every single release. Who could have imagined shooting down a desert canyon in a Xi'an space bike just a year ago? And now it's something you can do yourself at a moment's notice.

And yet, the Ship Team reports that 2019 is looking even better. As more complex gameplay mechanics come online, so too will a number of long-awaited ships…

5) CITIZENCON

In October 2013, members of *Star Citizen*'s development team and a small number of diehard fans converged on Austin, Texas to celebrate the first anniversary of the game's launch at GDC Online. The event took place at the Alamo Drafthouse on 6th Street and included short updates from the teams then working towards the launch of the Hangar Module. The newly developed Hornet commercial was premiered, Erin Roberts and Foundry 42 were introduced, and the night was capped off with a viewing of the Wing Commander movie and a friendly celebration at a local bar. There were no decorations, no signage, and a blueprint-style poster with the names of the development team was the only swag. Looking back, the evening was a perfect encapsulation of *Star Citizen* at the time: a small project working towards big dreams thanks to the generous support of a lot of good people.

In October 2018, *Star Citizen* premiered the fifth annual CitizenCon. The event returned to Austin and boy, what a difference five years makes. CitizenCon 2948 featured over 2,000 attendees and two stages of livestreamed presentations for a total of fifteen hours of content. *Star Citizen* players from around the world came to town to listen to developers, see the latest from Alpha 3.3, and to engage in all sorts of activities including recording emotes using mocap suits. Bar Citizen events in more than a dozen countries carried the live feed to thousands more fans. Chris Roberts presented a keynote and 'Road to Release', explaining plans for the next year of *Star Citizen*. Attendees were given in-universe programs and the entire convention center was skinned to look like attendees were stepping into the 30th century. Professional model builders (and *Star Citizen* fans!) constructed a life-size Dragonfly for photos and an enormous model of the newly-revealed Drake Kraken. A food truck even served up Big Benny's noodles in honor of one of the 'verse's most enduring memes. The event had all the hype, energy, and the excitement of shows like E3 and PAX... but just for *Star Citizen*'s backers.

Cameron Wilkie, *Star Citizen*'s events manager, spent months working with vendors, volunteers, and development teams to make the event a reality. The goal was to take CitizenCon to the next level and to reward the dedicated fans who had supported the project up to that point. Everyone involved wanted to create something special that would be both a chance to bring the future of *Star Citizen* into the real world and also to set a template for future events. By all accounts, the mission was a true success: backers there and at home were as stunned by the improvement in quality as they were by the new ships and upcoming features. How will CitizenCon 2019 top all of this? Plans are already in motion... but anything more would spoil the surprise!

END TRANSMISSION ←

WORK IN PROGRESS...
ANVIL AEROSPACE ARROW
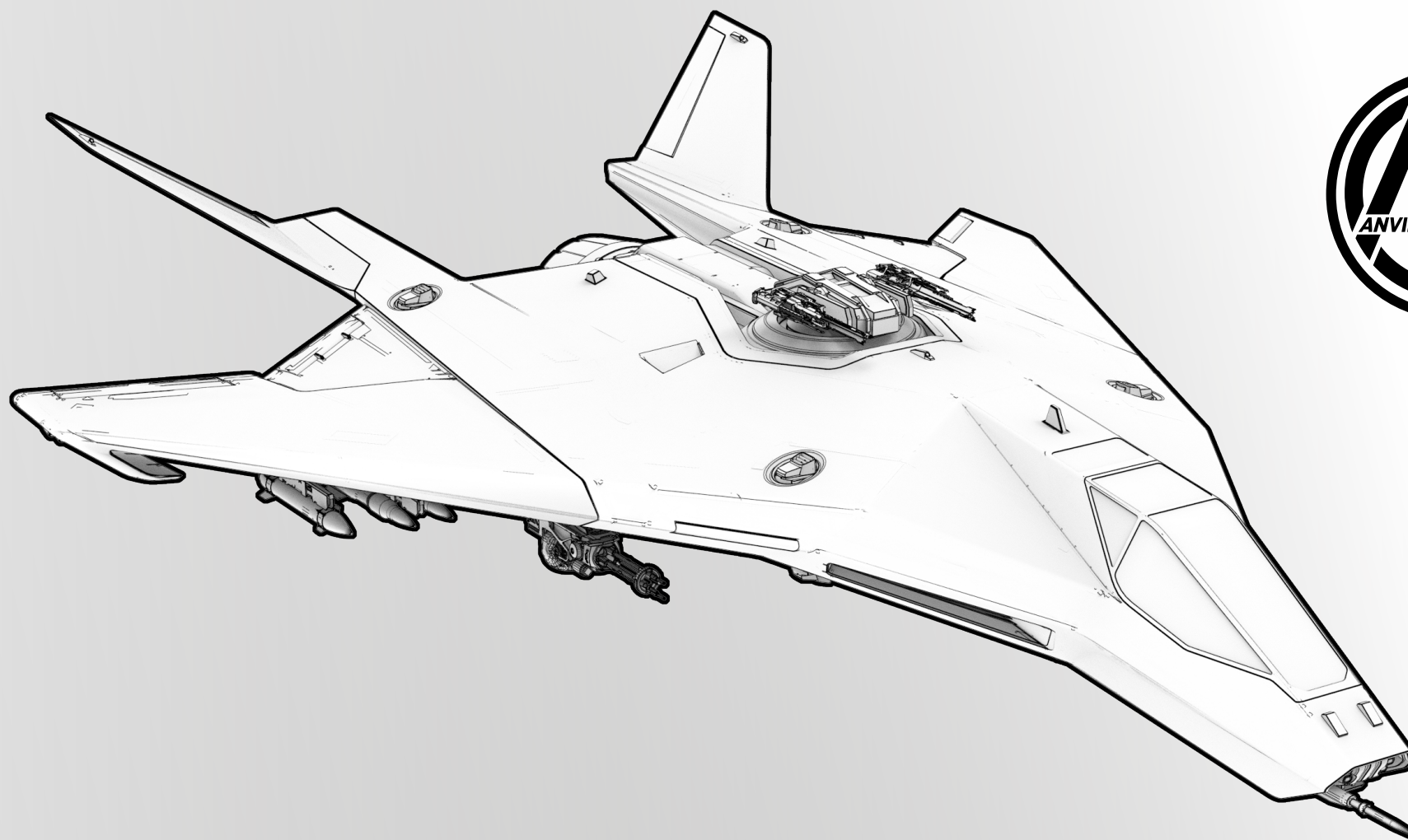
AIMS

- The Arrow is a light fighter that acts as a patrol and scout ship. Light and fast but with enough armament to hold its own.
- ANVL's answer to the AEGS Gladius. High angular velocity makes it more maneuverable than a Gladius, but sacrifices linear velocity.
- Its smaller profile, and sturdy frame aides in its survival, but makes it less capable in atmosphere.

AESTHETIC

- Smaller and lighter than the Hornet while keeping the ANVL aesthetic.
- Its compact design necessitates a thicker body to hold all its components giving it the distinctive arrow-like shape.

Length	16 m
Width	12 m
Height	4 m
Mass	30,752 Kg
Speed	270 mps
Max Crew	1
Powerplants	1 x Small
Shield	1 x Small
Cargo Capacity	0 SCU
Armour	1 x Small

Weapons	2x S3 - S2 Gimbal •2x S2 Gallenson Tactical Scorpion GT-215 1x S3 - Spine Mounted Turret •2x S1 Klaus & Werner CF-117 Bulldog Laser Repeater
Missiles	2x S3 - Behring MSD-322 Missile Rack •4x S2 Talon Dominator II 2x S2 - Behring MSD-212 Missile Rack •2x S2 Firestorm Kinetics Ignite II
Countermeasures	1x S1 CML Flare •16x Flare 1x S1 CML Chaff •16x Chaff

The vehicle depicted herein is undergoing concept and design as of the release of this publication. Specifications and appearance are subject to revision during development.

A NEW WAY TO BUILD A SPACESHIP

From the very start of *Star Citizen*, Chris Roberts and the team dreamed of a significant moment: the time when ship development matures from designing concepts to be implemented when technology and scheduling allow, to designing ships that are immediately integrated and released fully-playable. As *Star Citizen*'s teams learned how to most effectively design and build ships, they never lost sight of a particular vision: a future where ships weren't released to the community through the Roberts Space Industries website, but were instead introduced into *Star Citizen*'s universe live, presented at in-universe trade shows and available for players to test-fly before buying. As plans for the 2018 ship line-up coalesced, Roberts was eager to make this dream a reality. For the first time, he asked for a ship to be concepted, built in-game, and only revealed to the community once it was ready to fly.

Several factors would allow this to happen. On the concepting side, the process had become nearly foolproof. *Star Citizen*'s talented designers and concept artists now had the experience to understand exactly what was needed at every stage of a ship's development. Reference and material libraries were fully developed for the verse's different aerospace companies and the builders of new ships, especially ones in familiar roles, had a wealth of information available at their outset. Similarly, designers had built up a similar process for speccing out new ships that considered all of the issues discovered over the years. New ships no longer introduced surprise animations or components to be added to the game at the last minute; generally the process of going from design to concept was perfect. Similarly, the team responsible for implementation were now experienced with a wealth of knowledge and battle-tested tools that allowed them to construct, animate, and test ships in-engine in a much more efficient manner than ever before. Going in, the only fear was that changing the process now, however necessary in the long run, might impact a well-oiled machine. Making this all happen would use the hard-won tools and experience of the past several years of development, but it would also make fundamental changes to how ships were developed and how they were revealed to the public.

SLINGING ARROWS

The first step was deciding which ship would prototype the new process. The Design Team was keenly aware that there were certain limitations. Whichever ship would go straight into action would need to use only gameplay elements that were already available, so building a colony ship or research vessel couldn't happen at this stage. The team settled on a more familiar idea - a light fighter from Anvil Aerospace, the company behind the Hornet (*Star Citizen*'s very first ship). Designers John Crewe & Stephen Hosmer set about speccing-out a ship that would be roughly equivalent to the Aegis Gladius but would have the familiar Anvil flare and be different enough to make choosing it for dogfighting and interception viable.

"The Arrow is a light fighter that acts as a patrol and scout ship. Light and fast but with enough armament to hold its own. It's Anvil's answer to the Aegis Gladius. High angular velocity makes it more maneuverable than a Gladius but sacrifices linear velocity. Its smaller profile and sturdy frame aides its survival but makes it less capable in-atmosphere."
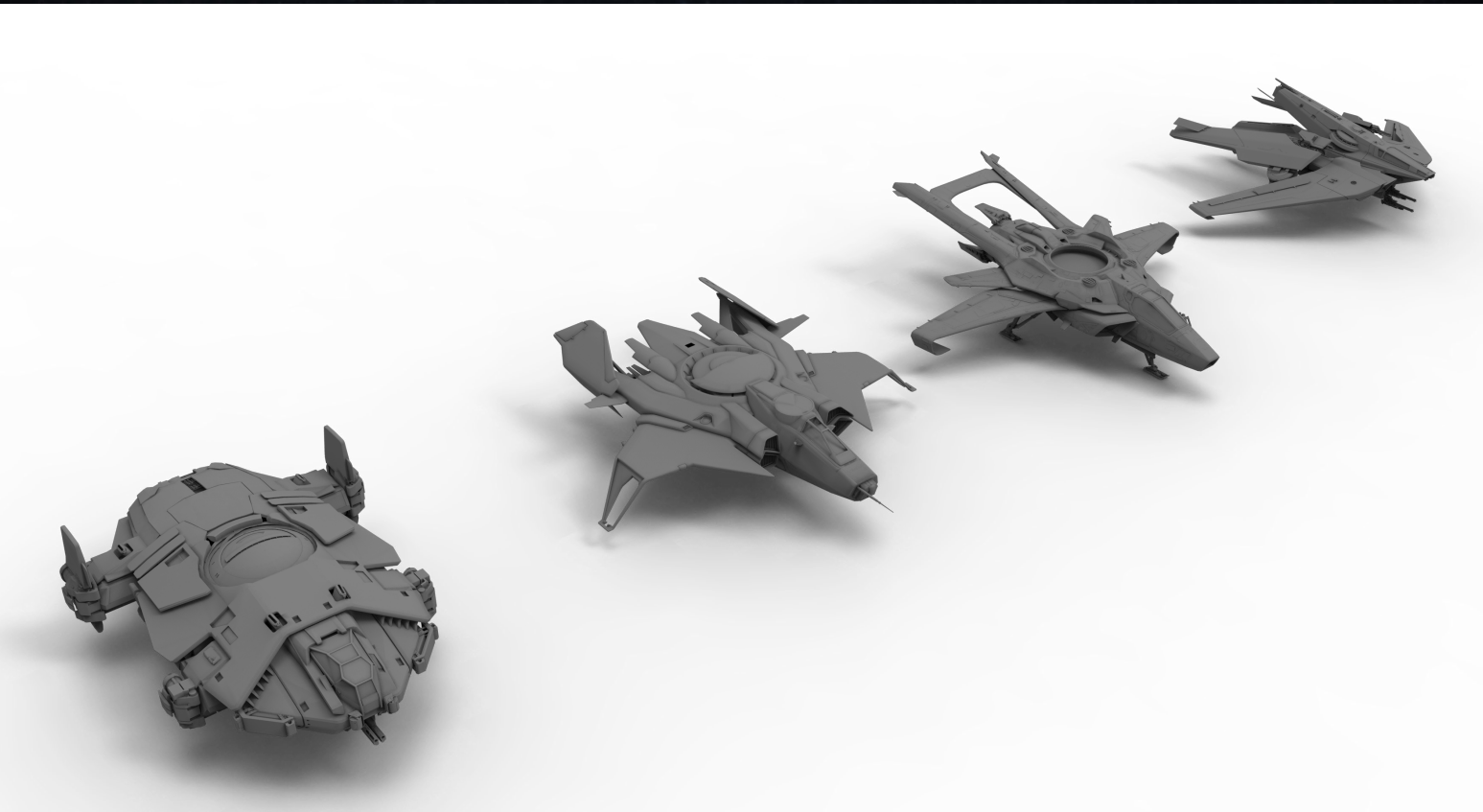
The Arrow has two important namesakes, both of which informed the final design of the ship:

Firstly, the Avro CF-105 Arrow, a Canadian warplane developed in the late 1950s. This Arrow is especially famous because of the unusual and controversial circumstances regarding its development. Prototypes of the plane, a delta-winged Mach 2 interceptor, were built and found to be extremely promising until financial and air-defense reprioritization led to the sudden cancellation of the project and the destruction of all prototypes and plans. Hopefully, *Star Citizen*'s Arrow would make it through the new development process more intact!

Secondly and closer to home, the Arrow's name, role, and overall significance to the development process are a nod to the Arrow-class light fighter developed for *Wing Commander III: Heart of the Tiger*.

This 'classic' Arrow was also a nimble light interceptor designed for protecting bases and flying short range patrol missions. Originally built by artist Chris Douglas, its slight, rounded triangle silhouette and bubble canopy were iconic in several of Roberts' earlier games (including *Wing Commanders* III and IV and the multiplayer spinoff *Armada*). But the Terran Confederation Arrow was more than just a beautiful spaceship, it also signified the move from pre-rendered 2D sprites to the fully 3D spaceships still used today. It was also the very first *Wing Commander* ship built as an in-game 3D object for Robert's RealSpace system, previously used only for traditional aircraft in Strike Commander. The Arrow is present in all early screenshots of *Wing Commander III* because it was the test article for the new engine... just as *Star Citizen*'s Arrow would develop a new way to make and release ships.
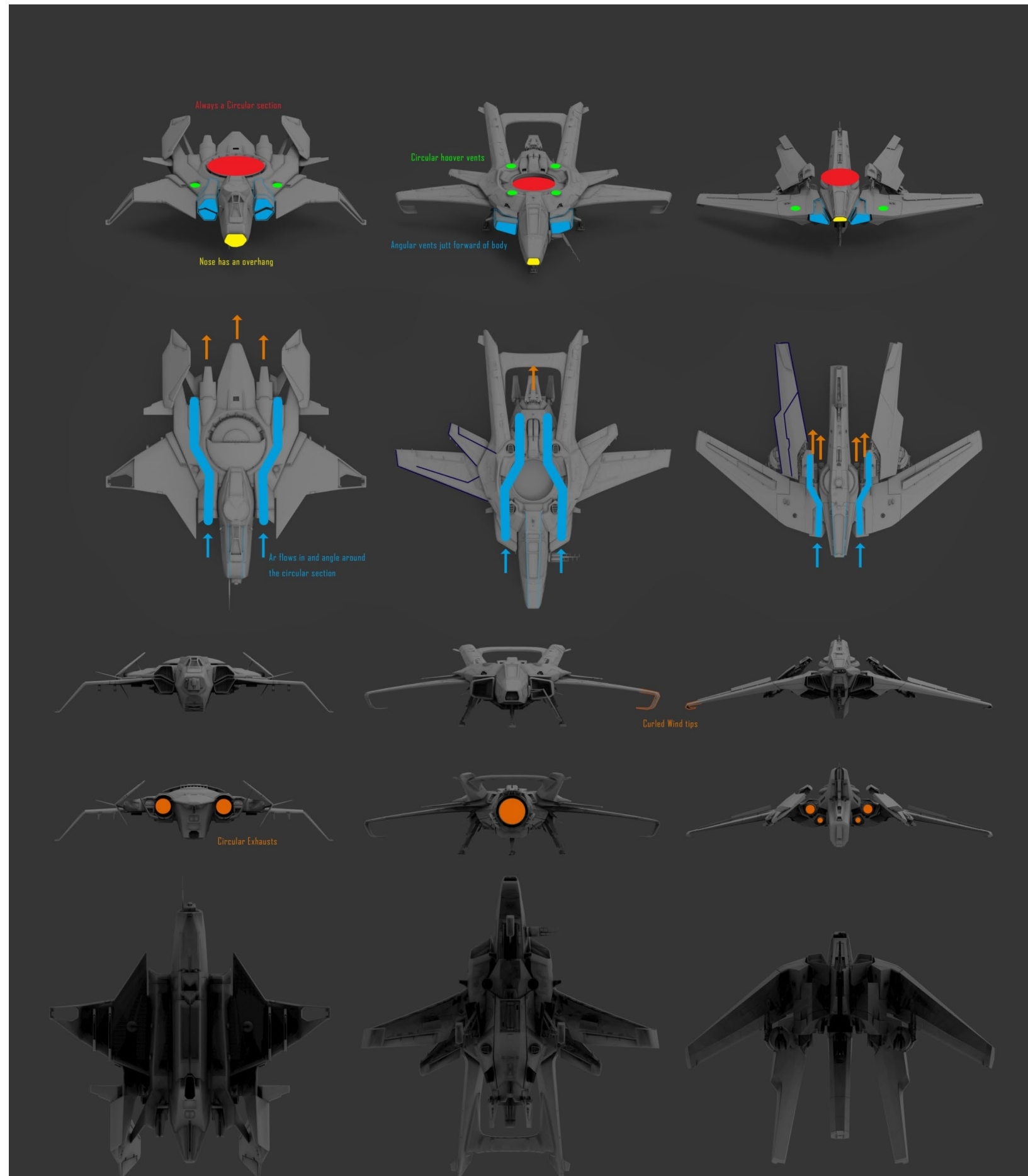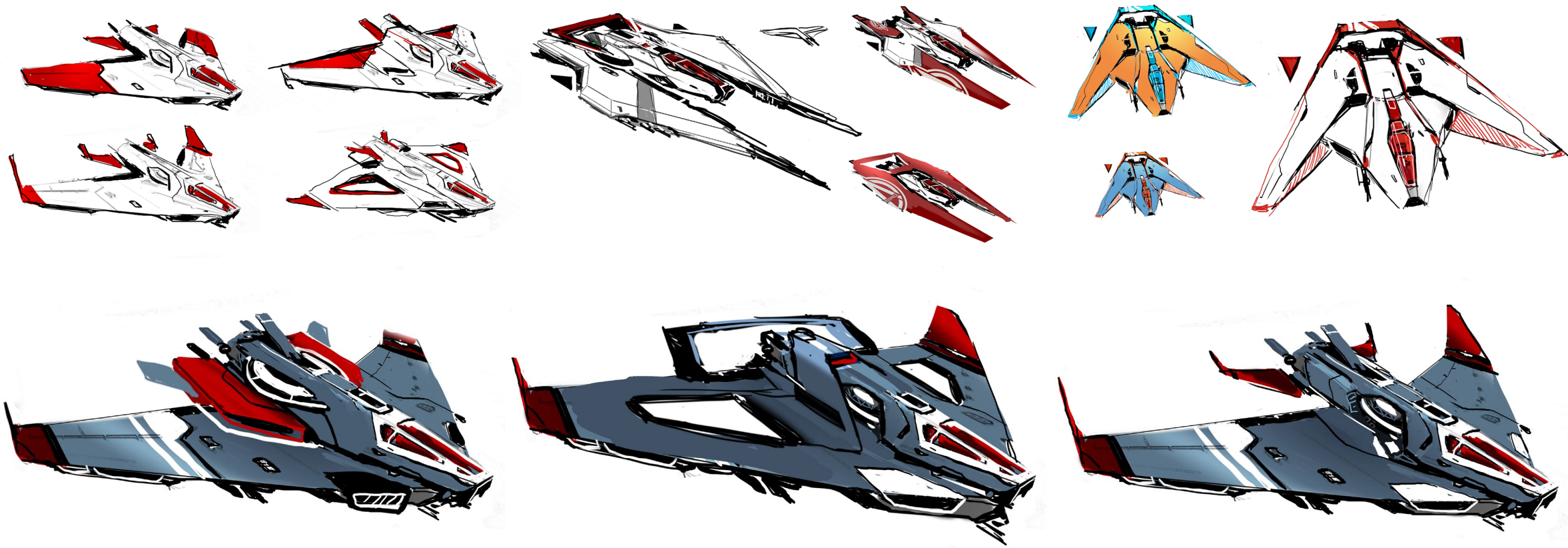
## FIRST TIME AROUND

Making the Arrow happen in time for inclusion in Alpha 3.3 and the November 2018 Intergalactic Aerospace Expo meant that the concept period was tighter than ever. Art Director Paul Jones and his team would have only six weeks to turn the design brief into a fully-imagined light fighter. To meet the deadline, Jones chose to work with concept artist Gary Sanchez, a veteran of several *Star Citizen* vehicles including the Xi'an Scout update and the Drake Dragonfly. A versatile artist, Sanchez had been relied on for everything from vehicles to environments in the past. His new challenge was developing a lighter counterpart to the iconic Hornet. Jones and Sanchez began the process by hitting the full spectrum of designs, ranging from what they expected a light fighter to look like through all sorts of wacky ideas. The result was a true voyage of discovery. Some of these initial sketches were influenced by the wing pose and formation of the Hawk, some attempted to use reverse wings. Jones specifically does not like to lock in a concept artist early and instead allows them to be as creative as possible to generate ideas never previously considered. Jones broke out the idea into 3D to explore the stance, with wings mounted up, down, and even as a four-part 'X' design. The goal was to hit on something that made it feel unique from a typical fighter. From numerous early sketches and the rough 3D ideas, he settled on three ideas to continue exploring: an arrow, an 'X', and a delta.
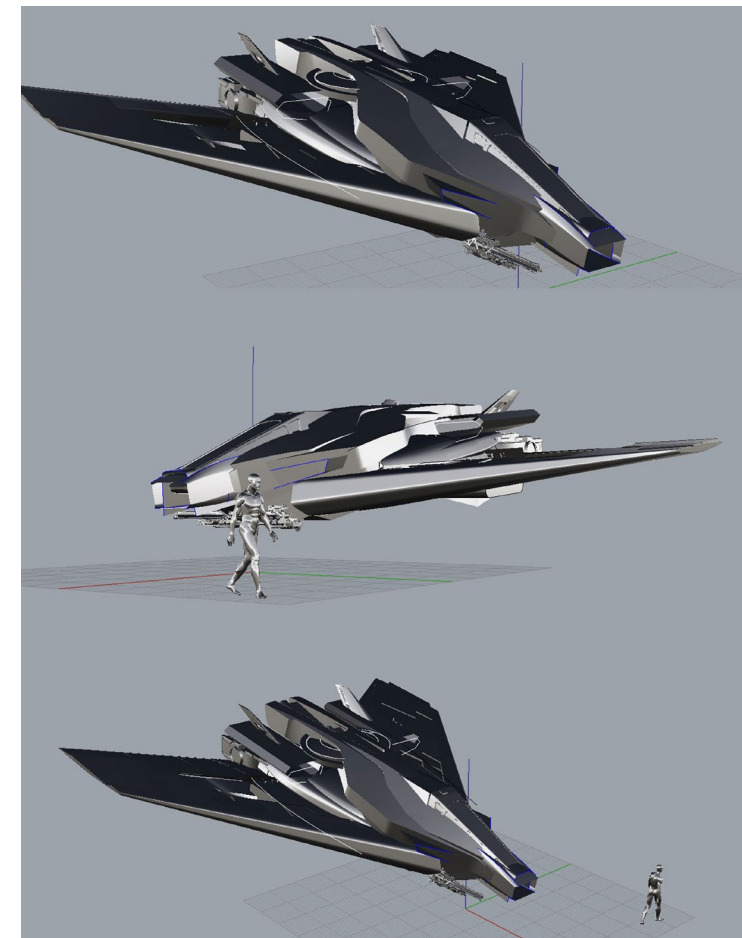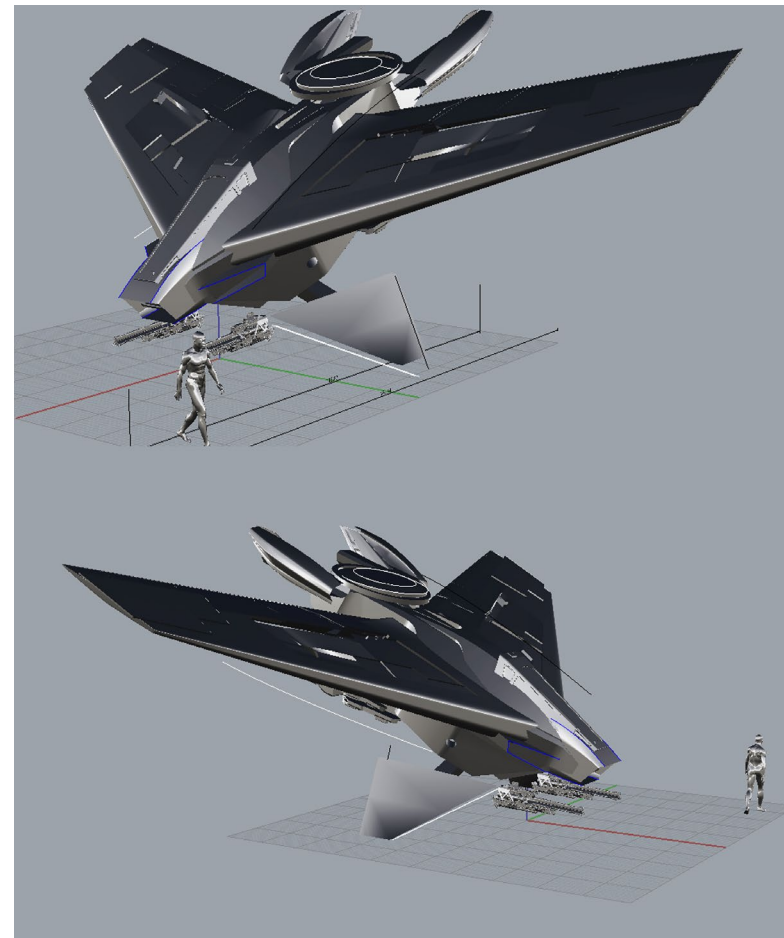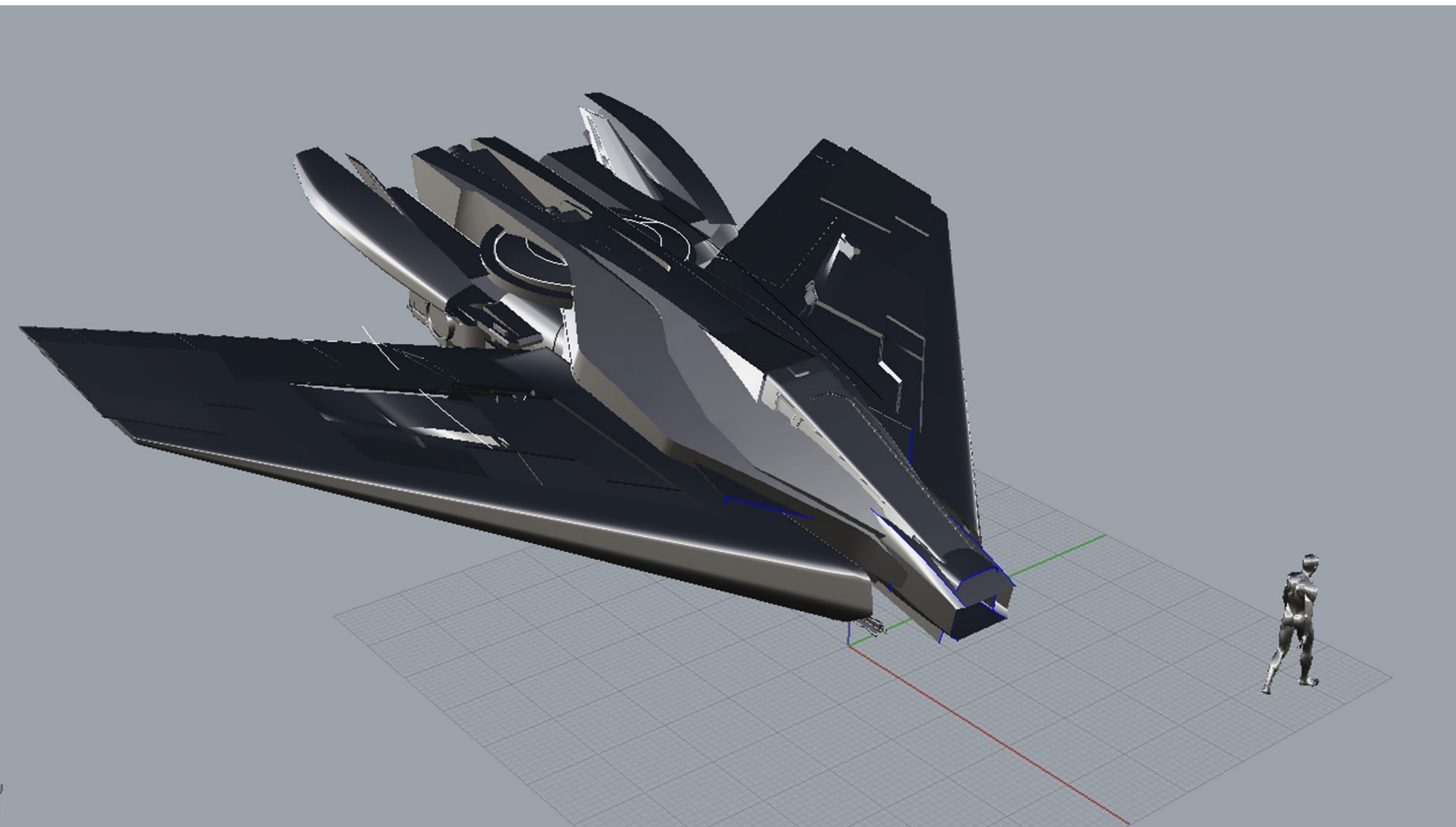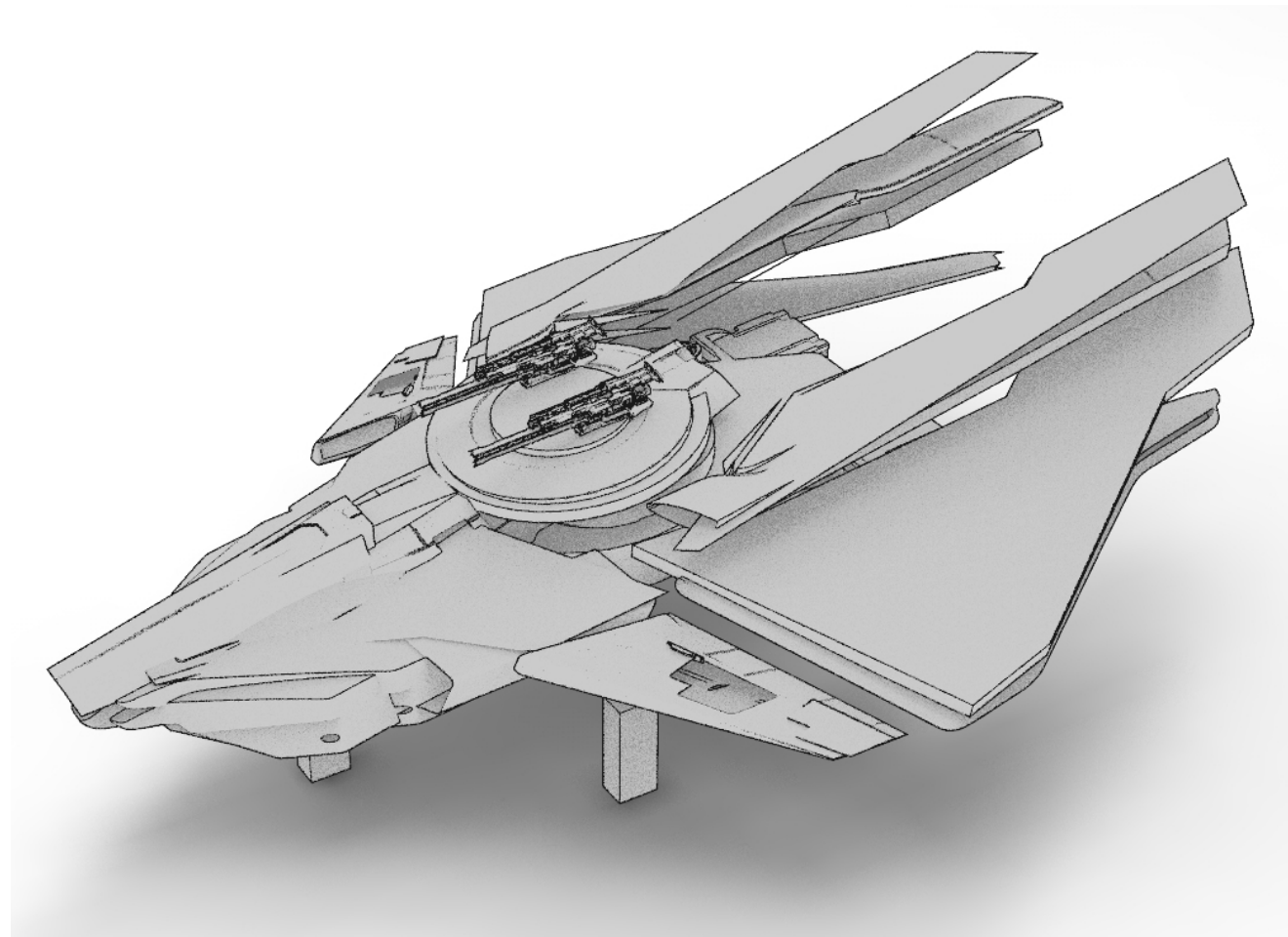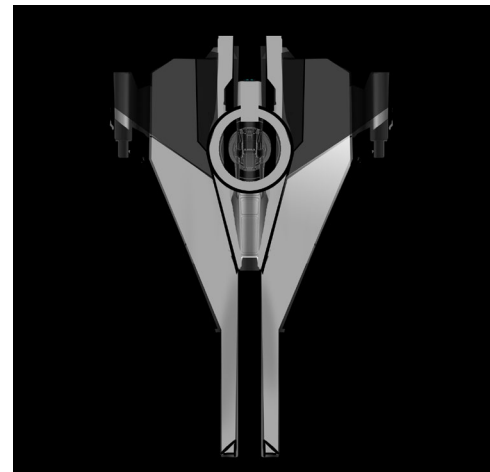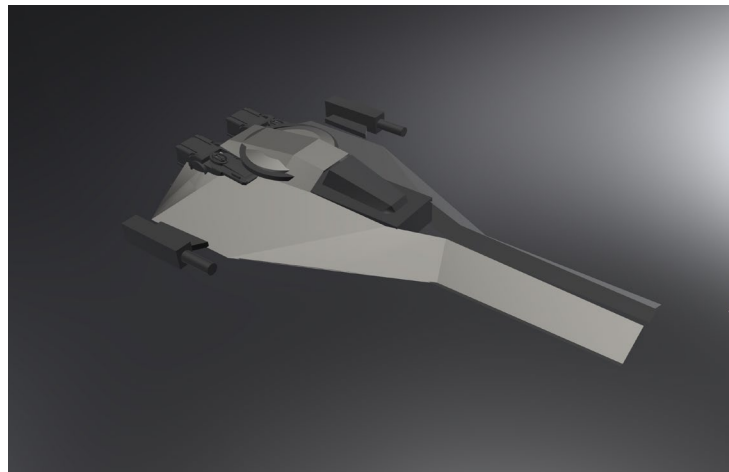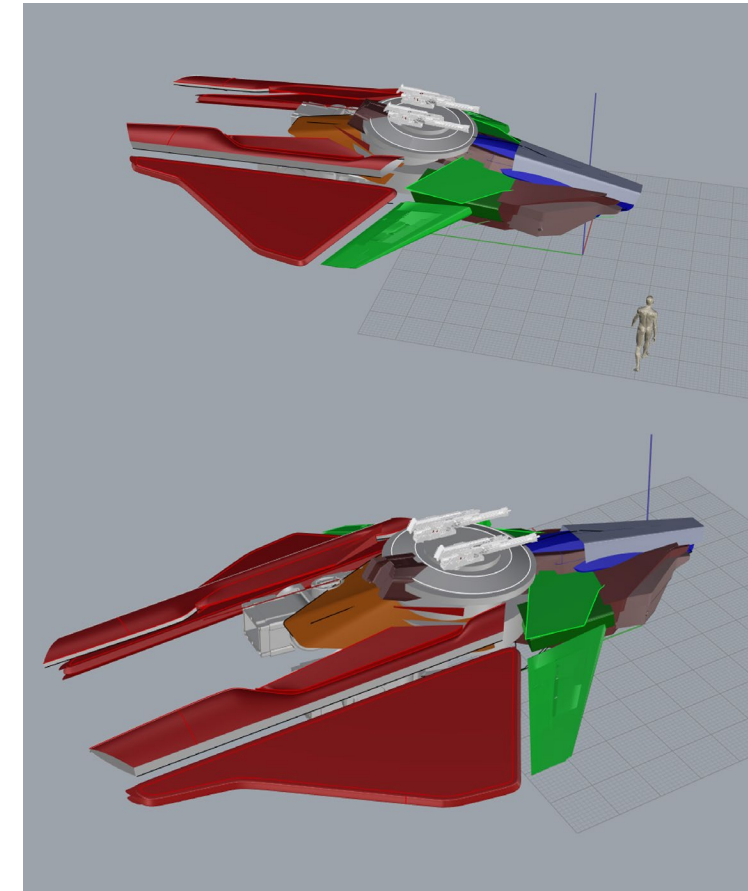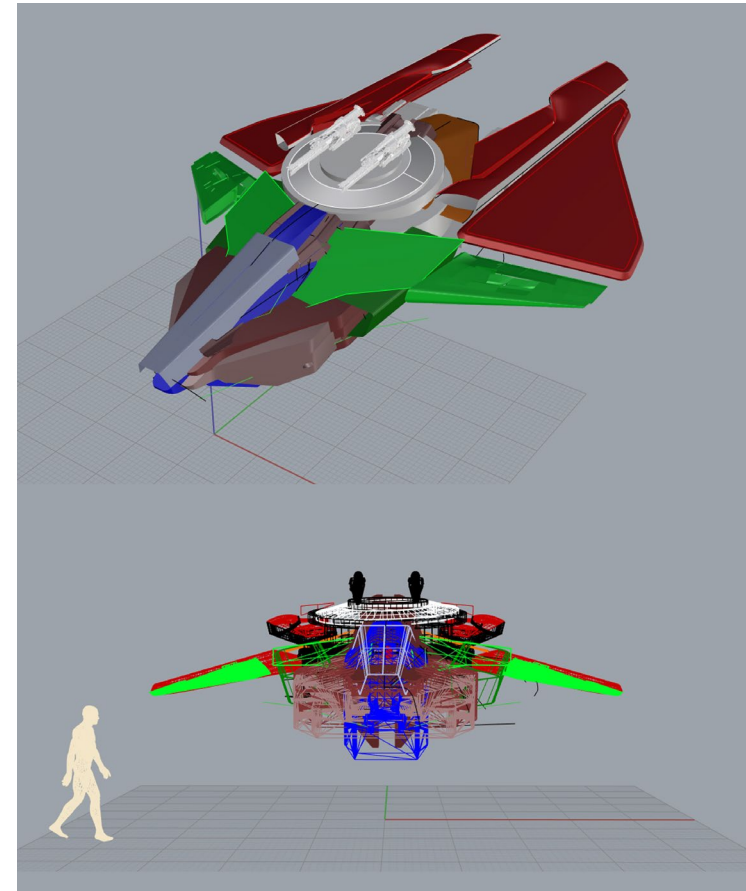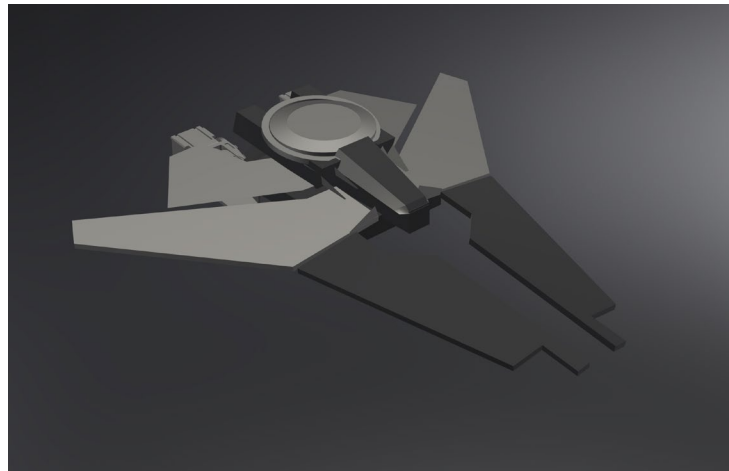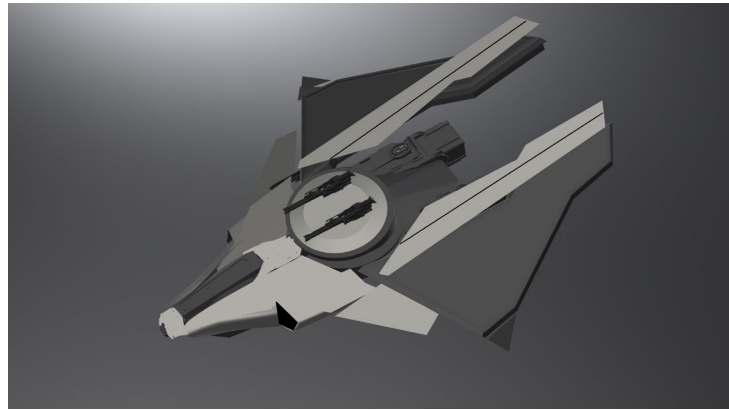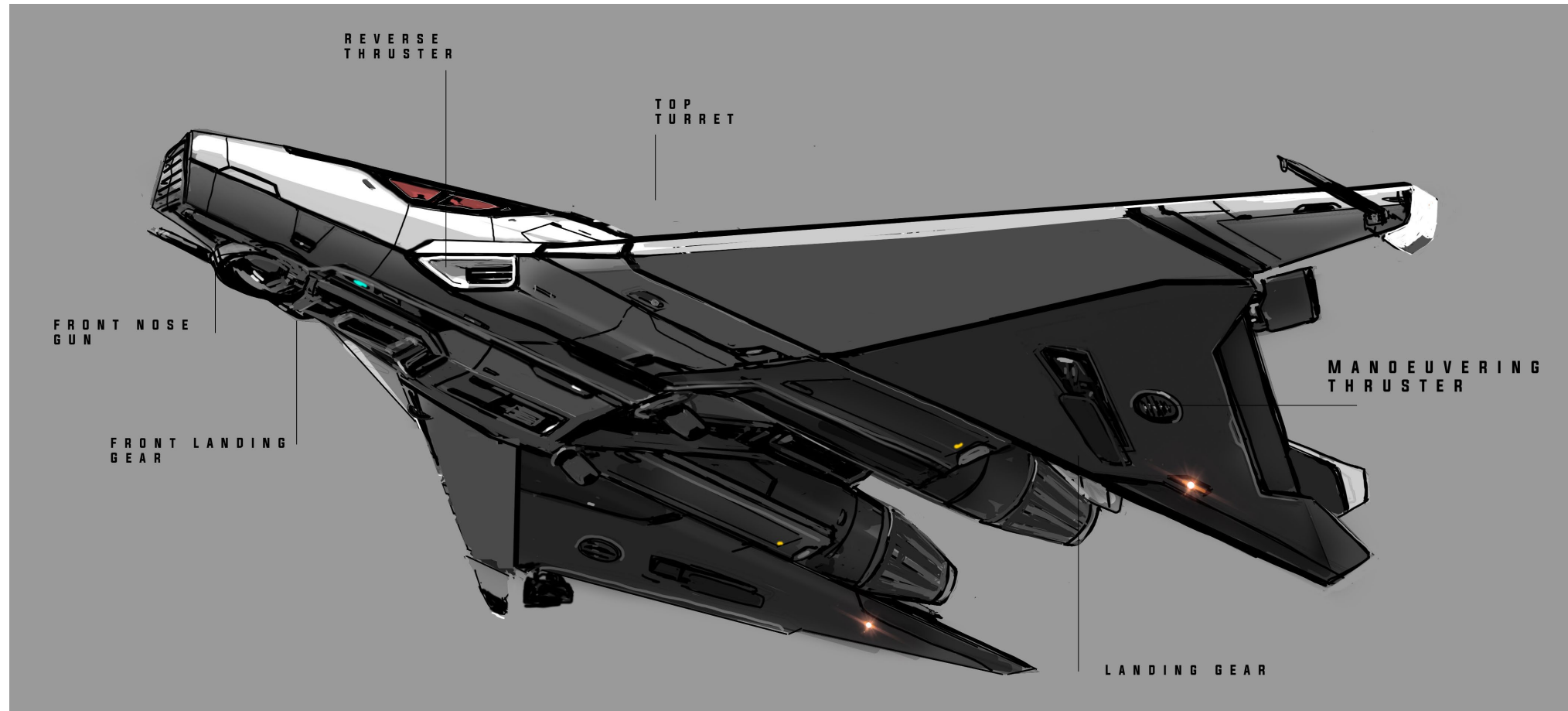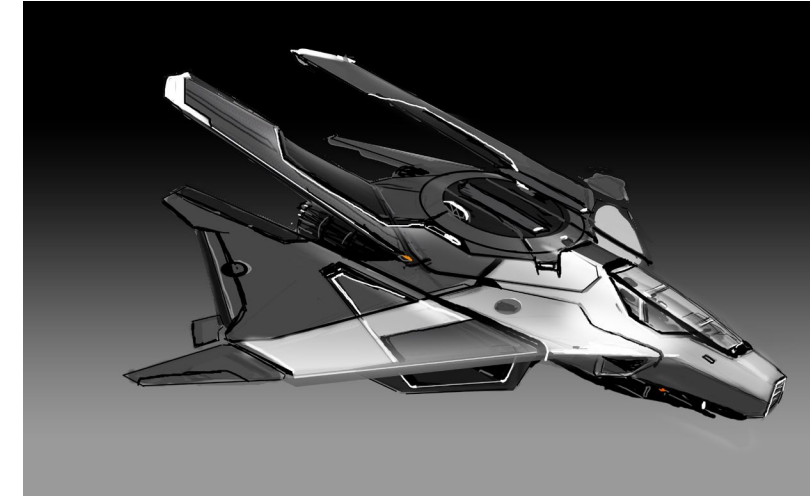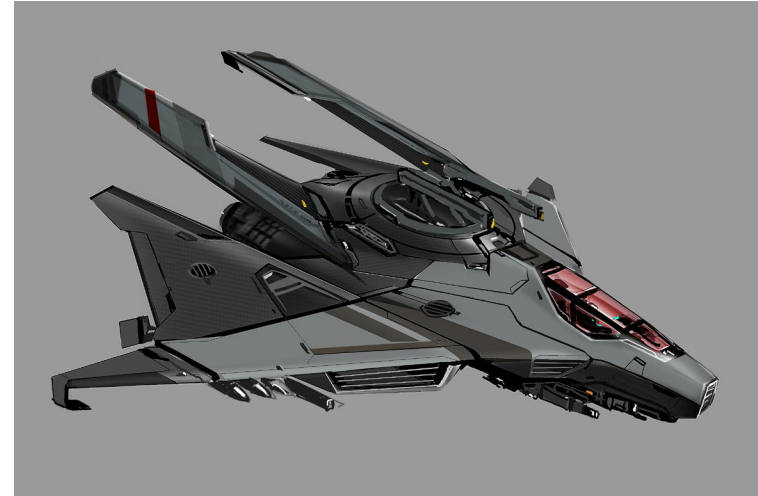
ON THE STRAIGHT AND ARROW

The team held their first review to look at the three rough shapes, The outcome was that they needed additional work. The group examined the three 3D ideas and looked back at the numerous sketch concepts, pulling out what they did and didn't like from each. Paul Jones began mixing elements from existing fighters to try and get a better feel for what was wanted, with Hornets, Lightnings, and others going under the knife. He provided Gary Sanchez with four variants to work from which were returned with great potential. The decision was made to push on Jones' second design, again by working up a rough 3D model.
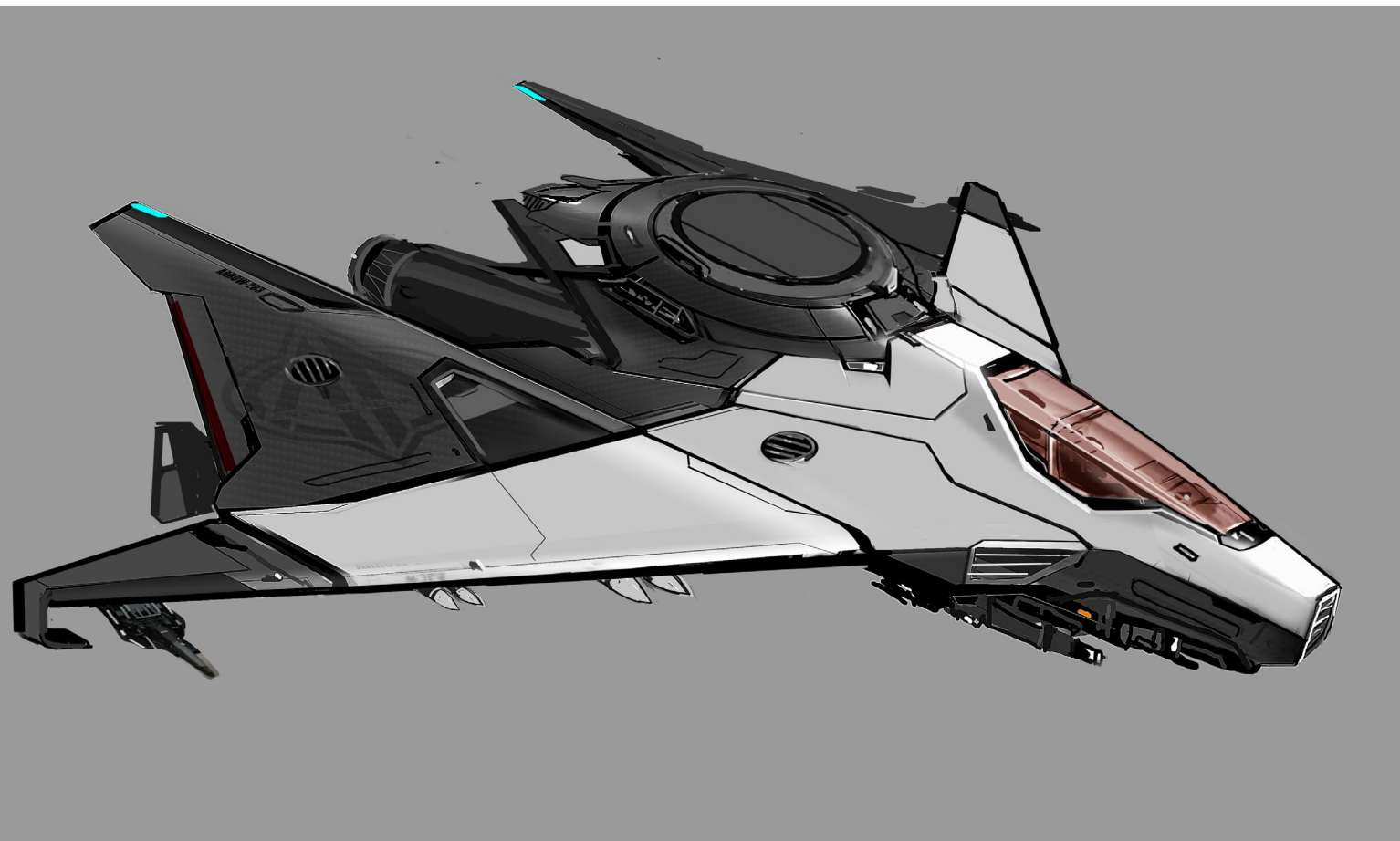
Time was tight, but the direction was promising... and then bad luck struck. With only a few weeks to go, Sanchez became unavailable due to circumstances beyond his control and a technical issue prevented further work when he returned to the studio. Between circumstantial and technological plagues, the Arrow lost a week and a half of the planned six-week concept phase. At this point, the direction was strong but there wasn't enough time to go into the detail normally included in the concept phase. Jones typically likes to provide the implementation team with a 3D model that they can pose to see exactly what the concept team was imagining. That

wasn't possible this time around and the decision was made to deliver only 2D assets based on existing frameworks and the style guide. From here, Jones and Sanchez continued pushing on the design, working on split lines to give it the unique Anvil feel. They looked at different possible markings, tweaked proportions, and completed general sanity checks to prepare the design for the artists in Los Angeles. The final phase of the concept was adding guns, thrusters, wingtips, and other components for the brief. Despite a mid-design reboot and unpreventable downtime, the selection of 2D images that would form the basis for the Arrow were delivered on time.


REVERSE THRUSTER

TOP TURRET

FRONT NOSE GUN

FRONT LANDING GEAR

MANOEUVERING THRUSTER

LANDING GEAR

NOW MAKE IT FLY!

With the Arrow concept imagery completed, the process entered the unknown. At this stage of development, the concept team typically moves from designing the ship for internal reference to developing marketing pieces that show it in action to best explain its role. Images would usually be carefully created showing a hot new fighter dogfighting with aliens or a lumbering transport offloading cargo. With systems still being developed in the game, these are the best way to explain the dream to everyone. This time, marketing art would be developed as a small part of supporting the big reveal. The Arrow moved directly to the implementation phase, which normally happens sometime after a concept reveal. Lead 3D Artist Elwin Bachiller and the team in LA took over the process of turning Sanchez's artwork into a game-ready model that didn't just look great, but also functioned correctly. This meant making use of 3D artists to create and light the model, designers to balance it properly in the wider game, animators to take care of any movement needs, and testers to put it through its paces. Where the initial artists typically own the lion's share of the look and feel of a ship, now every discipline would have an important say in the Arrow's final form.
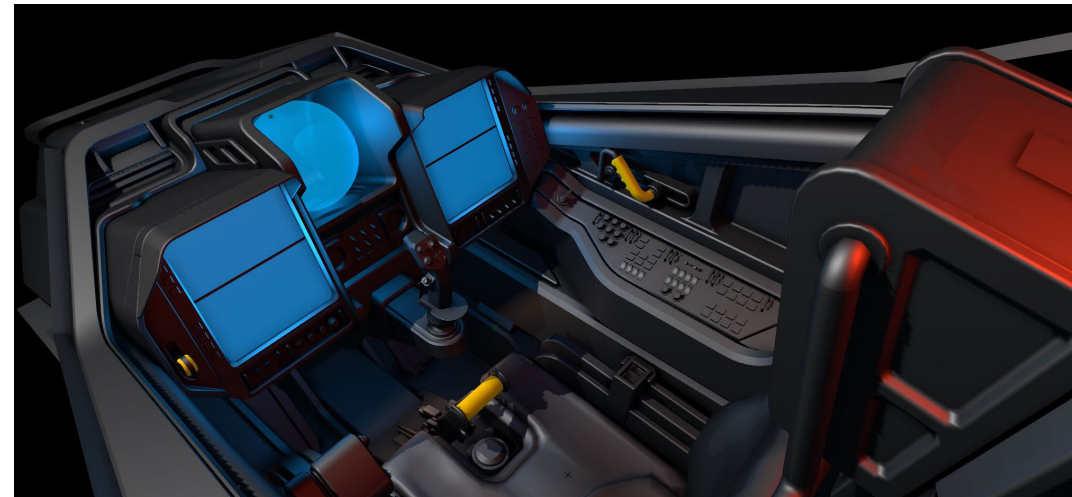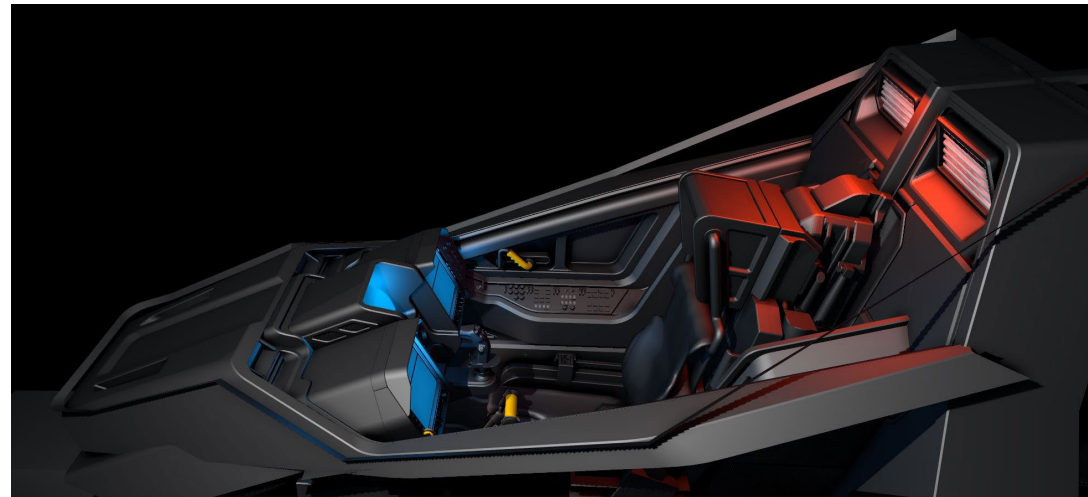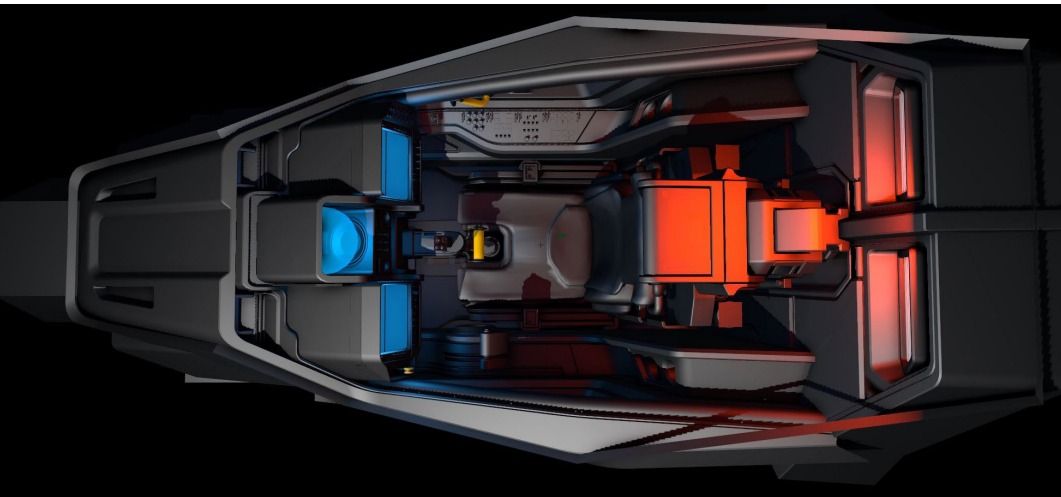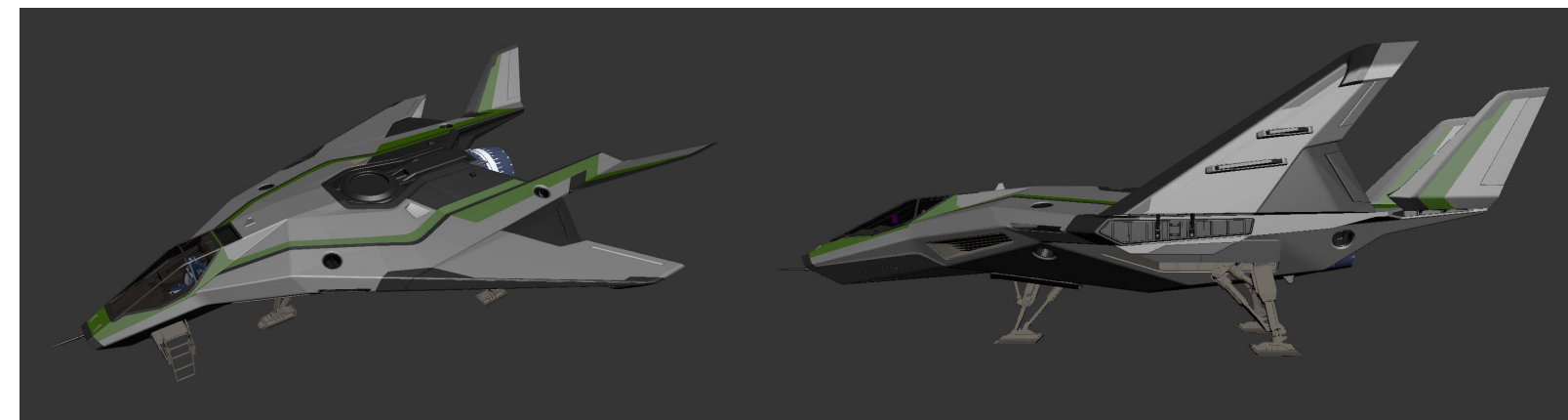
The team quickly discovered that there were some unplanned benefits to developing a ship for immediate release as a game asset. Chief among them was the fact that Chris Roberts could be more easily involved in the process, requesting and receiving changes to better reach his ideal concept for the ship before it was ever seen by prospective pilots (who are sometimes less than enthused when major changes are necessary between concept and implementation). This included some very significant changes from the initial concept that might otherwise never have happened. In the Arrow's test case, this meant a move from two engines to just one, better signifying that it's a nimble, light fighter. This change involved reworking the fuselage to some extent while still trying to keep the overall feel that had sold everyone on the design in the first place. The process also moved the location of the Arrow's guns, a change made possible because the implementation process let developers test and see how it actually played in real time. Finally, it introduced folding wings based on the design that allows contemporary fighters to be more easily stored on aircraft carriers. The new process was a hit. The additional freedom greatly pleased the Implementation Team, who were usually concerned about meeting external expectations. The Quality Assurance Team was an essential part of the process at this stage, running a secret test cycle to prevent the Arrow from being revealed to the world too soon. One tester even remarked that the process closely paralleled a real aircraft test programme, putting a design through its paces in secret before anyone even knew it existed!

THE EXPO

In November 2018, the release of *Star Citizen* Alpha 3.3 realized Chris Roberts' long-held dream by launching an in-game version of the annual Intergalactic Aerospace Expo event. Over the past three years, the expo had evolved exactly as hoped, from a web-based promotion to a 'real' event in *Star Citizen*'s world that players could visit and interact with. At the heart of the show was a very special display: the 2949 Anvil Arrow, sitting in a hangar for everyone to see. Players were thrilled, here was a new ship seen first in the game universe instead of as a promotional website. Then, they discovered the true surprise: that they could walk up to the ship and press interact to test fly it. A lot of hard work and adapted process had paid off. For the first time, the community had a new ship that they could fly immediately.

Going into the process, changing things up to produce the Arrow seemed daunting. The question at the back of everyone's minds was 'why change a process that works so well?' That, ultimately, is what keeps *Star Citizen* moving forward to reach its long-held goal. The team was delighted with the process and excited about what it means for the future, allowing more work to go into building, testing, and balancing every ship before they're ever seen by the audience. Like its namesakes, the Arrow is an important prototype. While it isn't yet possible to go straight-to-flyable with every new ship, especially those that introduce new gameplay concepts which must be built out separately, it's a definite sign of things to come. The changes in the pipeline that were tested with the Arrow will surely be replicated in increasing amounts with ships in the future.

REFERENCES:

SHIP PAGE

https://robertsspaceindustries.com/pledge/ships/anvil-arrow/Arrow

SHIP PRESENTATION

https://robertsspaceindustries.com/comm-link/transmission/16860-The-Anvil-Arrow

Q&A

https://robertsspaceindustries.com/comm-link/engineering/16883-Q-A-Anvil-Arrow

GALACTAPEDIA

BANDED FESSLE

The banded fessle is a carnivorous saltwater fish indigenous to the warmer areas of the Anasazi Sea on Terra (Terra III), Terra System, United Empire of Earth (UEE). A popular aquarium fish, banded fessles in captivity have been bred to encourage docility and to accentuate their deep blue vertical stripes.

DESCRIPTION

Banded fessles are identifiable by their ovular heads, protruding mouths, and deep blue and white longitudinal stripes. These stripes help them camouflage themselves among the seaweed and coral of their natural environment. They have squat, triangular dorsal fins, low-slung pectoral fins, and broad, strong tails. Their mouths are lined with two rows of small, sharp teeth which they use for grasping and consuming prey. Over a ten-year life cycle, a banded fessle can grow to between 40 and 50 cm long.

BEHAVIOR AND ECOLOGY

Banded fessles are ambush hunters, preying mainly on smaller fish, macroinvertebrates, and zooplankton. They play an important role in their ecosystem, keeping worms and other creatures from over-grazing on vegetation and disrupting delicate coral reefs. When hunting, a banded fessle floats motionless among local environmental features until a prey animal passes about 5 cm from its hiding spot. It then strikes before its prey is aware of its presence.

At around three years of age, a banded fessle will begin to seek out a mate. Banded fessles form lifelong pairs. Each fish will protect the other from threats, assist in hunting, share larger prey, and fend off potential suitors. A banded fessle that has lost its mate sometimes refuses to seek another.

When they are ready to spawn, the pair seek out an appropriate spawning medium, usually a strong seaweed frond or sheltered coral surface. The female then lays a line of eggs and the male fertilizes them. They repeat this process until they have laid up to a thousand eggs. The parents guard their offspring until they learn to hunt on their own. About 1 percent survive to adulthood.

In general, banded fessles seldom venture more than 12 meters deep, although they have been recorded at depths of 15 meters when pursuing prey.

AQUARIUM FISH

Prized for their pairing behavior and their vibrant, contrasting colors, banded fessles are one of the more popular aquarium fish in the UEE. They number among the marine life that can be raised in tanks alongside fish indigenous to Earth (Sol III). Ideally, they should be kept in warm saltwater, about 24 to 25 degrees Celsius. Because they can grow to be up to 50 cm long, they should only be kept in very large tanks (750 liters or more per fish).

The banded fessle is not territorial, but as a carnivore, it can pose a danger to other fish in a shared tank. It is recommended that generous portions of food be provided to fessles so they do not get hungry and turn on their tank mates.

WHERE IN THE 'VERSE?

Every month, we post a close-up image of something in the universe.
All you need to do is tell us where you think it was taken.

JumpPoint@Cloudimperiumgames.com

We'll reveal the answer next month, and share some of the best responses we received.
This month's image is courtesy of Ray Warner, our Assistant QA Manager in the UK.
Where in the 'Verse did he find it?

Ray also gave us last month's image.
But Where in the 'Verse did he find it?

Our winner this month is Toonager, who correctly identified the image after a quick search:

BEGIN TRANSMISSION →

I think the image is one of the drop seats of the Anvil Valkyrie.

I don't own a Valkyrie so i'm using footage I could find online.

The blue shine is what made me link it to these hallways.

END TRANSMISSION ←

Congrats, Toonager!
You get this month's coveted Jump Point no-prize.

Please remember to send us a screenshot of what you find, so that I can give partial credit if what you've found is close to the actual image.

ONE QUESTION

We asked the CIG staff to answer one question for us this month. Here's what they had to say.

WHAT WAS YOUR BEST STAR CITIZEN MEMORY FROM 2018?

BENJAMIN MCMONNIES, PRODUCTION ASSISTANT, ATX

Getting to be the backstage manager and the 2nd stage announcer at CitizenCon!

JEFFREY PEASE, DEVOPS ENGINEER, ATX

In the Fall, the LiveOps Team all went to the lake. Bryce and Ahmed were in kayaks while I was in my Hobie Wave catamaran. Ahmed was wondering if it was even windy enough to sail – it was. I was zooming around all over the place until a gust of wind caught me flipped the boat over. I ended up with hypothermia because I didn't wear my wetsuit.

CLIVE JOHNSON, LEAD NETWORK PROGRAMMER, UK

Whenever we push a new build out to PTU or Live, LiveOps monitor the situation and send out a company-wide report detailing the current major issues and a graph showing the distribution of FPS experienced by the backers playing it. My best memory of the year is reading that report after Bind Culling and Object Container Streaming were first enabled. I was expecting the peak on the graph to move slightly to the right, which would've indicated a healthy improvement. What I wasn't expecting was for the graph to have changed so radically that the FPS distribution was now a completely different shape. I don't think I stopped grinning for at least three days.

MICHAEL SIZEMORE, SYSTEMS DESIGNER, LA

Watching the missed jump during the CitizenCon demo and the universal groan and boos from the office. And then, how loud the local cheer was when the jump was finally made.

JARED HUCKABY, CONTENT MANAGER, LA

CitizenCon. Every minute I wasn't on camera was spent running around like a crazy person directing two stage shows and one of the broadcasts. It was equal amounts exhilarating and exhausting, and wouldn't have been possible without the help of Jake, Leah, Cameron, and a host of others.

WILL WEISSBAUM, LEAD WRITER, LA

Catching the train in Lorville for the first time. It wound up being a really immersive moment. There was something about doing an activity that I've done in real life that made the world come alive for me. And it got me extra excited for everything that's coming next year!

JAMES JOHNSTONE, EMBEDDED AI QUALITY ASSURANCE, UK

When myself and George Mihalache finally managed to take a Rover in the back of an Andromeda all the way from Levski to Hurston for the first time! (23rd of October 2018)

RYAN BARKER, SENIOR QA, UK

When Glenn failed the jump on the relay for the CitizenCon demo, twice. and then broke his legs and frantically searched for a MediPen before dying and respawning. Out of all the things that could have gone wrong, it was hilarious (we love you really Glenn).

STEVEN KAM, JUNIOR COUNSEL LEGAL DEPARTMENT,LA

Harrowing but exhilarating – that easily describes much of 2018, due to the increased pace of things, including everything from our quarterly release schedule to this year's CitizenCon. At one point in ▉▉▉▉▉▉ I got added to an email thread where ▉▉▉▉▉▉▉▉ asked me about whether ▉▉▉▉▉▉▉▉▉▉▉▉▉▉▉ was ▉▉▉▉▉▉
Now of course everyone has a lot on their plate, so they try not to ▉▉▉▉▉▉▉▉▉▉▉▉▉▉unless▉▉▉▉▉▉▉▉▉▉▉
because ▉▉▉▉▉▉▉▉▉▉▉▉▉▉▉▉▉▉▉and it usually works out. But hey, that's why we have a review process, right? So I went through my records and explained that ▉▉▉▉▉▉▉▉ ▉▉▉▉▉▉▉▉▉▉▉▉▉▉▉▉▉ which was a little surprising to ▉▉▉▉▉▉▉▉▉▉▉▉ but then, that's what happens when ▉▉▉▉▉▉▉▉▉▉▉▉▉▉▉▉▉▉▉▉because there's a lot about intellectual property that can seem either really arcane or idiosyncratic to a lot of people. ▉▉▉▉▉▉▉▉ ▉▉▉▉▉▉▉▉▉▉▉▉▉▉▉▉▉▉▉▉The joys of email communications across studios in such different time zones, but hey, everything's a two-edged sword. As long as nobody ▉▉▉ ▉▉▉▉▉▉▉▉▉▉▉ or ▉▉▉▉▉▉ the ▉▉▉▉▉▉▉▉▉▉ ▉▉▉▉▉▉▉▉▉▉ everything works out. Anyway this was just one of those times - everything turned out great, but it was just the ▉▉▉ ▉▉▉▉▉▉▉▉▉▉▉▉▉▉▉▉▉▉▉ that ▉▉▉▉▉▉▉▉ the ▉▉▉▉▉▉▉▉▉▉▉▉▉▉▉▉▉and we had really good laugh at that.

GERARD MANZANARES, PROJECT MANAGER, DEVOPS & IT, ATX

The best was definitely CitizenCon. I'm happy it was in Austin this year and loved all of the cosplay (both fans & "Ship Salesmen"). I can't wait for the next!

Do you have one question you want to ask the staff?
Send it to JumpPoint@Cloudimperiumgames.com and we might choose your question for next issue.