

# JUMP POINT

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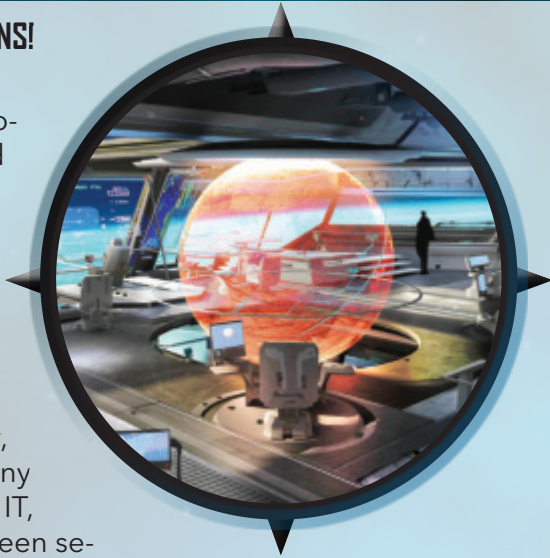
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## GREETINGS, CITIZENS!

This issue marks the first subscriber-driven Behind the Scenes interview, with the guys in IT. I appreciate all the suggestions that you gave me for who to interview, and then the many questions to ask IT, once they had been selected as the target featured team of the issue.



One clarification (for myself, and others): IT isn't the team that actually deals with prepping the game and its updates for download and online play. That's DevOps, and we'll plan on featuring them in an upcoming issue. IT deals with all the tech needs of the company, wherever we have staff, permanently or just for a weekend event. And while they don't get the game into your hands, they do make sure that each in-development version of the game is quickly available to everyone who needs it – over, and over, and over again.

Keep those suggestions coming for which team we should interview next, and keep an eye out for a post in the next week or so requesting questions for May's interview – they help a lot!

I am not ignoring your requests for an interview of yours truly (and Karma's suggestion that Will conduct the interview is definitely a possibility); I will try to make that happen within the next month or two. I still have my doubts about how interesting it will be ... we'll see.

Meanwhile, this issue wraps up our current Chronicles story, by Autumn Kalquist. She's also the bestselling author of the *Legacy Code* space opera series. You can

get a free short story and learn more about her books by signing up at:

<http://www.smarturl.it/AutumnSC>

You can also find her at: [www.autumnkalquist.com](http://www.autumnkalquist.com)

Ben is at his usual prime with the Portfolio and Galactic Guide articles; I think you'll enjoy them. And that reminds me that I have never mentioned the help that Dave Haddock and Will Weissbaum provide every month for **Jump Point**, even when (as today) they are hard at work in the UK. They review every article, especially the lore-based features, and keep it all within canon. Thank you both, sirs!

The new term of the issue for me is "BYOD," which comes up in the Behind the Scenes IT interview. It stands for "Bring Your Own Device," and has to do with people (especially tech folk) providing their own equipment rather than using the equipment supplied to them. That's what I did when I started with Cloud Imperium – I carry a MacBook back and forth between home and CIG, and I don't have one of the monster desktops and double/triple-wide monitors you can find throughout most of the rest of the office. Macs don't have the most familiar OS for CIG IT to deal with, but they keep me just as connected and up to speed as if I were operating a standard Windows box.

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

*David*

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**COVER:**

**CHRIS OLIVIA**

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**CLINT SCHULTZ (X3)**

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**PAGE 49:**

**KEN FAIRCLOUGH**



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# Vanguard Concept



CHRIS OLIVIA: CONCEPT ART

In the beginning, there was the Bulldog:

**Aegis Bulldog-class Twin-Engine Deep-Space Fighter** – Strike hard from a distance! The Bulldog, a recent design from Aegis, has quickly become Earth's premier deep-space fighter. Deep-space fighters are typically used to pursue engagements in outlying areas when support from a carrier is not available. Bulldogs are usually flown by ground- and station-based naval forces, and are widely used by militia squadrons. Specifically designed to operate from planetary bases and engage targets up to a star system's distance, the fighter trades some maneuverability for an extended supply of fuel and munitions as well as basic survival accommodations for a pilot and radar operator. The Bulldog's RIO operates a turret, the ship's missile loadout (optionally) and its highly advanced sensor suite. This distinct scanning array gives the 'Dog a particular advantage

when fighting in and around an obstacle such as an asteroid field or gaseous atmosphere! Finally, the Bulldog is known to be an extraordinarily sturdy spacecraft, with multiple backup systems not commonly found in single-seat ships; stories of Bulldogs limping back to base with a single engine and half their fuselage exposed to vacuum have become common as the battle against the Vanduul has heated up.

**Calix Reneau, Technical Designer**, was responsible for making sure that the new ship's stats (dimensions, crew space, armament, other equipment) were feasible; most of the visual part of his work (pages 4-8) is done with blockouts.

**Gurmukh Bhasin, Concept Artist**, was responsible for the actual design of the ship; its look and feel. His work begins on page 10.



WORKING IN PROGRESS



And then there was **Nostromo1977** (and others; this post triggered close to 300 responses).

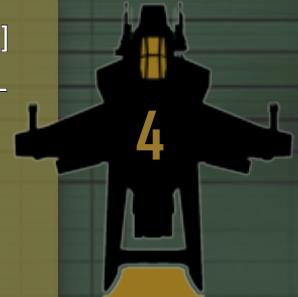
I don't think Aegis Bulldog is a good name for the Deep-Space Fighter (it's not terrible either). It just doesn't fit with the Aegis Dynamics naming convention with ship names like: Avenger, Retaliator, Redeemer, Gladius, Javelin, etc. I also think having Bulldog as a name for both a ship and a weapon is somewhat confusing to players. Furthermore, the name Bulldog does not symbolize long range, which is the primary characteristic of the ship. A name like Long-bow, Viking or even Crusader would be a better alternative. With that said, I hope CIG considers renaming the ship to avoid confusion and to keep in-line with Aegis naming conventions. There are so many great names listed below that would work better (in my opinion) for the Deep-Space Fighter. CIG has shown us time and time again they have an open development process with the community, and if this thread gets enough support, they might take this under consideration.

[Along with 11 other suggestions, he listed the following.]

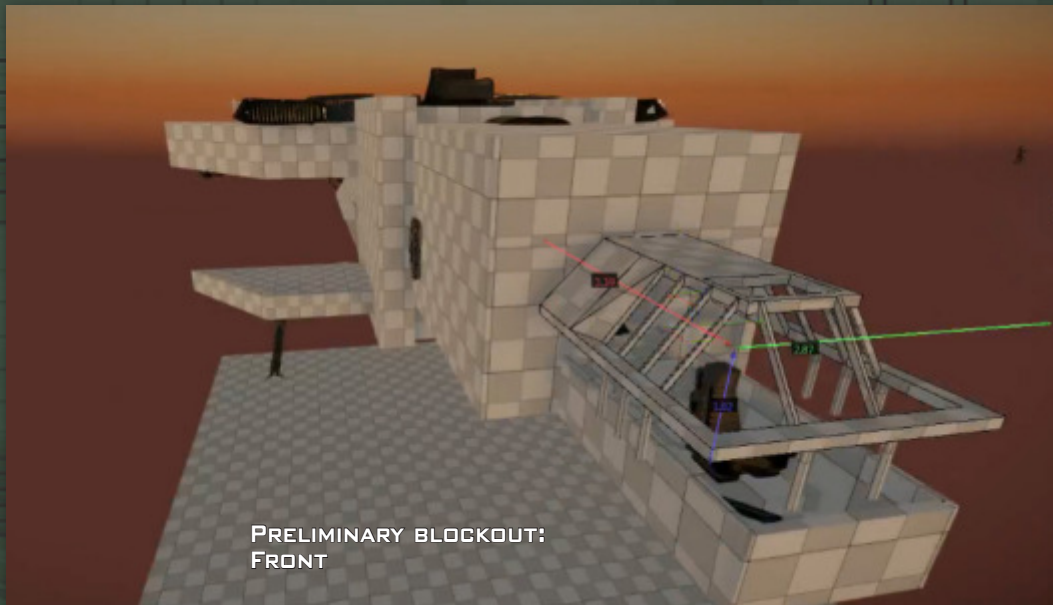
*Vanguard* – fits "Javelin" motif (means tip of the spear, advanced guard)

**Calix** was busy with the preliminary blockout of the new fighter, but also picked up on this suggestion:

**Calix:** I like "Vanguard," personally. So this is what I've got so far. I was thinking the hibernation pods are these coffins in the floor you can sleep in while waiting for someone to come rescue you. Also, I haven't determined how you enter the ship yet. I wanted a kind of Freelancer up-through-the-floor kind of deal, otherwise it'll just be a hatch in that open space near the front left of the ship.



WORKING IN PROGRESS

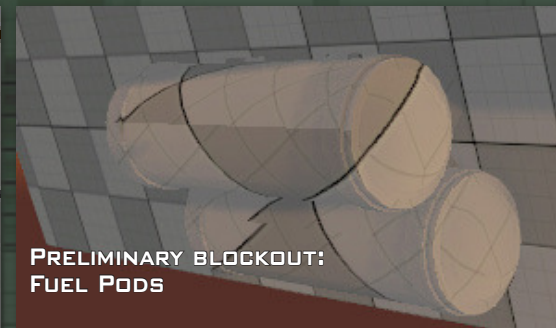


PRELIMINARY BLOCKOUT:  
FRONT



PRELIMINARY BLOCKOUT:  
HIBERNATION PODS





WORKING IN PROGRESS

**Gurmukh:** Has the name changed from the Bulldog to the Vanguard? Is this official? Who makes these decisions anyway? :)

(The smiley face is so Lance doesn't think I am mad when I write my emails.)

Anyway, I am looking forward to seeing the progress.

**Lance Powell, Supervising Art Director:** Gurmukh, why does your smiley face look angry? :)

**Calix:** Vanguard is the proposed new name. It is not official.

[By the next time they met, it was official.]

**Calix:** I'll collect the information on the size and space of things from my initial whitebox test.

Here are the descriptions of the proposed variants.

The Vanguard is the kind of ship that finds itself alone a lot. It can go further and it can do it faster, so it really needs to be able to hold its own long enough to do its job and get the hell out of Dodge. It excels at shorter engagements.

*Strike* (base variant) – long-range strike ship with decent dogfighting potential and plenty of survivability, but suffers if cornered into close range combat.

*Trickster* – gets there first, causes chaos. Equipped for jamming signals, spoofing signals, interfering with comms, it does a great job of drawing attention to itself. Good thing it's also good at running away.

*Bomber* – taking advantage of the long range capabilities of the ship, the bomber trades away pretty much everything else in favor of carrying a lot of hurt, deep into enemy territory. It still has some dogfighting ability, but only after it has delivered its payload. It can't carry a large number of torpedoes, but with its relatively low profile it is best used when a surgical strike can decide the battle.

**Dan Tracy, Lead Technical Designer:** I'm good with the high levels of these variants. You should look at filling out the specs (including the theoretical torpedoes) – default loadout, etc.



**Gurmukh:** This is a good start. I think the idea of this ship being alone most of the time might be wrong. A fleet could possibly have multiple Vanguards working together on the same mission, and they would all be flying together side by side.

I like how the variants are shaping up. They sound like a lot of fun and very different from each other. I can definitely see some of our fans buying all the variants for their fleet because they all serve the attack purpose, but carry out the attack in very different ways. I can see all of the variants in the same battle helping each other out to take down the enemy. The Stealth Scout comes in, scouts out the enemy and relays the information to the team. The Info Blitz (a possible fourth variant) comes in to damage the enemy's electrical equipment and disable the shields so the bomber and strike ship can cause heavy damage and screw up the enemy before they all get the hell out of there.

For the *ejection seat* I would say no, and add a category for escape pod (2-person escape pod). Saying yes to the ejection seat is confusing to me. I think that we can also add some other categories to the ship stats.

*Bed:* Wall-mounted fold-up cot, bottom cot acts as seat when top one is folded up, in escape pod. Yes (2).

*Toilet:* Small, tight, cramped, in escape pod. Yes (1).

*Kitchen:* Small, tight, cramped, space food storage, in escape pod. No.

*Refrigerator:* Small food storage for space food, in escape pod. No.

*Eating area:* Use bottom cot as seat. No.

*Sink.* No.

*Trash Storage.* Yes.

*Storage:* Small storage for a personal items and 2 extra EVA suits. Yes.

*Extra Fuel Tanks:* xxx size on each wing; detachable. Yes.

These are just a few things I can think of adding off the top of my head, but I am sure there are more that can be added that I might not be thinking of. My answers to them might be wrong, but that is what I was imagining for this ship. A small, tight, cramped living/escape pod for 2 as the belly of the ship that can be sealed off on both ends and detach to serve as the 2-person escape pod.

Will this ship have missiles, and if so, how many? I was thinking about the weapons and it seems like we will want something heavy-hitting like a large caliber ballistic cannon or something similar.

I am really excited to start the concept for this ship. Do you think you will have all this info complete so I can get on it soon?

Thanks!

**Calix:** You're right, Vanguards should be able to support each other. By alone, I guess I really meant, "without the fleet." I'll phrase it that way in the future.

I'm also updating the stats. The following numbers are the very, very, very first look at both the fps metrics and the whitebox results. Don't be afraid.

*Min height:* 2.75m floor-to-ceiling (fps metric)

*Doors:* 2.5 m H, 1.5m W (fps metric)

*Engine crawlspace:* 1mx1m entrance, 1.5m W x 2.2m deep x 1.75m H walkable space when inside.

*Bed (unfolded):* 2.4m L, 1.15m W

*Cockpit:* Whitebox 1.75m W x 3.26m L x 2.5m H; walkable 1.75m W x 1.9m L x 2m H

Cockpit chair slides forward 1.3m

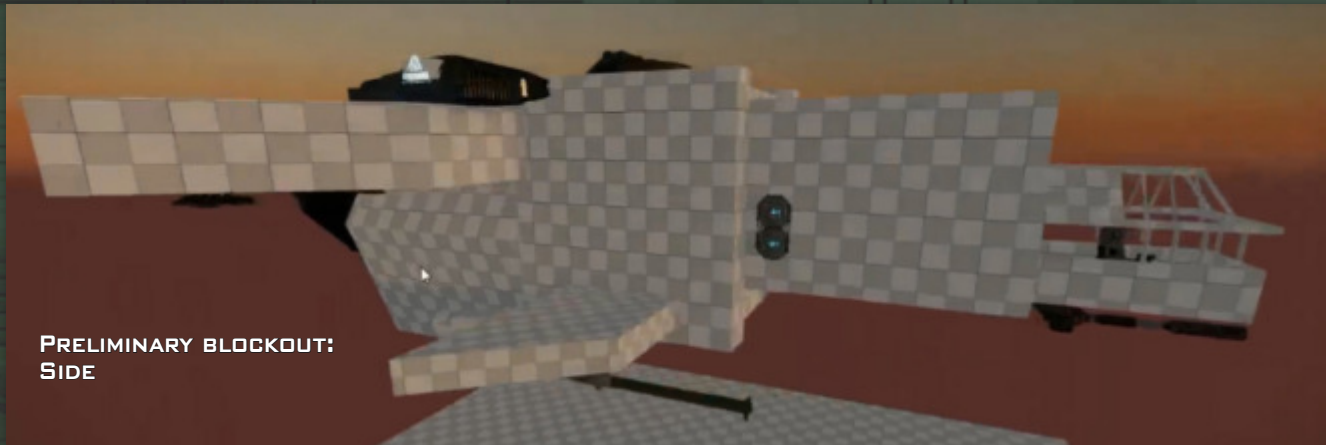
*Middle Pod:* Whitebox 2.75m W x 4m L x 3m H; walkable 1.9m W x 4m L x 2.2m H

*Turret Section:* Whitebox 5.20m W x 5.29m deep x 4.19m H (to make room for going up to the turret or crawl into the engine space); walkable 2.3m W x 3.5m deep.



WORK IN PROGRESS

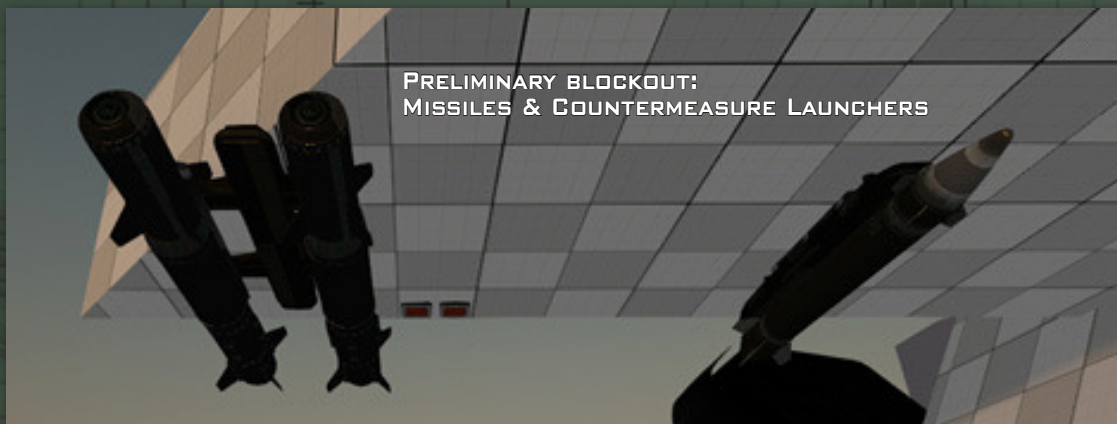




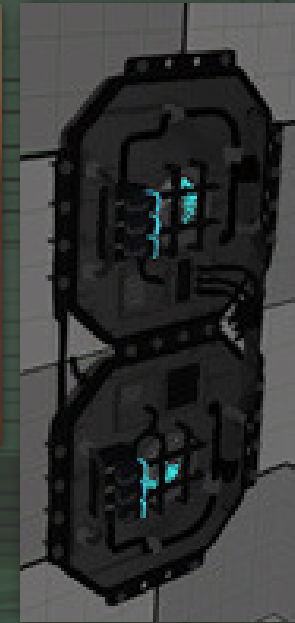
PRELIMINARY BLOCKOUT:  
SIDE



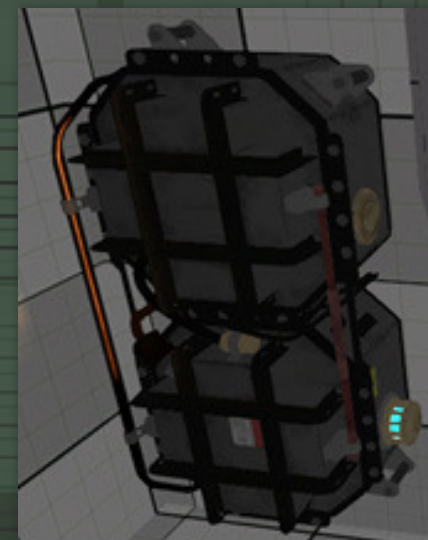
PRELIMINARY BLOCKOUT:  
COCKPIT



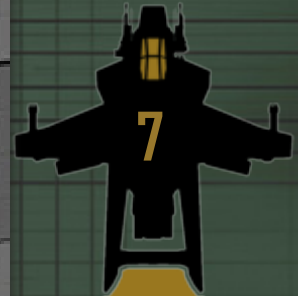
PRELIMINARY BLOCKOUT:  
MISSILES & COUNTERMEASURE LAUNCHERS



PRELIMINARY BLOCKOUT:  
SHIELD GENERATOR (EXTERIOR)



PRELIMINARY BLOCKOUT:  
SHIELD GENERATOR (INTERIOR)



WORKING PRIORITIES



**Calix:** I managed to reach the guys setting up these metrics and have gotten some clarification – those metrics are definitely for spaces intended for more classic level design. The small ships can be designed to accommodate only one person, so we can push the numbers around a little bit to make it be appropriately cramped.

*Minimum crouch space:* 1.5m H, 1m W

*Width for passing another character:* 2m W

*Power plant dimensions:* 1.8m\*0.8\*0.8

*Cooler dimensions:* Internal access panel, 1.375m W\*0.375m H; external, 2.5m W\*0.5m H\*0.5m D

*Engine dimensions:* Internal 2m\*0.75m accessible; external 0.5m\*1m\*2m (if flatish like the Avenger) otherwise equivalent volume

*Bed:* 2.4m L, 1.15m D

*Quantum Drive dimensions* (Quantum Drive is a subcomponent of engines, and is accessed by opening a panel on the engine): 1.25m W\*0.75mH\*0.25mD

*Turret dimensions:* connecting hardpoint 2m\*2m

*Middle pod dimensions:* 2m W walkable

Some considerations for the generation of the modules:

- *Rocket Turret* module uses a lot of the space in the tail for the reload mechanism, filling in the entire space of the armory
- *Cockpit Cowl* reduces visibility from the cockpit. The white-box version aims to effectively negate peripheral vision or any benefit from TrackIR or Oculus Rift. This is flexible.
- *Bomber Bay* greatly reduces mobility in the center pod, forcing characters to crouch and preventing them from moving past each other. The bombs are deployed through a hatch, either in the top or bottom.
- *E-War Pod* is a glowy tangled mess of panels that make up a standing 'seat.' A player would access these panels, whip up their custom cocktail of jamming, angel ECM,

comms hacking, and other mischief, and then could fire these programs off from the cockpit or the turret (although it would lose granular control when not fired from the e-war console seat).

Also added are 2 *battery packs*, which should be placed to accompany the power plants, and are sized 0.5m W\*0.375m H\*0.25m D

And a *jump drive* in the engine crawlspace, 0.5\*0.5\*0.3m

**Calix:** I'm going to take a bunch of screenshots of the whitebox to accompany these numbers, so they make sense and have context.

**Gurmukh:** The way you set up the white box page is really helpful for seeing and understanding the parts that are going into the ship. The overall white box design of the ship doesn't really help me too much, but I totally understand how it helped you think about all the parts that are going into this ship and the way you broke everything out, and showing the dimensions visually makes things very clear for me. Thanks for doing this!

**Will Weissbaum, Writer:** Calix wasn't quite sold on Vanguard Domino, so here are some alts if they are needed:

- Vanguard Rogue
- Vanguard Phantom
- Vanguard Gambit
- Vanguard Intrigue

**Ben Lesnick, Senior Community Manager:** Now you're just naming X-Men. :)

**Lance:** Dammit. *He was!*

**Will:** Hey, we are already selling an Aurora and a Phoenix. Figured we could use a few more.

**Lance:** I'll keep my lip shut on the whole thing if we can name a ship The Juggernaut, or Colossus.

**Will:** And maybe have the Xi'An run a school for the gifted ...

**Lance:** We call them Special Needs, but whatever. :)



WORK IN PROGRESS





WORK IN PROGRESS

### **Reference Art**

**Lance:** This is how we should approach the ship – it's close to what you have now, but with more overlapping details, and animated parts.

**Gurmukh:** Yes! I like the idea of this.

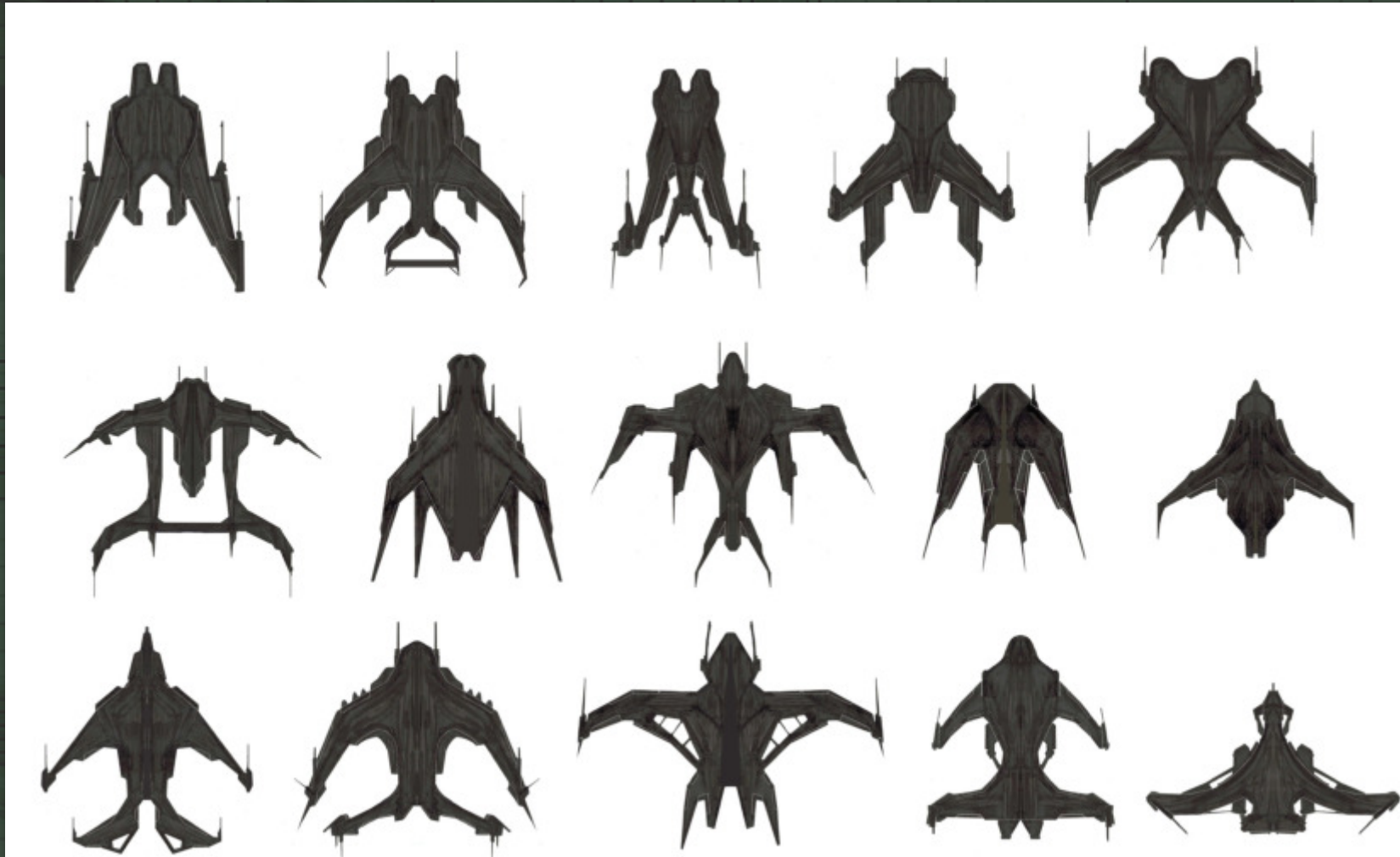


Most of the commentary in this article is composed of remarks made as the ship design developed. However, there are also a few comments from Gurmukh, looking back at the design process. Those comments are in black.

**Gurmukh:** When starting a new concept I really like to keep things loose and simple. I take a few hours to sketch a bunch of different silhouette studies with a brush pen to quickly explore different options for the ship. I really like to do these by hand and stay out of the computer at this stage to keep the ideas flowing freely and to explore different ideas.



WORK IN PROGRESS

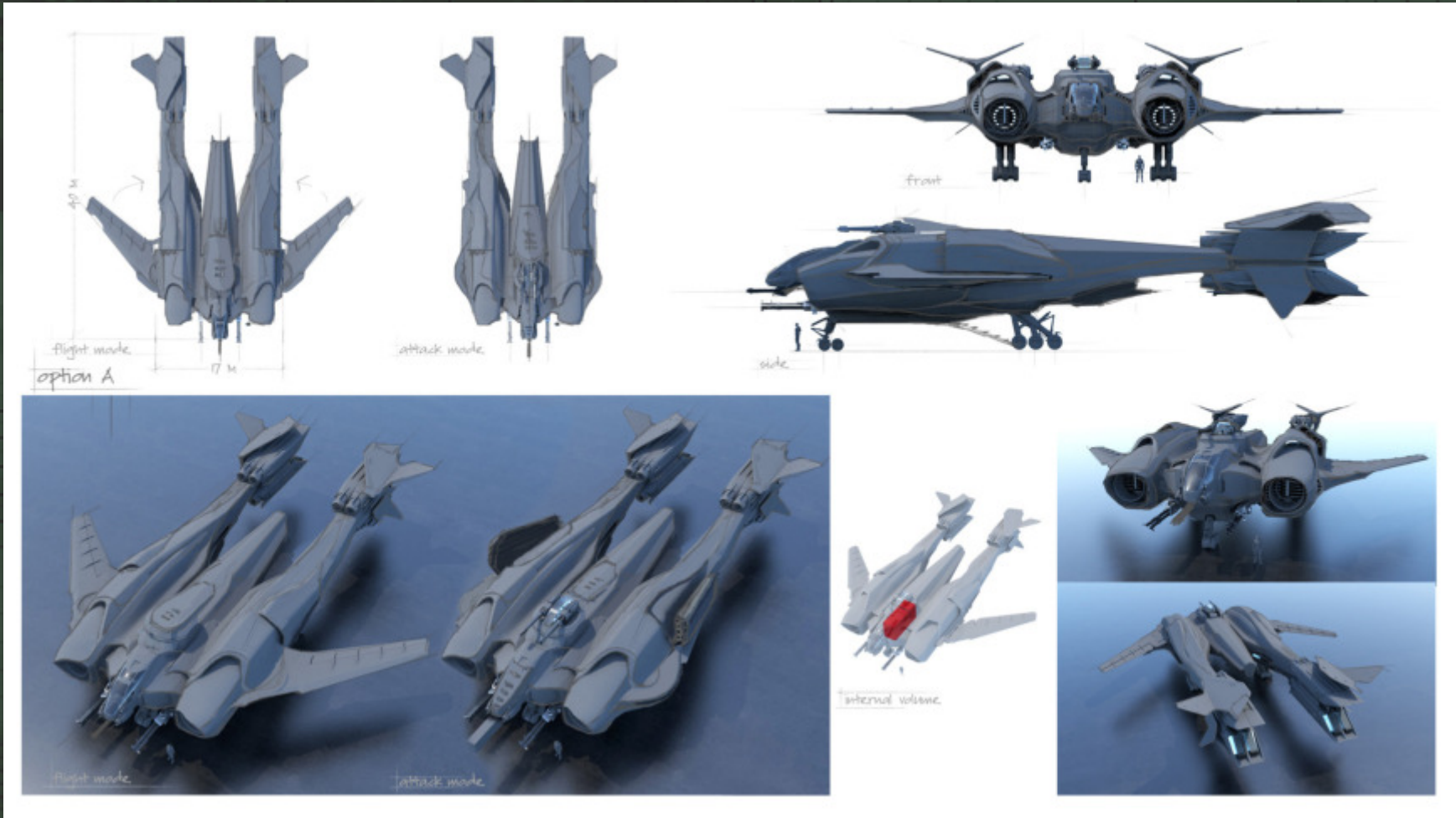




**Gurmukh:** Option A is based off of the P-38 Lightning, mimicking its two large engine nacelles with a smaller body in the middle. One of the main ideas for this ship is to have flight mode and fight mode, so that the ship transforms: things fold up and contract, or open up and extend out. This version has folding wings, a retractable turret, retractable weapons and more.

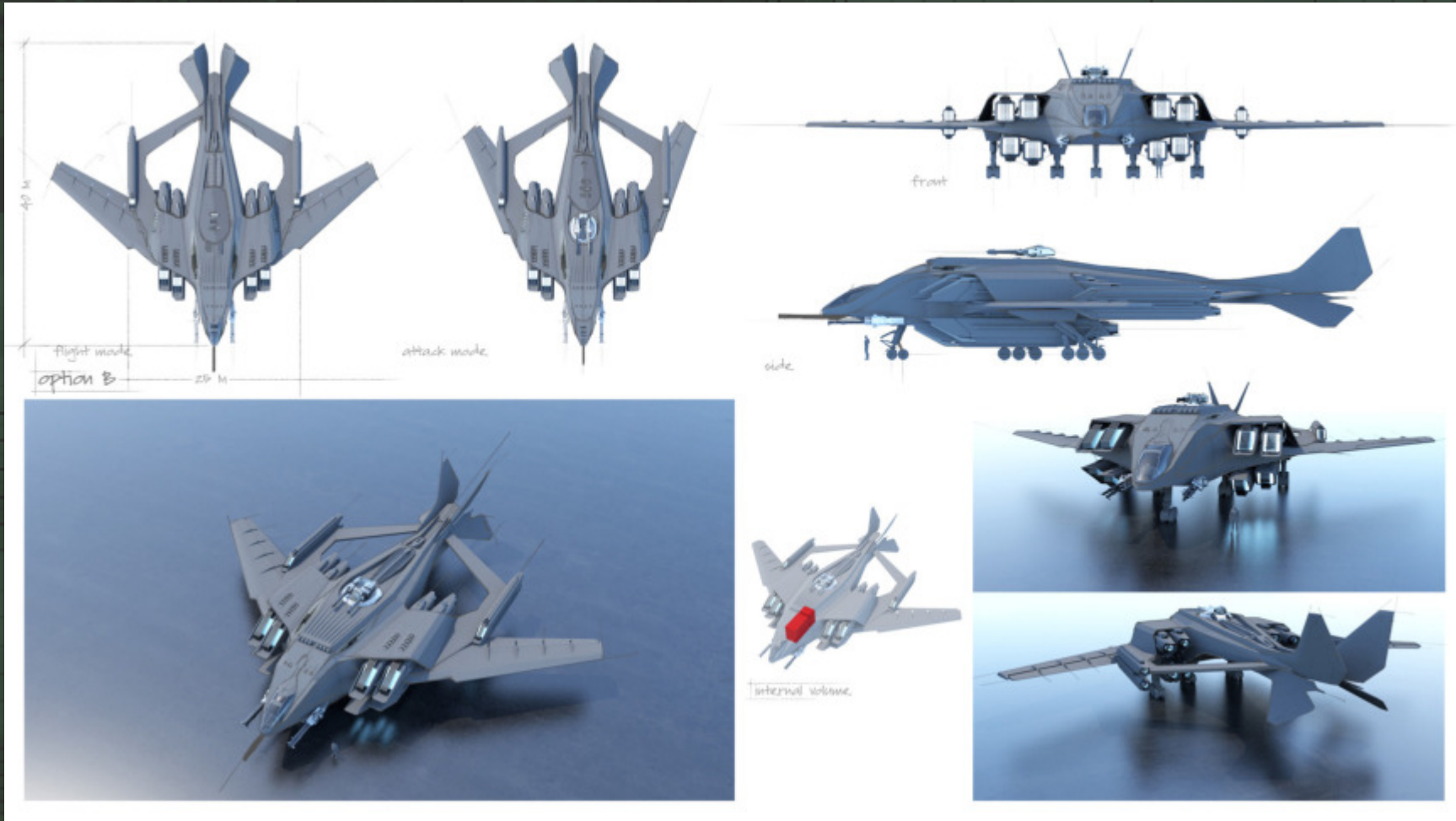


WORK IN PROGRESS





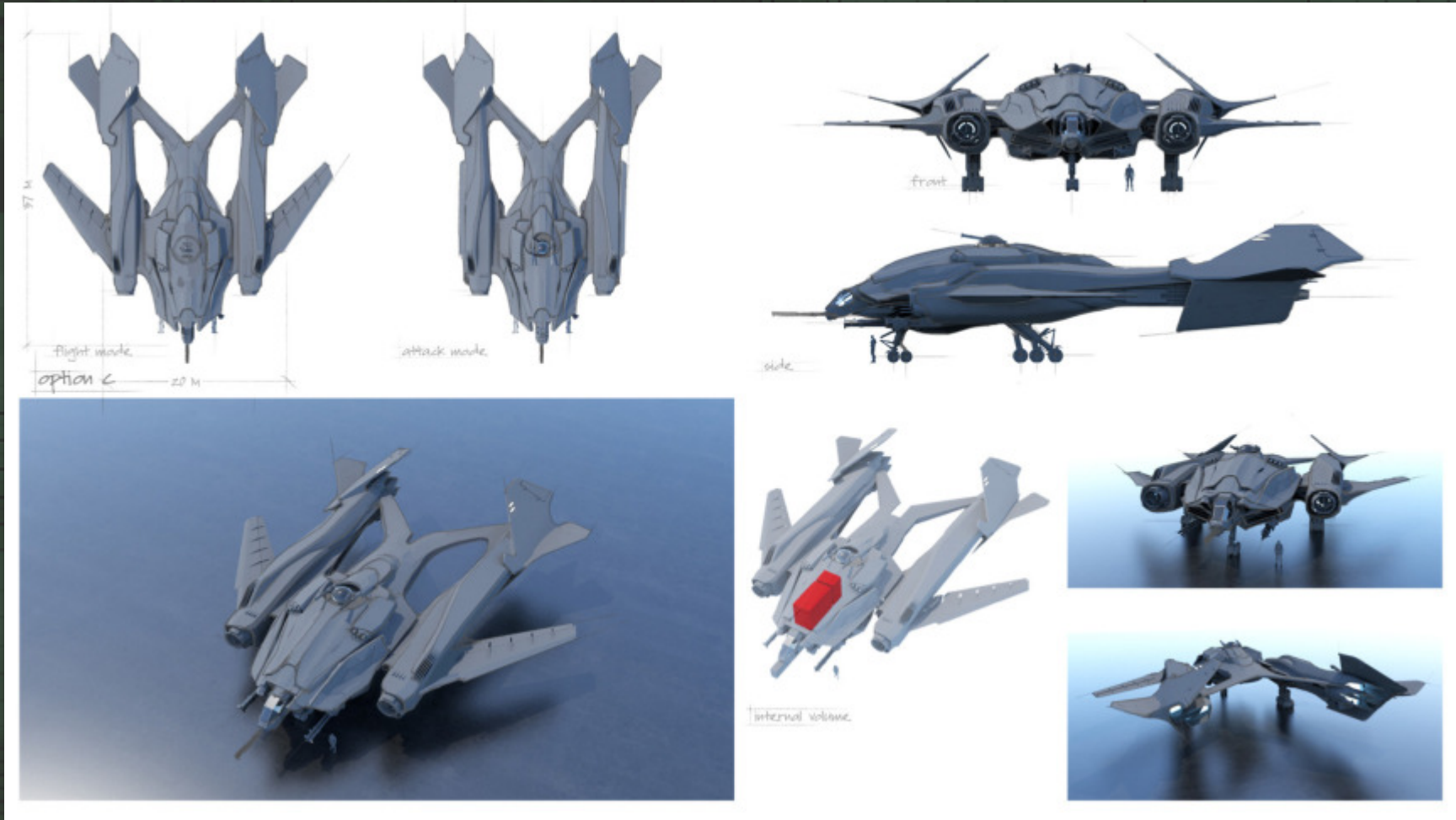
**Gurmukh:** Option B is based off of a stealth B-1. This option also has a retractable turret, folding wings and more.



WORK IN PROGRESS



**Gurmukh:** Option C is also based off of a P-38 Lightning and has the retractable wings, turret, etc., as well. All three options were presented to CR for feedback and to help choose a direction. CR liked all 3 options and said they would all make really cool ships, but option B felt more like a drop ship instead of a deep-space heavy fighter. CR liked the body and back of the nacelles of Option C and the front nacelles and wings of Option A, and suggested we merge the two to move forward.



WORK IN PROGRESS



**Gurmukh:** Here is a screenshot of the Vanguard with the proposed weapons. If you think it has too many weapons, we can have a quick discussion with CR to see what he thinks. The number and placement of the weapons are from the comments we discussed when Lance and I presented the Vanguard massing options to CR. It would be cool to figure out which sizes sound right and which type for each weapon. The nose gun is going to be built in like the P-38 Lightning reference and similar to what Elwin is doing for the Merlin right now. Please let me know if you have any questions for me.

**Dan:** I'm worried about the change in the Vanguard weaponry. From this quick screenshot that Gurmukh has, it changes the loadout in the following manner:

*Before:*

- 1 x Size 4 Railgun
- 2 x Size 2 Laser Cannons (long range)
- 2 x KLWE Laser Repeaters (Manned turret)
- 8 x S2 Missiles

*After:*

- 1 x Size 4 Ballistic Gatling
- 4 x Laser Repeaters
- 2 x KLWE Laser Repeaters (manned turret)
- 12 x S2 Missiles
- 36 (+36 reload) Rockets

This is a pretty drastic change, basically making this thing into a gunboat. In terms of weaponry, even the Constellation doesn't match. The main idea of this ship was to be a strong long-range engagement ship that can travel far from wherever it launches, with a high fuel capacity. I worry that we're detracting from that design and eliminating the draw for the "Trickster" and "Bomber" variants.

How about we do this ...

*Strike (Base)*

- 1 x Size 4 Ballistic Gatling (nose)
- 2 x Laser Repeaters
- 2 x KLWE Laser Repeaters (manned turret)

12 x S2 Missiles

*Bomber (2nd variant)*

- 1 x Size 4 Railgun (nose)

- 2 x Size 2 Laser Cannons (long range)
- 2 x KLWE Laser Repeaters (manned turret)

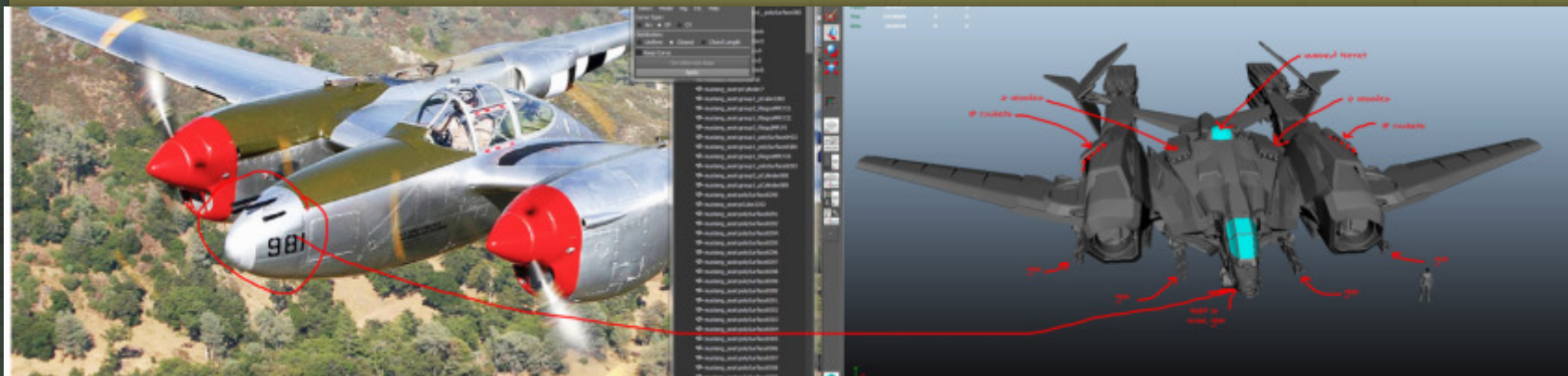
- 2-4 x S5 Torpedoes
- 36 (+36 reload) Rockets (wings)

**Chris Roberts:** I think the weapons got doubled up by accident.

The idea was to not do a Gatling on the nose (been there, done that) but have, say, four fixed high-rate-of-fire lasers sticking out of the nose (nod to the P38) and then have two Size 2 guns further out on the wings (and not also keep two on the inside). Nose also needs to be bigger - it's still looking too much like a dropship in the current oversized canopy configuration.

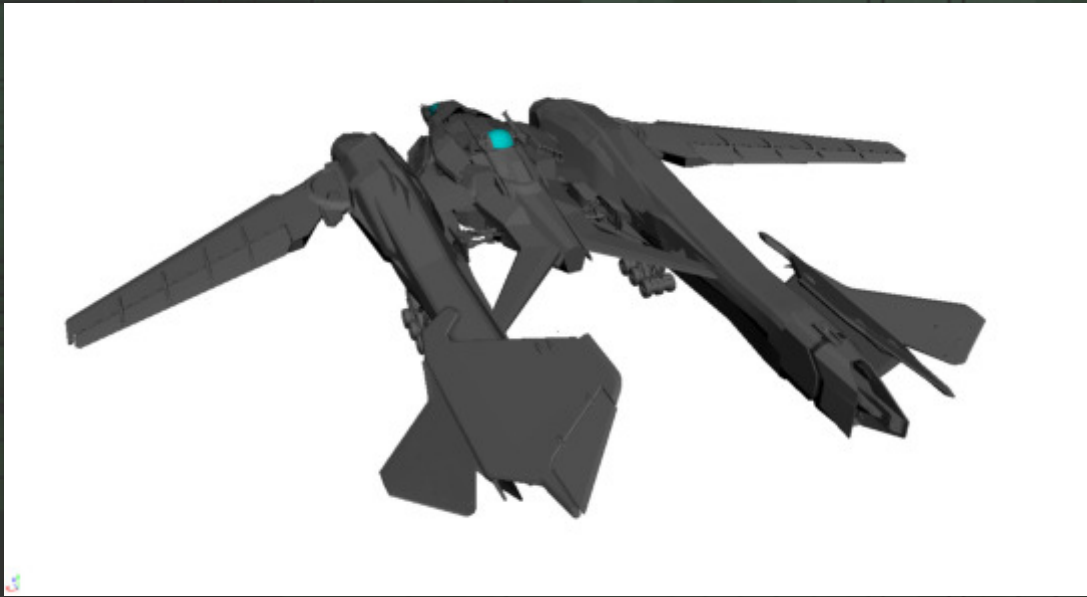
I would go with either missile or rocket loadout from the central pop-up launchers - I would lose the rocket launchers on the main engines.

Also not sure about the back of the rear engines with the extra nozzles - (set of 4 on each engine nacelle). I think I would have the back of the engines be more like the other twin engine option.

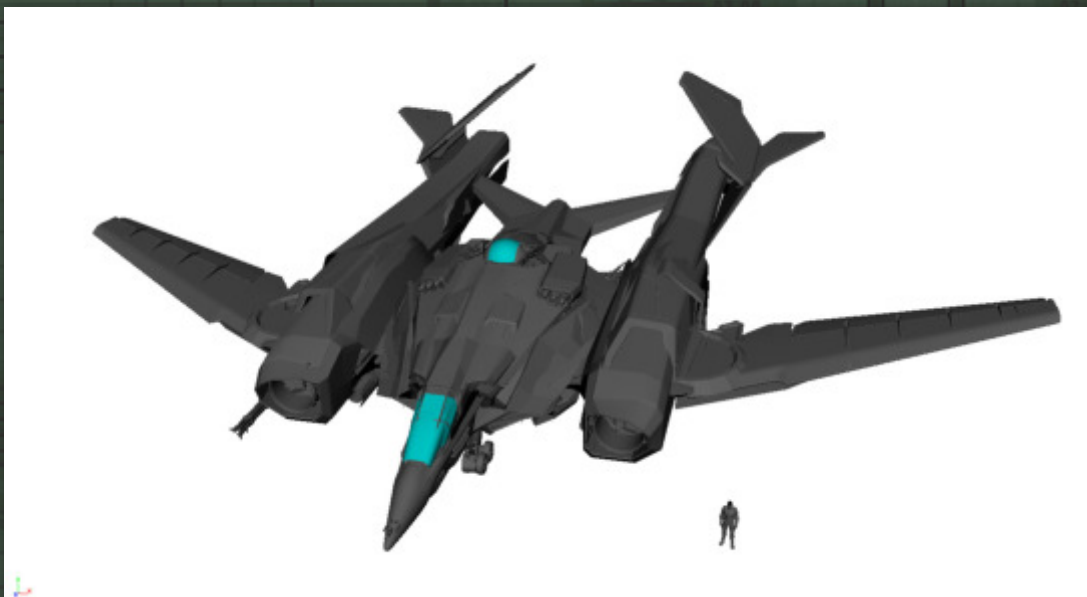


WORKING IN PROGRESS



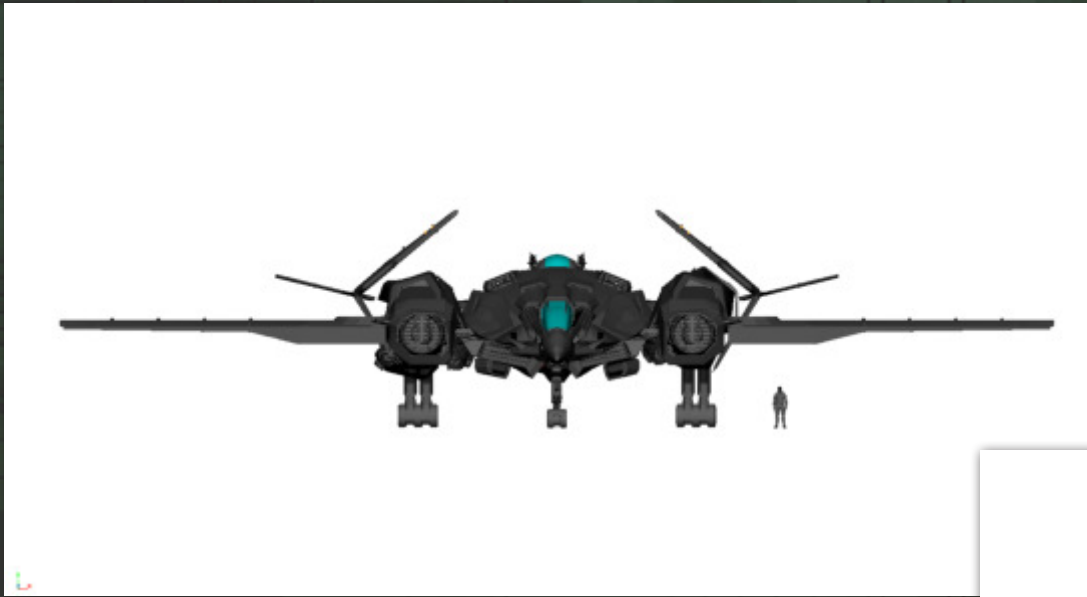


**Gurmukh:** Here is the updated version with the nacelles and wings of option A combined with the body and back of the nacelles of Option C, plus an updated cockpit shape for the ship. The cockpit shape was one of the hardest parts of the ship to get right and took many different attempts. For awhile, every time we showed something, the feedback was that it felt too much like a drop ship.



WORK IN PROGRESS





**Gurmukh:** In this option we tested out a more pointy shape to the nose, more similar to a modern day fighter jet. In my opinion, it made the ship look too whimsical. We decided to ditch that idea and keep testing other possibilities.



WORK IN PROGRESS

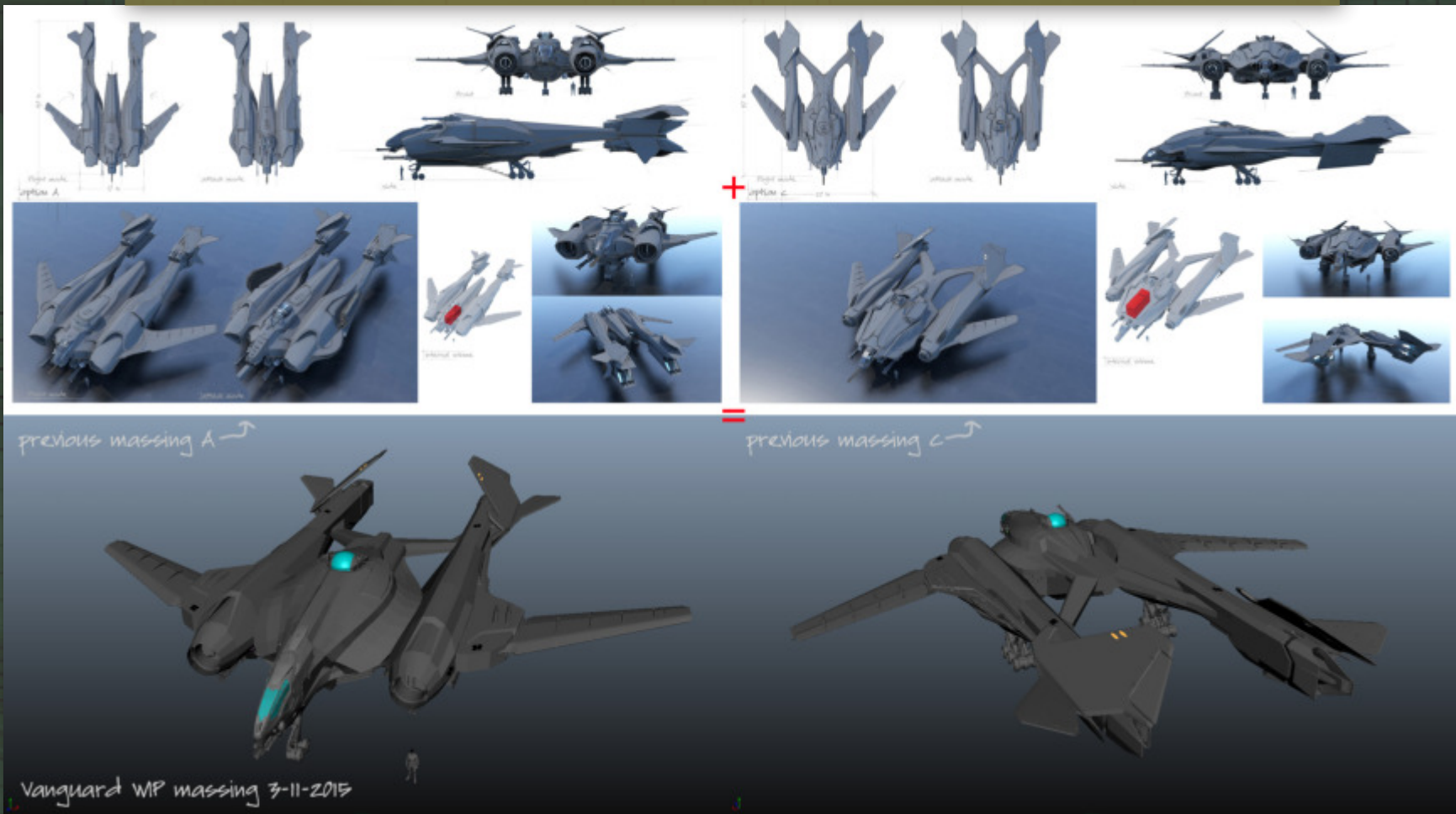


**Gurmukh:** Please find an attached image with the two Vanguard massing sketches we liked from the previous (at the top) and the current WIP massing (at the bottom). It is basically the two ships combined and refined to make the current ship.

I may have misunderstood your previous comment about the back engine nozzles. I thought the idea was to go away from having the 4 exhaust nozzles and make it one larger one, but maybe there was

something else that needed to be changed that I didn't catch.

I am currently working on refining and creating the final details for the entire ship, adding armor and building everything so it subdivides properly, so it will look beautiful in the final renders – so working in a design change for the nozzles at the back of the nacelles should be no problem.



WORKING PROGRESS



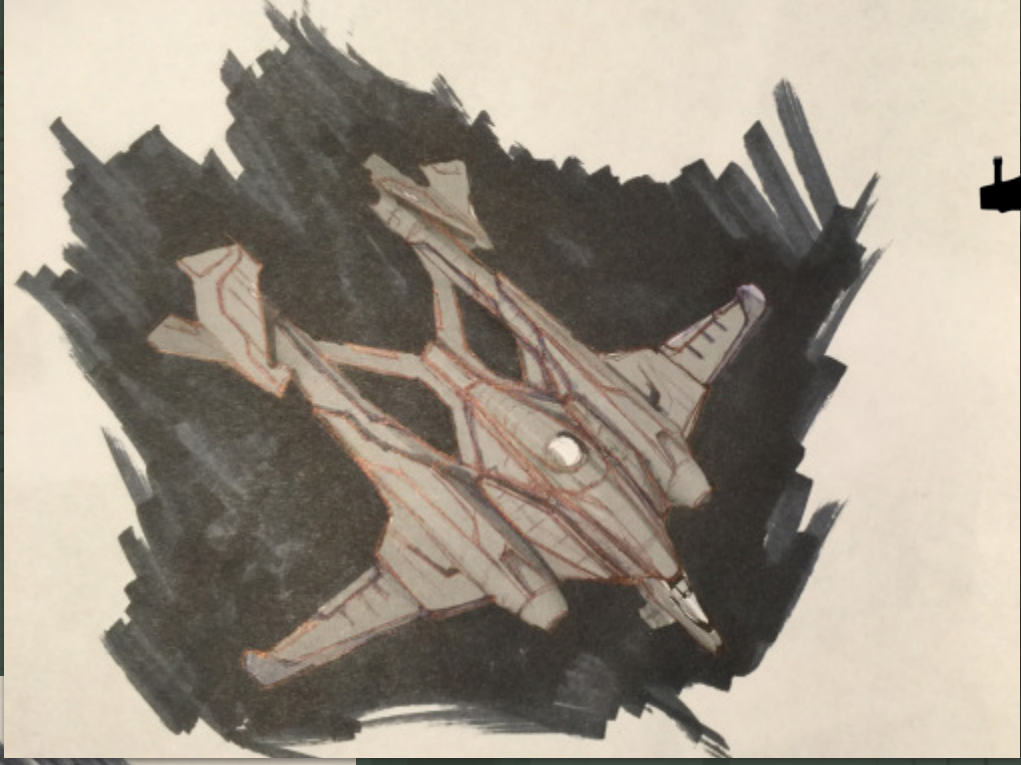
**Gurmukh:** As I started to clean up the ship after the massing point and tried to take it to a cleaner final model it started to lose its charm and excitement. I had hit a creative roadblock that held me back for several days. At that point I printed out a  $\frac{3}{4}$  view of where the ship was and Elwin and I sketched over the image to test out a few ideas on how to move forward. Leaving the computer behind and testing out ideas by hand proved very useful at this stage, and really helped to move forward.

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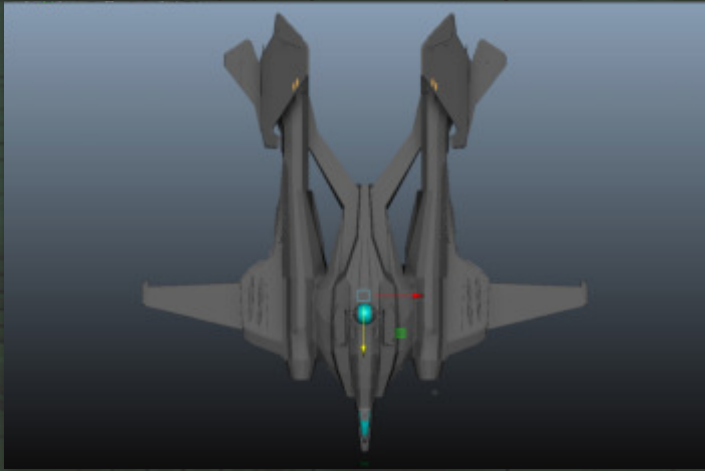


WORK IN PROGRESS

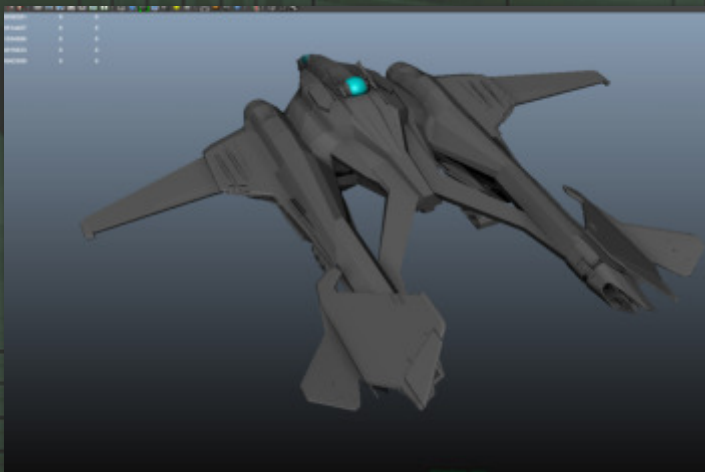




WORK IN PROGRESS

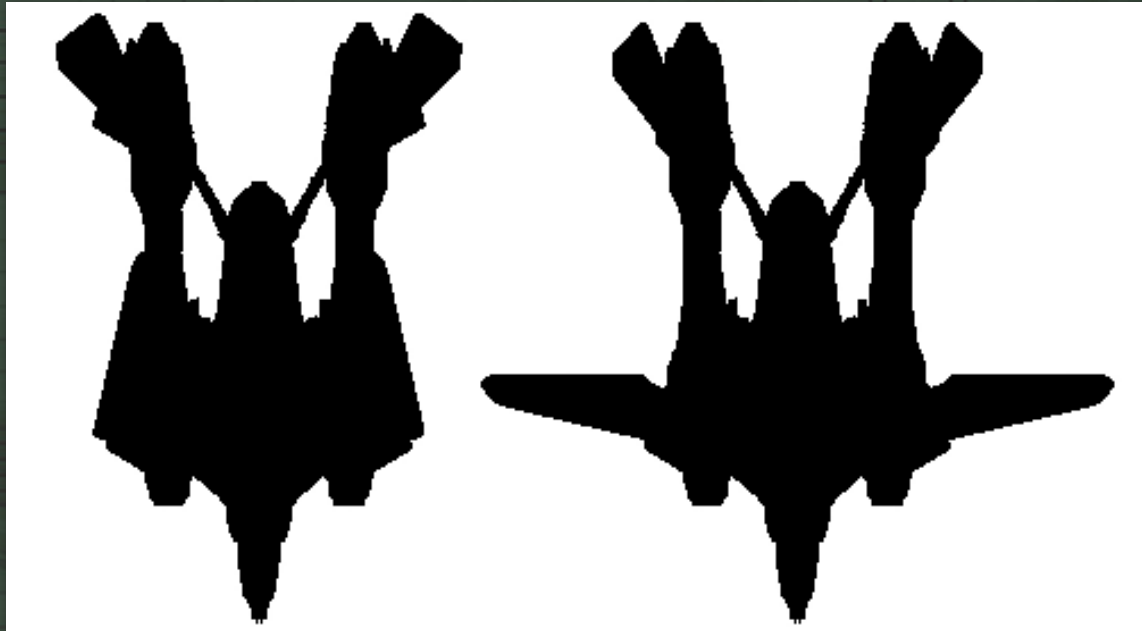


**Gurmukh:** This is the first step of progress after the sketches. The body and wings started changing.



WORKING IN PROGRESS





**Gurmukh:** As the design continued to evolve, the nacelle design changed, front intakes were modified, and the top of the body where the turret is was adjusted.

[this page and next page]



WORK IN PROGRESS



WORK IN PROGRESS



**Gurmukh:** Here is the description for the four beauty renders I am hoping you can do. The geometry is temp geo and I will send you the final geo next week, but for now you can get started setting up the render scenes and drop the final geo in for the final renders.

*Image 1.* This is a *Top Gun* kind of render with a few Vanguards on a runway and a pilot walking towards the camera. The environment is dusk lighting, the engines have a glow on the interior, and the exhaust is blurring the background behind the first ship.

IMAGE 1



WORKING IN PROGRESS





IMAGE 2



image bottom view of Vanguard flying by in deep space background and flame exhaust trails out of back thrusters

Image 2. This image is of the underside of the Vanguard flying through deep space, with cool engine exhaust out the back. This ship is a deep-space heavy fighter, so we really want a background that makes you feel like you are somewhere far away. I would leave planets out of this image, and probably put a really cool nebula or something.

Image 3. This image is of Vanguards taking down a ship. You can have some missiles with smoke trails and lasers shooting the ship with lots of explosions. At the moment there are three ships taking down a larger ship, but we might want to go with one Vanguard taking down a Vanduul ship, instead. The background for this one should also be a deep-space image. Probably leave planets out of this one too. The battle should take place in a Vanduul part of the 'verse, if that means anything.



SHIP by  
GURMUR '15  
ELWIN BACHLER



WORK IN PROGRESS



*Image 4.* This image is of a Vanguard under attack, with explosions from behind and pieces exploding off of it. The Vanguard is known to be able to take a decent beating and still limp home, so I want to show it with some pieces coming off but it is still able to fly home.

Let's talk tomorrow on these when you have a chance, and I will be here all week-end for any questions you have or if you need anything from me.

**Chris Olivia, Freelance Artist:** Sounds great!

*Image 1.* Do you know what pilot character / asset you want to use, or just have me come up with something? It might be good to send me which character / uniform you want to use (asset or image for reference).

*Image 2.* Sounds good.

*Image 3.* Yeah, just let me know how many Vanguards are in the shot ... and which Vanduul ship they are taking down (and again, if there is reference or asset for said Vanduul ship).

*Image 4.* You don't necessarily need to see a ship in BG firing on Vanguard, do you?

Also to verify, the final asset you send me will be untextured, correct? I assume you will just provide paintover texture reference and/or material reference for me to match?

**Gurmukh:** Thanks for the help, Chris. I think the best way to approach this is to have you continue moving forward with the renders, creating the backgrounds and setting the scene up, and then I can eventually pass you the final model for you to drop in and render.

*Image 4.* You don't need to see any ship in the background. An explosion behind with some pieces flying off should be good.



WORK IN PROGRESS





IMAGE Vanguard taking a punch and limping away from battle, parts flying everywhere with a cool space background.

IMAGE 4

I will send you the untextured model just like we did for the Carrack renders you helped out with. Please send me a Photoshop file with all the layers for each render. I will definitely need an ambient occlusion pass and probably a few different paint color passes that I can comp together (I am still figuring out the colors at the moment and will let you know later). This is an Aegis ship, so the materials will be pretty similar to the materials of the Retaliator, but the colors will be different. I am thinking we will probably go with dark grey/blue, light grey/blue, white or light grey and orange and yellow accent. If you send me the Photoshop files at 16 bit, I can adjust the colors on my side as well. I can add all the logos and decals, etc., after you take the images as far as you can. We will also need a few small lights on the wing tips and maybe a few others, and I will model those in down the line. If you send me the first pass of the images, I can mark up which parts glow, light, etc., and we can work from there.



WORK IN PROGRESS

WORK IN PROGRESS

ACTIVA



**Gurmukh:** Here are WIP OPTION A and OPTION B and screen capture WIP animation. Everything is still a work in progress, but I wanted to send you this to get your direction on a few things before taking it to the finish. The wings have been updated, the weapon sizes have been brought up, the gatling gun is under the nose with four lasers in the nose as well, and a lot of progress has been made overall.

*Option A* has a change in wings at the back of the nacelles and a much bigger cockpit nose.

*Option B* has a bigger cockpit nose as well, but it is slightly smaller than *Option A*.

The cockpit options are still a work in progress and are meant to show more of a direction on massing before I move forward with one and detail it out a bit. In addition, there is still a lot of clean-up and slight design tweaks to do here and there, but the ship is feeling pretty good so far.

The WIP animation shows how this ship transforms. Elwin did an amazing job animating everything folding up. We will definitely be rendering out an animation video for the website.

I am looking forward to hearing which cockpit direction to go in.

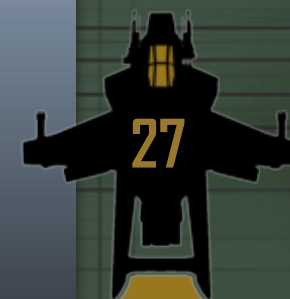
**Chris R:** Option A all the way! Back fins are much cleaner and I like the beefier nose!

Animation is SUPER COOL! (Elwin was always an animation rockstar with his TNGS work.)

I think people will dig this.

I think we lose the underwing guns, though, as I think we have all our guns on the nose and top turret from our specs – we could have underwing fuel pods or additional missiles / bombs on the wings, too.

**Gurmukh:** Sounds good to me! We will work in those last few changes, clean everything up a little, and start to work on the final images and animation.



WORK IN PROGRESS



ANIMATION IN ACTION



WORK IN PROGRESS





V A N G U A R D

**Gurmukh:** Here is a render of the almost finished WIP top view.

**Chris R:** I think we have a gimbal mounted Size 3 Gatling on the nose (Dan – do we have a bigger Gatling gun that the GT-220?) and 4 lasers on the nose (Gurmukh, have you embedded Size 2 lasers?)

On the crew front, do we have room for more than two? So a third passenger or perhaps radar op / bombardier?

**Gurmukh:** We have a Size 3 Gatling gun on the nose, and Size 2 lasers in the nose. The laser weapons cannot be swapped out, since they are built into the nose (similar to the Gatling gun in the Merlin). We have Size 2's on the turret, 4x Size 2 missiles on each side and 2x Size 4 bombs under the nacelles.

Currently the interior space supports enough room for two crew, but there is a decent-sized gap between the walls of the interior space and the outer shell, so we can try to make enough space for a third person if you want. I will be working on the interior next week, so just let me know what you want to do and I can work it into the design.

**Dan:** We have the proposed GT-300 Series (320 and 330, which are S4 and S5 respectively).



WORK IN PROGRESS



**Chris R:** I like having a gimbaled GT-320 or a fixed GT-330 on the nose of the Vanguard – it would make it different and more powerful than the Hornet (which has 2x GT-220s). How do we communicate this – maybe just lose the ammo box and scale up the gun? Also, let's make sure we put a size box on there before we commit to anything to make sure it won't look ridiculous with a S4 or S5 weapon on the nose.

**Gurmukh:** Elwin and I are finishing up one render each right now, and then we should have everything complete. I think the best option will be to scale up the weapon we already have in the renders, or keep them the way they are. We won't be able to put in a different weapon for the renders. I think we could also leave it the way it is and suggest that you can mount up to a Size 5 weapon. One other option would be to show the nose with different weapons mounted, and render them out as an ambient occlusion render that shows the different possibilities.

**Gurmukh:** We ended up going with a different Gatling gun that isn't in these renders. The gun we ended up using is from the Apocalypse Arms Death Series, which was conceived by Omar Aweidah. This gun will be used when the in-game model of the ship is built.

**Chris R:** Works for me!

**Gurmukh:** This feels much better!

**Travis Day, Associate Producer:** This ship came out looking really sick. Well done, guys, I am impressed!



WORK IN PROGRESS





## FUEL PUMP

### Refueling Options

There's an ancient Human axiom that states: you ain't going nowhere on an empty tank. In a galaxy where high-tech weapons manufacturers compete to build ever-more scientifically advanced laser systems, and jump drive scientists discover new ways to push molecules across the universe at faster-than-light speeds, it's somewhat reassuring that ultimately nothing is possible without good, old-fashioned electrically charged hydrogen atoms. From powering all shipboard systems to serving as the rocket propellant for maneuvering thrusters, every ship in space today needs the same basic fuel in order to do anything of value. Hence, the



## CRY-ASTRO STATION

rise of the ubiquitous service station, where ships can refuel and rearm.

With tens of thousands of ships in for repair and refueling around the universe at any given moment, it was more a question of when than if an organized system of service stations would come into existence. While there are countless independent refueling options (including self-refueling equipment found on many ships) there are three companies that have come to define the standard depot: stately Fuel Pump, upstart Cry-Astro and alien newcomer CTR. While most pilots view fuel, arming and repair as an 'any port in the storm' situation, familiarizing yourself with possible options ahead of time can save Credits and time.



UNIVERSITY



## Fuel Pump

Last of the old guard is Fuel Pump, a chain of service stations started in 2665 whose installations now dot the known universe. Often referred to as 'retro themed,' Fuel Pump's 'good old days' vibe, perfectly capturing Croshaw culture in the 2690s, has been carefully cultivated with an eye towards keeping it a relevant part of Human culture rather than simply a disposable waystation. The Fuel Pump corporation goes out of its way to sponsor family-friendly activities to reinforce this impression: their name and logo can be found everywhere from SataBall courts to racing teams, giving them a wholesome, active reputation.

While the days of the free spit-shine have passed, standard Fuel Pump stations are still built around the concept of offering traditional full-service refueling/rearming options. Fuel Pump prides themselves on offering a higher class of technician, with individual stations having at least one professionally trained repair crew leader on site at all times. While other companies generally focus on standard maintenance and do-it-yourself options, Fuel Pump continues to offer everything from tune-ups to ground-up space frame rebuilds. Additionally, the company offers

## Cry-Astro Station

Where Fuel Pump represents the old guard, Cry-Astro is the upstart reaching for the growing market of younger star pilots: the Shark Cola to its Stanley WebbDrink, if you will. Where Fuel Pump offers a full service solution to everything, Cry-Astro offers a cheaper, hands-on alternative while promoting the question: shouldn't you be the one making the decisions about the ship that's keeping you alive? Walls of do-it-yourself components and berths for self-installation are a common sight at Cry-Astro service bases. While technicians are available to perform work,



# FUEL PUMP

'safe space' tractor towing, but will not leave UEE insurance zones for any sort of repair or recovery operation.

Fuel Pump is also known around the Empire for its annual 'Fuel Pump Ship' toy event, in which a different toy spacecraft is issued every August 10th in honor of the chain's founding. The initial issues represented traditional fueling ships, such as the Starfarer and Hull D, while recent issues have been more action-oriented spacecraft (such as a military-style Hornet) presented in Fuel Pump livery. Fuel Pump ships remain a favorite of both children and collectors.



# CRY-ASTRO STATION



THE  
EMPIRE  
OF  
THE  
FUTURE



pilots who visit a Cry-Astro are encouraged to take part in the process rather than sit in an uncomfortable waiting room reading years-old issues of Star Digest.

Another well-known offering at Cry-Astro is the food. Many Cry-Astro stations serve what has become known as 'rubber meals,' a vast menu of fast food options ranging from comfort favorites such as Earth macaroni to simplified takes on things such as a Davien Dark Potato Screw. Cry-Astro's menu is fully automated and all food is robot-produced. Most reviewers agree: it's not good, it's not good for you ... but it's a comfort to find familiar food ten jumps from home.

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## CTR

Owned by the Jysho Corporation, CTR is the one of the first fully Xi'An-owned businesses to open and operate in UEE space. If nothing else, this would be enough to distinguish the company from its Human competitors ... but the stations do indeed offer a distinctly different level of service. Xi'An culture prides itself on efficiency, and repair operations conducted by CTR are a prime example: in a study, researchers found a 23% improvement over Human companies in terms of repair speed, with very little differential in terms of quality.

Those familiar with Xi'An ship design (such as the increasingly popular Khartu Scout) will find no surprises in the overall layout of CTR locations: they feature a clean organic design with distinct spindles and ribs for different service options. CTR hires Human customer service agents, but imports Xi'An technicians for actual installation work, creating a language barrier for captains seeking to interact directly with those working on their ships. The work is good and affordable, though, and an increasing number of pilots are becoming comfortable leaving their ships in Xi'An hands.

Cry-Astro is likely best known for their 'hip' promotional gimmicks aimed at a younger market, which range from the 'Can't Miss!' discount missile reload program to the utterly ridiculous 'Run Flat Out' program (in which attendants applied a comically squashed flatcat decal to visiting ships' cockpit Plexi). These marketing campaigns serve their purpose: in the eyes of much of the public, Cry-Astro is synonymous with ship refueling.



Today, Citizens and civilians the galaxy around are likely most familiar (most would say unfortunately so) with CTR's bizarre, energetic commercial jingle: "SEE TEE ARE! SEE TEE ARE! NAHH NAHH NOOOORB!" Utterly meaningless in any language (Xi'An included), the song and its accompanying commercial have cemented CTR's presence in the mind of a younger generation that already has fewer issues equipping their ship via an alien company.



THE  
MIND  
OF  
A  
YOUNGER  
GENERATION



# THIS IS IT

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BEHIND THE SCENES

FROM LEFT TO RIGHT: PAUL VADEN,  
HASSAN KAMRAN, KYLE CUNNINGHAM,  
MIKE JONES, DENNIS DANIEL,  
CHRIS GRAVES, MIKE PICKETT  
(THANKS TO NASA AND STS-114)





CIG has about 300 high-octane developers in four offices across North America and Europe (not to mention the devs in affiliated studios). For these devs to be as productive as possible, they have cutting edge hardware, software and networking at their beck and call. IT (Information Technology) is what gets it going and keeps it all running. We talked to the IT team members in Austin in LA; the UK techs (Hassan and Kyle) weren't able to sync with us, but we talked to Hassan a bit on the side (later in the article).

**JP:** First, to introduce everyone, what's your job title and how have you been involved in CIG's bug-hunting?

**JP:** Let's start off with the standard question for everyone: what is your title, and what do you do for Cloud Imperium?

**Paul Vaden:** Network Services Manager. I ensure connectivity between all studios and external contractors, as well as maintain our source control software.

**Chris Graves:** IT Systems Engineer. I do everything from new hire setups to making sure artists and engineers have everything they need to make an AWESOME Game.

**Mike Pickett:** I am a Senior Systems Administrator, and I handle platform design for internal systems – private cloud, storage, data replication, etc.

**Dennis Daniel:** IT Manager, Santa Monica office. I provide all services for all users in LA, from repair and building computers, to purchasing software, LA endpoint networking, site security and employee counseling.

**Mike Jones:** Director of Information Technology for Cloud Imperium Games. I am responsible for all IT decisions within the company, including internal corporate IT functions as well as external services connected to Roberts Space Industries.

**JP:** What are you working on while you deal with this chat?

**Chris:** I'm researching some JIRA plugins to help production.

**Mike J:** Today we're working up a new server option to support replication between our Austin office and the BHVR team in Montreal. I'm also reviewing purchase orders and scrutinizing invoices prior to approval for payment for various IT related projects and systems.

**Mike P:** I'm writing a method to stream binary data to an arbitrary endpoint (file/object), while simultaneously hashing the content. The aim is "touch once and done," which is important for cloud-based services.

**JP:** What does "hashing the content" mean?

**Mike P:** Hashing content can mean many things, but in this sense it means generating a string which serves as its unique identifier, plus an integrity check at any point which consumes the data.

**Paul:** Reverting files in source control exclusively checked out by a user who is out sick. Also quoting up a server for an external team.

**Dennis:** As this chat began, our lead programmer's CPU cooling system blow a leak, and we are rapidly deploying a new system to keep his workflow rolling!

**JP:** How did you get where you are today?

**Mike P:** Isn't it obvious? By ignoring my parents and playing video games as much as I wanted.

**Mike J:** I have always enjoyed technology, networks and solving advanced technical challenges. Throughout my career I've never been involved in such an exciting and challenging project as Star Citizen, so it was a dream project for me. This project has the largest scope I've ever seen, which leads to interesting problems to solve.



BEHIND THE SCENES



**Chris:** I tore apart a BSR 386x16 when I was 8 and then put it back together and it worked.

**Dennis:** I got to where I am today through determination. I started as an avid computer gamer back in the '80s. I got tired of paying people to fix my PC and started tinkering on it myself. In the mid '90s I managed an internet café and started learning basic networking and system repair. From there, I hooked up with a fast growing IT firm, working for small and medium businesses. After 10 years I moved into the corp world, becoming the site IT professional at CKE Restaurants Corporate HQ. Through self-education, hard work and an excellent corps of IT professionals that I've worked with, I've been able to amass 20 years of well rounded IT experience.

**Paul:** I started in Customer Service / QA at Origin Systems in 1995, then moved to helpdesk, then network team. From there I was IT Director for Midway Austin, then a few start-ups including one in Malta. Now I'm back on Terra Austin.

**JP:** *Let's jump right into the questions from subscribers.*  
From Buckshot: *How many people make up the IT team?*

**Mike J:** Currently we have 7 people in IT across all studios. We expect to expand that number this year in Europe and LA, and possibly other locations as well.

**JP:** *Mostly in Austin? Do you do much to support the other studios?*

**Mike J:** Each studio has its own IT presence. The Austin IT team supports all studios, as many of the services utilized across the company are located in Austin. We also provide overflow support for each of the other studios through



THIS IS WHERE IT STARTED. THESE ARE THE ORIGINAL TWO CIG SERVERS, STILL IN USE TODAY.

remote support tools.

**JP:** *Also from Buckshot: Do you use a "Help Desk" ticketing system?*

**Chris:** We utilize JIRA for ticketing and tracking a lot of our help desk requests, purchase requests, and misc. IT projects. We also have people walk up to our desks and say Please Help!

**JP:** *So there's a way to track things, but it can be pretty loose – if something needs fixing, you jump on it?*

**Mike P:** Yeah, definitely. That goes for all of us.

**Mike J:** Requests for procurement do all require a ticket, though.



BEHIND THE SCENES



**Chris:** Most definitely, sometimes just coming and getting someone from IT scares the problem and it fixes itself.

**JP:** *From Tacryll: Could you tell us something about your daily work? What does your workflow look like? Who is your major customer?*

**Mike J:** I think it varies between studios, but for the most part all development team members are our customers. In Austin, all studios (including those that are simply providing some contracted service, no matter how small) are also our customers.

**Chris:** For me, when I get here I start by reviewing any emails and requests that might have come in while I was asleep. I will re-prioritize my day based on anything that came in overnight and start work on what is next in the queue. I am usually re-prioritizing my day every hour though, based on what pops up. My biggest customer area is generally the artists. Once a new art tool comes out and one person has it, everyone wants it.

**Mike J:** Workflow is hard to answer for me, as I do attend a number of meetings which break up the day. We do a good job of sharing responsibility and covering for each other if things pile up on any one individual.

**Mike P:** Because of what I specialize in, my customers tend to be the rest of IT, Development, and Development Operations. Ultimately, the entire company is my customer.

**Dennis:** LA workflow consists of keeping all users' systems working at maximum efficiency, as well as helping all the departments interact with each other to increase their work flow. As it stands right now, I got here about five minutes ago, and I have had 3 walk-up with issues first thing. :)

**Paul:** I come in and check my tickets, then begin ticking them off. I also generate a lot of work for Mike Pickett.

**Mike P:** Indeed. I can verify that Paul does in fact keep me employed quite regularly.

**JP:** *What type of issues do you hand off to Mike?*

**Paul:** Given the fast pace and increasing demands on our infrastructure, we end up architecting a lot of new systems. A lot of those include leveraging existing hardware and software in ways that push their capabilities. Mike P has a talent for taking some of our hare-brained schemes and turning them into a robust reality.

**JP:** *Here are several questions from Wintermute: What tools do you use to monitor the health and status of the CIG IT... Apache SOLR? Kibana and Elasticsearch? Splunk? Or something else?*

**Mike P:** For monitoring and alerting, we mostly use Nagios, with many custom plugins and health checks. For statistics and analysis, we use Graphite/Carbon/Statsd, as well as Greylog.

**Mike J:** We also use Splunk on the game server side.

**Chris:** (An artist needs me, brb.)

**JP:** *Also Wintermute: What considerations have you had to account for with CIG internal traffic, in terms of bandwidth needed, HDD space, redundancy/loadsharing, etc.? What applications do game developers use that have caused you the biggest headaches in terms of the above aspects?*

**Paul:** ... passes mic to Mr. Pickett.

**Mike P:** The primary consumer of our bandwidth is the replication of multiple daily game builds to developers around the world.





**Mike P:** It's often over 2.5TB for each build, to multiple sites, to hundred of developers. It has required writing our own replication to handle it, as nothing existed to do the job.

**Dennis:** Perforce and replication is key for the LA endpoint – making sure the flow of builds from ATX keeps the primary workflow going for our devs.

**Mike P:** Incidentally, our replication and storage works something like how Git works, under the hood.

**Mike J:** On the developer/PC side we consume a lot of data. Developer PCs have a minimum of 1TB SSD, and 3TB Magnetic drives. Due to the rapid rate of development, some developers need twice as much as that so they can support multiple prongs of the development effort. Some developers get multiple workstations as well.

**Paul:** What a lot of people don't realize is that our needs don't match the normal 'Enterprise-class' equipment. We found that our replication needs were far out-pacing the capacity of our storage systems. Mike Pickett's solution is elegant and extremely effective at getting that data around the globe.

**Mike J:** Also worth mentioning with regard to Pickett's description of replication is how many builds we do per day, because it puts it into perspective. The data we're moving adds up fast and is approaching 10 petabytes per month at current calculations.

**Dennis:** (Sorry, guys. Lead engineer's system is down, let me step out for a second.)

**JP:** Also Wintermute: *How much freedom do you give the developers with regards to their workstations (installing bespoke software, even other OSs like Linux distributions,*



*etc.), and how do you protect your network across the CIG enterprise?*

**Mike P:** We give computers that are so awesome that the requests don't come as much.



BEHIND THE SCENES



**Mike J:** Windows development workstations are based on Windows 7 or Windows 8, with this choice often based on developer preference. Linux development is mostly based on Debian/Ubuntu for compatibility reasons. We're pretty strict on the network security within the company and between studios.

**Chris:** We sorta give them full customization as long as it helps with what they are working on.

**Paul:** Yeah, they can install any software they need that isn't a part of our standard loadout. Any special hardware requirements are handled through IT.

**Mike J:** Developers are allowed to use any tools they need on their workstations as long as it doesn't affect others. They also can use what accessories they like, such as specialized keyboard, mouse, trackball, headphones, those sorts of things.

**Mike J:** Remote offices and users all utilize VPN for work outside the office, and Mike Pickett is constantly optimizing our security profile.

**JP:** *Wintermute: What are the top three tools (hardware or software) that you simply couldn't live without?*

**Chris:** Screwdriver is my number 1 tool.

**Paul:** For me, VMware, Perforce, and gigabit ISP connections.

**Mike J:** Perforce, Jira/Confluence, Autodesk suites, MS Visual Studio.

**Mike P:** 1) Coffee, 2) Gumption, 3) A sense of humor.

**Mike J:** Great answer, Mike!

**Dennis:** The tool I need most is the best IT team backing me up every day of my life!

**JP:** *Gravy, Orsk and others: What is the default rig for a CIG*

*PC? What is the beefiest dev machine that CIG has?*

**Mike J:** That's a good question.

**JP:** *And Darkonus asks a related question, which might be answered at the same time: What is the best equipment at the moment to run SC at the best optimized settings?*

**Mike J:** Developer workstations are now on the x99 chipset. We run a minimum of 6 core i7s with minimum 32-gig ram and 1T SSD. There's a certain Very Famous developer in Santa Monica whose workstation is much more loaded than that.

**Mike J:** We also have specialized Xeon workstations with 64 cores each. These are used primarily for rendering huge ship models and helping out with compiling builds for developers.

**Mike J:** In Austin we have a build farm which currently has 6 servers with 120 cores (240 HT) and a combined 1.5 TB of RAM running on 10 gigabit fiber.

**Paul:** To answer the 'best equipment to run SC' portion, I'd add to the developer build Mike mentioned a RAID-0 SSD array and NVidia 980GTX.

**JP:** *Several subscribers asked about security – how it happens, how much of a focus it is, and so forth.*

**Paul:** That's not something we want to describe in detail, but it's also not something we want to suggest we take lightly. Let's leave it at this: we employ industry-standard techniques.

**JP:** *From Buckshot: Your team may not work directly on assets or programming that makes the game function, but you play an important part of supporting the other staff and keeping them up and running. Has an IT team member ever given another developer feedback that in-*



BEHIND THE SCENES

fluenced a game mechanic or an art asset that we currently enjoy?

**Paul:** I once off-handedly told an artist I didn't like a shade of orange on a space suit that was on the screen. The artist made it darker. You're welcome, community.

**Chris:** I make suggestions to QA all the time for them to enter. I also send them bugs from playtests. I really, really enjoy the aesthetic of the Revel and York hangar.

**Mike J:** I think for our part, the most important contribution IT has made is to keep up with the demands of this project. Considering that it's the largest game ever made, with the highest fidelity assets ever seen, we have huge storage and network demands to support the cross-studio development effort. The work Mike Pickett does with build replication is huge because it helps the company get revisions of the game tested and out to the players faster. The work we've done with our internal build systems also helps in this area by allowing us to run many parallel build jobs at once. We're also contributing to the publishing pipeline with our work with the DevOps and LiveOps teams.

**Chris:** I am still waiting for the approval for the 3D printer so I can custom craft PC cases in the Revel and York style.

**Paul:** Yeah, but that orange was just wrong ...

**Mike P:** Vaden = genius

**JP:** From Zukel: Do any of you have a hobby project that was integrated into SC, or a part of SC that became a hobby project?



A BUNDLE OF CABLES PROVIDE THE INTERNAL LINK FOR ATX, AND (FROM HERE) THE REST OF CIG.

**Paul:** Not really. I did fashion my own spacesuit out of bailing twine and duct tape, but that was for a separate project entirely. In fact, forget I mentioned that.

**Mike J:** I may be lucky in that my job is my hobby. I've often said that if I suddenly won the lottery, I'd still do what I do on Star Citizen for fun.

**Mike P:** Alas, no. I've been trying to sell the idea of a one-man-Belle-and-Sebastian-acoustic-cover-band to the Sound department, but so far I've been refused.

**Mike J:** (Perhaps I'd add a few cruises and maybe one of those trips to the international space station, but still ... I love what I do.)

**Paul:** For a serious answer, Mike Jones and I are constantly trying to build the best performing workstations. It's been a constant contest since we started working together five years ago. I usually win, btw.



BEHIND THE SCENES



**Mike J:** Oh Vaden, it's ON now!

**JP:** From Gene Starwind: *Considering all the data breaches over the past few years, how are our credentials and other information like CC info, email and physical addresses stored? Is the data encrypted?*

**Mike P:** That actually isn't a question for IT. We have a separate, dedicated team focused on customer data security, plus regular audits.

**JP:** Also Gene Starwind: *Why do you choose to use MSE as an antivirus product? (Noticed from Mark Abent's bug smasher's videos.)*

**Paul:** We actually use ESET NOD32. It is written in machine language and has a very small footprint. It also doesn't interfere with compiling.

**Paul:** Some machines may still have MSE enabled, though.

**Mike J:** One of the reasons to use MSE in the early days was because it was low impact on development, particularly compiles, compared to other options.

**JP:** Gene Starwind: *Is the main branch of SC that the devs are working on hosted locally, or over VPN to other sites, or is it hosted on a cloud provider?*

**Paul:** Our source control is located in Austin, with proxies located at each remote site. All data is transmitted between studios over VPN tunnel.

**JP:** Gene Starwind: *What is your internet speed? Do you have redundant internet connections?*

**Mike P:** (I think the "hosted" question is about the game servers, not source.)

**Paul:** Each studio has 1GBs fiber connection. As for game servers, they are all located in the cloud. Devs can run a

local server for testing, but any main branch stuff is done in the cloud.

**Mike J:** Game services are hosted on a 45-gigabit fiber network with full redundancy.

**JP:** Gene Starwind: *Do you use Active Directory? Or do you just have a bunch of individual workstations in a work-group?*

**Paul:** I can't imagine running a company of this size without AD.

**Mike P:** Indeed. We also do heavy automation through AD, not just authentication.

**JP:** From Mr McDuck: *When I was at the Santa Monica office a while back, I saw a switch that didn't look like it came from San Jose, so I'm curious to understand what routing, switching, security and wireless vendor was chosen.*

2nd order question: Why? Is it the same across all sites?

**Mike P:** We are currently awaiting a quote from said San Jose vendor to blow our socks off and entice us into committing to them fully. Until that time, heterogeneity will reign.

**JP:** Mr McDuck: *What does CIG use for telephony? Again, is that the same across all locations?*

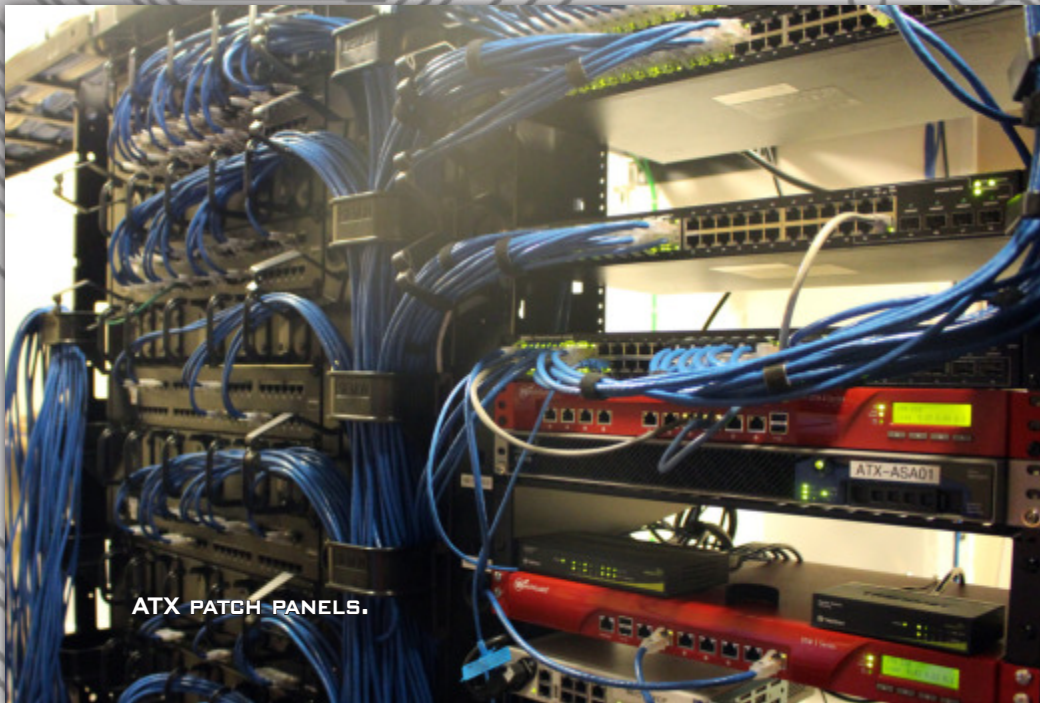
**Mike P:** We use open source IP telephony software. Telephony is not nearly as important here as it is in many companies, though – deployment is small.

**JP:** Mr McDuck: *Do you use MPLS, or is the network between offices commodity internet with VPN, DMVPN, or something else?*

**Mike P:** The base is Asterisk. Site connectivity is completely virtual and automated.



BEHIND THE SCENES



ATX PATCH PANELS.

**Paul:** We get better cost/performance from commodity 1Gbps fiber over IPSEC tunnels than MPLS.

**Mike P:** Yeah. My philosophy is “get a fat pipe and use it however you need each day.” MPLS is incompatible with this.

**JP:** Mr McDuck: *Is Skype the predominant (or only) videoconferencing that is used within the company? I ask because it's the only one I've seen in any of the streams or videos.*

**Paul:** Pretty much. We've tried some alternatives but everyone kept migrating back to Skype.

**Mike J:** Yeah, most people already have Skype and we have a special deal for our Skype deployment, so it's pretty well entrenched here.

**JP:** *Sparviero wants to hear about all things netcode related.*

**Paul:** The netcode is handled by our DevOps team and server programmers. IT doesn't interact with it much.

**JP:** *Several from kevball2, beginning with: how does IT work to stay ahead of the needs of the business and the developers? What kind of project strategies are used to get equipment and software online and working under fast paced deadlines?*

**Paul:** To stay ahead of needs, we rely on the experience of our team to anticipate needs and design solutions that are expandable and dynamic.

**Mike P:** I stay ahead by relinquishing the illusion of control. Instead, I design high-capacity systems that can be mold-

ed to almost any need, scaled out as required. Abstraction is also key – individual components can be replaced as required. When we go to cloud, it's because we need it – not because we are unable to build our own.

**JP:** *kevball2: What kind of DR plan or recovery strategy do you use to keep the devs working even when there are outages?*

**Mike J:** We replicate critical data between studio locations as a primary protection against full studio disaster. We also have onsite and offsite backups. For individual developers, every person has at least 30 minutes of redundant power. Critical servers have 1.5 to 3 hours, depending on how critical they are. All work must be checked in to servers regularly to help prevent loss, as well.



BEHIND THE SCENES



**JP:** kevbll2: *What is the favorite flavor of Linux used by devs, or is there a standard build that rolls out?*

**Mike J:** Not really, we're mostly Ubuntu but some Mint and Centos here.

**JP:** *From Boraxx: What is CIG IT's stance on BYOD for its office network environments?*

**Mike J:** We're pretty open to this. People bring their own laptops, tablets and phones. Those might be isolated to a different network but it depends on what they want/need to do.

**Paul:** We don't limit BYOD with technology, as that would have a negative impact on development. We have employee policies in place that address misuse of company assets.

**JP:** *From MACV1RUS: What is the most unique challenge that you face doing IT for the CIG team versus other IT specialists?*

**Paul:** SO MUCH DATA.

**Mike J:** Data. And it needs to be everywhere in minutes, not hours or days.

**Mike P:** Yeah, the scale of our game means we work with data far beyond what a company our size normally handles.

**Paul:** I wish we got paid by the byte.

**Dennis:** Data and nimble changes in environment. We have to be really fast on our feet in LA.

**Chris:** P4 Streams are one of my biggest challenges, as well as managing all the art licenses.

**Mike J:** Also, the engineer who poured a can of Coke down his computer and in his Oculus Rift was a challenge ...

**Paul:** I said I was sorry ...

**Mike P:** I also like the quotes I hear from the people around me, like: "So I cooked a hand grenade and killed myself! <general nerd snickers>"

**JP:** *From Freebirth (and others): How often does the IT department need to ask whether the power is on and the computer/monitor is physically plugged in?*

**Mike P:** Not much. There are some really smart people here.

**Dennis:** Never!

**Paul:** We work with some insanely smart people. By the time a request comes to us, we can be reasonably assured that they have done the standard troubleshooting.

**Mike J:** There's also quite a bit of proximity fixing here. Sometimes we're called to support a user and just our presence fixes the problem. They love that.

**Chris:** Only once!

**Dennis:** But we do have to remind them of the first law of tech support: have you rebooted?

**JP:** *On what occasion were you most surprised/amused/horrified?*

**Mike J:** Computers don't run on Coke.

**Chris:** I was horrified when I opened an employee's computer case and a spider jumped at me.

**JP:** *How big was the spider?*

**Chris:** It was big. Thumbnail size. [And Chris has big thumbnails.]

**Dennis:** When CR's C drive failed to boot and I had 6 hours to recover and fix it – the night before CitizenCon 2014.



GENEHSER  
BEHIND THE SCENES

**Paul:** When we first started tackling the replication issue. The sheer volume of data was very surprising, and I was amused at how horrified it made Pickett.

**Mike J:** I was pretty impressed with our fans the first trip I took with Chris out to PAX East in Boston. It really felt cool to be there with them; so many of them holding their Ikea lamps and cheering when we hit a bug on the big screen.

**Paul:** Oh yeah, and the events like PAX and SXSW have their own challenges for IT. Having the volunteers at PAX Australia was a life saver.

**JP:** *What makes an event special for IT?*

**Chris:** Fan energy.

**Dennis:** Teamwork and Chris Graves. With Paul Vaden – like PB&J.

**JP:** *[rephrasing question] How is an event a different type of challenge?*

**Paul:** You have to quickly set up 8 or more machines, network them, get the newest build on all of them, and have no mistakes.

**Mike J:** Pulling it off is special. We agreed at the beginning that we'd never fail, and we don't.

**Chris:** We have a very small window to work in, and so many things can go wrong.

**Mike J:** We've had multiple times when our internet failed at events, or worse, but we always come up with something during that small window.



**JP:** *So Chris's "this is b\*s\*" doesn't count as a fail? :)*

**Mike J:** Heh, that wasn't an IT fail.

**Dennis:** No, it was part of the experience.

**Mike J:** That was a bug. And I was there, the fans loved it!

**Paul:** Also, at events we are showing stuff that is very fresh, sometimes just a few hours old. Getting that over to all machines across an event site's cable modem is just ... stressful. But it's worth it to watch the event and see everything work, and the fans going wild for the stuff.

**Dennis:** With an event we do not have the home court advantage, so teamwork and fan support are the key factors. That makes the last-second changes a little more manageable.



BEHIND THE SCENES



**JP:** Any final words?

**Mike P:** Be decent to each other, friends.

**Chris:** Only you can prevent Space Fires!

**Dennis:** I love you guys. :) Sorry I had to be gone for so much of the interview.

**JP:** *I should have considered the implications of asking you to handle an interview as soon as you arrived in the morning.*

**Dennis:** IT's all good. The 4 amigos had my back.

**Paul:** We really enjoy it when fans send us stuff like candy.

**Chris:** Paul means Beef Jerky.

**Mike J:** IT can be fun. If you're in the field, make it fun.

**Mike P:** And all that pork. So much delicious pork.

**Paul:** Candied beef jerky.

**Mike J:** Oh, brother.

**Mike P:** Banded jeef porky.

**JP:** *I was with you till it got candied.*

**Mike P:** Can't tell you how many times I've heard that.

**Chris:** Shameless plug of hometown beef jerky place:  
<http://rileysjerky.com/>

**Dennis:** We are working together to make this great dream happen. Have fun and know we are driving 200% to make it happen. Thank you for all the support.



#### WHAT IS YOUR NAME?

My name is Hassan Kamran, and I am the IT Manager for F42. I am based in the Wilmslow, UK office, but look after the IT needs for all of our European operation. This mainly includes looking after the two studios in Wilmslow and Frankfurt.

#### WHAT IS YOUR QUEST?

I have worked in the games industry for 10 years; shout out and thanks to Paul Lockyer, who gave me my first break and took me on as a system repair engineer working for TT Games (now owned by Warner Bro Interactive Games). They are the company responsible for all the famous Lego games. I joined CIG for a challenge, and it has become much more of a challenge than I realized. From early on, it has required working closely with the IT team across the pond in Austin, Texas, which I have enjoyed as they have so much experience between them.


#### WHAT IS YOUR FAVOURITE COLOUR?

My Favourite colour is red. In my spare time (when I get some from working long hours and days) I enjoy spending time with my three kids and wife.



BEHIND THE SCENES





# OSIRIS SYSTEM ETOS



## DISCOVERY & DEBATE

Osiris is a red-yellow dwarf on the small end of the sequence that is orbited by a pair of planets and a dense asteroid belt. When discovered in the late 2700s, Osiris had little to naturally draw attention to it. With a small planetary system and an asteroid field readily classified as an imminent danger to navigation rather than a potentially profitable mining target, Osiris seemed initially as if it would be defined only by its proximity to well-traveled jump routes and its potential as a refueling point within reach of a major trade lane. A true survey of the system ended up taking a lot longer than anticipated, as the UEE

suddenly found itself in the middle of a revolution.

While science teams were en route to the Osiris system to start processing, footage of the Massacre of Garron II leaked to the populace and ignited public outcry and demonstrations. The Messer regime, already stretched thin, now found that every riot they squashed emboldened and inspired others to take their place.

By the time the dust settled and the government finally got back to studying this system forgotten in the turmoil, the first survey results of the inner planet yielded fascinating data. Beneath the cloud layer was an extremely active biosphere capable of supporting Human life, playing host to an amazing diversity of species unlike those found anywhere else in the known galaxy.



**TRAVEL WARNING** Just because you can, doesn't mean you should. While lax UEE oversight makes entry into Osiris system relatively easy, it also means that you can't rely on the Empire's normal protections. Beware.

The Osiris System became the first system declared to be a developing system under the Fair Chance Act. Proclaimed as such with a great deal of fanfare following a science team's discovery of higher primate-equivalents on Osiris I (by now known as Etos), the system became something of a cause célèbre for environmentalists and expansionists alike. Boasting an Earth-like world that would require relatively minor terraforming for Human settlement, Osiris became the flashpoint for a new debate over the morality of expansion. Though the thought of terraforming inhabited worlds for Human settlement was considered immoral in this political climate, critics questioned the legitimacy of first contact and potential uplift should the indigenous species be capable of sentience.

While the formal designation and resulting furor may have once attracted enough attention to the system and its inner planet to ward off everyday smugglers, pirates and worse, the luster has since worn off. With the looming specter of budgetary cutbacks, the military has relaxed its protection of Osiris System, meaning that the UEE military expends little effort in patrolling the system beyond the occasional fleet exercise. (At press time, the most recent confirmed military transit of Osiris was some 27 months prior, meaning that the smuggling of biologics and the use of the system for other illicit purposes have generally continued unabated.)

## HEARD IN THE WIND

"Osiris offered us a unique opportunity. With all the vicious argument about settlement and cohabitation, all the pieces were there for us to falter in our resolve, but we didn't. Humanity chose what was right."

– *Imperator Erin Toi, Excerpt from her memoir On the Path*

## OSIRIS I (ETOS: UNOFFICIAL NAME)

Ask the average Citizen to describe Osiris I's fabled biosphere and you will likely hear descriptions of impossibly dense rain forests teeming with every form of life imaginable. The reality is nowhere close. Etos is on the extreme solar side of Osiris' green belt, and life there has adapted very differently than on Earth. The first thing to understand is that life on Etos does not thrive in the open; there are no teeming forests reaching for the sky or wild, untamed polar steppes. While the atmosphere can support Human life, the proximity to the star means that most evolution has occurred underground, hidden from initial survey scans.

Underground, the world is much more interesting. Etos has an extensive, miles-deep cave system that worms its way into the planet's mantle. There, a variety of life forms have taken hold, ranging from spiny rock lobsters to a divergent set of species that might best be described as a prismatic disc (the informal survey name, 'flopping pancake,' has stuck). One of the deciding factors behind Etos' formal protection is Phare's Ape, a vaguely Human-like primate that biologists believe has the potential to develop higher thinking. With what can only be described as a natural 'sad face' and a seemingly gentle nature, Phare's Ape became the iconic image of the Etosian preservation movement.

In recent years, Etos has become home to increasingly bold smugglers and illegal corporate research surveys. These range from 'slash and burn' pirates seeking their own Phare's Ape skull mug (considered highly symbolic for those flouting the law) to megacorporations processing underground biomass by the cubic kilometer, in search of everything from cure-all elixirs to legitimate medicinal items to biological weapons. There is no set land out for these illicit visitors, although landing zones are rarely difficult to locate for those who travel the asteroid belt and roam near the planet. There are few major 'openings' to the world's cave network, and those seeking to do business here tend to plainly mark the ones they have used.



ETOSIAN PRESERVATION MOVEMENT



## ASTEROID BELT

The Osiris asteroid belt is one of the densest yet discovered and is believed by stellar geologists to be a strong representation of a developing planet. Most agree that within several billion years, enough material will have condensed for the Osiris belt to serve as the basis for a new world. There is little of interest here to miners or other visitors; heavy and rare metals are present only in minute quantities, so spread out as to make current mobile mining operations untenable.

### HEARD IN THE WIND

"Big secret is that there are plenty of Humans living on Etos. Well, they aren't living, more like planted ..."

– Loto Gaven, *Convicted Syndicate Enforcer*

## OSIRIS II

The gas giant, Osiris II, was what initially drew prospectors to the system: a large Jovian world with naturally pure hydrogen. Osiris II is the ideal stopover for anyone seeking to refuel jump engines or thrusters. While technically under the protection of the Fair Chance Act, Osiris II was quickly excluded via legislation and made available under license to both direct fueling companies and refinery concerns. Because of how the system's jump points fall (all those discovered to date are outside the asteroid belt), Osiris II can serve to fuel passing ships without any practical impact to the lifeforms on Etos. Although trade prospects in the nearby stellar region have diminished since Osiris' initial discovery, one active refueling station remains at an Osiris II Lagrange point to this day. Branding on the station changes so frequently as to be unprintable; what was once a Cry-Astro flagship station now hops from unknown brand to unknown brand on a monthly basis.



EDITH WALKER







# Phantom Bounty

by Autumn Kalquist

## Part 4

Mila was a traitor. She'd risked her career as a bounty hunter . . . had betrayed her partner, Rhys, to free Casey. Was it all worth it? Had Casey been telling the truth about her father developing bioweapons?

Mila snuck a glance at Casey as she returned to the co-pilot's seat. The dark-haired woman offered her a small smile, then harnessed herself back into her seat. Mila's childhood friend. A terrorist.

The emptiness of space loomed before them, nothing but darkness beyond the Devana's forward screen. Mila gripped the controls so tightly her hands ached.

"I've managed to mask our signal," Casey said, "but it's a temporary fix only. We have a half hour. No more."

"How . . . ?"

Casey explained the method, and Mila shook her head, partially in awe of the hacking skills required, partially in dismay over the length of the resulting prison sentence if she were caught at it.

"Could have used that trick myself a time or two," Mila muttered.

"Not if you want to stay on the right side of the law." Casey cleared her throat. "After this is over. Of course. Just picked up the signal on the scanner. Gotta be my contact. The ship's waiting a few clicks from the jump point."

Mila's hands grew tighter on the controls as she glanced at the scanner screen. Space normally held the dual promises of endless possibility and endless danger . . . but today it held only danger for her.



"Any sign of the Advocacy?" Mila asked tightly.

"Not yet. But . . . they'll follow. They always do. Get me to my contact, and we'll execute the plan."

Mila tried to calm her breathing, but her heart was racing, and she couldn't make it stop. It was supposed to be simple. Mila would pull up next to the contact ship; Casey would knock her out, then transfer to the other ship. When Rhys and the Advocacy found Mila, she'd tell them Casey took her ship and ran with it. Then everything could go back to normal. Or almost normal. Would Rhys believe the lie? Could she lie to him?

This was stupid. So stupid. She'd acted rashly. There was no way she could lie well enough to convince the Advocacy and Rhys that Casey had somehow escaped the containment pod, overpowered her, and then locked her inside. But Mila didn't have another solution.

"Straight ahead." Casey plotted new coordinates, and Mila followed the trajectory.

A long, sleek yacht came into view in front of them. A few thin lights gleamed along the length of the 890's hull. The owner of this ship had plenty of money; Casey's contact was the real deal.

"Freelancer," came a voice over the comm. "State your business."

Casey replied, "Tell S Whispering Wind approaches."

"Around which sun does the finest planet orbit?"

"Ilios."

Mila's heart skipped a beat and she slammed a hand over the comm, silencing it. "Ilios," she hissed. "Like the project?"

Casey's brows rose for a split second, then her expression smoothed. "Exactly like that."

"I thought you destroyed all that data."

"S has cleared you for docking," the comm interrupted, "but we'll need to scan you at close range."

Casey pushed Mila's hand out of the way and hit the comms. "Roger that."

"Tell me what's going on," Mila hissed. "What is this about Ilios?"

Casey sighed. "I can't tell you about S. Or Ilios. If I did, I'd have to kill you."

Mila tensed in her seat. There was no hint of humor in Casey's voice. None. She was serious.

"I risked everything for you!"

"Look . . . all I can say is that People First has friends in high places. They support the cause. But not all friends are created equal. Many do things . . . for their own reasons. And can be persuaded to help if you offer the right terms."

Mila pulled the ship up beside the much longer 890. "This contact is connected with People First? And what were her terms for you, to get you out of here and betray PF?"

The 890 commed them before Casey could answer. "We detect two life signs in the Freelancer. S says you were supposed to come alone."

"I needed help getting here," Casey replied tersely.

"S says both of you must board. Or we leave."

Casey glanced at Mila with a veiled expression "I'm sorry to drag you into this. But we both have to go over there."

"No," Panic rushed through Mila, and she tightened her grip on the stick. "No way. That wasn't the deal. You go over. I stay here. Or I'm leaving."

"Evony."

"Don't call me that," she said through gritted teeth. "My name is Mila now."



CHRONICLES



“Mila,” Casey’s voice was low, soothing. “How do you think it’ll look if we fly away now? They’ll shoot us out of existence and jump without a glance back. You have to go over there. I’ll make sure S sends you back here.”

“How will you make sure?”

“I just will. Now suit up. We’re wasting too much time. S definitely won’t be happy if the Advocacy shows up at her door. But I’m pretty sure you understand that.” Casey left her seat and headed back to suit up herself.

Mila stared at the yacht, trying to decide if she could out-manuever it and escape. But then what? She had to get rid of Casey, not keep her on board. She let out a frustrated sigh, unbuckled, and headed back to her gear. She ignored Casey, not meeting her gaze.

Her injured shoulder, shot by Casey, cried out in pain as she pulled her suit up. She slapped a new numbing patch on it and continued dressing. As she closed the suit up, her hand touched the necklace around her neck.

Mila’s heart twisted as she pulled the bronze token over her head. She stared down at it, at the infinity symbol, the special iridescent “good luck” stones dangling from it, and a new wave of regret washed over her.

Rhys had spent some of their last creds on this. To make her happy. Mila took the necklace and tucked it in the space between the bunk and the wall. She didn’t deserve it. And it hadn’t brought her good luck anyway, had it?

When Mila got back to the cargo hold, Casey was suited up, her helmet under one arm.

“Ready?”

“Yeah,” Mila mumbled.

They both latched their helmets on, then Mila depressurized the cargo hold and opened the back ramp. She and Casey pushed off the ramp and drifted toward the 890’s

rear lift. When they were inside the empty space, the cage lifted under them, and artificial gravity gently resumed. A light turned green above them, and Casey took off her helmet. Mila did the same.

They stared at the double doors before them, waiting in tense silence.

The doors finally slid open, revealing a broad-shouldered man in a dark grey flight suit. “S will see you now.”

The man stepped into the lift, one hand gripping a pistol, and gestured for Mila and Casey to enter the ship.

Mila squared her shoulders and met the man’s hard glare with one of her own. She wouldn’t be afraid of these thugs. She’d faced off against dozens of wanted criminals and come out on top. She could do it again.

Another pair of guards met them in the next corridor where it widened. One of them patted Casey and Mila down and removed their mobiGlas as the other kept his gun trained on them. When they were satisfied, they led them down the corridor and into a well decorated lounge.

Mila’s eyes darted around. The lounge was on two decks, and more guards looked down at them from behind the rail of the upper deck. By the taste displayed here, Casey’s contact was old money. It could have been owned by Mila’s parents or any of their friends on Terra. Silk panels from Rihlah, famous Terran brocade applied to the benches, a delicate glass and metallic table at the center, and a very impractical glass chandelier hanging from the middle of the ceiling. Iridescent stones decorated the chandelier, and Mila’s hand almost went to the spot where her good luck necklace used to be. They looked just like the stones on it.

Two more guards entered, bringing the total to five on the main deck. Mila’s lips parted as a woman, apparently the mysterious ‘S,’ walked in behind them.

It was the woman from the market stall where Rhys had purchased her necklace.





Mila did a double take. No . . . there were differences. This S was petite, with space-black hair and light blue eyes, just like the woman at the stall. But the woman before her wore a well-tailored suit and robe, not loose skirts. And her hair wasn't done up in braids, and she didn't have a nose ring. She looked more . . . well-preserved – her skin smooth, a product of youth treatments. This was not the same woman . . . but Mila would be willing to bet they had some relation to each other.

The woman walked up to them with a smile, and exchanged kisses on the cheek with Casey.

“Brought a friend?” she asked, raising a brow at Mila.

“Like I said. I needed a ride.”

“And who is this?”

Mila didn't answer, just tried to keep her expression blank. She couldn't let this woman know she knew anything about her.

“She's just an old friend of mine,” Casey said, her voice light.

The woman's eyes darkened, her polite demeanor fading a fraction. She gestured to one of the guards.

“Come with me, Elaine. Let us talk over here.”

Casey followed her to an ottoman near the center of the room, while the guard grabbed Mila's arm and pulled her to the edge of the space and out of earshot of Casey and S's quiet conversation. Did S know who Casey was originally? She'd called her Elaine, the name she'd used on Tevistal.

The two of them engaged in an intense, quiet talk for a few minutes and then Casey lifted the sleeve of her suit and peeled off a piece of her skin. False skin. Mila went cold at the sight of it. Casey hadn't mentioned any hidden data . . . or details on the price for her passage. Casey scraped a chip from the skin and passed it to S.

Casey was selling data, probably Phan Pharmaceutical data.

Had she lied about everything? Was she just stealing data to sell to competitors? Anger started to bloom in Mila's chest, and she fought to keep her mouth shut. All that mattered now was that Mila get out of this alive and unscathed.

Casey finished her transaction and returned to Mila.

“What was that?” Mila hissed.

Casey's expression was tight. “She'll let you go back to your ship just as soon as she checks my payment.”

A new guard ran through the door. “Madame. The Advocacy was spotted by our scout. We need to jump. Now.”

“Wait – no.” Mila looked toward the door they'd come in.

“Send me back. Send me back now.”

S shot them a glare and gestured to the guard behind Mila. “Take them each to a room until after the jumps.”

Jumps. This was starting to get a lot more complicated.

“Let me go back to my ship!” Mila's voice rose.

Casey dug her nails into Mila's hand and leaned close, whispering. “They won't let you now. Keep it together if you want to survive this.”

Mila lurched to the side, trying to make a desperate run back out to her ship.

The guards closed in on her, grabbed both her arms, and dragged her the other way. She went limp, no longer fighting it as the realization of what had happened sunk in.

They took her up a flight of stairs and opened the first door they came to, pushing her inside.

“Harness up. We'll be jumping soon,” one of the guards said.

The door slid closed and she heard the lock engage. Mila took a panicked look around the small room, and then sank down in the jump seat. Tears brimmed in her eyes as she buckled in.

She'd messed up. She'd always been able to get out of





scraps before. Always. But not this time. She just kept sinking deeper into a pit that appeared to have no bottom.

The ship hummed softly as it powered up, and in mere minutes she felt the woozy sensation of the first jump. Another soon followed, and Mila's hope died as they travelled further and further away from her ship.

When the Advocacy found the empty Devana . . . they'd know. They'd know she'd helped Casey escape. They'd think she was working with her.

And it would be true.

\* \* \*

The stomach-lurching feeling of the third jump let Mila know her old life was over for good. Now she was a criminal . . . on the run. She could try to say Casey had kidnapped her, but why would she have? There was no good way out of this. And Rhys knew the truth; he'd known about their shared past. If the Advocacy pressed him . . .

Would Mila even get off this ship alive?

When the yacht powered down, Mila unharnessed herself and began to pace the small room.

Hours passed, and a guard brought Mila food and water. The reconstituted food tasted like death, like a last meal before the end, and a terrible one at that. She could barely wrap her mind around what she'd done – how much her life had changed in just a few hours. Then the locks disengaged on her door again, and she turned as it slid open.

Casey slipped through and quickly closed it. "The guards are busy . . . for the moment. This might be our only chance to talk."

"You lied to me. You knew."

"No. I didn't. I'd hoped to get you back to the ship."

"I can never go back now, Casey. Not ever."

"Shh. I'm Elaine here." Casey looked completely calm, unbothered by the fact that Mila's entire life was hanging in the balance.

Mila rushed Casey and shoved her against the metal wall. "They're not gonna let me walk out of here, are they? I'm an unknown entity. I was never supposed to be here."

Casey winced with pain and her forehead creased with worry. "S – Sybil – will make sure she knows who you are before she lets you leave now. And when she finds out you're a bounty hunter . . ."

"Well, I think I know something about her. There was this woman selling trinkets at the market—"

"A younger sister. You don't say a word about knowing anything, understand? She'll kill you if she thinks you know anything about her. She operates under the illusion that we don't know anything."

Mila backed away from Casey, feeling dizzy. "You lied to me. You're selling data—"

"Not bioweapons! When we do jobs, we collect harmless, or even beneficial, research and sell it to fund our cause. But I'm funding my escape with it this time."

"What is it? What did you just sell?" Mila's voice rose as she spoke, and she tried to calm herself down, but her mind was racing.

"The formula for a medical treatment that hasn't been patented yet."

"How can I believe that?"

"Look, we don't have time for this." Casey placed her hands on Mila's shoulders, forcing her to look her in the eyes.

"You know about her family. She's going to find out about you. There's no way she's letting you just go back to your regular life now. You have one choice."

Mila shrugged off Casey's hands. "What?"



CHRONICLES



“You come with me. I’m going to try to convince her to let us disappear together.”

“No!” Mila began to pace the room again. “I can’t just . . . leave the Empire.”

“If you stay – you just freed me and left your ship stranded next to a jump point. They’ll know you helped me. You have no other choice.”

“You think I don’t know what it looks like? You have to help me get off of here. Have them drop me off somewhere so I can . . . somehow make it right.”

“You know too much! About me – about PF – about Sybil.”

Red crowded around the edges of Mila’s vision, and it took everything she had not to wrap her hands around Casey’s neck and squeeze. “I helped you. You’d be dead if it wasn’t for me. You have to help me fix this. Help me get out of here.”

Casey folded her arms across her chest and glanced back toward the door. “I can’t.”

“You. Will.”

“They’ll catch you—”

“And it won’t matter to you either way. You’ll be long gone, hiding in Xi’An territory.”

Casey met Mila’s eyes and sighed. “Fine. Get yourself killed if that’s what you want.” She reached into her suit pocket and pulled out a translucent swipe card.

“Stole it off a guard.” Casey smiled ruefully. “This should get you into the corridor at the end of this one. They have a little 85X there. I know we’re stopping at a planet soon. Backwater, but plenty of places to hide. I’ll distract the guards for you. When I knock twice on your door, wait five minutes, then it’s time for you to go.”

Mila stared down at the card in her hand.

“Thank you again, for helping me. I owe you my life.” Casey

wrapped her in a quick hug that Mila didn’t return. “I really am sorry. Try to be safe.” Casey gave her one last sad smile. “If you change your mind . . .” “No,” Mila said, her voice breaking. “I’m going to fix this.”

\* \* \*

The knocks came after Mila had given up on Casey ever following through.

Two knocks.

Mila grabbed her helmet off the floor and hugged it to her chest.

Heart pumping a chaotic rhythm in her chest, Mila waited through five tense minutes, then swiped the card Casey had given her. The door slid open to reveal an empty corridor beyond. She barely breathed as she gingerly stepped into the corridor and looked both ways. She turned right, as Casey had directed her to, and hurried toward the end. It curved right, taking her to a new door.

She said a quick prayer to the Banu god of luck that the room beyond would be empty, then scanned the card.

The door opened into a hangar bay. The 85X sat at the center of it.

An alarm sounded, and red lights began to flash in the bay.

Mila was sweating freely as she latched her helmet on.

“Hey!”

Someone tackled her from behind, shoving her down on the floor. She fought back, twisting in the man’s grasp until she saw him face to face. A guard, the one who had warned Sybil about the Advocacy’s arrival.

Mila slammed a gloved fist into his unprotected face, and he stumbled backward. She desperately climbed forward, trying to get into the 85X cockpit, but the guard followed her.

Depressurize Bay. The small words flashed in the cor-



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ner of the cockpit's interface. As the guard grabbed her leg, she hit the button on the screen. A whole new set of alarms joined the ongoing din. The man's eyes widened, and he scrambled away from her, toward the hangar door. He scanned his key card, trying to make it open, but it was sealed shut. He would die if she didn't do something.

Mila paused the depressurization and lurched out of the ship. She crashed into the man, seeking the pistol he held in his grip. She slammed an elbow into his gut again, and he released the gun. She picked it up and trained it on him.

"Last chance to get out!" she yelled. He stared at her wild eyed and scanned his card again.

This time the door opened. Several guards waited beyond, but he yelled something to them and they didn't try to enter.

The door slid shut, and Mila climbed back into the ship, tossing the pistol into the seat beside her.

She brought up the local map, her hands shaking with adrenaline, praying that it would display more than a void. They were in orbit over a settled world! She chose a landing site to the west of the closest city. She could abandon the ship there, hide in the wooded hills, wait it out until she was sure Sybil and her guards had given up waiting for her to emerge. She chose her destination, and then completed the prep sequence.

The countdown began. She harnessed herself into the seat as the hangar bay opened up, revealing black space behind. She throttled up and took off, leaving the 890 behind.

Mila headed directly planetside, sparing little attention for the ship at her back. If they shot up the runabout, she would have no more worries herself. There was nothing she could do but speed to her landing site.

She pictured Rhys. His handsome face, his reassuring words, the way he'd held her. That smirk she'd probably never see again unless she got caught or found a way to

fix this impossible situation.

As she entered the planet's atmosphere, she spared the time for a few tears.

A few days ago she'd been hunting the Phantom.

Now she needed to become one.

### *Five Months Later*

Mila wove her way through dark alleyways, keeping her head down, a hood concealing her face. A lock of her newly short-cropped blonde hair fell into her eyes, and she blinked as it irritated them. The green colored contacts she wore felt dry, scratchy. But at least from afar she wouldn't be recognized.

She glanced back at a huddle of transients gathered round a rusty heater, and turned down the next alley. She'd reached the hostel sector.

It was dangerous being back in Tevital so soon after the Incident, but she'd run out of options and time. A dozen small-time jobs had funded her existence along the way, but now there were even more bounties on her head. She'd been hunted for months, had been nearly caught, but so far she'd always gotten away. And this was the one place they'd probably never expect her to return to.

Mila gritted her teeth and walked down the dark alley between two hostels. A cracked globe flickered, guiding her to a hostel entrance. She pushed open the door, and the scent of piss wafted over her. It barely registered. This place was only half as filthy as most of the places she'd slept the past few months.

Voices rang through the thin metal walls. Arguments. The sound of two people moaning and grunting. An old vid playing at full blast.

Mila found an unoccupied room and went inside. Dim sensor



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lights lit up the room. The place had a film of filth coating it, but it would do.

She shut the door behind her and activated the second-hand mobiGlas on her wrist. Her hacking program did a quick job of activating the RoomTab. The lights and power came on in response, and she pulled her mobi away. It would stay on until she ran her program again. No creds needed. Which was good, because she didn't have many left.

A glance around the now well-lit room brought a flood of memories back. The pain came with it, weighing Mila down. She sank to the dirty mattress.

She and Rhys had tracked the Phantom to a room like this once.

Mila did something she hadn't done for weeks. She brought up the news search she'd saved to her mobiGlas, to see if anything had changed since she'd last checked.

#### **PHAN PHARMACEUTICAL CEO UNDER INVESTIGATION**

She rewatched the vid of Casey's father being arrested with the sound turned off. Owen Phan's face was the same regal countenance she remembered from growing up. When Mila had first heard that the truth about the biological weapons had leaked, it had been a relief to learn that Casey had at least been telling the truth about that. And even more importantly, Mila's mother had been kept completely clear of the breaking scandal. Knowing that Phan wouldn't be making weapons anymore was the only glimmer of light in these recent dark days.

Almost without thinking, Mila accessed another archived news story.

An image of herself flashed in the air before her. Or at least what Mila used to look like. It was the photo the Advocacy had been using on her bounty.

#### **EVONY SALINAS CHARGED WITH AIDING AND ABETTING "THE PHANTOM"**

The article speculated on the nature of the terrorism, on the relationship between Mila's parents and Phan Pharmaceuticals, and on Mila's motives. Even with the revelation of the biological weapons it hadn't changed the fact that the Phantom had wreaked havoc for months. Casey, and by association Mila, were still considered criminals.

The article had included a small photo of Rhys as well. He had been held for questioning, but with no proof of any wrongdoing on his part he had eventually been released.

Mila reread the final line.

*Evony Mila Salinas is still at large, with several bounties on her head for crimes ranging from petty theft to terrorism.*

She scanned back up to see Rhys's face one more time, but it was like a knife through her heart. She turned off the mobi.

She needed to get to Xi'An territory fast, and she only knew of one woman who could get her there. Sybil.

But she'd been unable to dig up anything useful on the woman. All she knew was that she was related to that peddler who had sold trinkets in the Tevistal market square on Pilgrim's Day. So that's who Mila needed to find. Sybil might have her guards shoot Mila on sight after what she'd done . . . but Sybil had helped Casey — for a price.

And Mila was desperate enough to pay just about any price Sybil asked. She'd learned a few weeks ago that Rhys was hunting her down, trying to bring her in, that her time was running out.

Maybe . . . maybe if he did find her again in Xi'An territory, free of Advocacy influence, she could explain. She could hope for his forgiveness, if nothing more.

But until then, she'd be a Phantom. Doing what she needed to stay free.

*The End*



**CHRONICLES**