

JUMP POINT

ISSUE: 06 03



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What was the first game & system you played?

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FROM THE COCKPIT

GREETINGS, CITIZENS!

This month, our grasp exceeded our capacity, in more ways than one. First, going Behind the Screens, we had a fascinating discussion with the Music team in the UK. It was a no-brainer to add sidebars from the two principle composers for our two games — Pedro Camacho and Geoff Zanelli. That is, until we actually sat down and had those additional discussions . . . which turned out to have as much content as the original Music article. By the time we realized this, we also realized that we were overflowing in content anyway. It didn't take us long to conclude that the composers' interviews will compose an entirely separate Behind the Screens discussion in an upcoming issue.

Meanwhile, we asked the CIG staff One Question: *What was the first electronic or computer game you can remember playing, and on what system?* We got lots of responses, so many that we can only cram half on the back page this month, with the remaining half coming next month. It is interesting how many see a direct path between their first experience with games and their current professional calling.

I appreciate all the discussion in this thread, even the parts that don't apply directly to One Question. In particular, I like GreySix's question about the staff's primary ship, but we covered a similar topic a few months ago and I want to wait a few more months before getting back to it. I think the various staff are going to have to know more about the various systems before they can give decent responses to questions about where they'll start play, or where they'll visit.

I particularly like Gund-olf's question about when staffers became excited about the game, and I planned on using it this month until we got so many responses to last month's question, I expect we'll be asking something along those lines in an upcoming issue.

One other reminder. For "Where in the 'verse" guesses, please send me a note direct (via email) and please include a screenshot if you can get one.

Thanks to Foible (and others) for pointing out that we haven't been following our **JP** naming convention. This issue should have the right name, and keep those cards and letters coming in the Den!

We'll also update the January and February file names, but if you keep a downloaded folder of **JP**, it might be easier to change the January and February file names yourself. They are:

JumpPoint_06-01_Jan-18_A Slice of Virtual Life
JumpPoint_06-02_Levski's Travelling Asteroid Show

We also haven't been keeping up with posting **JP** images in the Vault. We'll be taking care of that, as well.

Until next month . . .

Hold on, it's gonna be a wild ride!
David

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MUSIC TEAM, UK

In the April 2017 issue, almost a year ago, we began a three-part Audio series, going Behind the Screens with the Sound Design team to discuss their work on SFX and ambient sounds in the game. In August, we continued with the Dialogue team, looking at all the speech (Human and otherwise) in the game. This month, we conclude with the Music team and how they deliver all the various tunes — some short and some very long — you hear as you play our games.

BEGIN TRANSMISSION →

JP: Let's get started! Please tell us what each of you do for CIG.

PHILIP PEERS-SMALLWOOD, LEAD SOUND DESIGNER: My main role at CIG is to ensure the audio team as a whole achieves the goal of designing and implementing world class audio. This includes designing and implementing audio myself, providing guidance, advice and feedback to the wider team, and coordination between different disciplines and departments.

My main focus recently has been supporting the new and legacy music requirements for both *Star Citizen* and *Squadron 42*.

SAM HALL, SENIOR AUDIO PROGRAMMER: I am part of the audio programming team and our job is to support the sound designers in implementing audio in *Star Citizen* — helping them make the game sound as good as possible.

DARREN LAMBOURNE, PRINCIPAL SOUND DESIGNER: I'm responsible primarily for ship audio, thrusters, interior ambience and moving parts. That has certainly been my focus. But as Principal I'm looking at the audio presentation across all aspects of our game and working to bring our audio design, as a team, into a focussed and coherent aesthetic. I do that by mentoring more junior members of the team and providing my taste, ear and judgement as a guide to help bring the whole thing together.

JP: None of those titles include the word "Music." Is music a primary responsibility, or just part of the whole?

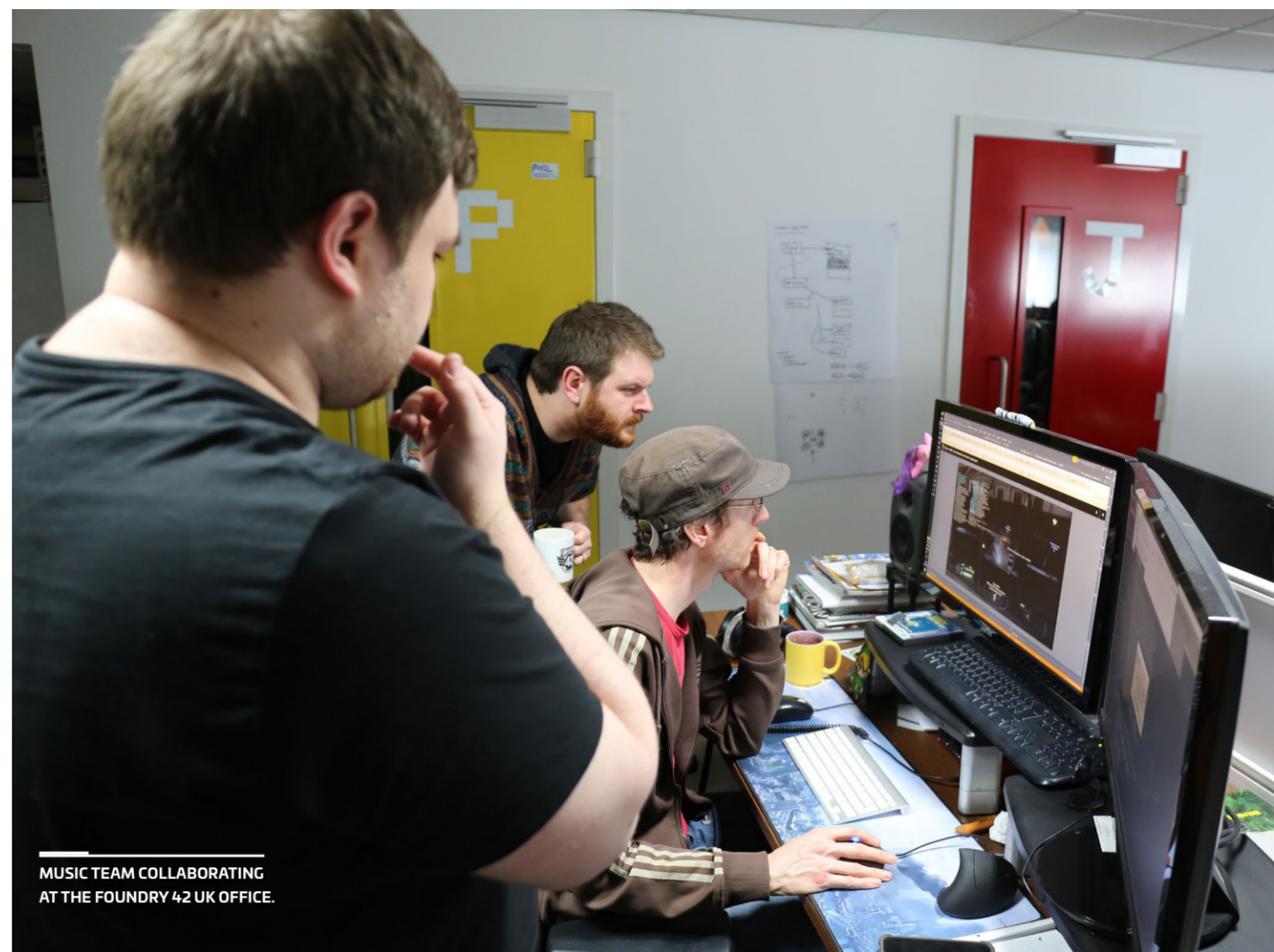
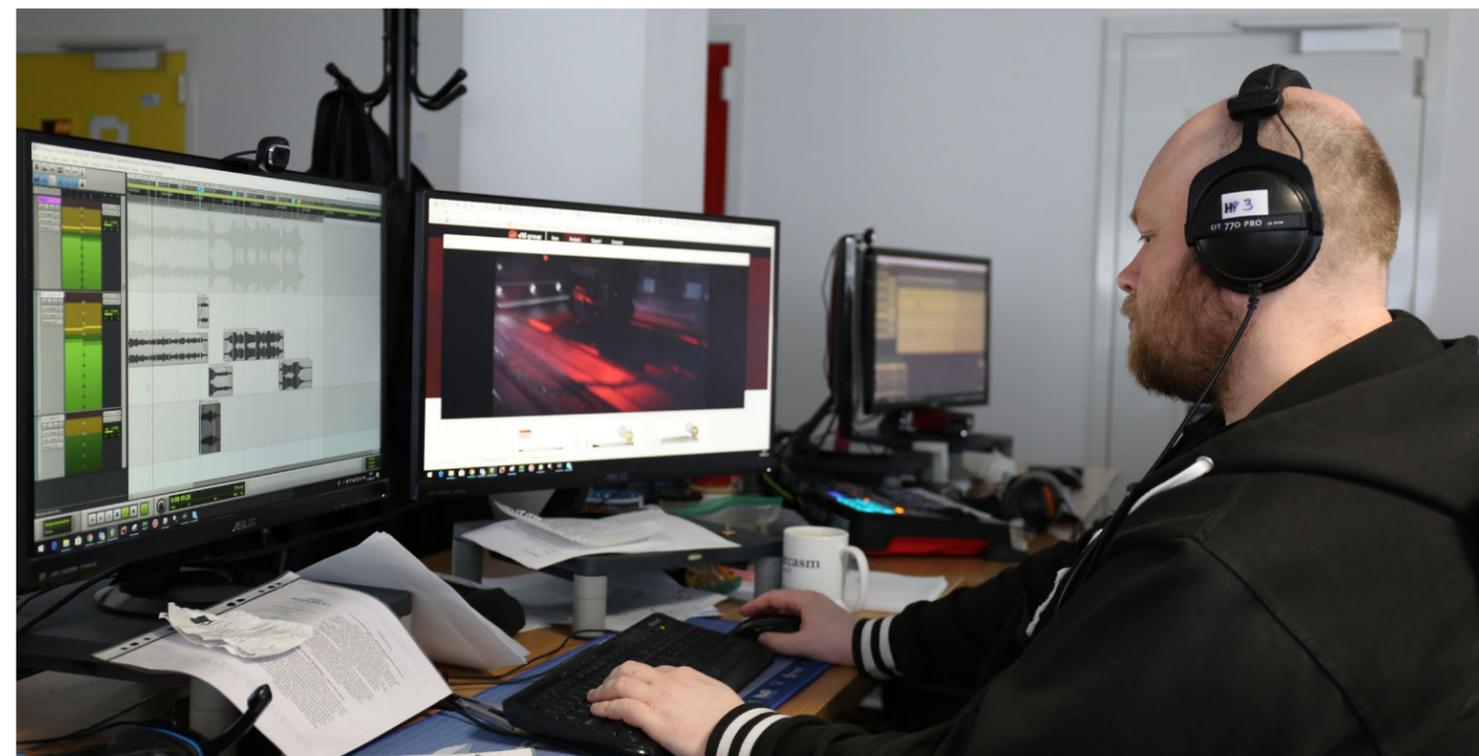
PHIL P-S: Sound design is a broad term which often covers all audio disciplines — Dialog, Music and SFX.

SAM H: One part of my role involves designing and creating systems that can be used to efficiently and effectively make use of the assets the sound designers create. One of those systems I had a big hand in creating was the interactive music system that we use in *Star Citizen* and *Squadron 42*.

The design of the interactive music system was a collaborative effort, and involved lots of iteration, reworking and refining to get to where we are now. This process involves working closely with Phil to create the tools that he needs to make a great cinematic musical experience.

JP: I want to follow up on what specifically you each do with regard to creating music, but I think we'll need to define some terms first. :) Before we go there, let me ask this: How did you get to where you are today? How did you learn to do what you do, and what did you work on prior to CIG?

SAM H: I suppose I got to where I am today because of my undying passion for making games. I always loved games and computers from an early age. I went on to study computer science at University and after graduating I was lucky enough to get a job in games immediately. I have been in the industry for almost 20 years now.



MUSIC TEAM COLLABORATING
AT THE FOUNDRY 42 UK OFFICE.





SOUND PROOFING HELPS KEEP MUSIC TEAM MEMBERS FROM DISTURBING THEIR OFFICE-MATES.

JP: And what are some of the titles you've worked on? Did you work on audio and music before *Cloud Imperium*?

SAM H: I made my start in gameplay programming but soon moved into audio because that is another one of my passions. I previously worked at Bizarre Creations for 11 years working on titles such as the *Project Gotham Racing* series, *Fur Fighters*, *The Club*, etc. I was lucky enough to work on many aspects of game programming and see game development from many angles. The team at Bizarre Creations were also hugely talented and I learned a lot from my peers.

I worked for a time making software in the professional audio field. I worked on GUIs for controlling mixing desks remotely, which was great fun. These mixing desks ranged from consumer units to high-end mixing desks used in stadium gigs. However, my pro-audio programming career got cut short when an opportunity came up here that I couldn't miss out on.

PHIL P-S: For me, my first venture into sound design was whilst studying a BA (Honours) in Popular Musicology and Recording at the University of Salford (UK). Whilst this was primarily a music focused degree, we sat a module called "Music Technology and Sound Production." As part of this module we were given several assignments outlined as "sound to picture." This included recording, editing and designing SFX and music to a clip of footage from a film. This was huge turning point for me and massively changed my ambition from wanting to be a musician (rock star) to sound design.

After graduating University, I made the (un)natural transition into a fulltime job in a corporate bank whilst also trying to make headway as a freelance sound designer. After about 18 months of enduring this horrific job and making little progress as a sound designer, I decided to apply for a scholarship to the Vancouver Film School to study Sound Design for Visual Media. This turned out to be one of the best decisions of my life/career.

I was accepted into the course at VFS, moved over to Vancouver and studied all elements of sound design in their twelve months intensive course. After graduating I was lucky enough to qualify for a 12-month work visa, so I worked on any and all indie film and game projects I could get my hands on.

As my visa was coming to an end, I moved back to the UK hoping to find work. Fortunately, about five weeks after getting back to the UK, I landed a job in QA at Frontier Developments. However, I sat the interview and was completely open about my ambitions to one day join the audio team. Luckily, at the time of applying, Frontier needed a QA audio support and welcomed me to the team.

After working at Frontier Developments, testing the audio for *Elite Dangerous* for about six months, I was given the opportunity to test for an entry level sound design position in the audio team. Fortunately, I passed and went on to become a graduate sound designer, primarily helping with marketing material and trailers.

Then I saw a sound designer position open at Foundry 42 and immediately applied, as the studio happens to be about 20 miles away from my home town. This would give me the opportunity to follow my dream career whilst also being a lot close to my friends, family and girlfriend (now wife).

After joining the audio team at Foundry 42 in 2015, I have been fortunate enough to have been given the opportunity to progress up the ranks from Junior Sound Designer to where I am now, Lead Sound Designer.

DARREN L: I've been in the industry for about 28 years, doing pretty much what I'm doing right now. Back in the day, there was generally just 'the audio guy' and we did all the sound and music for the game. So music and sound design have always been part of what I do. I see very little difference in the two really, they occupy the same part of my mind.

While sound designer has become the role I identify most strongly with, musician always seems like a branch of that. It's just the arrangement of sound design elements into the grid of musical timing. So whenever there is a need for music, beyond that which the guys who really specialise in it are able to provide, I'm always there to step up and fill in for them. Making music for games feels second nature to me despite not having the word musician in my job title.

So far whilst working on *SC*, I've written quite a lot of music — the Raven, Ursa Rover, Nox, Eclipse, Prospector and Javelin trailers, for example. The trailer work is interesting because I also generally do the sound design on those. So writing the music, doing the sound design and then mixing and mastering the whole package really compounds this feeling that music and sound design are the same thing by different names. It's quite a privilege and not one I take lightly.

Beyond the trailer music, I've also made over an hour of ambient music for the game and hope to write a lot more as our journey unfolds here.

Sound design, to me, feels like making the noise for something that exists, whereas music feels like making the noise for a dream about something that exists. It's more whimsical, ephemeral. The tools and methods for both are the same, but the mental premise with which you approach the creation is different like that.

JP: Let's talk process and terminology for a few minutes. First, I'm going to really date myself. Back in *Wing Commander* days, you had MIDI files that were like a script that told the computer what instruments and notes to play. Please bring me up to date: what's the present-day equivalent? Once music is composed/created, how is it implemented in a game? Or more specifically, in our games?

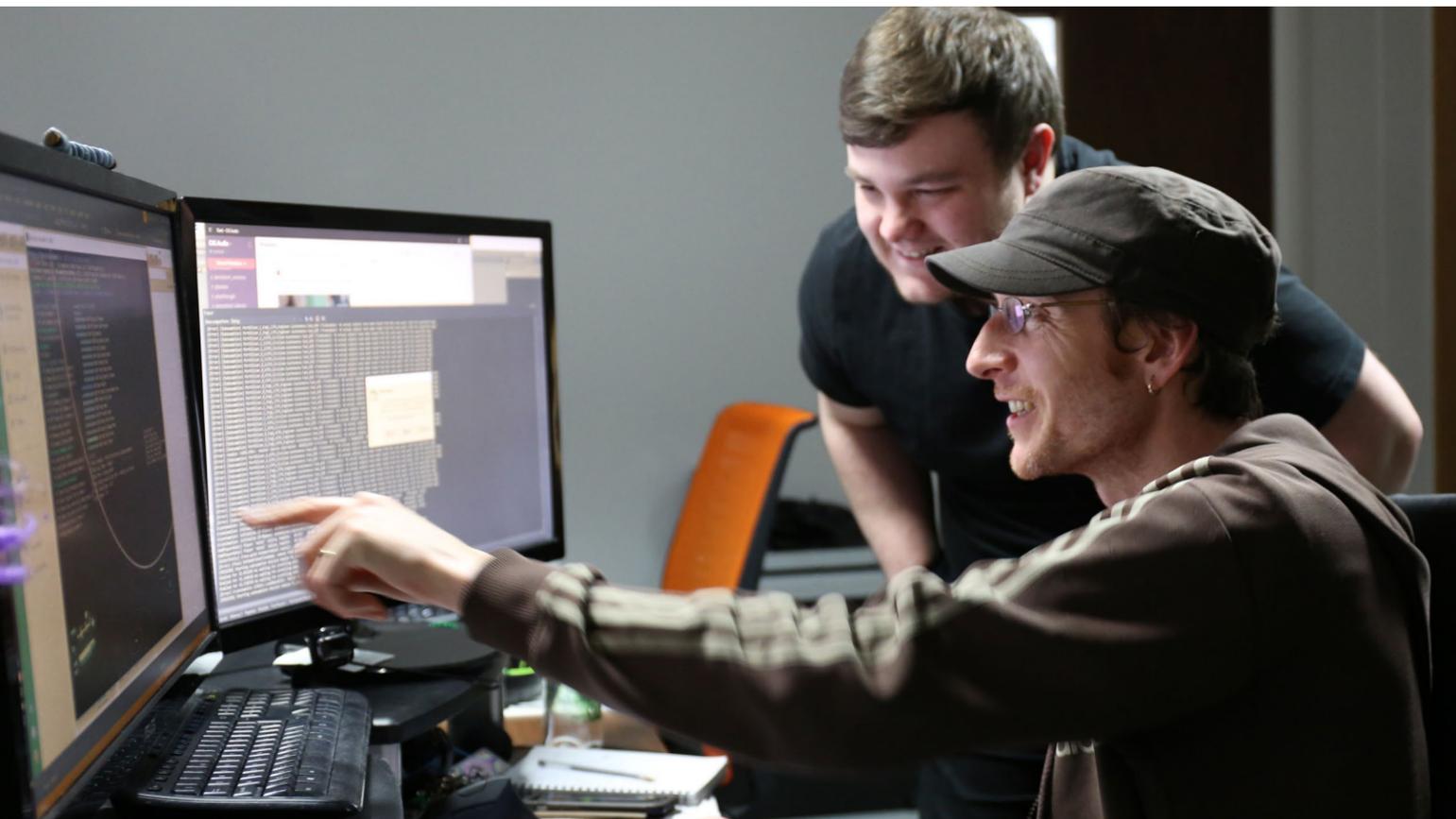
PHIL P-S: Yes, so things have come on a little since then. :)

With advancements in the games industry, the technology, consoles and PCs have far greater memory allowances for media. As a result, all of the music you will hear in *Star Citizen* / *S42* is recorded, mixed and mastered audio files being played.

Sam will be able to give you a better handle on the code system side, I'll address how the audio is implemented in our audio middle-ware (Wwise).

SAM H: There are two systems that work closely together to allow the music to be implemented in our game. One of those systems is the Wwise interactive music system. This is the audio middleware tool that Phil mainly works in to create the rules that determine when one piece of music should start playing or when another should stop playing, although I am oversimplifying my description here. He can create transitions from one piece of music to any other piece of music, giving him great flexibility to control how the music will sound in the game itself. The Wwise interactive music system allows control of the music to mainly be influenced by the setting of parameters and switches at runtime.

The next system is our game's Music Logic System that, at its essence, takes the game's current state and translates it into music parameters and switches via a Music Logic Suite. A Music Logic Suite allows the creation of rules that determine how the music reacts to the events that are happening in the game.



The music parameters can control such things as how “big” the music feels at any one point. Just by increasing a single parameter, the music can transition from a low intensity piece of ambient music to a blood pumping piece of battle music. The music switches can signal various changes, such as which state the player is currently in — “in vehicle,” “EVA” or “on foot.”

The system relies heavily on the use of “music events.” These events signal something significant has happened in the game that the music can optionally react to. Part of the complexity of the system is giving the sound designers control over exactly what these music events do and how they affect the music parameters. Examples of music events might be things like a bullet flying past your ship, a bullet hitting your shields, an unknown ship making contact, you landing a shot on an enemy ship, etc.

It is up to the sound designers how important they feel each music event is and how it should affect the music. They might feel your own ship getting shot is a dramatic event so they can decide to increase the music intensity parameter by a large amount every time this happens.

So my job as a coder is to create as many different types of music events as possible to cover a wide range of different gameplay situations. These events are triggered in the code and passed to the current music suite. Phil has access to these events in the Music Logic Editor tool and can design logic for each event.

Our system is heavily data driven and we have a GUI that allows the sound designers to control exactly what happens when the various music events occur in the game. The good thing about this is once I have added the music events to the code, the sound designers can edit music logic without needing me at all.

Another tool we have at our disposal are “music areas.” These are shapes that can be placed in the game world that can affect the music based on location. Entering one of these music areas could subtly affect the music based on the mood of the location or dramatically switch the music to a piece of cinematic music for maximum impact.

Once all these systems are working together, the effect is a seamless musical experience that allows the music to ebb and flow and adapt to the action of the game. If the

player gets involved in a dogfight, there is no single piece of code that starts the dogfight music — instead, the dogfight music happens naturally due to events that get triggered when the player gets shot at or when enemy ships approach. When the dogfight ends, the music will automatically die down and start playing the ambient music when the music intensity parameter decays over time.

PHIL P-S: In our audio engine (*Wwise*) we have a vast array of music cues which have been specifically composed for an intensity level and mood, e.g. ambient to intense action. We also have complete sets of each intensity / mood for all current perspectives in the game, e.g., FPS (player character running around), Flight (when the player is flying in a ship) and EVA (when the player is EVA-ing in space/zero G environments). So the music will respond to the player’s perspective (FPS, FLIGHT or EVA) and transition between material dependent on game values such as intensity level and mood.

However, there is further complexity as each single music cue typically comprises several layers or stems. When played together, the stems come together to present

a full composite mix / performance. However, in isolation a stem may only contain a limited set of instruments — e.g., only strings, only percussion, only brass, etc. This allows us a great deal more flexibility and variation in the music material.

However, we have recently been experimenting with defining stems by “intensity” rather than instrumentation. This allows us to break a composition into stems which may contain mixed instrumentation but focuses on the intensity of the parts — e.g., faster rhythms or more intense melodies. This provides us an even greater deal of variation, as each stem could play individually and support the gameplay experiences. However, what is more likely is for a combination of stems to play. In the example of a piece comprising four stems, we could have around 14 different combinations.

JP: I’m almost afraid to ask — counting just incidental music, how many different . . . what should I call them? Cues? . . . how many different music cues currently exist for the two games?

PHIL P-S: As it stands across all game modes in *S42* and *Star Citizen*, we have over 1000 cues.

JP: Does the music in *SC/S42* follow specific patterns? Is it always in 4/4 time, or in the key of C?

PHIL P-S: Whilst a lot of the music is 4/4 in the game, it’s not always the case. There are occasionally pieces in 3/4 and 5/4. However, these are composed with the knowledge that a transition to another piece of music may happen on the next beat, next bar, or at the end of a passage.

JP: I’m assuming having most of the music in one tempo (4/4) makes transitions easier?

PHIL P-S: Yes, we typically try to stick to regular time signatures such as 4/4 to make transitions easier. However, we can set conditional transitions which take into account a music cue’s time signature, tempo and key. We can also implement specific transition cues which can be triggered at a specific transition point between any two cues. This, combined with the ability to add custom entry, exit and transition markers per cue, gives us a pretty comprehensive tool set to work with.

JP: Are we trying to create sets of cues for locations — a distinct set for each LZ, or world, or system?

PHIL P-S: Yes, we’re currently adding additional content for the major locations in the PU such as Port Olisar, Levski, Grim HEX, Cellin, Yela, Daymar, etc. This really allows us to create a sonic identity for each location. We hope to expand this to all landing zones and POIs such as outposts and derelicts.

We also are having a big push to increase our ambient music content. This has involved Darren composing, recording and providing ambient cues which are currently in the game.

JP: Are there different cues for cutscenes versus planetside versus mission?

PHIL P-S: Absolutely. Whilst both *Star Citizen* (PU) and *S42* have full music sets (FPS, FLIGHT and EVA), there are also additional cinematic cues. *S42* features by far the most cinematic music cues, which are





simple and it only provides responses to a small subset of the music events that can occur.

However, the Persistent Universe music logic suite is a complex beast, as you would expect, because it has to deal with every situation and event that could occur in the PU — of those there are many!

PHIL P-S: In the PU we have several Wwise music sets. These are currently designated as:

- CINEMATIC
- EVA
- FLIGHT
- FPS

These “sets” contain music material that correlates to a specified context, e.g., The FLIGHT set contains music specifically composed for in-game flight. Similarly, this is done for EVA and FPS.

SAM H: The PU music logic suite is a spiders web of logic that deals with all the events that can happen in the galaxy. This suite deals with how the music is affected when the player is on foot, in a ship or in EVA. At some point, we would like to split this mega-suite out into

smaller, more manageable chunks, but for now we are stuck with this arrangement.

PHIL P-S: Each set contains subsets of intensity, e.g.:

- ambient_FPS
- music_standard_action_low
- music_standard_action_high
- music_standard_action_bridge
- music_heroic_action_standard
- music_heroic_action_high
- music_grim_action_standard
- music_grim_action_high

These subsets then contain music “cues,” which are composed tracks for the given context, intensity and mood. Action cues typically last around 1 minute and have the ability to loop. However, the music is frequently changing in response to the music logic system, so cues are rarely looped or repeated.

DARREN L: I guess the Nirvana of ambient music is having enough coverage to specifically call something like “Player is an outlaw, he’s on an ice moon with no atmosphere and there is a medium level of

hostility, it’s the first time he’s been here and he’s been here 30 minutes” . . . to reflect all that in the music in a robust way would be amazing. Consider if we changed those conditions to “Player is a prospector, he’s on a temperate planet with an earth-like atmosphere and there is no hostility, it’s the fifth time he’s been here and he’s been here 10 minutes.”

To score the emotional and dramatic content of the game state at any given time in as articulate a way as possible has to be the goal of any interactive music system. Imagine if you were a fugitive running from the police and heading straight for a dense asteroid field . . . the asteroid field would pose a serious obstacle but also offer the chance of sanctuary. It’s ominous in that you might die rather quickly if you rush through the field, but it’s also safer than open space because you can hide or the police would be hindered by the rocks.

Consider that same location, but instead you were a Prospector/Miner looking for raw materials . . . that asteroid field would appeal to you in a much different way and the music should reflect that. The field represents an opportunity to a Prospector/Miner.

typically composed to specific cinematics, animations or key gameplay points. Some of these were featured in the Vertical Slice.

JP: Are we trying to have music of some sort playing at all times, or are there times that we intentionally hold the music?

DARREN L: I think nowadays, wall-to-wall music is not the way to go. There is so much room to be articulate with the medium today, and having no music is certainly a part of that. Consider film. You are, as with sound design, seeking to underscore, emphasise or reinforce narrative.

Being tasteful is key. If the potential impact of something would be undermined by the presence of music, it’s absolutely our job to make sure music isn’t happening at that point. If you look back, you’ll find that music has become less of a blanket feature of a gaming experience as the medium has matured. Also, the audience has matured with it. Their palette is now more subtle, which enables us to work with a far greater dynamic range of emotion.

PHIL P-S: So although we will have a vast amount of music in the game in the music logic suites and cinematics, we firmly believe the project should not be plastered in unending music. We need the game to breathe and allow for the sound design, ambiences, SFX and dialog to have equal weighting in the mix at appropriate moments.

JP: How do you decide what cue is playing at any given time? Is it all individually selected, or is there an algorithm of some sort? Are there procedurally determined music cues as part of procedurally generated locations?

PHIL P-S: The music logic system typically determines which music cues are selected and played. Again, this goes back to which music set is selected based on perspective — e.g., FPS, FLIGHT and EVA. The intensity of the music cue inside these suites respond to two real-time parameter controls (RTPCs). These are defined as “Intensity” and “Mood.” Intensity is a composite value comprising many sub-values such as “how many enemies are there,” “are you being shot at,” etc. The

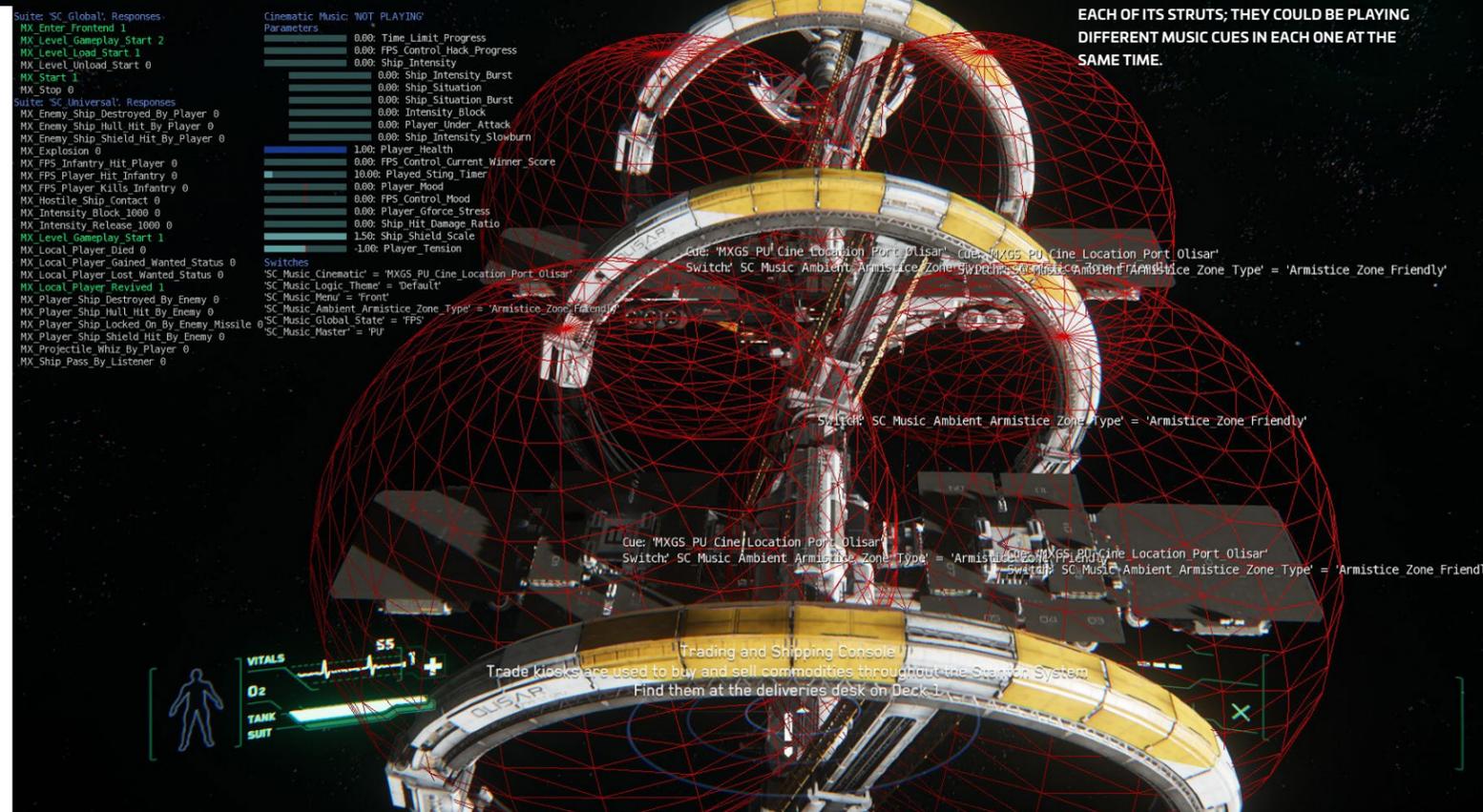
Mood parameter is a composite value which indicates how well the player is doing and takes into account “player health,” “have you sustained damage,” etc. Using these two parameters, an appropriate intensity music cue is selected from a particular music suite, e.g., Flight > Combat Low.

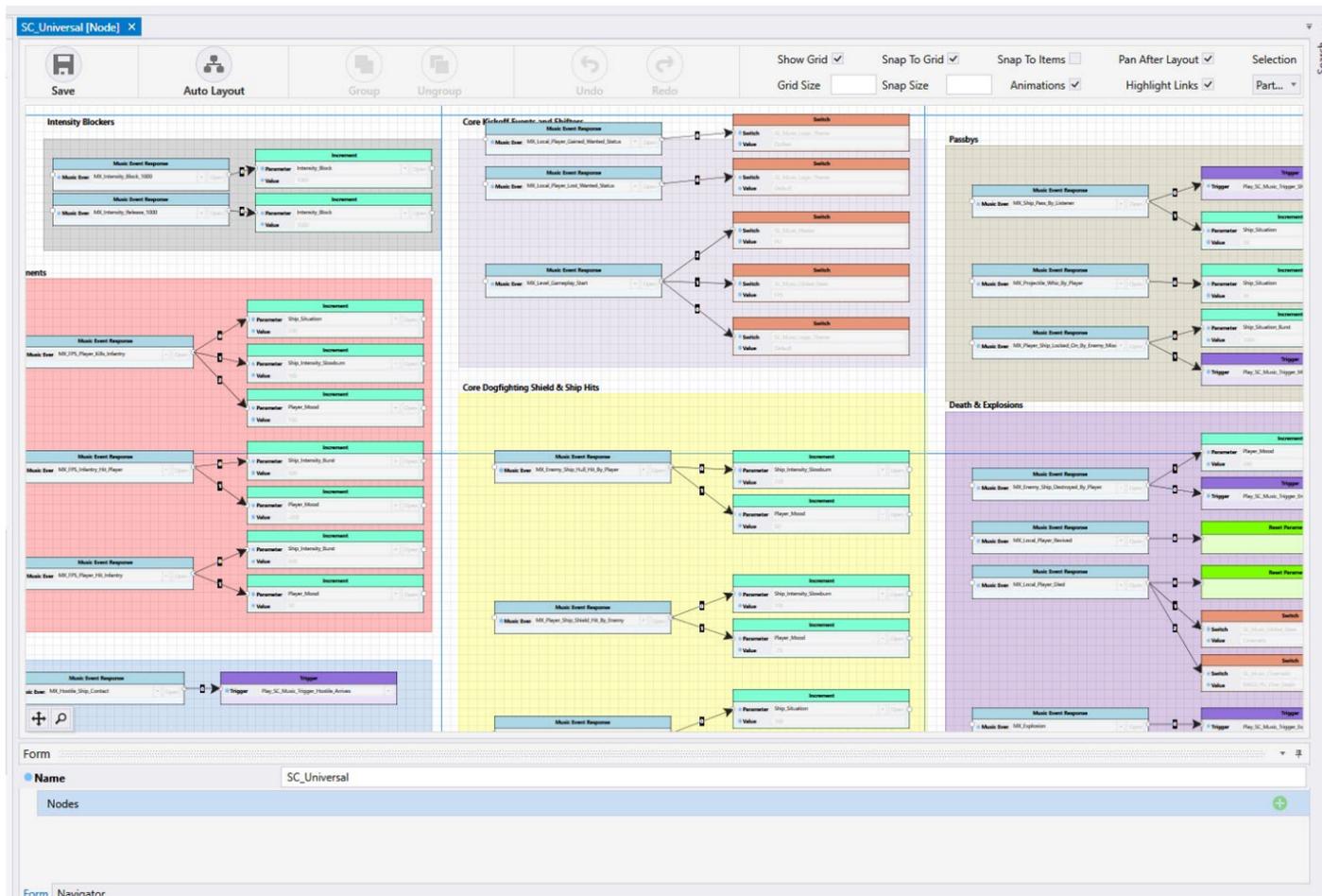
The music logic system is always evolving in light of new features, such as procedural planet tech. We currently rely on a fairly manual mark-up process for locations. However, due to the scope of the game, the music system is going to expand and adapt to accommodate these new procedural features.

JP: We’ve talked a bit about both cues and suites. Could you describe each of those?

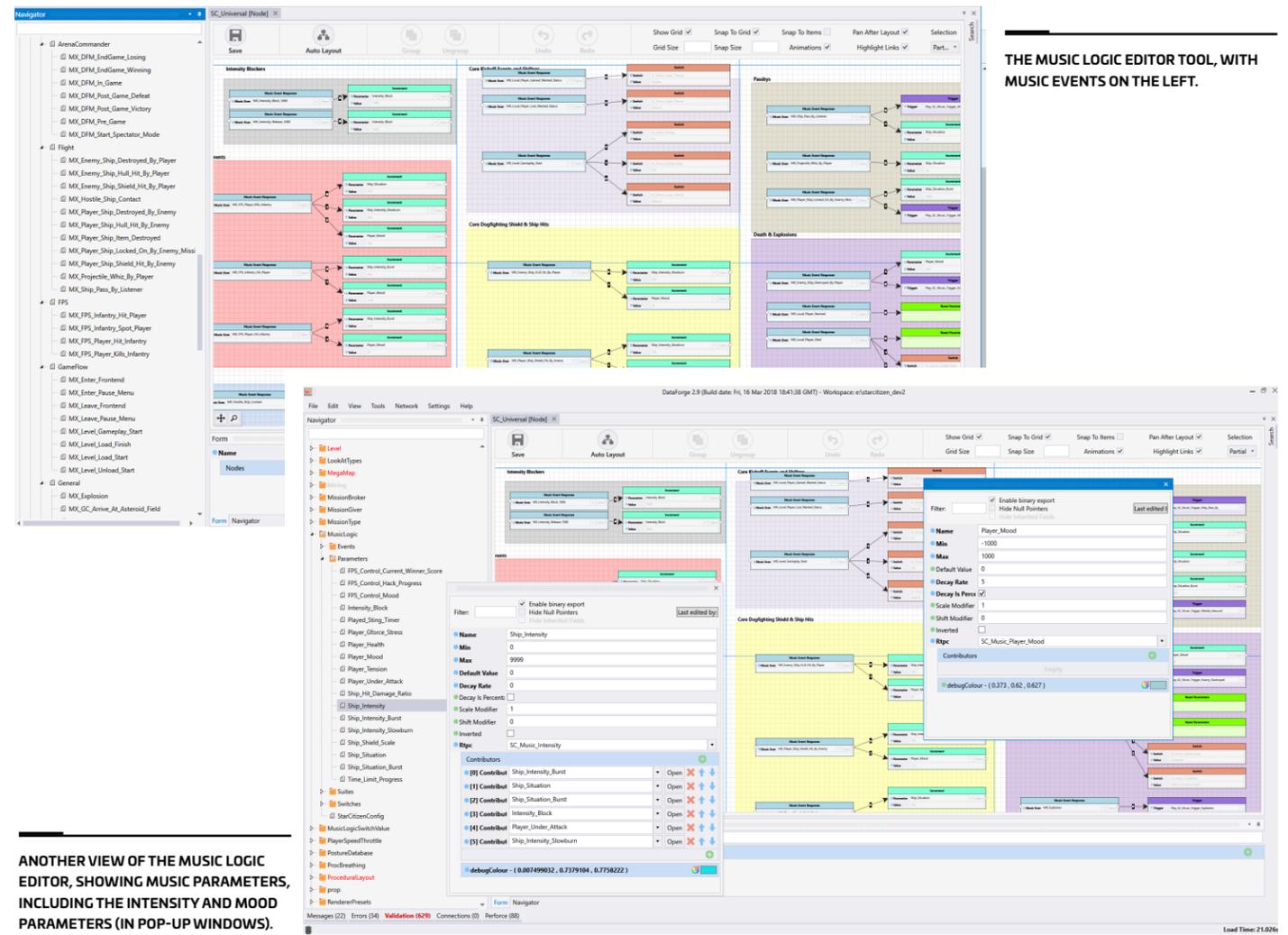
SAM H: A music suite is best described as a set of rules that determine how the music reacts to the gameplay and to each of the music events that get fired off from the code.

We currently have a suite for each of the different game modes and each one is drastically different from each other. For example, the Race mode music suite is very





A VIEW OF THE MUSIC LOGIC EDITOR TOOL, SHOWING THE PU MUSIC LOGIC SUITE.



ANOTHER VIEW OF THE MUSIC LOGIC EDITOR, SHOWING MUSIC PARAMETERS, INCLUDING THE INTENSITY AND MOOD PARAMETERS (IN POP-UP WINDOWS).

THE MUSIC LOGIC EDITOR TOOL, WITH MUSIC EVENTS ON THE LEFT.

Not only does the music itself have to be written in such a way that it can chop and change, moulding the unfurling composition to the ongoing game events, but the music system must be smart enough to correctly infer the tone of the game at any moment. It's an incredibly hard thing to get right. So you can see that 'asteroid field' might have a thematic tone, but what that asteroid field means to the player is another thing. What is it to me?

JP: This just keeps getting more interwoven with everything else. How does the game code distinguish between "standard," "heroic" and "grim"?

SAM H: To determine if the music should be playing the standard, heroic or grim music we introduce the concept of the player mood. This is a single value that will be positive if

the player mood is heroic or negative if the player mood is grim. If events occur that we consider are related to the player doing well, such as landing shots on another player's ship in a dogfight or landing the killer blow to a damaged ship, then we increase the player mood by an amount that we decide is relative to the event.

Simply put, when this player mood value is positive you will hear the heroic music, when it is negative you will hear the grim music and when the value is 0 the standard music will be heard.

Conversely, if events unfold that mean the player is not doing so well, then we can decrement this player mood value, meaning it can end up negative. Events that are considered bad are things like your ship taking a beating from enemy fire or losing an item from your ship. If events we consider bad are coming in thick and fast, then the value will end up negative and cause the grim music

to begin to play. Over time, the player mood value will smoothly blend back to 0 if no further events come in, and this is when the standard music will return.

PHIL P-S: For a sound designer, all of the values from the music logic system are distilled into two parameters: "intensity" and "mood." Using these two parameters, Wwise (the audio engine) selects an appropriate music cue.

As a rudimentary example:

1. High intensity and positive mood would result in "music_heroic_action_high"
2. High intensity and negative mood would result in "music_grim_action_high"

JP: We've had live orchestra recordings for Star Citizen in the past, as part of a stretch goal. How is music generally created today — live recordings, electronic production with a mixer, or somewhere in between?

PHIL P-S: Typically the composers will compose a piece of music inside a Digital Audio Work Station (DAW) such as Cuebase, Logic, Pro Tools, etc., and use digital instruments, MIDI and sample libraries to perform and record the cue. Using a variety of plugins, the composer will typically mix and master the final product and deliver the cue as a composite mix and broken into stems.

Once a cue is reviewed, approved and signed off, we can assign it a priority of "must record," "should record," "could record" or "won't record."

Once the cues have been prioritized we go about the process of organizing the orchestration and any recording with orchestrators, orchestras, recording engineers and recording venues.

JP: Why approve and sign it off, if it's going to be tagged with "won't record"?

PHIL P-S: There are many considerations when prioritizing a cue to be recorded.

For example, the S42 main theme will be flagged as a "must record" with a real orchestra / real performers as it's a prominent cue in the game. However, if a cue is particularly short, not featured often or consists primarily of digital instruments such as synths, this will carry a lower priority to record and will likely remain constructed from sample libraries.

JP: Ahh... we have the cue; the decision is then made on whether to actually record it with real orchestral instruments, or just have an electronic mix. Is that correct?

PHIL P-S: Yes. We would ideally record all of the music if possible. However, the large costs involved with hiring and recording a full 94-piece orchestra means we have to decide what to record very carefully.

Fortunately, digital instruments and sample libraries have come on a long way since their inception. A cue composed entirely of sampled instruments is very convincing indeed.

JP: Is all of this the normal process for creating music in games today? How does our music and our music process compare to other current games?

PHIL P-S: Every project has different music requirements, so it can vary wildly.

If a game follows a primary plotline, most of the gameplay moments are scripted and therefore can have music composed for specific events, contexts and scenarios throughout the game.

If a game is more procedural in nature, it will most likely need some type of music logic system which can adapt to the gameplay and cater for any/all scenarios.

As it stands, we are having to cater for both of these approaches with *S42* and *Star Citizen*/PU.

DARREN L: I think it's important to know when to go with real players, a real orchestra. If you are going for an action sequence with lots of rhythmic activity and it's going to be buried under a ton of gameplay and visual information, then you can quite clearly go with a well produced synthetic piece. On the other hand, if you are scoring for an intimate scene where the emotional content of the music is vital to carry the message, then it would probably be a good idea to get a real violinist or ensemble of real players to interpret that scene. It's the humanity in the performance that we relate to. If we hear a bunch of musicians reacting to the scene via the conduit of their instruments, then we will respond to that and the scene will be much more effective.

JP: How many composers are you working with, in-house and contractors?

PHIL P-S: There are currently three contributors of music to the wider project, one internal and two external.

Our main music contributor for the PU is Pedro Camacho, one of our external composers. However, our principle sound design Darren Lambourne often contributes additional music cues for both the PU and trailers. And, our main contributor for *S42* is Geoff Zanelli.

JP: How do we decide we need a piece of music, and once we do, what's the process for getting it?

PHIL P-S: Currently for the PU, new music requests are drafted to support locations, points of interest and new gameplay features.

JP: Are these requests made by designers, QA or another department? Or all of the above?

PHIL P-S: For *S42*, Chris Roberts will typically sit a spotting session with Geoff Zanelli and call out the cinematic and gameplay moments that require specific composition, in addition to *S42* music logic sets. For the PU, music requests typically come from within the Audio Department on the back of a new gameplay feature or location which needs music support.

JP: Once a request is approved, is it then handed off to a composer?

PHIL P-S: Yes, once a request is outlined and approved we draft a "composition request." These requests contain the brief and specifications to adhere to in addition to concept art, gameplay videos, reference cues and creative direction from CR, Lee Banyard (Audio director) and the wider audio team (if needed).

JP: And then once a cue or other piece of music is composed, how does the feedback process work?

PHIL P-S: Typically we first make sure the delivery from the composer fulfills the technical specification — e.g., 24bit, 48kHz, all elements are delivered (e.g., stems, composite mix, etc.).

If a delivery fulfills all of the technical specifications, the cue(s) are passed to CR and Lee Banyard and reviewed to see if the delivery meets the creative direction.

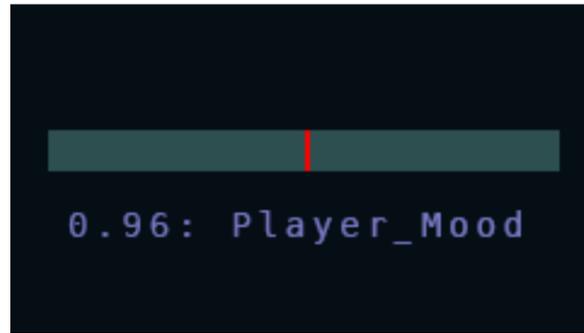
Typically there is a fair amount of back and forth between the audio team and the composers to really dial in the cue to make sure it hits the mark.

JP: There's lot's more I want to talk about, but we've kept you very long already. Let's finish with a couple more quick questions. :)

What has been the most difficult piece of music that you've worked on for *CIG*? The most enjoyable?

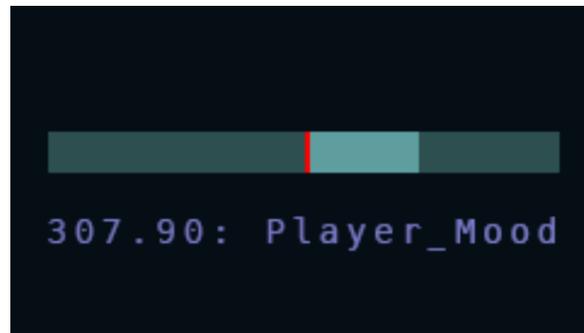
SAM H: As far as the most challenging aspect of working on the music system, I can say it took a few iterations to get a good design for the system to deal with playing cinematic cues. It probably sounds trivial when I describe it, but it was a challenge dealing with the game being able to trigger a cinematic piece of music at any point and making the system resume the correct music afterwards. The difficulty comes when deciding which music to play when the cinematic cue has finished. The player might have been in a ship when the cinematic music was triggered, but when the cue finished they might have been in EVA, so the system has to deal with caching all the state changes while the cinematic music was playing and then restoring the correct states when the cinematic track finally ends.

PHIL P-S: The most challenging times are typically around trailers or demos. The



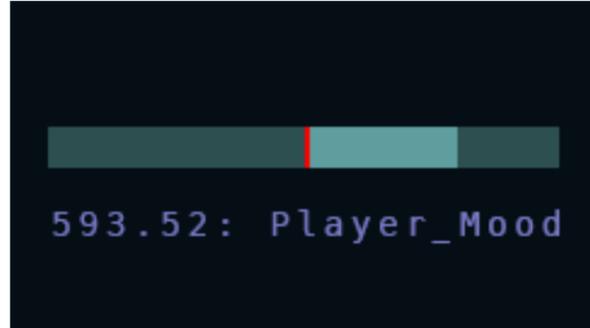
THE PLAYER MOOD BAR IS TO THE LEFT OF THE PURPLE "PLAYER MOOD" TEXT, IN THE MIDDLE OF THE RIGHT DEBUG COLUMN. THE SMALL RED MARK IS THE ZERO POINT BETWEEN GRIM (TO THE LEFT) AND HEROIC (TO THE RIGHT). AT THIS POINT, THE PILOT ISN'T INTERACTING WITH ANYONE ELSE, AND THE BAR IS AT ZERO.

THE OTHER BARS IN THE RIGHT COLUMN ARE ALSO FACTORS IN DETERMINING WHICH MUSIC CUE IS PLAYING.

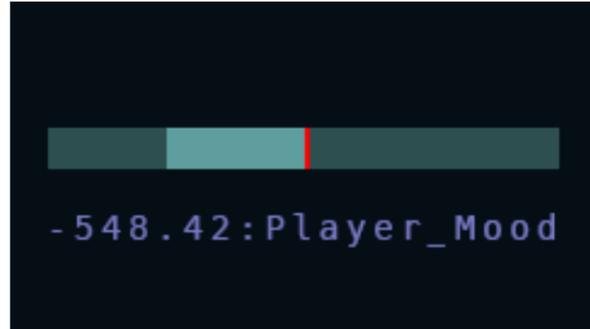
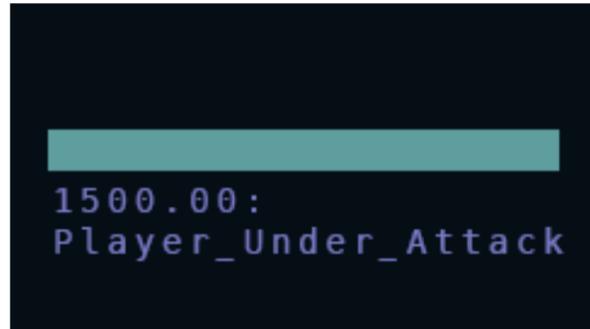


AT THIS POINT, THE BAR IS ABOUT HALFWAY TOWARD HEROIC.





THIS PILOT IS DOING WELL AND HAS REACHED THE HEROIC POINT ON THE BAR.



THIS PILOT IS IN TROUBLE. NOTICE THAT THE "PLAYER UNDER ATTACK" BAR (FIVE BARS ABOVE THE PLAYER MOOD) IS MAXED OUT. THE MOOD BAR HAS ALMOST REACHED GRIM STATUS.



audio team are quite often short on time as upstream deadlines can often slip, typically reducing the amount of time we have to internally compose, mix and master a piece.

My favorite music cues have to be the recent additions to the Grim HEX landing zone. We churned through a fair amount of iterations and in the end came up with cues which I feel hit the nail on the head.

DARREN L: It's interesting. As a musician you look at something (a ship, a scene, etc.) and you pour out of your heart what you feel about that thing. Sometimes the thing you feel is the same or similar to what others feel and so you end up with a very quick turnaround, you 'nail it' so to speak. Other times the way you interpret a thing is different from the way others feel about it and you produce something that nails it for you but doesn't land in the sweet spot for other people. So you have to open your heart and try to understand how the thing feels to everyone else. You have to understand that, as artists, we try to tell a story and to give life to ideas via poetry — be it visual, written or sonic.

To simply do what has worked before (the cookie cutter approach) is anathema to an artist. If we were to simply do that, copy the last thing that generally worked, then can you imagine what the state of the art might look like? Awful. So we try to make something, an offering that speaks to us as a creator, and give it to the project in the hopes it will elevate the experience, communicating more clearly and brilliantly the idea we are trying to convey.

So the simplest ideas are often the easiest things to write music for. I've just finished the music for the Reclaimer trailer, for example. It's a big, industrial-looking ship that deals with scrap metal. It looks like something from the *Alien* universe, and therefore the feel of what the music should be is already rote in culture. So it's easy for me to nail that and have fun in doing so.

The hardest thing to do is to write music for something that nobody has any preconception of. My initial interpretation will lead to a piece of music that I put before

an audience. That audience will then, for the first time, hear music alongside the visual or concept and immediately feel at home or alienated by that marriage. You cannot be too attached to an idea because essentially you have no clue if the idea is potent only to you.

It's far easier to mirror something culturally known, like the standard space opera shtick, than it is to originate something and have that understood and accepted by anyone other than yourself. You have to have empathy, and keep that empathy real. Not easy. But if you don't try to make something new, then you end up just reusing old ideas. Where is the fun in that?

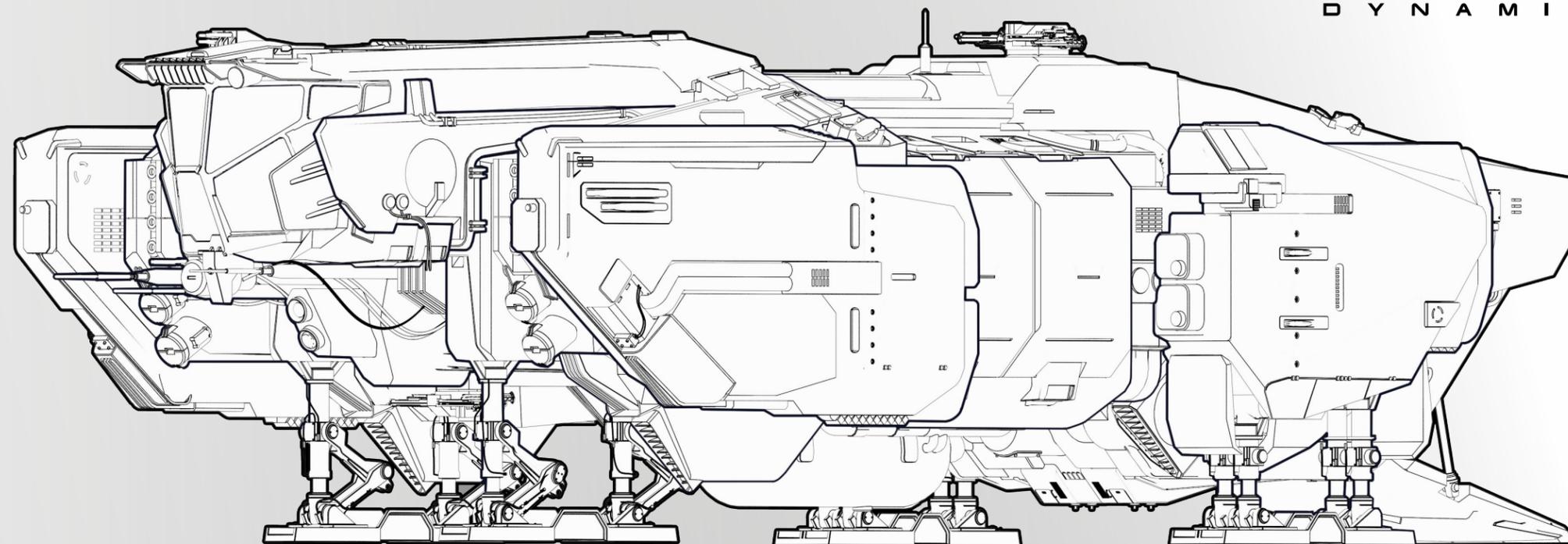
JP: Thank you very much for all the time you've given us, and for the great music. Any last words?

SAM H: I would like to acknowledge former colleague Ross Tregenza, who played a big part in the inception of the first version of the music logic system. A goal of the design was to keep the system as simple as it needed to be and not so complicated that it would be difficult to use. I think the current design turned out pretty well and is something Phil and I can build on and continue to make our games' interactive scores sound even more awesome. We have a lot of ideas for making the music system even more adaptive and emotionally driven than it is now. The sky is not the limit. :)

DARREN L: I think it's obvious to anyone who 'gets' *Star Citizen* that the project is way beyond anything that has gone before in terms of scope and the demands that it makes upon the people who build it. I would really like to express my gratitude to all those guys and girls who are working tirelessly to bring this dream out of the shadows and into the light for all to see. Thank you for believing in it, and in doing so, believing in me. It's a huge privilege to be contributing to something so awesome and I am immensely proud to do so. To all of you out there, backers, colleagues and players: thank you.

END TRANSMISSION ←

WORK IN PROGRESS... AEGIS VULCAN



AIMS

The start of the "Utility Ship" tree. Able to repair, refuel and rearm a small group of fighters in space via deployable drones. Combat ready with limited armament/shield capability so able to be deployed during battle scenes. Freelancer-sized ship, able to travel medium/long distances, but not loiter for long periods of time.

AESTHETIC

Aegis industrial styling (like the Reclaimer) rather than their military styling.

Length	38.5m
Width	16.5m
Height	10m
Mass	625,330kg
Speed	210
Crew	3 Pilot Engineer Gunner
Powerplants	1x Medium

Shield	1x Medium
Armour	Medium
Weapon Hardpoints	4x S2 Weapon TBC 2x Remote Turret (2x S2 Each) 4x Drone Launching Mounts + Drones Countermeasures 2x AEGS CML (1xL 1xR)
Interior	Medium Avionics x 1 Medium Cooler x 1 Medium Radar x 1 Medium Life Support x 1 Medium Gravity Generator x 1

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.

KEY CONTRIBUTORS : CONCEPT ARTIST: ANDREW LEY
DESIGNER: JOHN CREWE
ART DIRECTOR: PAUL JONES

VULCAN INBOUND!

STAR CITIZEN'S LATEST CONCEPT SHIP IS DESIGNED FOR A RANGE OF JOBS. HERE, A UEN VULCAN USES BARD DRONES TO REFUEL A FORMATION OF ECLIPSE BOMBERS.

FORGING THE VULCAN

The Aegis Vulcan began life as the last of an ambitious slate of 'role focused' 2017 ships which included the Hammerhead fleet screen and the Pioneer colony builder. While the Vulcan may seem to have a simple concept compared to these ships, that could not be further from the truth: where combat ships like the Hammerhead and the Hawk were created to build upon mechanics that are already in various stages of functionality, implementing the Vulcan would involve design work for at least three significant processes which had not yet been implemented on any previous ship: repairing, refueling and rearming (a fourth major process, drone control, would later be added to the stew). The Vulcan was initially imagined as a small-to-medium workshop ship, an idea which was strongly sharpened by Chris Roberts' request that it function as a sort of 'career starter' for several support roles. With larger platforms prototyping support concepts on a much broader scale, the Vulcan would be the ship that brings them to the introductory level, making a swath of long-dreamt beyond-combat roles possible in the 'verse.

The initial brief may seem very different from the ship that was presented to the community, focusing mostly on the refueling process and not even considering the idea of including a drone platform. It read: "A small (perhaps Freelancer-sized) refueling/rearming ship intended to be the start of the 'utility' ladder that eventually gets to the Crucible (and some future drydock?) This is the 'single ketchup packet' of repair ships, featuring fuel and weapons to rearm a small group of fighters while in space. It would be built around a sort of 'docking nozzle' that ships attach to to receive new munitions and fuel in-flight. Unlike larger support ships, the Tern (the original working name for the Vulcan) is 'combat

ready,' with a limited armament and shields/armor that allow it to be deployed during battle. Think of this as being like the medic in a *Counter Strike*-style game; players will bring one person operating it with them into fights. It would also be a really valuable NPC service . . . players get a discount from the corporation that you can pay for in-flight rearming."

The description is short and simple but belies the amount of work required to implement the idea. Consider the challenges inherent in this short concept: the team was tasked with creating a ship that does not

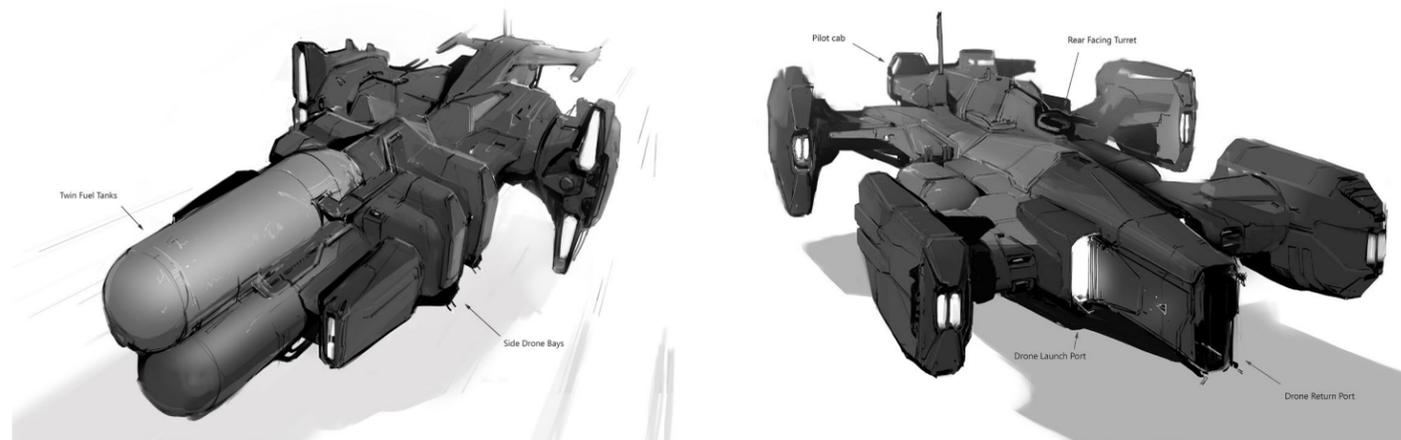
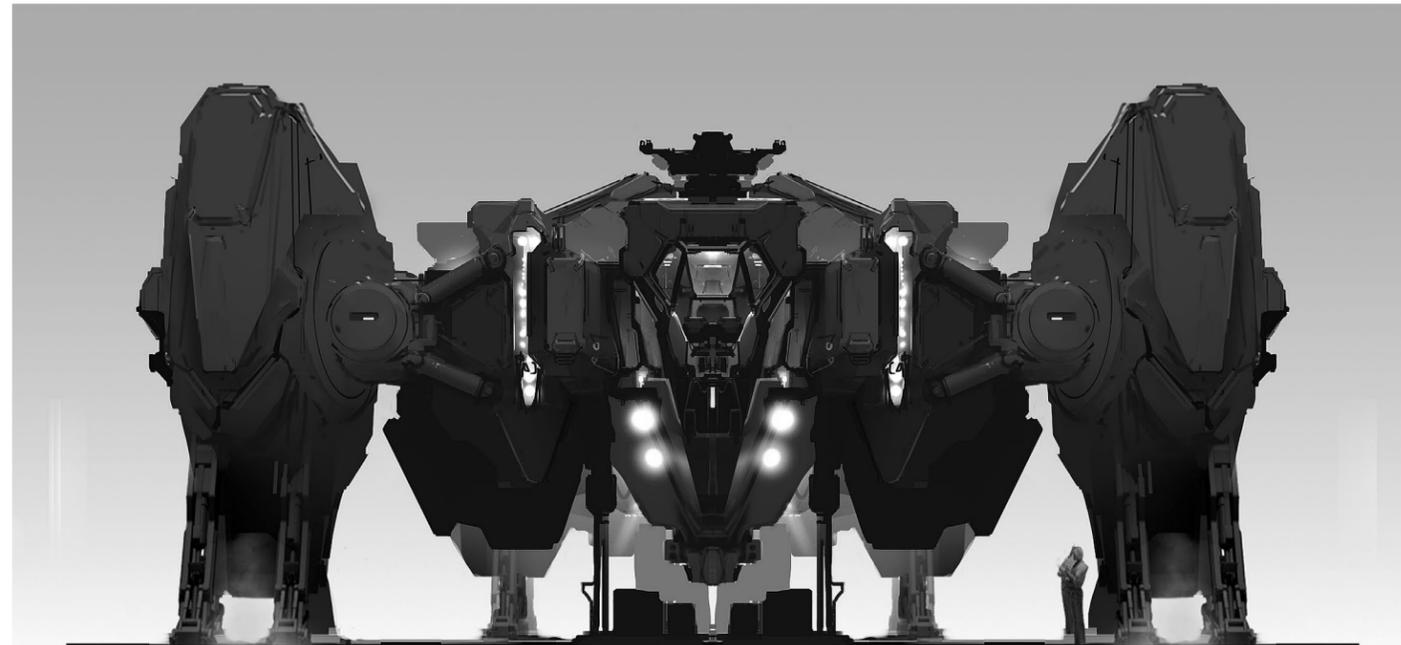
one, but three new jobs (jobs it is likely to introduce in the 'verse) and it needs to be able to perform all three of those jobs on over one hundred extant spacecraft, some of which were originally built not knowing precisely how a universal refuel/rearm/repair system would work. The concept team would need to go beyond the vague idea of a nozzle and create a ship that can perform new functions in an already-working world. *Star Citizen* boasts many small ships that pack a special punch; but in this case, it wouldn't be the Vanduul or pirates feeling the impact... it would be the game's mechanics.



ROLE REVERSAL

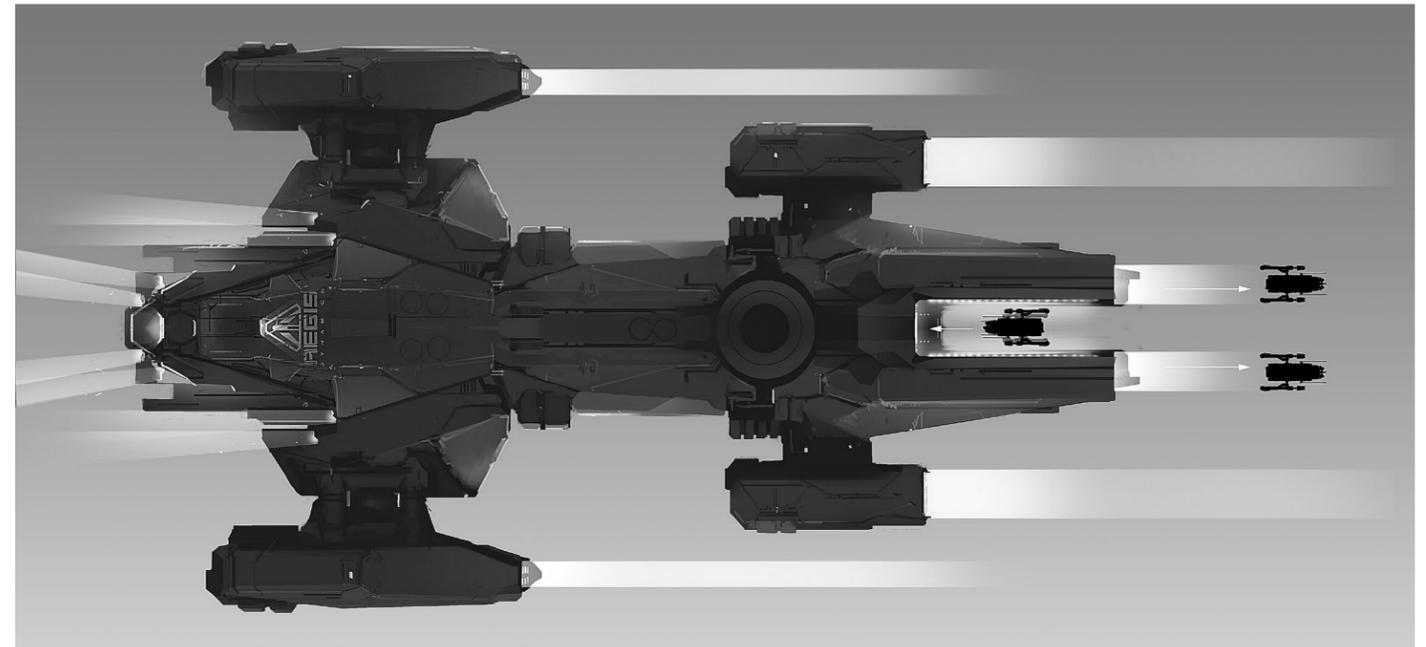
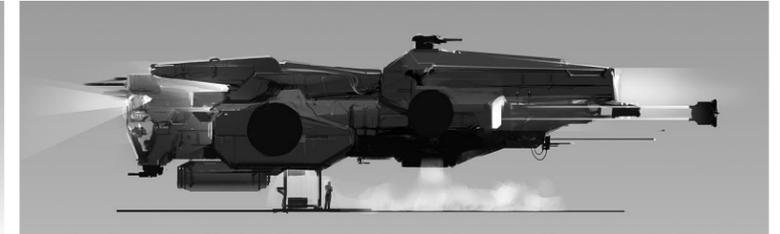
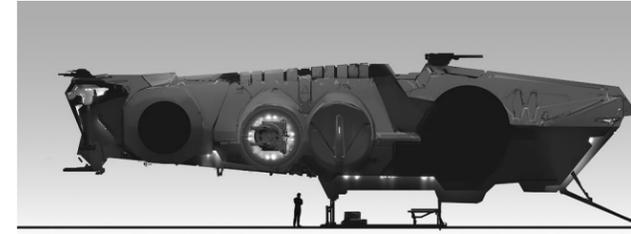
The idea of in-flight refueling has been around as long as aviation itself, with an increased need as aircraft became more advanced and their roles more essential to both the military and civilian services. Planes that could remain in the air without landing could cross longer distances, allowing them to bomb distant targets or bring cargo and mail to corners of the world hitherto inaccessible. Among pilots, in-flight refueling has long been considered one of the most difficult maneuvers, requiring an expert pilot to dock with a short aerial lead and very little margin for error. In early iterations of the proposed game mechanic, refueling was to be done quite literally with two ships connected for the fuel transference; it was later adapted to function with the drone system in a way that makes sense in *Star Citizen's* future setting.

The Vulcan was conceived to continue this legacy, with the idea of offering a special challenge for support pilots who would make other players' success their responsibility. Unlike the Starfarer, which was intended to transport large quantities of fuel from one place to another with in-flight refueling added as an extra, the Vulcan would focus strictly on support and not transport. The hope was to create a true single-person support craft which would accompany familiar bombers and fighters on operations and keep them fighting when time and distance might prevent them from reaching a carrier or base. The hope was that a class of players would gravitate towards the Vulcan as an effective force multiplier, something that orgs would involve in operational



HUMBLE BEGINNINGS

ARTIST ANDREW LEY PRESENTED A NUMBER OF DIFFERENT HULL OPTIONS FOR THE TEAM TO REVIEW BEFORE MOVING TO THE MODELING PHASE.

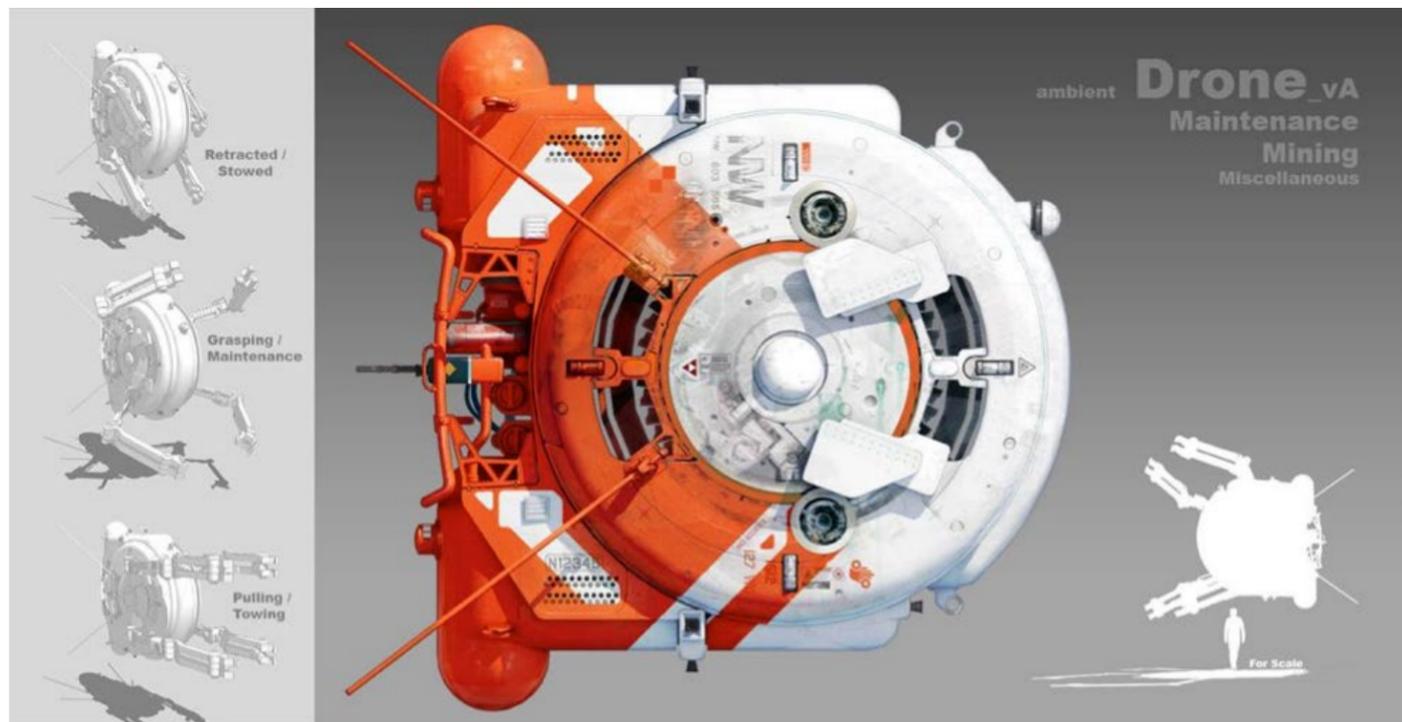


planning. Similarly, it was hoped that the Vulcan would find use on the civilian side of the game, with players supporting transport convoys, rescuing stranded ships and generally helping lubricate the moving parts of a massive economy. As in real life, Vulcan pilots would likely not get the glory associated with dogfights or torpedo runs, but missions would hinge on their difficult-to-master skills and necessary abilities.

But where the job of a tanker ends when the aircraft's tanks run dry, the task of a Vulcan crew is just beginning: the Vulcan would not just refuel spacecraft, it would also rearm and even repair them on the battlefield. Where airborne refueling has been perfected into a

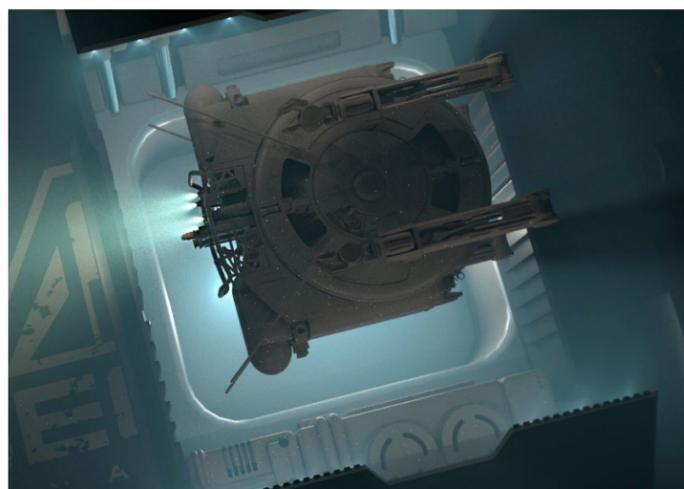
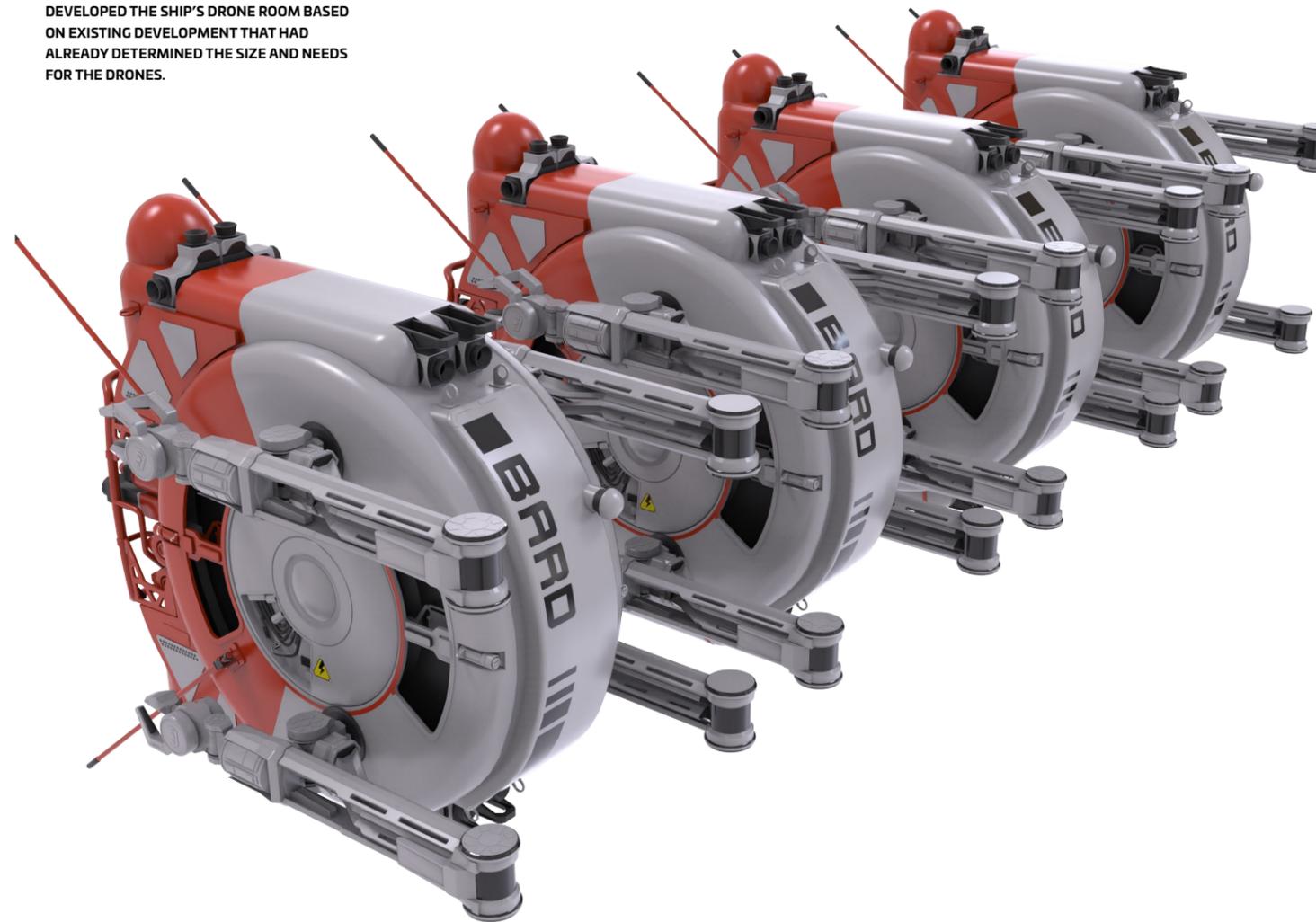
delicate dance over a century of air warfare, no one has effectively created a system that allows for airborne rearming on a large scale. Much of the reasoning for this is logistical: an aircraft that needs additional fuel is one that is on its way somewhere, while an aircraft that has depleted its munitions has already reached a target and likely engaged the enemy. A 'rearming' plane would need to have the same capabilities as the one expected to fight in the first place. These logistics fade quickly when the expected area of operation expands from a single biosphere to dozens of star systems. In a world where you might be operating days away from a base or carrier ship and where you might face multiple enemy encounters in a single mission, there is a strong need for rearming.

Lastly, there was the call for repair. One initial idea was to have the Vulcan feature a space-exposed workshop to cover the small-scale repair functionality in the initial brief. The thought at this time was that the repair role would be something of a bonus addition for the ship, whose primary objective would be replenishing fuel and munitions. While larger repair platforms like the Crucible have their own 'dry dock' workshop, the starter class would instead feature a sort of shed area with tools and supplies that would be accessible in zero-g. Players would EVA from this workshop to repair ships and installations using hand tools and manipulator arms.



DRONE ON

THE VULCAN'S QUARTET OF BARDS ARE THE KEY TO ITS SUCCESS. THE ART TEAM DEVELOPED THE SHIP'S DRONE ROOM BASED ON EXISTING DEVELOPMENT THAT HAD ALREADY DETERMINED THE SIZE AND NEEDS FOR THE DRONES.



IT'S ALL BEEN DRONE

The solution? Drones! Independent drone spacecraft were a concept already in the works to support a number of other *Star Citizen* ships including miners and exploration vessels; by adapting what the game's drones could do, work on the Vulcan dovetailed nicely with other projects already in development. With a single multi-purpose drone instead of a series of manipulator arms, fuel booms and zero-G sheds, the Vulcan could become the jack-of-all-trades it was intended to be without limiting the shape and roles of other future spacecraft designs.

Designers adapted existing drone concepts to create the BARD, or Basic Articulated Repair Drone. Each BARD would be 'armed' with four robot manipulators capable of performing small repair work, pumping in fuel and carrying replacement parts and expendable munitions depending on their positioning. The belly of the Vulcan would contain several (eventually four) drones that could be dispatched to fulfill any sort of maintenance request.

With the 'how' determined, the ship team at Foundry 42 began their work by creating the initial sketches to work from. This artwork had two purposes: one, establish the basic silhouette and use of Aegis design language for the ship and two, show how the ship will take advantage

of the drone system. Several options for the ship were sketched from different angles in different configurations to lock down other necessary choices like how it would land and its scale compared to a human figure. A total of four different options were presented to Chris Roberts, with the most significant difference being the side panel, which ranged from an angular stealth warship to a broader, full rectangle. Chris liked two options, and asked that elements from both be included in the next pass with some other modifications; he was especially concerned about reducing the size of the then-prominent VTOLs so that they were less imposing. The result was a ship that seemed to merge the military lines of the powerful Javelin destroyer with a sort of functional beetle with an abdomen full of hard-working drones.



COMING TOGETHER
 THE VULCAN WENT THROUGH SEVERAL REFINING PASSES DURING THE GREYBOX STAGE. THE END RESULT IS A MORE COMPACT SHIP THAN ORIGINALLY ENVISIONED.

AS THE WORLD TURNS

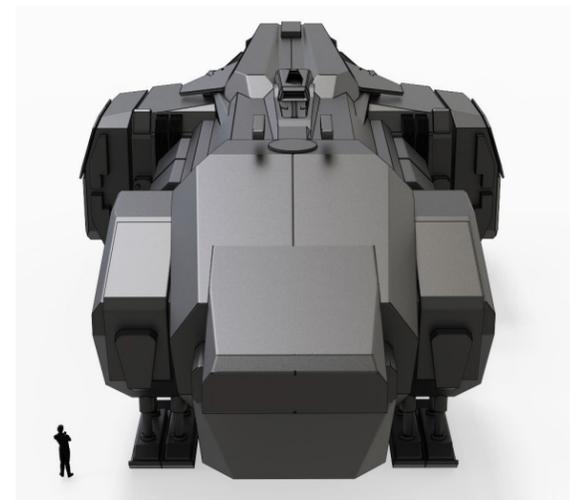
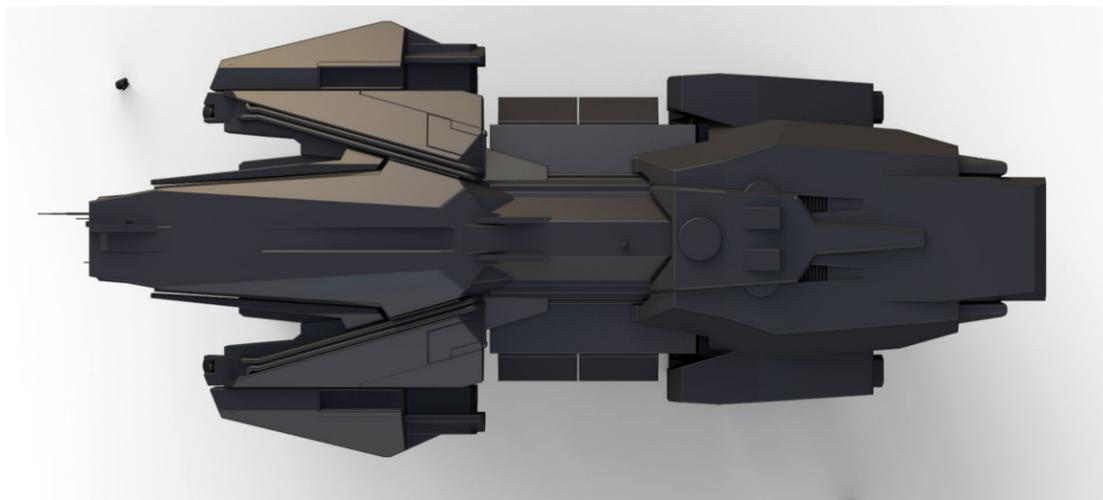
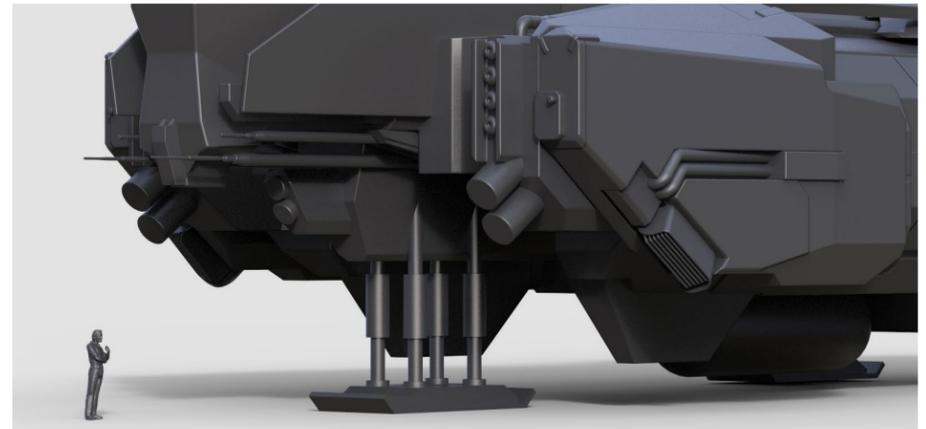
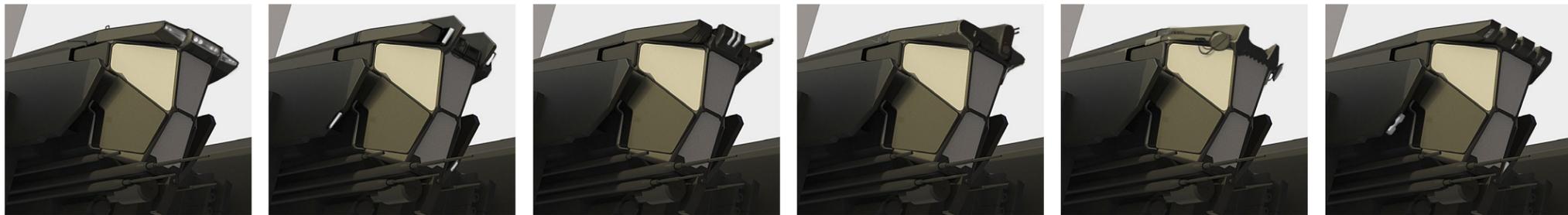
From the initial sketch selection, artist Andrew Ley, who had been responsible for the Vulcan concept, constructed a base 3D model for refinement. This first model had a much larger visual focus on fueling in specific; it featured a large, detachable external fuel pod similar to the Space Shuttle's External Tank. The idea in this pass was that the fuel tank would be a modular option, extending the amount of fuel the Vulcan could carry when enabled. This version was dropped entirely for feeling "too much like a mini-tanker." Visually, the Vulcan needed to balance its roles so the external fuel tanks continued to diminish with each pass, slung under the sides of the ship in the next version and then, responding to fears that it looked like it might explode with a careless (or well-placed) shot, covered with protective armor thereafter.

The overall hull shape of the Vulcan went through a series of refinements in the greyboxing phase, aiming for a more distinct silhouette than the initial sketches. A major focus of this work became the shape of the cockpit cabin and the forward 'hood' of the ship. Several takes on a butterfly-style viewport were rejected early on as being too unorthodox, with another version altered because it looked too much like the head

of an armored suit. The final 'construction cab' style was deemed spot on for the utilitarian nature of the ship. It wasn't just the viewport that had refinement; since the Vulcan would be frequently seen facing other ships, it was felt that special attention should be paid to the overall look of the ship's "hood." Ley came up with nearly a dozen different options, showing tool racks, lights, scanners and other greebles that could be included around the ship's front.

The last greybox pass reduced the appearance of the ship's original VTOL 'gorilla arms' and added more emphasis by broadening the traditional landing gear. This helped make the design more visually distinct from other Aegis ships such as the Reclaimer, which had previously shared a similar set of forward 'standing' pylons. The ship's thrusters were reworked along the same lines, making them more unique to the Vulcan and its lower profile. The final ship remains distinctly Aegis, but without some of the broader features that define other ships from the manufacturer. The outside had become a snug package. The final step in the concept art process was to fill that package by locking down a deceptively complex interior.

WHAT BIG GEAR YOU HAVE
 THE FINAL GREYBOX PASS INCREASES THE SIZE OF THE LANDING PADS BUT REDUCES THE VULCAN'S OVERALL FOOTPRINT.

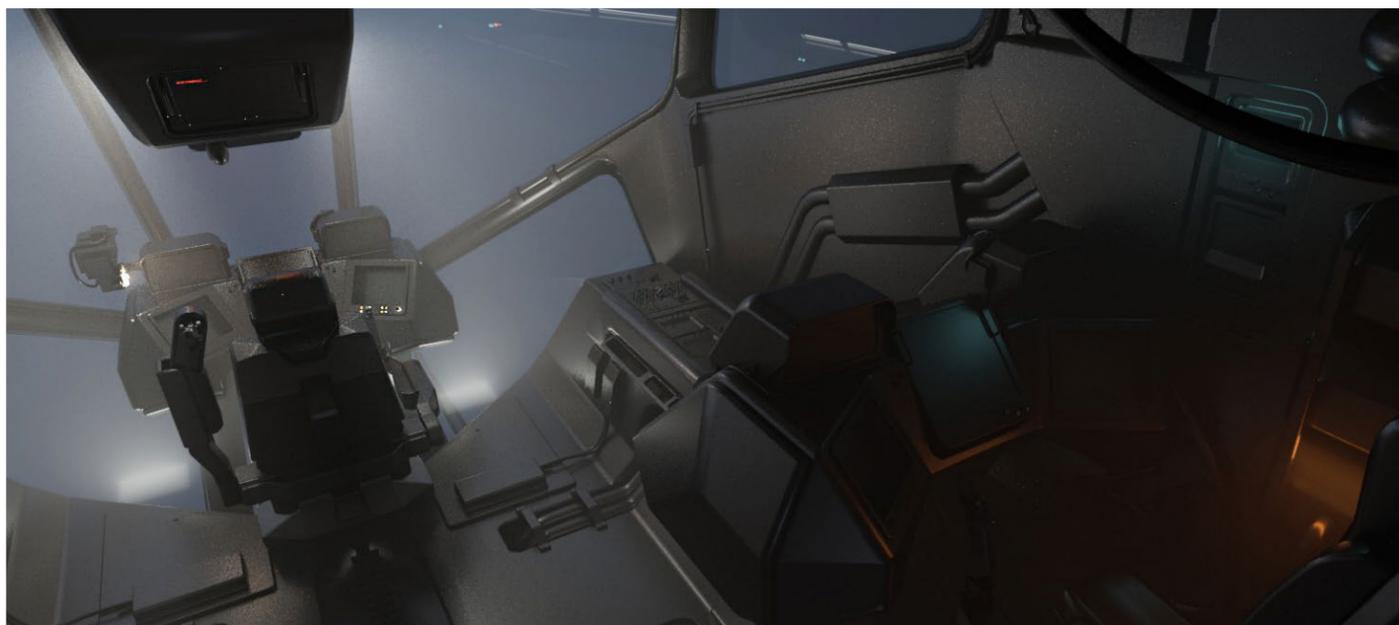


IN THE COCKPIT

The challenge: block out an interior for the Vulcan that would fit all three of the support roles. It quickly became clear that there were three areas of development that needed to be iterated for the internals. The first was the view from the cockpit, especially important in this case because it was how the ship's captain would "work" most of the time. The Vulcan would need to present the world in a way that combined a large viewing area with the 'hard working' visual stylings of the ship itself. The second crux of internal development was the drone room. While specifics like the dimensions and range of functions had already been plotted by Design, how the drones would be controlled by the player still needed to be developed. Finally, the Vulcan needed a crew cabin that could accommodate a crew that would often be employed far away from larger bases: beds, cleaning facilities, storage and the like.

For the internal cockpit, a variety of shapes and chair positions were attempted to give a broad view while still allowing access to a bank of computers (physical monitors being a hallmark of Aegis ship designs) and controllers. That would allow the player freedom to interface with the drones as needed. The final version of the cockpit suspended a bank of monitors forward, plus a pair of floating controllers accessible to either side via pylons. With this system, the captain would have an improved field of view ahead while still having the real estate needed to use any of the drone-related systems that Design was still working up.

After consulting with the design team, it was determined that the players needed to have physical access to the drones themselves while they were aboard the ship. This would allow them to reconfigure, repair



LOOKING OUT ON CREATION

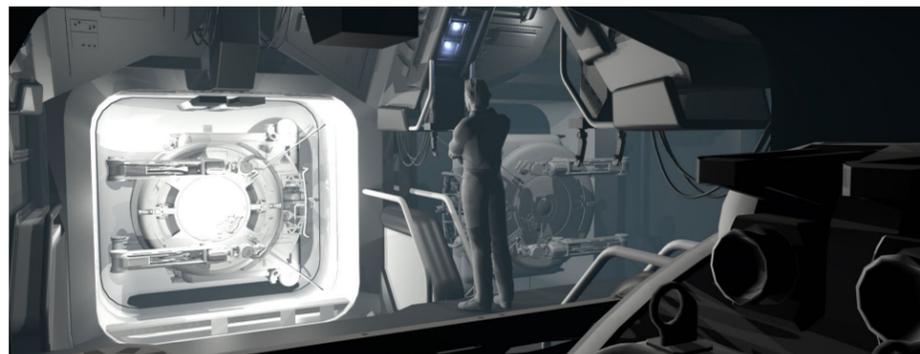
ARTISTS PAID SPECIAL ATTENTION TO THE VIEW FROM THE VULCAN'S COCKPIT, WHICH WOULD BE IMPORTANT TO PLAYERS SEEKING TO REARM, REFUEL OR REPAIR ANOTHER SHIP.



CHOW TIME

CONSIDERED A 'STRETCH GOAL' BY THE ART TEAM, A SHARED TABLE WAS FITTED SNUGLY IN THE CREW QUARTERS BY THE CONCEPT TEAM.

and otherwise work with them pursuant to the needs of the mission. Additionally, access to the drones should be as close to the cockpit as possible so that players operating without a crew would be able to go back and forth with ease. Ley developed a comprehensive plan for a 'drone room' that allowed each BARD to slip into place over an airlock, similar to how an escape pod works. Players could interface with the 'working' parts of the drone while the rest remained exposed to the vacuum. The room needed to be large enough that all four drones could dock and be visible at once, rather than rotating them from point to point before launching.



The Vulcan's creature comforts prompted more questions. The Vulcan was intended to be a smaller ship with a more limited crew (potentially operated by a single captain with the option for more stations). While most 'starter' ships reduce overall complexity by forgoing items like beds and showers, the Vulcan would need them in order to operate for longer periods of time. To make good on this disparity, Ley focused on making the living cabin appear to be melded with the role-specific functionality that defines the rest of the ship. Beds in the crew quarters were recessed into the walls in a manner paralleling the drones, with other features such as lockers and a single shared table making it clear that this is a ship without a cubic inch of unused space.



To fit everything together and to explain the interior to reviewers, Andrew Ley created a cutaway side view that included positioning for these rooms plus all of the essential engineering components. In the final version of the layout, the drone room was positioned amidships and the living quarters in the rear above a cargo area which would allow the ship to transport additional spare parts, ammunition or fuel. Access to most engineering features was allowed in the walk spaces between the drone area and the bridge, with panels for life support, shield generation, radar, avionics and the jump drive. The Vulcan now had everything it would need, courtesy of the art department: room for a crew to live, access to the drone system and space for everything needed for a fast repair or rearming job.



ONE GOOD TERN DESERVES ANOTHER (NAME)

The first essential lore decision for the Vulcan was manufacturer, with Aegis quickly determined as the preferred option. The only strike against the idea was that there were already a large number of Aegis ships and developing a new ship for another company might make it more appealing to supporters interested in getting behind the stick. But the Vulcan was intended to be a long-standing support ship, something with a storied and familiar history with the UEE military. Anvil and MISC were considered, but Aegis' status as the historical prime contractor for the Navy back through the Messer era meant it won out with little debate. The Foundry 42 team's established design language for Aegis military ships and their experience building them for both *Star Citizen* and *Squadron 42* helped further lock down the manufacturer.



Further along the process came the debate over the name. The Vulcan entered the pipeline with the placeholder name Tern. Tern was chosen in reference to an even earlier method of refueling: the age-of-sail practice of seamen raiding island colonies for tern eggs to sustain lengthy naval expeditions. Placeholder names like the Tern are usually chosen with the express purpose of organizing shared concept work rather than indicating a final name. Similarly to many other instances, "Tern" was used to refer to the ship before the role had been completely developed and before a manufacturer had been decided. Unlike many ships, the Vulcan made it through much of the process still referred to as the Tern internally, which can sometimes make for confusion once a final name is selected. Though the decision came later, once the team determined that the refueling ship would be delivered by Aegis Dynamics it was clear that a more martial name would be needed to match the existing fleet.

The debate over some ships' names can sometimes go on in the background for weeks, with dozens of options floated in lengthy email chains. In this sense, the Vulcan was again atypical: lead writer Dave Haddock suggested the final name and it immediately seemed like such an accurate moniker that the usual lists of options were never discussed. Vulcan was the Roman God of fire who is closely associated with the forge, seemingly ideal for a ship that was now expected to refuel and rearm the

metal of the United Empire of Earth Navy. The character of Vulcan is considered the patron of oven-related trades (from baking to metalworking) and is historically depicted with a hammer at hand, again strongly calling to mind the abilities of this jack-of-all-trades support ship.

There were slight reservations from stakeholders and, perhaps surprisingly, they didn't have anything to do with cold logic or pointed ears:

ship team members at Foundry 42 were concerned about the connection to the Avro Vulcan, a famed 1950s British bomber with a unique tailless silhouette. Further research revealed that this Vulcan bomber had actually ended its career as a refueling aircraft, with the final serving examples converted to the Vulcan K.2 tanker model. With that connection in mind, Chris Roberts gave the thumbs up to use Vulcan as the ship's official name.



VULCAN DO!

The first step to revealing the Vulcan to the public was to develop a set of images that showed the ship at work at its various responsibilities. The team brainstormed and wrote up a series of five options that could be presented as corporate imagery coming from Aegis:

- **Air-to-Air Refueling.** The classic shot of a tanker refueling/reloading a smaller aircraft. Since these are corporate advertisements, we should keep them in the Aegis family wherever possible; if it could be refueling an Eclipse it would be especially cool!
- **At the Depot.** One or more Vulcans parked planetside, on a military runway with ground crews at work. A truck or tank is pumping fuel. Spacecraft doors are open. There are clusters of missiles, bombs, crates, etc. waiting to be loaded.
- **With the Fleet.** Foreground, a formation of Vulcans. Ahead of them is an impressive UEE battle group at anchor. Formations of fighters fly CAP in the distance. Other Vulcans might be amidst the warships, already hard at work refueling and rearming for the next battle.
- **Under Fire.** The Vulcan repairs a clearly damaged smaller ship while a battle rages around it. (Should have Vanduul rather than pirates; remember this is to sell to a UEE government audience.)
- **To the Rescue!** Bold, propaganda-ish shot of multiple Vulcans flying towards the camera, a beautiful spacescape in the background. Ships should all be smooth and undamaged, in fleet colors.

Working from these broad ideas, the concept art team turned out a selection of action shots of the Vulcan at work. Additional concepts were added showing the ship's interior, the final schematics and some of the drone work. To help better promote the Vulcan's multi-talented nature, Chris Roberts also asked the art team to develop a series of options for different liveries which might be offered alongside the ship. Artists experimented with nearly a dozen different versions and finally settled on a selection of three. To reinforce the idea of the Vulcan's three roles, the liveries chosen each signified one of the core uses: a military green scheme for rearming, a yellow hazard style for repair and a blue for refueling. All three skins were made available as options as part of the concept rollout.

With the concept art completed, the web team at Turbulent turned the artwork into a stunning ‘moving picture’ presentation themed around the Vulcan’s role. As was the case from the very first blackout images, the job was to bring across not just an exciting new starship but to explain its place in the ‘verse. To help reinforce the importance of players taking up the jobs offered by the Vulcan, the lore team connected the ship with CTR, a chain of already-established ‘space gas stations’ run by a Xi’an company. (Their livery would also appear on the blue fueling skin.) The brochure also pushed the importance of the roles, taking the form of a “United Wayfarers Club” presentation booklet that invited citizens to join

the dedicated ranks of support pilots (complete with membership card). With this material completed, the Vulcan tender was revealed to the world.

The Vulcan will premiere in a future *Star Citizen* patch as it is built out in the game and after additional work is completed on drone mechanics and the different careers it touches. While a great deal of work went into making sure form and function fit expectations for such a ship, it’s likely the reverse will also come to be true in the long run. The Vulcan will be such a help to damaged, stranded and otherwise injured ships that it will come to represent the best of players working together against the void!



AEGIS VULCAN RESOURCES:

AEGIS VULCAN SHIP PAGE:

<https://robertsspaceindustries.com/pledge/ships/vulcan/AEGIS-Vulcan>

AEGIS VULCAN BROCHURE:

https://robertsspaceindustries.com/media/n195vqvz35bmir/source/UWC_Membership_Document.pdf

AEGIS VULCAN Q & A:

<https://robertsspaceindustries.com/comm-link/engineering/16458-Q-A-Aegis-Vulcan>

GALACTAPEDIA

EMPEROR BLOOM

The Emperor Bloom is a member of the genus *Plena*, of the *Tuserac* family of plants. It is one of many varieties of flowering plants indigenous to Terra (Terra III) with a solitary flower featuring a conical spiral of petals over the pistil. Its vibrant color, strong scent, and long blooming season have earned it a prominent place in Terran culture.

Found primarily in the tropical regions of Terra, the Emperor Bloom Reserve in the state of Vastac attracts thousands of sightseers every year.

DESCRIPTION AND LIFE CYCLE

The mature plant features a single, thick stem with simple, basal, elliptical leaves. When the plant begins preparing to flower, it develops a dark brown husk coated in brown fuzz that averages 15 cm in length. One by one, the Emperor Bloom drops its leaves as its energy is redirected into incubating the blossom. Finally, the husk turns a deep purple and unfurls into a spectacular, three-tiered flower in showy shades of violet.

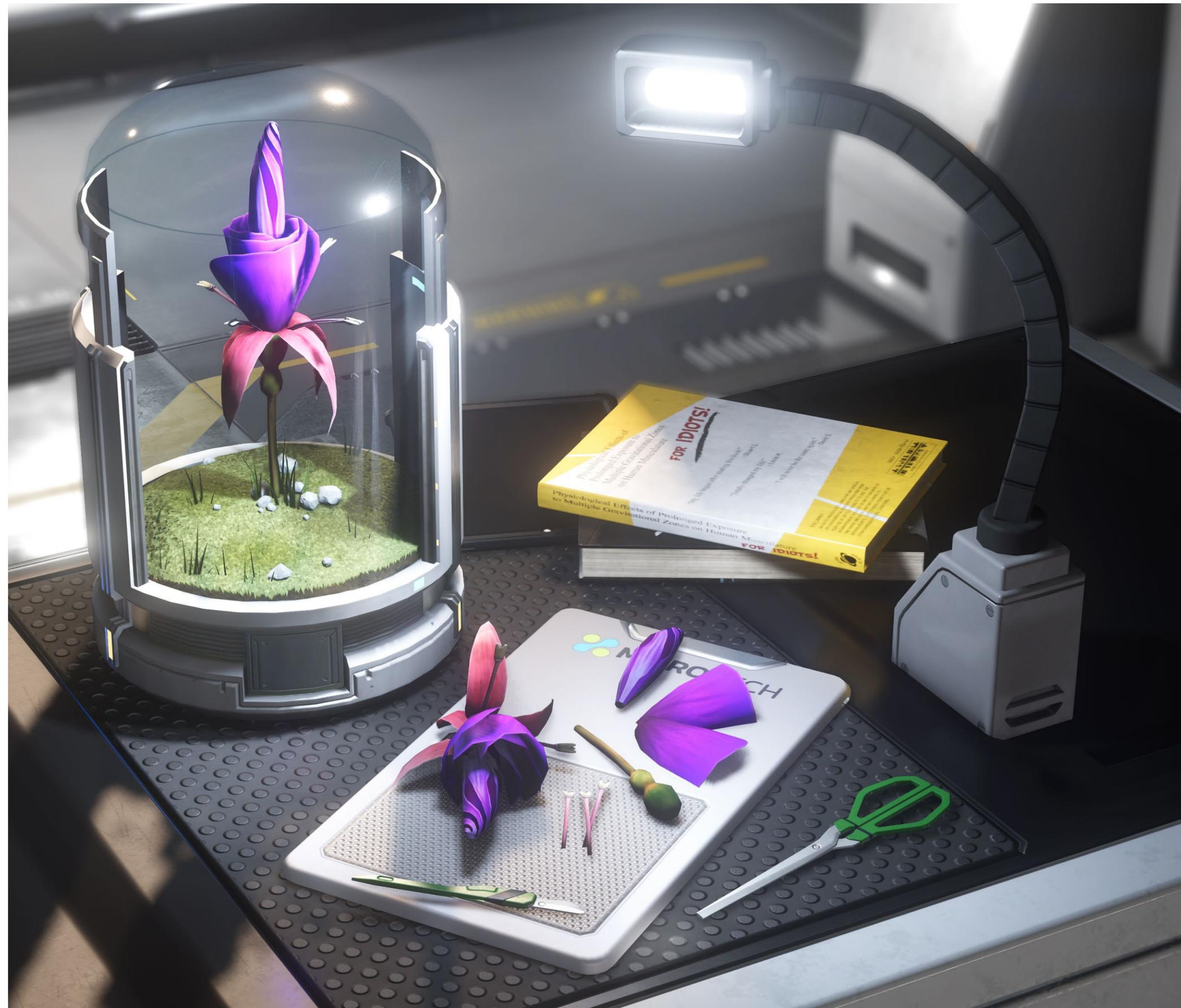
It blooms during the temperate dry season, when average temperatures reach 25 C. The outer petals of the flower drop off when temperatures begin to average above 32 C. The conical spiral of petals in the center harden and darken as the plant develops its seeds. At the height of the dry season, the pods burst open and hundreds of fluffy seeds are picked up by the late-dry winds and propagated to germinate at the beginning of the wet season.

DISCOVERY

In 2559, a group of early planetary surveyors came across a field of these flowers on the outskirts of what would later become Prime. Specimens were collected and brought back to the settlement, where they have been cultivated over centuries to maximize flower size, scent, and brightness of color. Today's domestic Emperor Bloom is larger in size than its wild cousins and has a longer flowering time.

CULTURAL SIGNIFICANCE

The Emperor Bloom has become an unofficial symbol for Terra's natural beauty. It's celebrated on Terra with the Twilight Festival, which is held every year in Vastac at the start of blooming season. The morning of the festival, ships both airborne and aquatic cross the Zaffre Bay from Prime to reach the vast Emperor Bloom reserve. Temporary viewing areas are made available to attendees so they can enjoy the flowers without accidentally trampling them. Food, music and games are featured at the festival, along with an outdoor market where attendees can purchase their own Emperor Blooms. Just after sunset, with a single stroke, the elected chairman of the festival illuminates hundreds of lights that have been staked among the flowers.

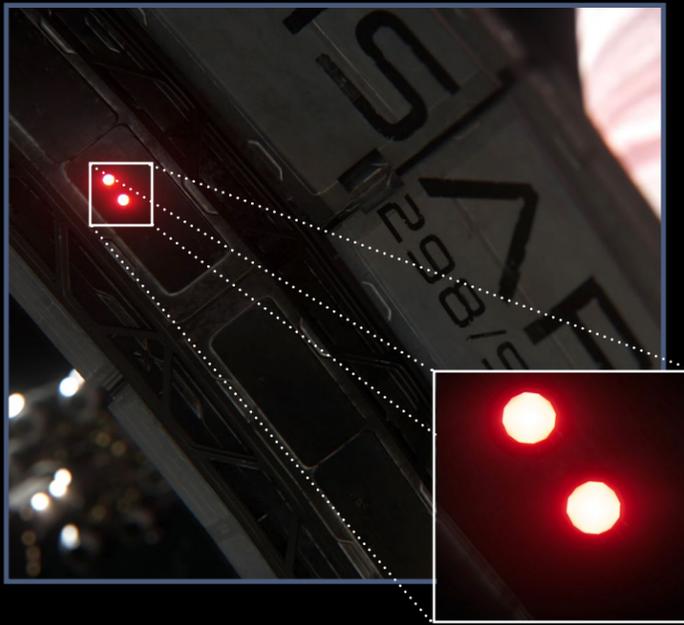


WHERE IN THE 'VERSE?

Each month, we'll post a close-up image of some point in the universe.
Each month, tell me where you think the image was taken:

David.Ladyman@cloudimperiumgames.com

Then next month, we'll reveal the image's location, and post the best replies we got.
This month's image is courtesy of Ray Warner, QA Assistant Manager, UK.
Where in the 'verse did he find it?



Last month's image was courtesy of Dave Haddock, Lead Writer.
Where in the 'verse did he find it?

Daniel Braun (Sarge701), tells us:

BEGIN TRANSMISSION →
I'm writing you from outside of Port Olisar, where I think I've discovered your close-up image of the universe during an EVA. I think you shot the close-up very close to one of Port Olisar's rotating ring elements.
← END TRANSMISSION

And he is correct, as you can see from the larger image. Congrats, Daniel!

Honorable mention goes to Zach Coman, who suggested a texture on Levski (even wild guesses can be right from time to time). Dishonorable mention goes to Shinji Yonazaki, who suggests it marks where Ellen Ripley died. No doubt slain by a Vanduul bursting from her chest.

Next time, please send me a screenshot of what you find, so that I can at least give partial credit if what you've found is close to the actual image.

ONE QUESTION [PART 1]

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

WHAT WAS THE FIRST ELECTRONIC OR COMPUTER GAME YOU CAN REMEMBER PLAYING, AND ON WHAT SYSTEM?

ADAM RUTOWSKI, SENIOR ANIMATION PROGRAMMER, UK

A very obscure game called *Doubleback* on the TRS-80 computer at my school when I was in kindergarten. A surprisingly addictive game where you have to lasso moving objects to capture them without hitting other objects. Have never seen it anywhere since then, but would love to see if the gameplay still holds up at all.

LUKE HALE, ASSOCIATE PRODUCER, UK

The first game I ever remember playing properly was *Tekken 2* on the original PlayStation. I was really young at the time, so I don't remember a whole lot about the experience, but I do remember being fascinated by the colours, the ability to interact with what was on screen, and the really cool-looking characters.

JOSH COONS, 3D MODELER, ATX

Not the first, but the most notable. I had a Tandy computer circa 1995 (probably a RadioShack buy), I procured a shareware version of *Doom* from a local flea market. (Remember shareware!?) I installed it on that beast and realized . . . I needed one more ram, literally 1 meg of ram, One! I had to mow yards for an entire summer to earn the money for that 1 meg stick of ram. Finally got it in, loaded up the game and the following months of playing changed my life forever.

HANNES APPEL, DIRECTOR OF CINEMATICS, DE

The first game I remember playing was a *Space Invaders* clone called *Amoeba Invaders* on an Amiga 2000 using a Competition Pro joystick around the year 1987/88!

The first game I bought with my own money must have been *The Secret of Monkey Island* from 1990, also on the Amiga. Four floppy disks and quite confused when the tree stump puzzle asked for disk #22.

And then there was also *Turrican* on the Amiga as well!

GERARD MANZANERES, PROJECT MANAGER, ATX

The first video game I played was *Super Mario Bros.* on the Nintendo Entertainment System. I remember being very frustrated that I couldn't clear the jump on World 1-2. I may have been around 5 years old at the time.

GLEN KNEALE, QA LEAD, DE

Sonic the Hedgehog for SEGA Megadrive / Genesis (NA). Dad bought it for me as a present and I had no clue as to what it was. I remember playing it and it broke my mind! Super fast and awesome music! To this day I still play them and have the same SEGA console with all the games. Much cooler than Mario.

ADAM PARKER, TECH DESIGN, UK

Super Mario World on the SNES. I was so young at the time I didn't understand what a videogame console was, I thought it was a special cartoon you could control with the TV remote! I was blown away when *Link to the Past* and *Super Metroid* came along.

MATTHEW SLATTERY, JUNIOR CINEMATICS DESIGNER, UK

I think . . . *Gauntlet* or *Gauntlet 2* on PC!

LEE BANYARD, AUDIO DIRECTOR, UK

The first game I remember playing was *Tennis* (a *Pong* clone) on the Adman Grandstand 4600 console. This also came with a light-gun so it might have been a shoot-the-moving-square game I played first, but most likely *Tennis*.

JOHN PRITCHETT, SENIOR PHYSICS PROGRAMMER, LA

The very first game I recall playing was *Space Invaders* back in the late '70s. This was the first arcade game that came to our local bowling alley. I definitely thought it was really cool, but it wasn't life-changing. That moment came when I first played *Pac-Man* a year or two later.

FORREST STEPHAN, CG SUPERVISOR, LA

The first electronic video game I ever played was a computer game on the Commodore 64, *Defender of the Crown*. I was 4 years old and played that a lot.

LENA BRENK, PRODUCER, DE

My first memory of playing a computer game as a kid was the first *Prince of Persia* on a Macintosh Plus. That meant playing it in black and white on a tiny screen, but it was still an amazing experience and I was absolutely hooked.

TYLER SIMMONS, HR COORDINATOR, LA

I'm sure I played others first, but I would have been young. I truly remember the experience of opening and playing *Super Mario Bros. 3* (NES). Probably because I had seen *The Wizard* beforehand.

STEVE BENDER, ANIMATION DIRECTOR, LA

The first one I recall playing on my own was on the Apple IIGS: *Space Quest*. I spent hours trying to earn the spacecraft by betting money in the bar, and will never forget having to put a rock in a jockstrap to knock out the guard patrolling overhead. Or was that *Space Quest 2*? Old age kicking in . . .

DASH WILKINSON, ANIMATION ASSISTANT, ATX

The farthest that I can reach back into memory was a game developed by Bill Gates called *Donkey*, which was a DOS game developed in 1981. My father had it on his PC and I was probably around the age of 4. Basically it was a driving game that was very simple: try not to hit the donkey in the lane of the street it appears. Apparently it was created to demonstrate the IBM PC and the BASIC programming language's capability to produce interactive programs with color graphics and sound. It's arguably the predecessor of all IBM PC games. Which I suppose is pretty cool.

TYLER WITKIN, LEAD COMMUNITY MANAGER, ATX

The first games that I ever played were *Paperboy* and *Sonic on the Sega Game Gear*. I still vividly remember the feeling of gaming for the first time. Minutes turned into hours — I was hooked.

And more to come — this is only half of the responses we got from the CIG staff this month! Next month, same question and the rest of the answers.