

JUMP POINT

A ROBERTS SPACE INDUSTRIES PUBLICATION

ISSUE 03.08

IN THIS ISSUE

- Work in Progress: FPS Armor 3
by many artists and others
- Portfolio: Kastak Arms 55
by Adam Weiser
- Behind the Scenes: The Producers 58
by the Producers
- Galactic Guide: Ferron 73
by Adam Weiser & Will Weissbaum
- Brothers In Arms (Part 4) 77
fiction by Andy Rogers



GREETINGS, CITIZENS!

Another month, another **Jump Point**.

And once more, I'm on the road.

This time it isn't a convention;

GenCon was a couple weeks ago and Drag-

on Con won't be for another couple of weeks.

(Be sure to say Hi if you're attending!)

This time, I'm passing one of those lifetime milestones and

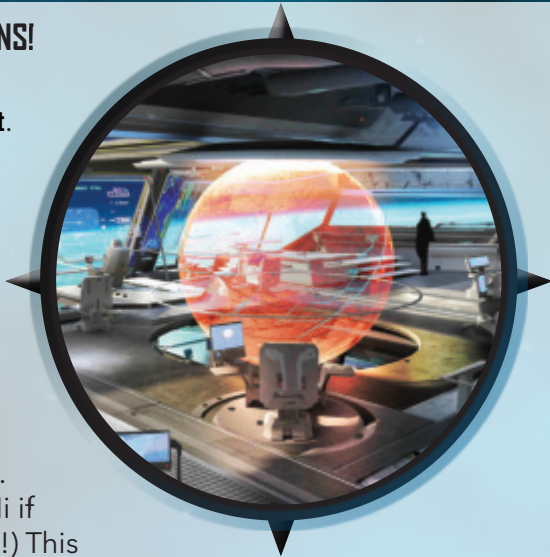
dropping my son off at college for his first year. I've gotta say it's been distracting this week, but thanks to a lot of help from the usual suspects, it's getting done.

Not without a major shift or two. When Ben and I sat down to plan this month's issue, we thought: FPS equipment – of course. Little did we know that there were over 100 images just of armor, plus at least that many more of guns, grenades and gadgets. We had to split it into two issues (yes, coming in September) and this is still one of the longest **JP**s we've done.

So long, in fact, that I also had to push another section to next month: a three-perspective description of Gamescom, from Mike Jones, Jared Huckaby and Alyssa Delhotal. I very much apologize to each of them, and we will definitely be including their work next month.

Meanwhile, we've got the checkered history of Kastak Arms, and the lowdown on Ferron – the victim of the Van-duul even when they wren't attacked.

Plus the full scoop on what exactly it is that our producers do. I knew they did something – you can't look that busy all the time without getting work done, but I didn't really grasp what that involved. Now, I do, as will you.



Our term for the month is actually a series of terms: 1st Read, 2nd Read, 3rd Read and (wait for it) 4th Read. There's actually a pic to explain it; check out page 4.

As usual when we wrap up a series, we give you a little more about the author. Here's Andy:

Andy Rogers is a professional writer and author from Alaska, where he lives with his wife, two kids and some number of hunting dogs. A former owner and CEO of the software engineering firm PangoMedia, Inc., Andy now writes and works as an advocate for private sector businesses in Alaska.

Find him online at arogers907.wordpress.com, or send emails to arogers907@gmail.com.

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

David

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COVER: SCREEN CAPTURE, TYLER WITKIN

PAGE 55: CLINT SCHULTZ

PAGE 58: NASA

PAGE 73, 76: KEN FAIRCLOUGH

PAGE 77: KEN FAIRCLOUGH



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FROM THE HICKPOT
A CLOUD IMPERIUM GAMES PRODUCTION. A STAR CITIZEN NEWSLETTER.
PART OF THE STAR CITIZEN/SQUADRON 42 UNIVERSE.

FPS Armor

The initial releases of *Star Marine* will include:

- 6 suits of armor (three each for Marines and outlaws)
- 2 Sataball teams
- 6 guns
- 3 grenades
- 4 gadgets

Until a short while ago, this article was going to cover all of the above. But we've got over 100 armor images, and more than that for the other types of equipment, so we've just made a command decision to split this into two articles – armor this issue, and everything else next issue.

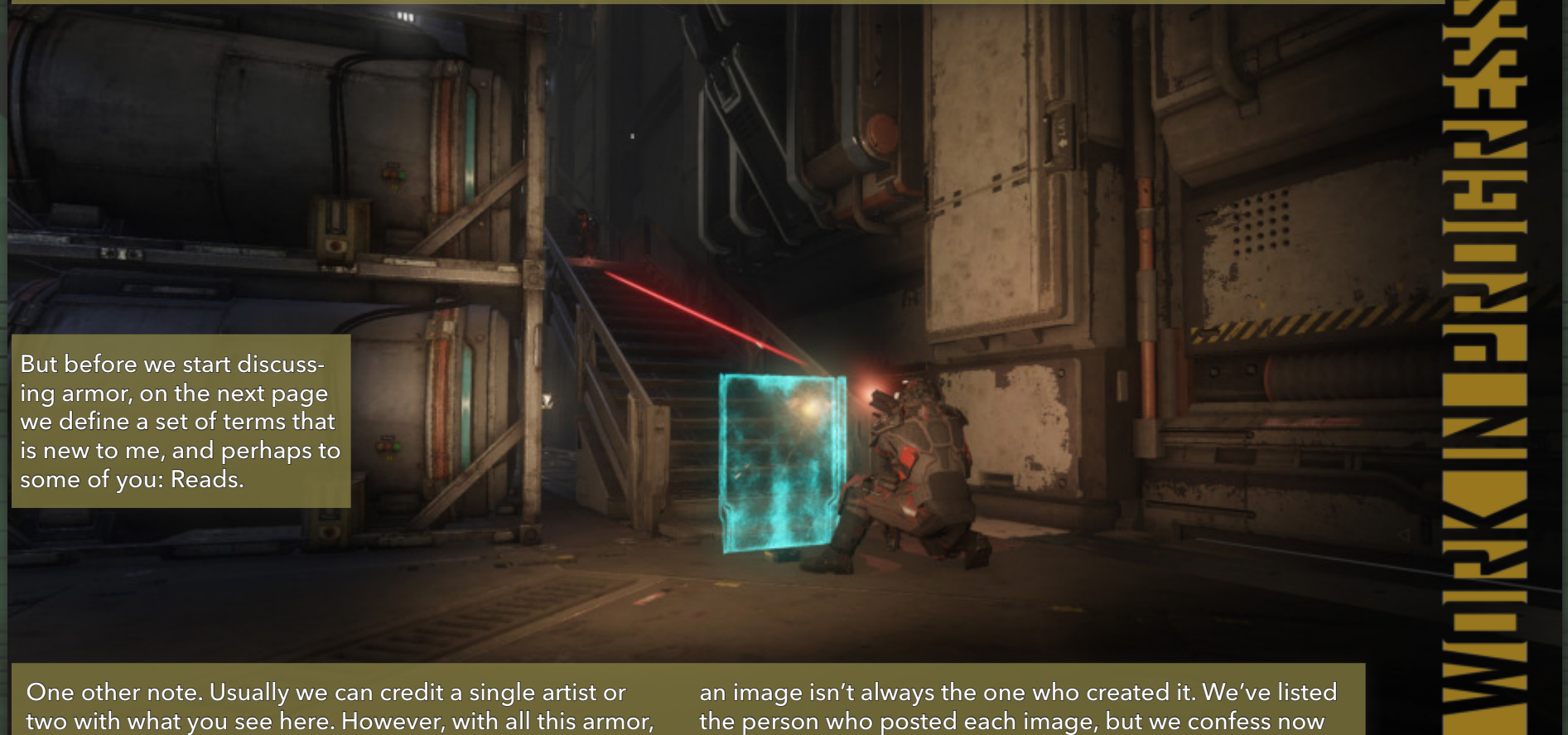
But before we start discussing armor, on the next page we define a set of terms that is new to me, and perhaps to some of you: Reads.

One other note. Usually we can credit a single artist or two with what you see here. However, with all this armor, there are literally dozens of artists who contributed to these designs. It doesn't help that the person who posted

an image isn't always the one who created it. We've listed the person who posted each image, but we confess now that we can't tell you for sure who actually did each piece here.



WORK IN PROGRESS



Here's a page from the *Star Citizen* style guide, discussing 1st – 4th Read. The terminology comes from Neil Blevins, who has more details at:

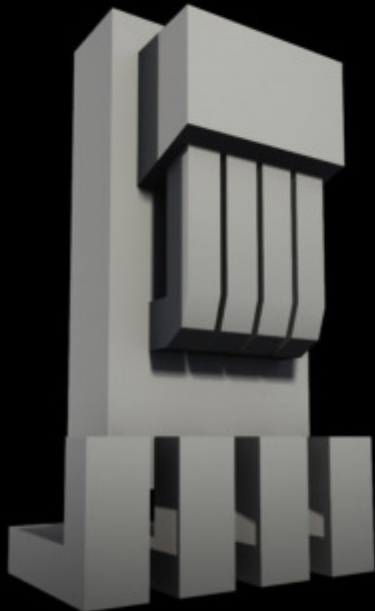
http://www.neilblevins.com/cg_education/primary_secondary_and_tertiary_shapes/primary_secondary_and_tertiary_shapes.htm

The meaning is pretty intuitive, once you're given a clue. "1st Read" is what you see when you first glance at an object. "2nd Read" is what you absorb on closer examination, and so on. An object that has additional "4th Read" details to discover is highly intricate.

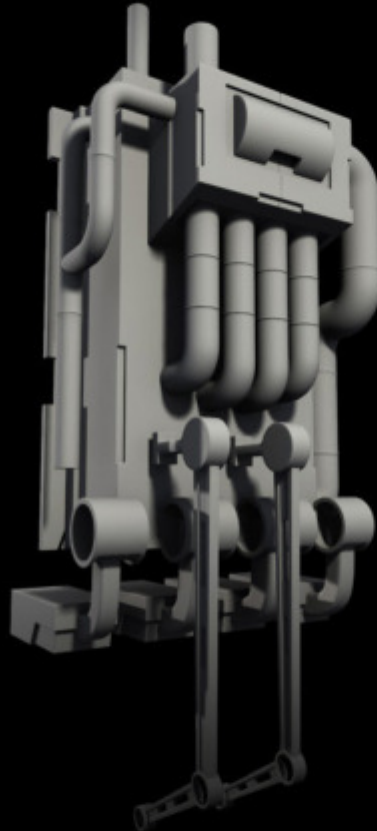
This month's WIP article discusses Reads in a few places.



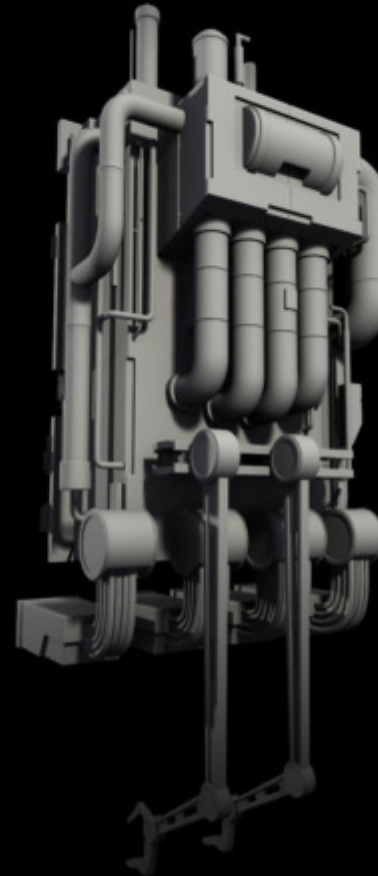
1st Read



2nd Read



3rd Read



4th Read



"Sometimes, 3 reads aren't enough" - Neil Blevins

Star citizen visuals should have as much realistic detail as possible - harmonious, unified and balanced.

- Have large, medium, small and "4th read" tiny shapes ... Detail.
- Have variety to the size of shapes in each of these categories.
- Make sure there are areas of dense detail as well as areas of sparse detail.
- Compose these details to focus the viewers attention.

WORK IN PROGRESS

Marine Heavy



Forrest Stephan, Technical Artist, CIG-LA:
Version 0.1

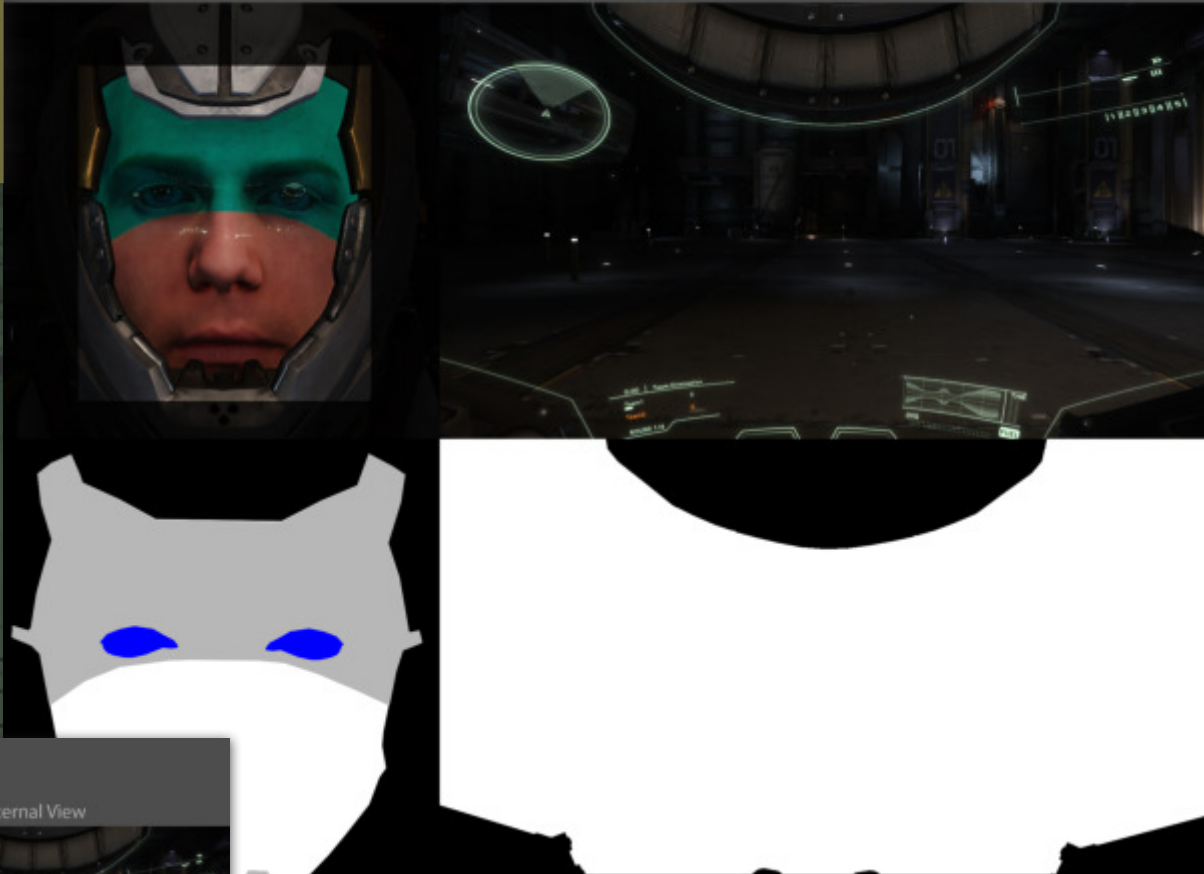


WORK IN PROGRESS

Helmet View: Marine Heavy
Version: 0.1 (Before Revision)

External View

Internal View



Forrest: We will be starting helmet modifications next week. Please provide feedback/requests.

Helmet View: Marine Heavy
Version: 0.1 (Before Revision)

External View

Internal View



Chris R: There is a clear visor on the current heavy Marine model.

Also, this doesn't seem to exist anymore.



WORK IN PROGRESS



Forrest: Marines color adjusted to Green color theme as requested. Diffuse detail pass in progress. Wear pass in progress. Fixes to helmet glass in progress. Fixes to wobbly normal maps on helmet in progress. Hard surface fixes to helmet in progress.



WORK IN PROGRESS

UP



Lisa Ohanian, Production Coordinator, CIG-LA: Marine Heavy Helmet Interior View. [Discussion on next page.]

DOWN



WORK IN PROGRESS



Chris R: General shape feels ok. I would have the sides come in some though; it should feel more claustrophobic. Heavy marine outfit makes you a tank but hurts your visibility.

Also a minor quibble: looking at the 3rd-person view, the gap between the front of the crown and the side of the helmet feels like it should be taller / longer. Chin area doesn't seem to match up either; it kind of feels like there is a pretty deep slanted chin section, with thinner side guards rising from it. [See notes, three pages earlier.]

Josh Coons, 3D Modeler, CIG-ATX: This matches the ref I had.

Chris R: Ah, if you look at the most recent Heavy Marine turntable, you'll see the glass of the visor

goes all the way up to the metal exterior on those; it's like there is a bit of geo missing on the exterior helmet or it was slightly modified.

Josh: I'm adjusting it as I type.

Sean Tracy, Technical Director, CIG-ATX: Just a general comment: I would say the interior looks a bit less chiseled than I would have expected. The Heavy Marine has a ton of hard edges, and with the large rounded shape in the top center it makes it feel like he's not in that helmet. Also the rest of the interior is shaped like that so it feels weird that the top is rounded. JUST MY OPINION, THOUGH!

I would imagine it being more like a staggered/ sharp "U" shape rather than a soft rounding.



WORK IN PROGRESS



Forrest: Omar and I did the Marines Digital Camo. Green & blue color variant. Fixed all textures and fixed material. [Green this page.]

WORKING IN PROGRESS



Forrest: Omar and I did the Marines Digital Camo. Green & blue color variant. Fixed all textures and fixed material. [Blue this page.]



WORKING PRIORITIES



Mark McCall, Technical Animator, CIG-LA: Marine Heavy Interior With Edge Blur



WORK IN PROGRESS



Gavin Bird 2D UI Artist, F42: FPS HUD UI mockup of Marine Heavy Helmet



WORKING IN PROGRESS

Marine Medium



Forrest: Version 0.1

Chris R: Who did the helmet? That looks like it got some hard surface modeling love!

Guilherme Carvalho, Character Artist, F42: Glad you like it, Chris. I had to reuse the back part of the light marine helmet due to time constraints, but it was a fun exercise.

Mark Skelton, Lead Artist, CIG-ATX: There's a seam on the back of the helmet and in the front mouthpiece. This would probably be apparent in our 3rd-person view.

David Jennison, Lead Character Artist, CIG-ATX: Yeah,

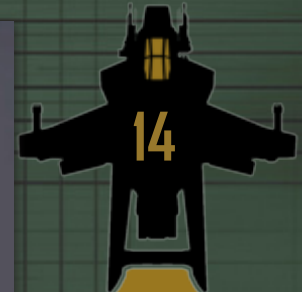
that helmet looks pretty sweet!

Chris R: I feel like this suit needs bulking up a bit – doesn't really feel very "medium"; more "light." I would go for a bigger chest plate, bigger boots. Also needs some custom normal love, especially on areas like the arm and leg armor.

Materials could do with some love / definition. Need some insignia.

Suit needs to be airtight for EVA.

Forrest: Cool, agreed. Thank you!



WORKING PRIORITIES



Forrest: We will be starting helmet modifications next week. Please provide feedback/requests.

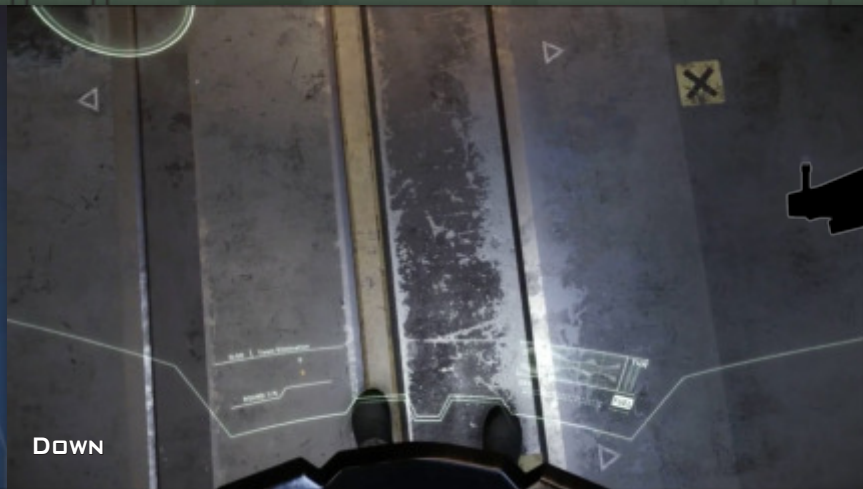
Helmet View: Marine Medium
Version: 0.1 (Before Revision)

External View

Internal View



WORK IN PROGRESS



Lisa: Marine Medium Helmet Interior View.

Chris R: Hard to give proper feedback without a recent 3rd-person shot.

Feels a bit square on the visor plate (but I need to see the medium helmet).

Josh: It's square; for all of these frames I directly created geo by tracing the outside ortho shot of the helms [on previous page] and then wrapped them around the camera position.

Chris R: Ah, ok, cool, then! Just needs detail! :-)

Josh: Another reason I would like that blur effect locked in where you want it: so I know how much we need in there. :)

Sean: The frame just looks a bit odd cause you can see it all together almost and you see a lot of the inside looking up (feels pushed inside, similar to the light helmet).



WORK IN PROGRESS



UP

Mark: Marine Medium Interior With Blur



DOWN



WORKING IN PROGRESS



Gavin Bird: FPS HUD UI mockup of Marine Medium Helmet



WORKING PROGRESS

Marine Light



Forrest: FPS Marine Light Armor

Chris R: Killzone 1 called from 2004 and said it wanted its character back! :-p

Seriously, the helmet's not too bad (could do with a bit more close-up definition and proper hard surface modeling a la ships) but the body? We've got to up this significantly!



WORKING IN PROGRESS

Helmet View: Marine Light
Version: 0.1 (Before Revision)

External View

Internal View



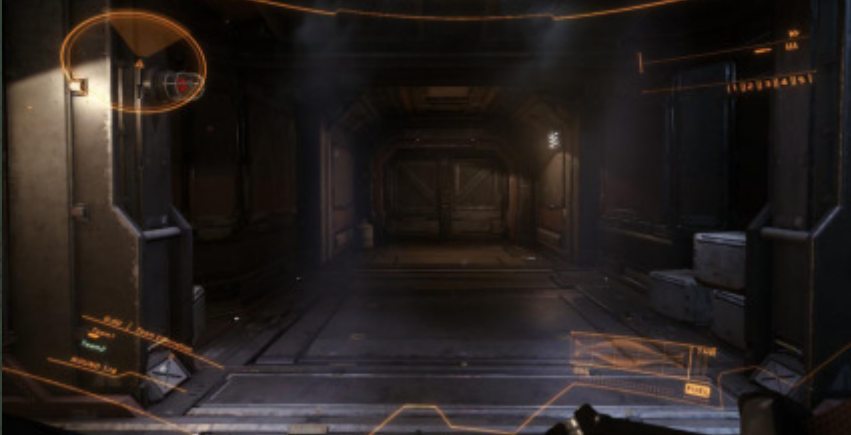
Forrest: We will be starting helmet modifications next week. Please provide feedback/requests.

Wil Josephy, Senior Designer, F42: Whatever solution is chosen it ideally should work with changing FOV. Currently you can not change the FOV without it bugging the view, due to the helmet mesh being so close to the camera (see attached).

PC gamers are used to being able to tweak their FOV for performance/gameplay reasons.

Hannes Appell, Cinematics Director, CIG-Frankfurt: Not only that, we need changing FOV in the conversation scenes. We don't want to look our A-listers in the face using FOV60 FOV55. We will want to go down as far as 35, so we need a solution for what happens when you are in a helmet for that case.

60 FOV



90 FOV



WORKING IN PROGRESS



WORK IN PROGRESS

Forrest: Marines color adjusted to green color theme as requested. Helmet revisited and updated. Diffuse detail pass in progress. Wear pass in progress. Fixes to back of upper torso and back of helmet in progress.

Chris R: I wonder if we should not go with a greyish color for the "cammo" color – especially as most space marines will be seeing action on spaceships / urban environments. To discuss.

Moving in the right direction though! Good work, guys!

Forrest: We have all the materials broken up and well organized; any tweaks and variations are not a problem. We will give it a try and re-post.

UP



DOWN



Lisa: Marine Light Helmet Interior View.
[Discussion on next page.]



WORK IN PROGRESS

Lisa: Marine Light Helmet Interior View.

Chris R: I think the top edge of the interior of the helmet encroaches too much into the view in the neutral pose, and when you look up to the extremes you see way too much of it. I would halve the amount of this part of the helmet that you can see.

I also think you see a little too much of the sides, so I would push those out a little too.

The idea would be for the light helmet to give the most visibility, then the medium helmet, then the heavy (which is most constricted of all).

Adding some slight blur / out of focus for the interior helmet when looking outside (i.e., when we aren't at the extremes on each side) would help a lot. There may need to be some special shader work done for this.

I'm assuming we would reconfigure the FPS HUDs to have edge graphics that contour to the shape of each helmet?

Charles Brungardt, President, Illfonic: Just to answer that last question, we support that pretty easily through the XMLs. We would just need to work with a Flash artist to modify the border lines to fit the shape of each helmet.

Josh: Roger that on the light Marine. I would like to get the blur onto these interiors asap so we can get CR's eyes on it and get the correct amount nailed in (especially the outlaw helms). I'll get on those fixes today.

Zane Bien, User Interface Designer, CIG-LA: What do you think about having, in addition, a soft / subtle glow that emanates from the edges of the helmet to indicate a light source projecting the HUD? It could flicker on / off in conjunction with the bootup / shutdown of the HUD, as well as with a hit from an EMP.

Chris R: Zane, that sounds good!

Josh: Halved the visibility on the light marine helm. Much more open now. Reduced visibility on the top visor when looking up maxed out as well. Just need to get that blur effect going now. :D

Sean: We do have the lights in the helmets, just need to add one more for Zane. :)

Zane, we could even make it project the flash HUD if we were crazy. :)

This one feels like I'm a bit too far inside the helmet (like the helmet is a bit out in front of me). It's due to what Chris mentioned (seeing too much of the sides AND top at the same time). To make it feel close, we have to be careful never to see the whole framing of the interior, otherwise we will feel pushed back into the helmet.



WORK IN PROGRESS



Forrest: Omar and I did the Marines Digital Camo, green and blue color variants. Fixed all textures and fixed material. [Blue this page.]



WORKING IN PROGRESS



Forrest: Omar and I did the Marines Digital Camo, green and blue color variants. Fixed all textures and fixed material. [Green this page.]

Chris R: Green camo is what we should do. (For the final one we may want to look at olive green colonial marine style, but for now this looks nice!)

Forrest: Green it is! Adjusting the final color to be a more olive green colonial marine is no problem.

WORK IN PROGRESS

Marine Camouflage Color Lineup

note: Helmet has an experimental light inside coming from the top, inside

Original 1 Saturation 5% of initial texture

Revision 2 Saturation 70% of initial texture

Revision 3 Saturation 100% of initial texture

Revision w/Dark Green Undersuit 4 Saturation 100% of initial texture



Forrest: Attached are a couple greens to pick from (we went for an olive green) for the FPS marine camouflage. It's easy to adjust, so if there needs to be some hue adjustments, like if we need to push a little more yellow in the hue for example, it's not a problem. Thanks!

Sean: Looks great!

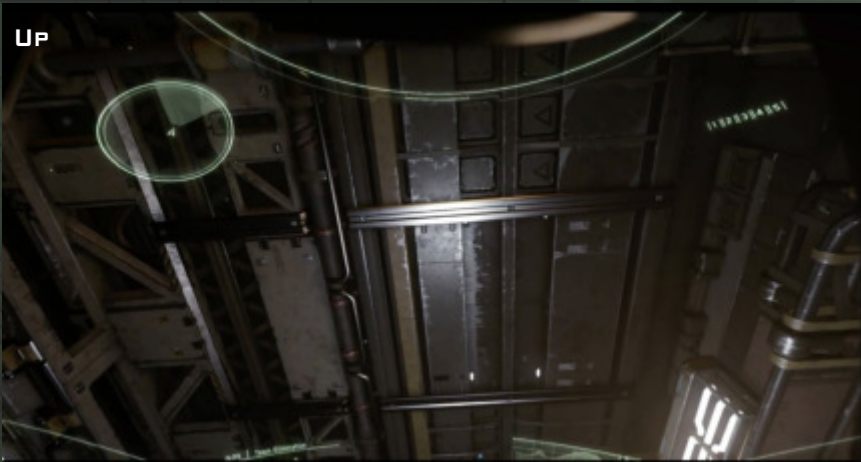
Chris R: Remember I also wanted a solid olive green option (Colonial Marines / Vietnam style), but with some nice patina as an option with some good decals – UEE marines, rank name, etc. (as digital green camo does feel a bit weird in a space station, and there are some readability concerns).

Phil Meller, Lead Designer (S42), F42: Looking good, liking the whole torso look. All I'd say is that it's all looking a bit tight leather / motorcycle outfit below the waist. How about some thin armour on the thighs?

Forrest: On it. Working on some patina wearing with a solid olive green option now. I'll get some UEE decals on there as well.

26

WORK IN PROGRESS



Mark: Marine Light Interior With Blur



WORK IN PROGRESS



Gavin Bird: FPS HUD UI mockup of Marine Light Helmet



WORKING PROGRESS

Outlaw Heavy



Forrest: Version 0.1



WORKING IN PROGRESS

Forrest: We will be starting helmet modifications next week. Please provide feedback/requests.

Helmet View: Outlaw Heavy
Version: 0.1 (Before Revision)

External View

Internal View



WORK IN PROGRESS



Forrest: Nose detailed, updated visor, interior mask with cutouts for eyes, color updates: Crimson, yellow and black as directed. Basically took a "make him look more bad ass" pass as requested, as well as more sinister. Rendered at 3 distances. Hope you like!

Chris R: I think it's looking MUCH better!

It's hard to say if there is too much crimson in the helmet without seeing it in context with the outfit.

Forrest: Absolutely. It's built in a way where color adjustments are not a problem. They're quick iterations. We are posting the uprezed body tomorrow, then seeing the composition as a whole will help us dial in those values.

Mark: I still feel the back doesn't have enough 3rd / 4th read. Not detailed enough.

WORKING IN PROGRESS



WORK IN PROGRESS

Omar Aweidah, Associate Concept Artist, CIG-LA:
Heavy Outlaw Turntable Version 1. Basic Idle animation inside Gold Horizon. Put together by Omar Aweidah and Chris Wolak.

Chris R: Has there been some work on the heavy outlaw? Materials and detail seem much better than before.

Or is it from better lighting?

Forrest: Every FPS character has gone through pretty major revisions, including the heavy outlaw. There is a more revised version than the one even in the video.

Chris R: Great!



UP



DOWN

Lisa: Outlaw Heavy Helmet Interior View.
[Discussion on next page.]



WORK IN PROGRESS



Lisa: Outlaw Heavy Helmet Interior View.

Chris R: In the third-person view, the helmet has two eye holes, but this gives the impression of one visor, kind of like a skiing mask.

For the heavy, I wonder if we can do a trick where you focus on the top or bottom of the helmet and then bring the helmet into view, so that you see the middle bridge the helmet (basically think of two circles overlaid on the visor).

If you put your fingers together to form a circle with your left and right hand's thumb and the index finger then place them on your face like a pair of glasses you will notice that you don't perceive the tips of your fingers where your nose is until you focus up and down (basically focus on your fingers and not beyond) so when focused outwards it feels a little like a ski mask with a downward peak at the top and an upward peak at the bottom.

We could simulate this with some geometry that represents the inner part of the helmet eye holes that only becomes opaque / in focus when you look down or up to the extremes of the helmet.

I've marked it up on the attached frame.

Josh: Yeah, simulating the "eyehole" effect was the one I was worried about. I think we can pull this off, but I also believe we won't know how to until we get the blur going, which would give us a vignette type effect. This is an issue across all the Outlaw helms since they all have eyeholes.

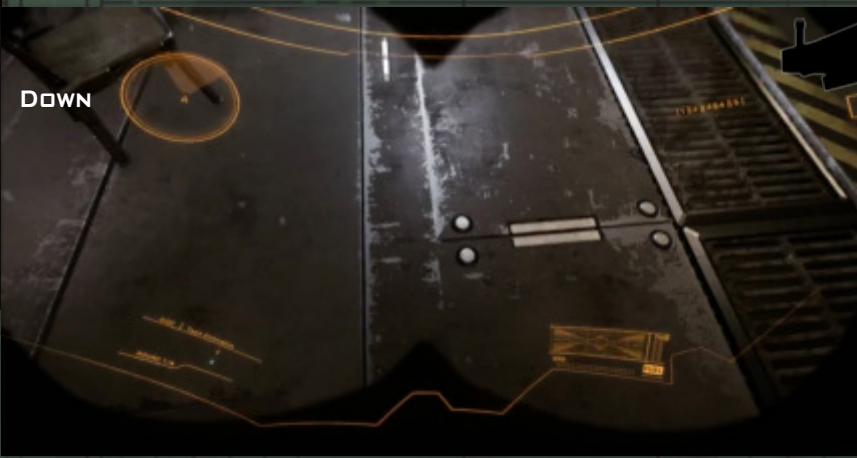
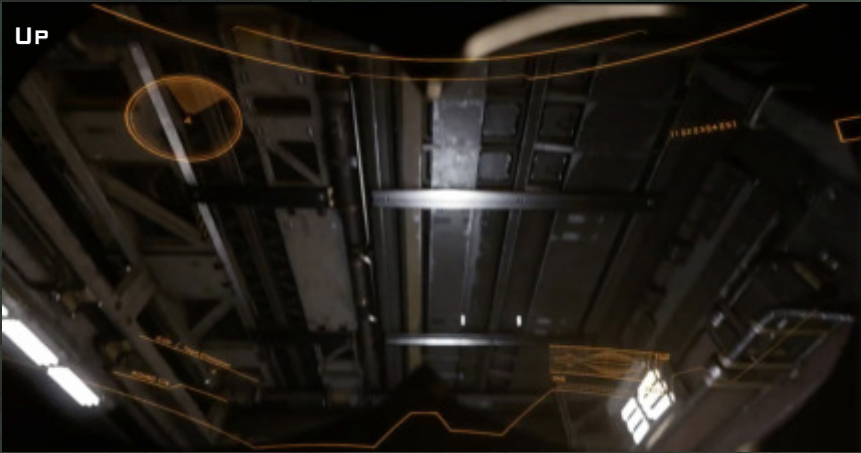
Sean: Yeah, this one is tricky – we need the blur to do the "eye holes" right. I think it would look weird for sure without it. It very much feels like ski goggles though! (Just ones that lag behind. :P)





WORKING IN THE DARK

Forrest: Omar and I did the turntable of the heavy outlaw.



Mark: Outlaw Heavy Interior With Blur



WORK IN PROGRESS

Gavin: FPS HUD UI mockup of Outlaw Heavy Helmet

Hannes: Is there a way to do the darkened edges with more "gaussian" blur (without killing performance)? To simulate peripheral vision? Edges feel a bit harsh currently.



WORK IN PROGRESS



Outlaw Medium



WORKING PRIORITIES

Forrest: FPS Outlaw Medium Armor

Chris R: This needs a serious up-rez in quite a few areas!

Primarily, we need proper normal and smoothing group usage on the hard surface parts, as well as more polys (looks pretty low poly). In particular:

- Wires / pipes need help / love.
- Cod piece is dumb

- Model / sculpt on legs feels very low res
- Boots look super low poly / basic

This really feels like a last-gen console character model at 10K polys and old school materials.

Idea / concept is cool, but execution is lacking.

Forrest: We will be starting helmet modifications next week. Please provide feedback/requests.

Helmet View: Outlaw Medium
Version: 0.1 (Before Revision)

External View

Internal View



WORK IN PROGRESS



Forrest: Material fixes to outlaw medium. Diffuse detail pass in progress. Wear pass in progress. Decal pass in progress. Helmet geometry has been uprezzed, hard surface. Fixes to removing cod piece in progress. Color changes for outlaws available upon request, as currently they are dark and neutral. [Discussion on next page.]



WORKING IN PROGRESS



Chris R: Definitely moving in the right direction!

I would say the bottom half still needs some geo / sculpt love, but the top is looking pretty good.

I would think about separating out the pouches on the belt – they still look a little baked in. If each pouch were a separate attachment, they could be physicalized using Ivo's physical attachment stuff that is in CryEngine 3.16.13.

Also, we should consider some more fun color schemes for the outlaws. They're rebels so perhaps they are loud. Have some color? Perhaps some signage / skull and crossbones / that kind of thing.

Marines should be military – grey / steel. Make the outlaws feel a bit louder.

Forrest: Yes, Good eye. Every thing mentioned above is correct. The bottom half hasn't had geo and sculpt love. It's a resources thing, but I would also like to see those improvements. The pouches are indeed baked in and haven't been separated out yet to properly utilize the attachment system.

The color is neutral but we can swap out with different themes. We had Greens or Tans, but how often would

they be in the desert or forest? Seems like those would be more variant outfits. We started conservative to concentrate on the base PBR workflow and values; now we can experiment with some louder looks and colors. We were thinking of adding some pirate signage, in the diffuse detail and decal pass. Glad to hear since that's something we want to do, so will continue.

Quick question, do these rebels have an official pirate/ outlaw logo?

Then we still plan on beating up the rebels' armor sets since I imagine the Marines should look more pristine than the outlaws.

Additional note: To confirm, we are following the direction to move the Marines to the grey and steel, with grey digital patterns. Will get that theme posted. Thanks for the feedback!

Chris R: Yep grey digital camo for Marines seems appropriate for space & urban environments.

I would go bolder for Outlaws - kind of screw you – try to shoot me – crimson, yellow maybe some black, too.

Forrest: You got it!



UP



DOWN



WORK IN PROGRESS

Lisa: Outlaw Medium Helmet Interior View.

Chris R: Same comment as Heavy and Light in terms of helmet vignette. If we went more towards the concept and less towards the style of the current helmet (which looks cool but is kind of a death's head), you could go with the current vignettted ski mask style.

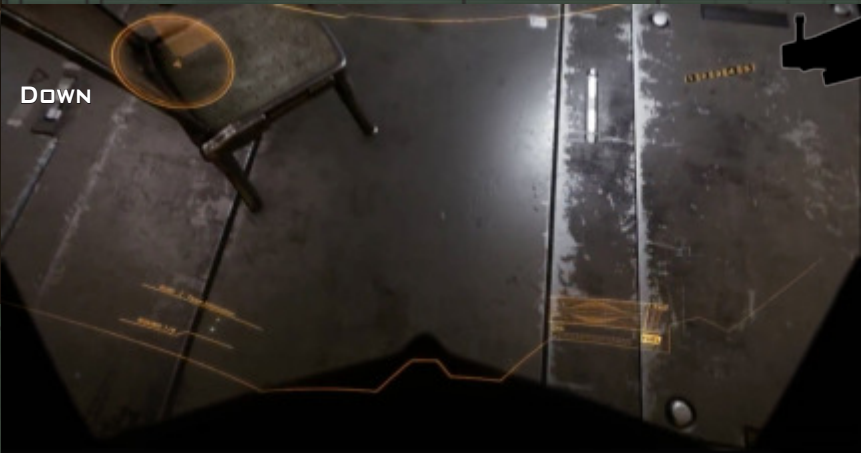
Josh: Agreed, light and med outlaw eyeholes are super similar; could use the same one in terms of shape/effect.





WORKING IN THE DARK

Forrest: Omar and I did the turntable of the medium outlaw.



Mark: Outlaw Medium Interior With Blur



WORK IN PROGRESS

Outlaw Light



WORKING PRIORITIES

Forrest: FPS Release 1.2

Chris R: What can I say?

Re-sculpt body / suit? Adapt a better sculpt?

This feels super low-rez. Helmet's about the only thing that works, but it could do with detail, especially inside the visor.

Cod piece looks silly; pants, arms, backpack all look like they were built on the Crysis 1 poly budget.

Forrest: Yes and yes. Similar to the medium marine, we will be up-rezzing this character, cleaning up geo on the helmet, replacing the backpack with proper weapon attachments, and of course new materials/textures for the FPS launch. This should get us to a decent place for the release. Note: The character will be going through a full art direction pass followed by a ground up re-sculpt.

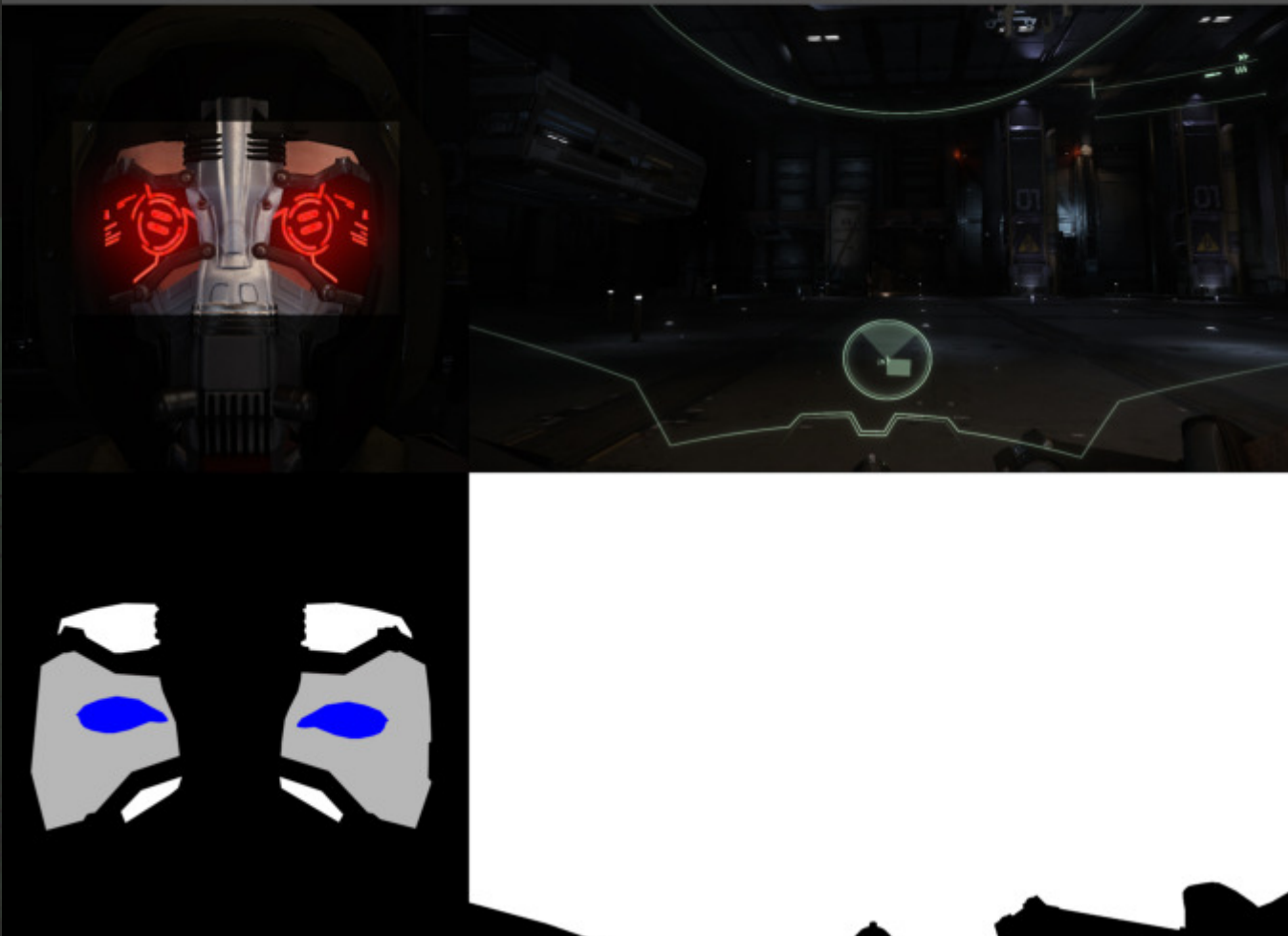
Hannes: Will vest pockets/ammo pouches be dangling on those models (using pendulum attachments)?

Forrest: We will be starting helmet modifications next week. Please provide feedback/requests.

Helmet View: Outlaw Light
Version: 0.1 (Before Revision)

External View

Internal View



WORK IN PROGRESS



WORKING IN PROGRESS

Forrest: Helmet revisited and updated. Outlaw colors temporary until final color theme is decided. Complete helmet remodel for the light outlaw character. Achieved through ship space art techniques. Diffuse detail pass in progress. Wear pass in progress. Fixes to capping the back of nose plate in progress. Artist: Hard Surface Model - Josh Coons, Tech Setup / Surfacing: Daniel Kamensky.

Chris R: I could see more detail in the mouth breathing assembly.

The eye HUD reticle doesn't look nearly as spooky / bad

guy as before. Basically, it now looks like a friendly robot with a simple mouth. Let's get back to the more "evil" looking HUD.

Forrest: Sure thing! Will take a pass at that now.

Mark: I feel like the 4th read detail level could be higher. And yeah, he needs "angry eyes," like Terminator, with insinuated eyebrows.

Forrest: The outlaw medium helmet redo has the angry eyes. Somehow Coons is the master at making things look mean. That's being wrapped up right now.



Forrest: Outlaw Light revised. Helmet revisited and updated. Diffuse detail pass in progress. Detail decals in progress. Wear pass in progress. Glass reflections off to see interior adjustments. Fixes to the entire model. Weapon attachments built into armor set.



WORK IN PROGRESS



Forrest: Nose detailed, updated visor, interior mask with cutouts for eyes, color updates: Crimson, yellow and black as directed. Basically took a, "make him look more bad ass" pass as requested, as well as more sinister. Rendered at 3 distances. Hope you like!

Forrest: Comparison shot (After and Before). SC Ship Techniques vs Prior Techniques

Chris R: I think it's looking MUCH better!

It's hard to say if there is too much crimson in the helmet without seeing in context with the outfit.

Forrest: Absolutely. It's built in a way where color adjustments are not a problem. Quick iterations. We are posting the uprezzed body tomorrow, then seeing the composition as a whole will help us dial in those values.

Mark: I still feel the back doesn't have enough 3rd / 4th read. Not detailed enough.

**Light Outlaw Helmet
(After Revision)**



**Light Outlaw Helmet
(Before Revision)**



WORKING PRIORITIES



Lisa: Outlaw Light Helmet Interior View.

Chris R: See my note on the heavy outlaw. We should try something similar here.

Also, the HUD internal should match the style of the exterior 3rd-person HUD (which is cool and intimidating).



WORK IN PROGRESS



Gavin: FPS HUD UI mockup of Outlaw Light Helmet



WORK IN PROGRESS

Most Recent Developments

Forrest: Did some Gamescom helmet lighting test with the updated skin/eyes Sean Tracy and I have been dialing in, with additional texture touch-ups by Omar A. Scan data from Danny Head. Shot taken in Gamescom Level. *note: There is a known bug for the eyes reacting with the area/texture projectors. Graphics team believes this may not be a bug with the Eye shader but with the light projectors. Took the screen at Hi-Rez, so feel free to zoom.

Sean: Who says there's broken eye shader! :P
Setup right now looks freaking awesome. :)

Chris R: Looks awesome – although last Gamescom demo I did (with this morning's UK time build) the helmet glass

was so reflective it was basically mirrored so you couldn't see the face.

Forrest: Okka provided the code fix last night that turned on the reflections in the last play test which didn't have the updated glass mats. Shelved the materials from the screenshot for the demo. Doing tech setup on lights now.

Chris R: So they won't be so reflective now, or do you need to check in your shelfe?

Forrest: Correct, the reflections will be dialed back appropriately. Shelved for playtest. Going to review in the next playtest, which I believe is in the next 30 minutes, and hopefully will be good to go, then will check in.



WORKING ON THE



Omar: These are olive green color options as requested by Chris Roberts.

Request for feedback from CR on which number he prefers.

This does not include the wear pass.

Chris R: #3 – classic 'nam!

Forrest: Awesome. Thanks!

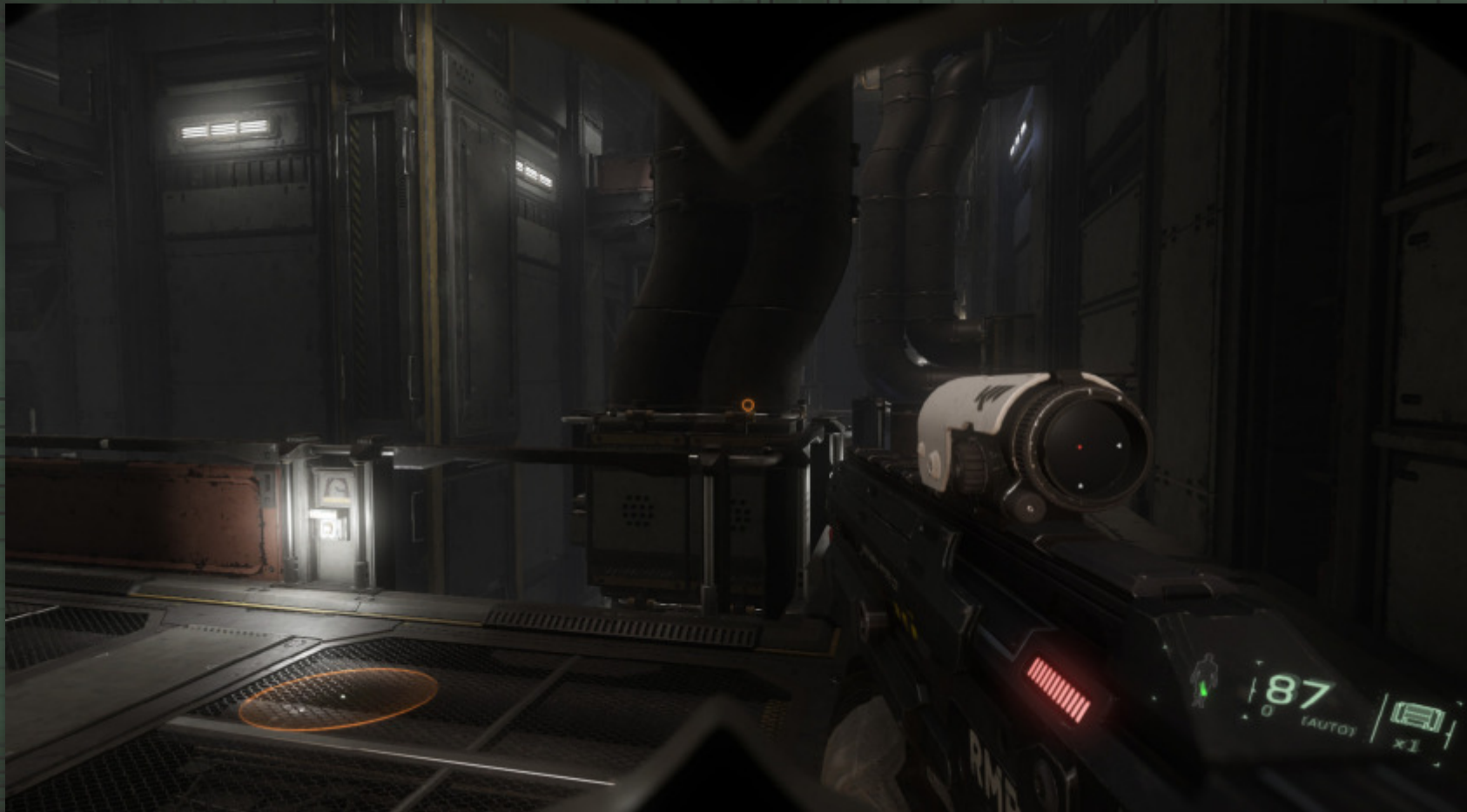
Omar: Will get this on the characters ASAP.



WORKING IN PROGRESS

The elements of all helmet HUDs have been shifted, mostly toward the bottom of the display.

... more changes to come.



WORKING IN PROGRESS



"We don't care about being subtle. We care about being effective." So said current Kastak Arms CEO Thaddeus DeWitt at a recent shareholders meeting. The comment came in response to criticism over the company's latest marketing campaign. The ad features a young civilian family of four standing outside of a modest house. With flames licking the foreground, two kids huddle next to their parents, who each hold a Kastak weapon. The wife blows smoke from the barrel of her gun. The husband holds his weapon high, leading the eye to the tagline "Protect your Empire!" next to the company's ubiquitous logo – a clenched fist coming at the viewer.

Kastak Arms makes inexpensive energy weapons with intimidating names like Devastator and Firestorm, and aggressively markets them to distressed parts of the Empire. Even though the company portrays itself as providing weapons for personal defense, the brand has become more readily identified with people who use them for aggressive and unlawful purposes.

"Let there be no mistake," Thaddeus DeWitt continued in his speech to shareholders, "we make guns, like countless other manufactures in this Empire, but we get criticized because our ads are honest about owning a weapon. Having one is about more than protection. It's also about

power.” Kastak’s stated goal is to make effective and affordable weapons for everyday Citizens and civilians. However, critics argue that the company’s business model floods the streets with cheap weapons that cause more violence than they stop.

State Sponsored

Shortly after Virgil fell to the Vanduul, Vega System was not only flooded with refugees, but had suddenly become part of the conflict’s front line. The looming threat of attack drove both businesses and the public from the prosperous planet of Selene. Those who chose to stay, or could not afford to leave, worried about what would happen if a Vanduul attack cut them off from the rest of the Empire. So Selene’s Governors Council strove to make their planet self-sufficient. With no native personal defense weapons manufacturer, they decided to create their own.

Technically, Kastak Arms was established in 2738 as a public-private partnership between Selene’s Governors Council and a consortium of local business interests. Named after the first city to fall to the Vanduul in the attack on Virgil, the company’s mission statement was to make powerful weapons available to Selene’s public at a modest price, so if the invasion came all Citizens and civilians would be able to defend themselves. Despite the hysteria, the Vanduul attack on Selene never arrived. Instead, the planet became awash with weapons that, combined with an unstable economy, were attributed to a rising crime rate.

Public safety groups protested that the Governors Council was profiting off the violence caused by Kastak Arms. In 2753, a rogue Kastak executive was arrested after tampering with Vega’s early warning system for Vanduul attacks in an effort to spur sales. Selene’s Governors Council moved to dissolve the company. The Council’s lone dissenting

voice was Hiram Larcher, who delayed the vote, allowing Kastak’s private partners the time to put together a bid to buy the Council’s stake in the company. Larcher successfully lobbied the Governors Council into taking the bid, then promptly resigned from his seat to become Kastak’s CEO.

Universal Ambition

Today’s Kastak Arms is the result of Hiram Larcher’s vision. Once the company became a wholly private endeavor, Larcher implemented policies that he had been pushing for on the Governors Council. Sensing saturation of Selene’s market, Larcher brought the brand to Bremen amidst a massive ad campaign featuring an attractive model standing over a dead Vanduul and holding a Kastak shotgun. The ad’s copy read, “There’s a reason the Vanduul avoid Vega,” and sparked a heated debate among pundits on the Spectrum, which generated a windfall of free advertising for Kastak. Sales climbed and allowed the company to increase operations across the Empire.

As the company expanded, it quickly realized it was better for its bottom line to advertise on the streets of Hyperion instead of the salons of Terra. So, before the company entered a new system, they would make aggressive ad buys in low-income areas, letting its pervasive and provocative ads stir up consumer interest and controversy before its weapons landed on shelves. To this day, ads for Kastak Arms are a common sight in lower income neighborhoods like Newcastle and Tram. When critics charge that Kastak spurs violence in such areas, company officials point to high sales and affordable ad space as justification for its practices. As Hiram Larcher bluntly said in an interview, “These people need affordable guns. Look how much crime and violence they have to deal with. Do you know how dangerous it would be for them to go unarmed?”



Over the years, Kastak Arms has worked hard to cultivate an image as a corporate underdog. A common thread in its marketing is to portray itself as the much maligned gun manufacturer whose only mission is to provide cheap protection for the masses. This image is more than an advertising ploy, though. Historians credit Kastak Arms with playing a pivotal role in the overthrow of Ariane Effendi, Locke's dictatorial ruler during the early 29th century. The availability of Kastak weapons allowed opposition leader Omar Astacio to arm the planet's oppressed populace. Following the revolution, Astacio sent the official flag of Locke's new government to Kastak Arms as a thank you.

The flag was framed and has been displayed in the lobby of the company's corporate headquarters ever since. More recently, the company came to the aid of the Asura police after they went on strike. One of their complaints was about being outgunned by criminals. After hearing this, Kastak donated weapons to the force to upgrade their capabilities. It was a smart and shrewd maneuver that has bought the company a wave of good will.

Whether Kastak Arms' business practices have led to a safer society is debatable. Whether its practices have been good for the company's bottom line is beyond doubt.



KASTAK ARMS D12 DEVASTATOR





THE PRODUCERS

More than twenty producers, project coordinators and other similarly titled people work together to keep everything straight and moving forward for Star Citizen. We grabbed those of them who could talk to us and tell us what roles they play in making SC happen. We appreciate everyone who was able to contribute, because they're all in the middle of cranking to get the PU and FPS out, after the sprint to complete our Gamescom materials.

JP: *It's that time! I really appreciate you all taking the time to contribute here. :)*

First question, to get everyone introduced: what is your title, and (in a sentence or two) what do you do for Star Citizen? If you can, please avoid the words "produce," "production," and

"producer" in your description of what you do – we're trying to describe what exactly a producer does. :)

Matt Lightfoot: Project Coordinator (F42 UK). My job is to support the development teams, by ensuring there is clear communication of what we want to achieve, how long we have to do it and any problems. On top of that, solving any problems that hinder us hitting those goals and plotting out the schedule of tasks for those deadlines.

Benoit Beausejour: Yes, my name is French! My official title is CTO at Turbulent, but I take on the role of Lead Producer for all things Web for *Star Citizen*. My team is responsible for SC's online web presence ; that of course



BEHIND THE SCENES

includes the website but also many systems that power different aspect of the project. The store, promotions, account management, pledge inventory, authentication and a bit of launcher. Internally at CIG, we are called "The Platform."

Tom Johnson: Senior Project Manager; I manage the UK production team and *Squadron 42*.

Mark Hong: Production Coordinator, ATX Engineering.

Jake Ross: Associate Producer, CIG ATX. I manage the art, design and animation teams in Austin and generally am in charge of tracking and chasing up Persistent Universe interests across the company.

JP: *Jake, what does "chasing up PU interests" mean?*

Jake: Sometimes the Persistent Universe features require attention from developers across the globe at our various studios. Our environment assets are a good example of this. The direction for the environments come from Austin, the work is done at BHVR, and the quality bar is set in the UK. That requires wrangling and ensuring that information is communicated across the various studios. It also requires tracking on a daily basis to ensure work is being done in a timely manner in order to achieve our deadlines.

Alyssa Delhotal: My title is Associate Marketing Producer, at CIG-LA. I manage the work & communication pipelines between the game production team, marketing and community. I also organize the events.

JP: *What sort of events?*

Alyssa: Like Gamescom. :)

I will also be assisting Erin with the setup, logistics and staffing for CitizenCon.

Eric Kieron Davis: Senior Producer in the Santa Monica office. I'm focused on supporting the Santa Monica studio and, with Gamescom behind us, I'll get back to overseeing the production staff, managing the concept team, diving into the ship process and planning with our leads, improving the structure and usage of our Shotgun software production tracking tool, and continue to provide general support for the studio with things such as staffing, reporting, JIRA tracking, performance reviews, standups, team meetings, etc.

Alyssa: Anything else, Eric? LOL

Zoe Collier: Project Coordinator, Foundry 42 UK. I'm still quite new, just completed 3 months as a CIG employee: 'Achievement unlocked.' My role is supporting the project manager of *Arena Commander*, Ricky Jutley. The short version is I help get the AC updates and patches live. This entails getting QA the information they need, supporting dev staff so they can keep working and prioritising work. Lots of speaking to people.

Mathieu Beaulieu: Producer at BHVR, dealing with planet production and some Persistent Universe functionalities. We have 40 developers in Montréal. My role is to make sure that the team has every tools needed so they can deliver on time and on budget.

Benoit: Love the accented é, Mathieu.

Luke Davis: I am a Project Coordinator at CIG UK. I look after the UK ships, environments, props, concept, tech design, VFX teams. What this means is I ensure everyone is clear on what they are supposed to do, unblocking the team with issues they have, relevant stakeholders are aware of what we are aiming and keeping everyone happy. :)



BEHIND THE SCENES

Matt Webster: I'm a Junior Project Coordinator at CIG UK. I oversee the audio team and tools development, and provide support with engine and network programming.

Jason Hutchins: Senior Producer for CIG-Austin. I oversee the production staff at the Austin studio, provide general studio support with staffing needs, developer support, studio direction, and providing production best practices advise. That includes how to use email, JIRA, confluence documentation, meetings, etc.

I have also been overseeing the production of the *Star Marine* module, directing communication and tasking between Illfonic and the other CIG studios, writing weekly updates for Ben to use on the forums, and doing long-term planning for both *Star Marine* and the Persistent Universe.

Darian Vorlick: Production Coordinator, CIG-LA. I oversee development of *Arena Commander* design and engineering, plus task management and feature production for *Arena Commander* tech such as GOST, and multi-crew seat technology, physically-based damage, weapon and component balancing.

JP: *So a producer is ... a boss? a coordinator/facilitator? an assistant? All of the above?*

Zoe: Producer is anything you need it to be.

Jake: What she said.

Jake: We're the people shoveling coal into the engine to keep the train running smoothly.

Tom: If a project is a vehicle, then a producer is the bolts, the oil or the fuel, depending on what the road is like ahead.

Eric: Producers do a bit of everything to help get things



MATHIEU
BEAULIEU,
BEHAVIOUR

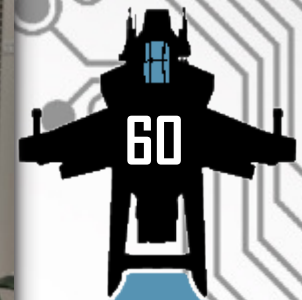
done. Great communication is one of the key elements to any successful producer. We provide support, assistance, guidance, direction, clarity, information, etc.

Alyssa: For me, it's all of that and then some. I basically get a task or idea and figure out how to make it happen. This requires tons of communication, meetings, fact-finding and head-scratching. Producers are like ninjas: if we do our jobs correctly, you never know we were there.

Matt L: Here are two ways of phrasing it. A producer is essentially a fixer – think Morgan Freeman in *The Shawshank Redemption*. If something needs doing, they are the people to get it done, and they are the ones with the contacts to be able to do it.

The Producers are the enablers – their job is to support the rest of the team, solving problems, facilitating communication, and freeing up the developers to develop the game.

Zoe: There also isn't a consistent definition between development teams and even between roles in CIG. I think some of us have different responsibilities.



BEHIND THE SCENES

Alyssa: I agree with Zoe. There isn't even a steady definition of producer within the industry.

Matt W: a facilitator is one facet to the job. It's helping provide the people doing the development work with the right information of where the work should be being done, what's required, and when things they're depending on will be available for them.

Luke: We are the center of communication, the facilitator to enable the development team to do their job on time and on budget while keeping everyone happy. This can be anything from scheduling a roadmap, gathering information on what is needed, or even getting them food – however we can best aid the teams.

Jake: We allow the developers to spend less time on things that might distract them from what they do best, DEVELOPMENT!

Benoit: I think a producer is first a leader. He brings energy and momentum to his team by organizing their work, judging its quality, letting no issue slide, and pressing hard on getting "things done." He's the one person who has the horizontal vision of the piece he's managing. In this he's enabling the resources so they can have tunnel vision on THEIR work.

Jason: All of the above, none of the above, and some other things. Den mother, diplomat, shoulder to cry on, mentor and interpreter. I like the fixer analogy that Matt just used. Makes it sound a lot more compelling than den mother. :)

Most times, issues that need fixing simply come down to knowing who can fix the issue or solve the conflict and getting them either assigned to fix the issue, or getting the two parties in conflict to talk to each other. The best pro-

ducers can communicate with all types of people – extroverts or introverts, be they engineers, designers, business people or artists.

Zoe: I agree completely. Also sometimes you have to protect development from themselves.

JP: *What's an example of protecting dev from themselves?*

Zoe: Stopping them from being distracted by the new shiny thing when a fix or something else is a higher priority.

Matt W: ^ That. And also trying to get it across that "one last tweak" isn't important enough to potentially break the build.

Zoe: Yes! Everyone wants to make the best thing ever and will try and get in that last fix or that change at the last minute which can be the straw that breaks the camel's back.

Luke: Devs often get requests from other teams. We ensure that the developers are always working on what they are supposed to and not being dragged off to do something else, and then have someone wonder why their work isn't done (which gets the dev into trouble). Producers help that entire process and make sure it goes smoothly.

JP: *If I'm a typical SC artist, designer or programmer, do I have just one producer, or several?*

Jake: Developers usually have one go-to producer that they approach if they need information or are blocked from continuing their work. But there are times when they need to interact with multiple producers.

JP: *Can you give an example of such a time?*

Jake: If there is a question that needs answering, a bug that needs fixing, etc.



SENIOR ENGINEER
BEHIND THE SCENES



FOUNDRY 42, LEFT TO RIGHT:
 MATTHEW LIGHTFOOT
 TOM JOHNSON
 ERIN ROBERTS (HEAD OF PRODUCTION)
 ANDY TILDSLEY (PROJECT COORDINATOR)
 MATTHEW WEBSTER
 RICKY JUTLEY (PROJECT MANAGER)
 LUKE DAVIS
 ZOE COLLIER
 SIMON ORMISTON (JUNIOR PROJECT COORDINATOR)

him to build something for her map. The request will go through me and I task the developer, thus he or she remains with one producer (ideally).

Alyssa: I need to pass on this one since it doesn't apply to my position.

JP: *So your production responsibilities are more related to tasks (events, etc.) than they are to a specific team of developers?*

Alyssa: That's correct. My tasks are directly related to getting sales assets, coordinating the community and game production teams, and keeping track of all the

Eric: Depending on what portion of the game you're talking about, you'll have a dedicated production person, likely supported by others throughout the studio and the company.

Matt W: for the most part, it is just one main producer. Though that's not to say they will never come into contact with other producers. For example, audio and VFX are closely linked. While I'm not the production owner for VFX, I will still need bits of information from them to pass on to the audio team to enable them to do their work more effectively

Luke: Everyone on the development team will usually have a production point of contact. For example, I have an environment artist working on Building X, but Zoe wants

moving part related to sales, events and art that goes to the public in its many facets.

Zoe: Releases like the Gamescom demo had a group of producers to coordinate the different teams involved in delivering all the different parts. It was EPIC!

Mark: To me, production at CIG is focused largely around managing communications and around people management. You can do all the planning and organizing you want (which is very important), but if you can't effectively wrangle the communication aspects of all the company's intertwined and often times conflicting plans, as well as getting your team to rally behind them, then all that planning will be useless.



If you consider all the types of communication we use ... instant messages, post-it notes, in-person discussions and e-mails ... on a busy day a producer can easily get several hundred to over 1000 messages. You have to learn how to actually get through them all, even if it means staying late hours after the rest of the studio has gone home. Of course, you also have to learn to prioritize them, and the bulk of them won't need your response or action, but any one you skip may have been something urgent needing your attention. You also have to be able to keep track of your own commitments and follow through on them. If you say you'll handle something, you can guarantee that people will be counting on you to do it. On top of that, good producers will also track their team members' commitments as closely as their own. If you know that someone on your team promised something by end of day, it's as much your responsibility as theirs to make sure it happens. It's a lot to be on top of, but if you can't manage it all, you have no business in production.

On the people management side, at least in middle management where I am at, you have to be able to represent the goals and desires of individuals to those outside your team and to upper management, as well as the very real limitations of your team. You have to find functional ways to make both sides happy and meet everyone's needs, often times through compromise of some sort. Including resources outside of Austin, I manage a team of 14 people. Sometimes people suggest that with a smaller team I should have more time on my hands. However, I find that ironically it's almost more of a handful to manage less people. Because of the limited resources, I actually spend as much time managing the needs of people outside of my team (who are all vying for the very limited bandwidth

of my team) as I do managing the needs of my actual team. So you really have to find ways to make the bandwidth.

JP: *What did you do before you were a producer? How did you prepare for this job?*

Eric: Before professionally producing, I managed and mentored hundreds of employees, produced several creative products, and learned about game development and the creative process.

Matt W: before this, I was a QA tester here for a few months, and before that, QA at another company for 4.5 years. Having been a lead tester there and with the duties that involved (leading a team of testers), it was a fairly natural progression. Before that, though, I was an audio engineer at a radio station, making promos, audio dramas, etc. It certainly gave me the experience of organising the voice talent and being able to work to a deadline (usually tight ones).

Alyssa: I worked at Activision, where I started at the very bottom as a temp in QA. I worked my way up to *Call of Duty* production by taking a job as an Administrative Assistant. That was boring, so I turned it into a Production Assistant job. I had my tentacles in all of the *Call of Duty* projects (about five at once) and learned A LOT from the Senior Producers there. I shifted to a position that specifically handled contracts and finance for all of our active projects (about 17 individual games), where I learned a significant amount about workload balance, tracking and reporting. All of these things helped me to learn a ton about the industry from the bottom up.

Zoe: I was QA for nine years (at Sony). A QA Manager for about five (?) of those; too many to count :). There is a lot of crossover with type of role in terms of issue priority and





communicating with people, and certainly it gives me a very good perspective on quality/bugs. And I was well versed in JIRA, which we use here for bug and task tracking.

Jake: Before producing I went to college at Texas A&M University and got a Master's degree.

I'm still trying to figure out if it was worth the student loan debt, but ultimately it gave me the connections that got me my first job in the industry, so it worked out.

Matt L: I was a politics student. I was thrown into it through my part on the *DayZ* modification, which unexpectedly grew from six of us to over a million players. My role was to deal with the demand of the players and all of the support systems, so my production skills had to scale up with that.

However, I pull lessons I've had from all parts of my life, from organising trips away for charities I volunteer with, to where I went wrong with previous mistakes.

Luke: This was always something I wanted to get into. I started off doing an undergraduate degree in Game Production Management, and then took a year out to learn about management as a junior consultant outside of games. After that, I did a Master's degree in project management. I still wanted to get into games, so I went into QA for a year to gather some hands-on experience. And then I moved into production at Creative Assembly as an assistant producer, moved from there to Evolution Studios, and now I am here. :)

Tom: You can draw on all kinds of experiences in life to prepare yourself, but every production is different so you can never truly be "100% prepared." I've worked in bars, restaurants and clubs which involves people skills, communication and organization that are all critical to production. I've also worked in fruit farming, which can teach you a lot about the importance of process, techniques and pipelines.

This might sound ridiculous to some people, but you can even sharpen your production skills outside of work. For instance, problem solving at home by organizing things in the kitchen to improve the flow and therefore make it more efficient to cook; long term planning by colour coding your e-calendar to manage different aspects of your life; coordinating with friends and family for a holiday together; or conflict resolution by diffusing an argument in a bar. You can look at just about anything as a production; it's a way of life! So if you're already "that guy," then you'll probably make a good producer.

JP: *Y'all have a wide range of experience and skills. For those of you who have done this before, what have you produced before your current job?*

Matt L: *DayZ* and *Arma 3*, including the *DayZ* modification and the Make Arma Not War Competition.

Eric: Prior things I produced include several cinematics for Blizzard Entertainment – most recently, the *Lords of War* animated pieces. I also produced a novel called *The Holder's Dominion* and several web series.

Alyssa: Technically, I've never been a "real" producer prior to this job, but I've assisted with production on *Call of Duty Modern Warfare 3*, *Black Ops 2*, *Ghosts*, and *Advanced Warfare*. Also, three *Skylanders* games, *Guitar Hero* and *Destiny*.



BEHIND THE SCENES

Mathieu: I started in the industry as a producer. I applied as a programmer, but since I had a Master's degree in business, they ask me to manage a team right away. Before *SC*, I worked on *SplinterCell*, *FarCry* and *Thief*.

Jake: I was a Client Producer at CGBot, an outsourcing company that CIG has actually worked with quite a bit. I managed the relationship between clients such as Blizzard, SOE, and Disney and CGBot's workforce in Mexico. My experience working with remote teams has very much helped me in this job.

Luke: I worked on *APB* (realtime worlds), *Total War: Shogun 2*, *Rome 2*, *Attila*, *Warhammer* and *Arena* (Creative Assembly) and *Driveclub* (Evolution Studios).

Jason: Before *SC*, I worked at Blizzard Entertainment for 16 years, 13 of them in some production capacity. I was localization producer for the *Warcraft 3* series, I produced the *Blizzard Arcade* titles, and ports of *Lost Vikings*, *Blackthorne* and *Rock n' Roll Racing* for the Nintendo GBA, I was the localization producer for *World of Warcraft* before moving on to that team to be the Live Content producer (overseeing the patch releases after *WoW* went live), and eventually became a Senior Producer for the engineering team on *WoW*.

JP: Again for those of you who have produced before, what are the differences between this job, this project, and previous producer gigs that you've had?

Mathieu: I think multi-site development is the biggest difference for me. The fact that we are spread across the world makes the dynamic something new. Although it's not always easy, I'm quite impressed how the producer team is able to coordinate over 10+ time zones.

JP: Yeah, just coordinating this interview is a bit of a task for me.

Benoit: For me, the main difference with this project compared to all my previous ones is how close we are to the actual customers. The web being such an integral part of *Star Citizen*, during its development we've had to tackle problems and manage situations that you normally only get with a launched game. That brings interesting situations with resources where you have to allocate time for them to talk to fans. That's a nice complication!

Luke: With previous titles I worked on, the pipeline for how to build the game and how it should be managed was mostly already in place; I followed what the senior producer had already put in place. Whereas here we are working with a fairly new company on a game no one has really made before. There is a lot of experimentation in terms of what the right approach to doing things is. I get to take what I have previously learnt see how it is best used to help out here. It's actually quite refreshing.

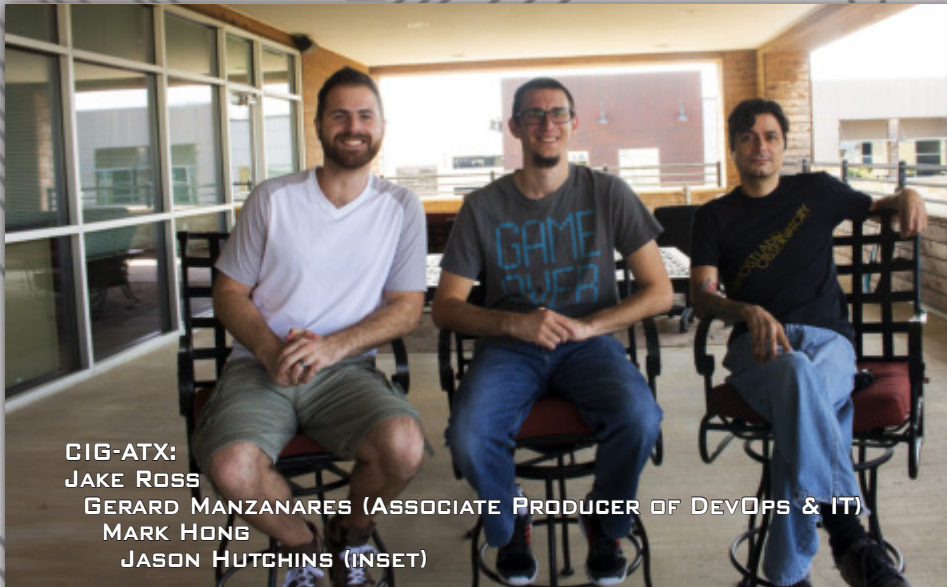
JP: I have several questions from our subscribers. The first is from **SFLSpear**: How ambitious is the development schedule of *Star Citizen* compared to other projects you've worked on in the past?

Matt L: I'd say less ambitious, but we missed our first release deadline at my previous company by over a year :P. We did it to ensure we had a solid initial release to then develop on. We have a similar approach here – we'd much rather delay and have a quality release.

Yes, it's ambitious, but it's good to be ambitious. That means we are constantly pushing ourselves and striving to have a quality game out as soon as possible.



SENIOR PRODUCERS
BEHIND THE SCENES



CIG-ATX:
JAKE ROSS
GERARD MANZANARES (ASSOCIATE PRODUCER OF DEVOPS & IT)
MARK HONG
JASON HUTCHINS (INSET)



Jake: And +1 for angry tiger.

Zoe: In some respects it is difficult to compare because SC is very unique. It's not like other games with the ways it's been funded and the community involvement. I think this is the most ambitious project I've ever seen. I think we owe it to the backers to be this ambitious.

My last project release was also delayed by a year, which is not uncommon in games, so it's a fair old achievement what SC has released.

Alyssa: This is the most ambitious project I've ever been a part of. There's never been anything like it before! Working with the game producers and seeing the break-neck speed at which we're planning is both astounding and inspiring.

Luke: Imagine past games being painting plain white wall. You know roughly how to approach painting it. SC is like trying to paint a specific drawing on an angry tiger. That's how I like to see it – it is an interesting challenge. :)

Zoe: When it's done it will be the most magnificent beast you have EVER seen. :D

Jake: I can't imagine there are many projects out there that are more ambitious than ours. With eight studios working on the project in some capacity, there are too many dependencies to count. None of the studios are 100% isolated studios working on their own little corner of the 'verse. We all have to coordinate our massive schedules and dependencies so that the titanic scope of this game can be managed.

JP: From **1tactician:** How do you keep all of the assets that are being created in synch? Is there a master catalog of game assets somewhere that everyone is contributing to and has access to? So say a Squadron 42 developer in Manchester is like "I need a pair of boots." (boots being potentially anything from a gun to a vehicle) and he logs in and sees a catalog of boots that the PU group in Austin has created and he picks a pair to use and goes on. Then if those boots get updated in the master catalog are they automatically updated across the board for anyone who has decided to use them?

Jake: More or less, that is the direction we're trying to go in. Art assets especially have to be consistent in direction and quality across the project. We've established Global Leads across the project who are in charge of ensuring the same quality bar is hit for things like VFX, Props, Environments and Weapons. That way everything



BEHIND THE SCENES

can be shared and nobody is duplicating work. Likewise, we are building our environments in such a way that they can be recycled as “building sets.” The environment teams at BHVR, Illfonic and the UK all use these same sets to create different environments. It’s a very efficient process that we are trying to replicate in other areas.

Luke: This is part of why producers are so useful. It is our job to figure out that someone wants those “boots.” Let’s take an example. Say Chris Roberts wants a unicorn in SC. First we have to figure out what teams are needed to make that happen. Let’s say it’s a ship task, so I would go off and find out the priority of that task and create tasks for it and find out who could do it. If a request comes through later that the tail on the unicorn should be pink, not white, that request would go through the producer to update the task and to make sure all relevant stakeholders are aware of that change.

Zoe: Luke, you better not be making a unicorn.

Luke: :P

JP: *I heard ATX was making the unicorns.*

Jake: Don’t touch my unicorns!!!

JP: *From **steve-2001**: “Each producer will schedule and prioritize work to keep their own schedule moving along.” There are several producers, though, and spread out all over the place to boot. How do you resolve conflicts between resource scheduling between two (or more) different producers when they want to use the same available resources?*

Jake: In one word: Roberts. Ultimately it is up to Chris what takes precedence when a resource has conflicting priorities.

Luke: In any company you will have a product owner making the overall decision on what they want in the game. In our case it is Chris Roberts. He will make a call on what he wants out first and we as production find a magical way to make that happen.

Mathieu: We also try to share knowledge as much as we can amongst the developers. This way we don’t end up where a single developer is the only one who can do the task. This give us more flexibility when two priorities conflict.

Zoe: It’s important that we talk to each other. It’s generally good practice not to poach another producer’s resource without asking. But the buck stops with CR, so when there’s any doubt he makes the final call.

Alyssa: I actually run into this quite a bit with my needs for Marketing materials. Ricky Jutley, Eric Davis and Lisa Ohanian are lifesavers. We meet often and discuss what the needs for Marketing & Community are, and plan out as far as we can go. I’m not one for surprises and I believe they think the same way. Constant communication keeps us sane.

JP: *From **Nianfur**: We hear talk of how the producers, directors and chairman, all are fans of Star Wars. That and the concept or feel is loosely based off the Star Wars style.*

What I would like to know is if there are any Babylon 5 fans in the team? In particular, I ask the producers over in Squadron 42, as Britain was the greatest fan base of all things Babylon 5.

JP: *I personally am in favor of all Terrans wearing a side-to-side crest, like Londo’s. :)*

Luke: *Babylon 5 – afraid not for myself. Star Wars on the other hand, that’s another story!*



BEHIND THE SCENES

Matt L: I personally think *Babylon 5* was terrible, also *Star Wars* was cool and all, but I'd much prefer a better done *Stargate* or more *Firefly*.

JP: *Matt, at some point, we'll have to debate the relative merits of SW and Bab5 storytelling. I'll save that for a later issue. :)*

Matt L: Haha, certainly. You just can't beat the wild west in space, though.

JP: *Yeah, I think we're agreed on Firefly.*

Jason: I <3 *B5*. But I don't want to talk about it. :)

I love *Firefly* more, and would love to talk about it.

Zoe: I'm going to say a bad thing: I do not like *Star Wars*. I like *Firefly*, *Farscape* (way back when), *Battlestar G* (except the last season) and some other stuff.

Jason: It's okay not to like *Star Wars*, Zoe. You are totally free to be wrong. ;)

JP: *I can see I'm gonna have to run a company-wide discussion of seminal SF influences.*

Matt L: Haha, that will start a company-wide civil war.

Jason: You can be influenced by things you don't love. Doesn't need to be a war.

Matt L: The rebel alliance versus the browncoats.

Alyssa: I'm going to catch a lot of flak for this but ... I like fantasy. I've never seen *Babylon 5*.

Zoe: Wouldn't it be boring if we all liked the same things.

Jason: Yes! Well said.

JP: *From Emrys_CHN: I think most of the backers may want to know what is your latest estimation of the game's release date?*

Alyssa: Soon™ (that's a *Community* joke).

Matt L: I think it depends on what you mean by release. I think it's going to constantly be iterated on for years, like *World of Warcraft*.

Luke: Thinking about the games that have released over the past year, I am sure a large percentage of those you are thinking of released in a broken state, requiring several patches to fix or even letting people down on what they were expecting. This is due to strict deadlines publishers set. We have a very rare opportunity to do this properly, to make the game people are expecting. I would like to steal a quote that DICE used for *Mirror's Edge*. *Star Citizen* release: when it's ready.

Zoe: I'm pretty sure mentioning release dates is forbidden? :)

Mathieu: IMO, we are building a living world. We will be constantly releasing new features and the game will be constantly evolving. In this context, it's hard to define what release date means. It's just not like a console title where you need to put the game on a DVD and stop development.

JP: *But there will be a time when we ship boxes.*

Matt L: Will we?

JP: *A collector's box is a thing. It's already being pre-sold.*

Matt L: But that doesn't necessarily require the finished game, e.g. online distribution; it just requires having a code in the box.

ERIC KIERON
DAVIS
CIG-LA



BEHIND THE SCENES



ALYSSA
DELHOTAL,
CIG-LA

Jake: 4/2/42

Jason: At the risk of sounding wishy-washy or pedantic, it really depends on what you define as release date.

Is the release date when we start monetizing the game via sales rather than donations?

Is the release date when go into Beta Test?

Is the release date when we sell boxes at retail stores?

What if we never release boxes?

The plan is that we will continue to release modules to players as they are ready. Heck, before they are ready, really. We'll put the modules out, they will be proving grounds for us to playtest features alongside our backers, getting them fixed and polished, and then move on to the next module. Many of these modules will be worked on in parallel with other modules. It's ... complicated.

Other than collectors' edition boxes, which are more of a nostalgia thing at this point, there isn't much of an impetus as a developer to put a box in a retail store. Especially for an online-only game like SC.

Sure, you can argue that there is exposure to be had by being on the end-cap at Wal-mart, but I would argue that you are giving a lot of money to the retailer and the wholesaler that you could be keeping to spend on development, infrastructure, customer service, or even other marketing efforts. So, BOXES IMNSHO = not worth it.

JP: From *Valdore*: How do you integrate plans for long-term goals on short-term projects? For example: If you know a re-design of a system is coming up with still unspecified details (like the internal re-do of the component system or external stuff like the Vulkan API in the future), what kind of approach do you use to not make all the work done so far obsolete?

Luke: SC went through a change with how we approach ships being damaged. This required new tech and new tasks for artists to follow. Once it was signed off that we needed to do this, we worked out what's needed, who would do it and when it can be done. Long-term goals don't need to affect short-term plans. SC can have releases as normal and others with changes (like the new damage system). Whatever features that are requested, the approach on how it goes in the game stays the same.

Jake: This is a great question, and it's one we ask ourselves all the time. Due to the nature of our project and our desire to give the backers content sooner rather than later, we are often releasing things before we've had a chance to answer all the questions, as it were. Because of this we sometimes have to go back and retrofit legacy systems and assets to match our latest standards or to account for some shiny new tech. The short answer to this question is: very carefully. We don't want to spend all of our valuable developer time updating old assets, but we also don't want to have assets and systems that don't match what the rest of the project is doing. It's a balance that requires careful planning and timing.

JP: From *Far-seeker*: What is the major way, regardless of whether it will be noticeable by most players or not, that you feel you have "left your mark" on this game's development so far?



BEHIND THE SCENES

Benoit: Being involved in the Crowdfunding campaign since the beginning, I think I've been able to leave a mark by imposing a cadence on how the team here revolves. We've been shipping website builds every week since 2013, and that cadence continues today. That fast-paced update process that I put in place early in order to keep up with ship sales, announcements and other online events has really helped shape the culture of the web team for SC. Being on the line is part of our DNA now ... and I think that's in part because of my work as a producer on the project. I also hope this influences other departments!

Alyssa: I suppose it would be the ship sales going up on to the website on time ...? That's not development, but I haven't been here long enough to make a major impact yet.

Jake: This may sound cheesy, but when developers tell me I've made their lives easier in some way, then I feel that I've done my job. A lot of what a producer does goes unnoticed if it is done well, and that's fine by me. Working behind the scenes to keep the machine well oiled is an arduous task, and the reward is seeing the developers succeed in making something awesome.

Mathieu: For me, I don't create content for the game, but I make sure the team has everything they need to create amazing art or to code a cutting edge system. I feel I've left my mark when the team are able to leave their mark.

Luke: If something got/gets released and fans are happy, then we are happy. An artist may be proud of an asset; myself I am happy, regardless of deadline changes, that we get something out and that it's being done the right way. There is a lot of politics to making games; if we as producers can shield the development team from as much

hassle as possible so they can get on with their job, than I'd say we succeeded.

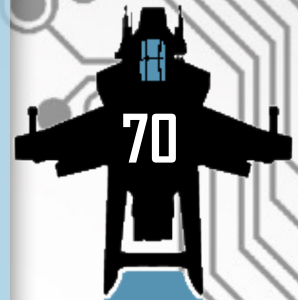
JP: *From AragonBH: I have heard from several sources, including Chris Roberts, that CIG is looking for ship artists. Is this open position the one that you are most in need of filling right now? If it is not, then which position would help limit production bottlenecks the most right now for SC? Finally, why do you think it is difficult to find people with those specific qualifications right now?*

P.S. I am not a ship artist and would have sent you my resumé several months ago if I were. Keep up the good work!

Jake: This answer is going to vary from studio to studio, but in my opinion we are in desperate need of tools programmers. You can never get enough people writing tools to help streamline development, and any developer would tell you the same.

Luke: We run into bottlenecks for resources all of the time. We in the UK have no lighting artist or art tech resource available in-house. We rely on our other studios to help us while we find these resources. Producers identify resource issues and find ways of helping teams that need additional resource.

Benoit: I think it's difficult to find people who are cut out for this project in all disciplines. I know Chris hates it when we say this, but the bar that he sets is high. We want a standard of quality, in both engineering and art, and having resources that have this level naturally is really what makes a team work in the context of SC. You want people who always re-evaluate their work and that never ship broken functionality or incomplete work. That applies specifically to the web team, since we are pretty much 100% user-facing in all parts of our work.



BEHIND THE SCENES

JP: And now a few closing questions. What are the best things about producing for Star Citizen?

Luke: We get to do what many thought was impossible and make it a reality.

Tom: The ambition, the fans and the team.

Jake: Getting to be a part of a history-making, record-breaking, ground-shaking, name-taking, dead-waking project of such a massive scope has been rewarding on so many levels. :)

Alyssa: This is the most challenging project I've been a part of, and it requires all of my know-how plus teaches me new things as we go. I love a challenge!

Benoit: It's the thrill of the ride. The public nature of the project makes this a really high adrenaline job. Since we're shipping to players all the time (either via a patch, web update, website launch or forum conversations) we're on the spot at all times and the demands of fans are really high. (Sometimes unreasonably so, but that's fine!) That makes for very action-packed scheduling sessions with the teams, and re-evaluating priorities daily ... even hourly! An SC launch schedule that is outdated by 24 hours cannot be trusted! I love that speed.

Matt L: The best thing about working as a producer on Star Citizen is the community engagement. I love how there is a vast community, that all care a vast amount. It makes all that hard work completely worth it, when we release something and you can see, on the RSI Forums, Reddit, 4chan, Facebook and Twitter, people playing it and giving their feedback as they play. It's also splendid to be able to wake up every morning, knowing that after my hour-and-a-half commute I'm going to be working

with a bunch of brilliant people to make a damn cool game.

Zoe: What's great about working on SC? I know it's a bit cheesy and not original, and I haven't been here very long yet, but from the day I started, everyone was really welcoming, the talent is amazing and even though everyone, i mean EVERYONE, is crazy busy they will take time out to answer questions and lend a hand. That can be from another continent! Also, the excitement for this game is infectious – it's impossible not to be drawn into it.

We were working on the Gamescom demo and as I watched the QA playthrough and saw some of the set pieces like the powered down Retaliator lighting and the explosions, I 'squeeeeeeeed' out loud. You know how much effort went into it and you know the fans were going to love it and I think that's why you make games. <3

JP: What's the downside? What can be frustrating or annoying about what you do? In hindsight, what might you have done differently?

Jake: It can be frustrating to work remotely with people at times; so much context gets lost over Skype and email that tensions can rise pretty easily. Part of Production's job is to calm people down when tempers rise and to be a mediator between conflicting parties. That's the "den mother" portion of the job that Jason mentioned. :)



BEHIND THE SCENES



DARIAN
VORLICK
CIG-IA

Matt L: The biggest challenge is keeping up with all of the pertinent information, knowing what everyone is working on, especially who may be working on things that impact your work, so you can coordinate with them and keep on top of the vast information flow that's

required for such a large team working on a vast game.

I recently went on holiday for two weeks camping and volunteering in Japan, and when I returned I came back to well over 600 unread e-mails, from build status updates, to meeting notes, to daily updates from all of the other offices.

Alyssa: Just that it's so dang busy all the time! That's the nature of this industry, though.

Benoit: As much as I love the ride, it's also very tiring and demands A LOT of energy IN and OUT of the office. Since the operations of the project run almost around the clock, there is always something coming up. This takes a toll since the producer is in the middle of all tasks and deliverables. The schedules are so fast that you go to bed at night and your mind is preparing the team meeting for the next morning.

I would lie if I said that pressure from the fans isn't also a factor. As a producer you really don't want to let them down and so you try to get the most out of your team as possible ultimately to get fans and backers happy.

JP: Any final words?

Alyssa: RED ONE, JARED!

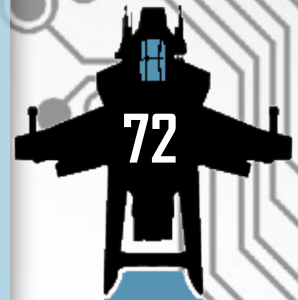
Jake: Snorkel, Foible, Gazebo, Pubbawump, Chumblespuzz

JP: This is usually the "it's great to be working with such great fans" section, but if Pubbawump is what you've got, we'll go with it. :)

Mathieu: Kudos to all producers on *Star Citizen* across the world. Keep up the fantastic work at managing this ground-breaking project and rallying 300+ developers to build an amazing game experience.

Matt L: I hope this gave you a good insight into the day-to-day jobs of some of the producers here at CIG. Thank you for your support and keep your eyes peeled for more exciting things in the not too distant future!

JP: Thank you, everyone!



BEHIND THE SCENES

FERRON SYSTEM ASURA



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As noted historian Ariel Rutte once wrote, "If the Sol System is the Empire's heart, and Terra its head, then Ferron is the blood coursing through its veins." When the system was discovered in 2460, few could have predicted how vital Ferron would be in driving the economy and expansion of Humanity's burgeoning Empire for decades, or how far it would eventually fall from its former glory.

Ferron was discovered by Pali Laumet, one of the founding members of the Sol Astroexploration Society. Composed of extremely affluent adventurers who dedicated themselves to the search for new star systems, the S.A.S. can be linked to many jump point discoveries of the time.

Laumet had been sailing the expanse of Croshaw for several months already, and, low on supplies with a restless crew, was days away from having to return to Sol when his stoker, Darcy Ferron, noted that their quantum drive fuel calculations were off. Laumet, double-checking the figures, surmised that the extra burn-off was due to the pull of an unmarked jump-well. Sure enough, two days later, the crew would become the first Humans to jump to the system that Laumet graciously named after the perceptive Darcy, and upon his return, in the tradition of S.A.S, gifted the coordinates of the system as a philanthropic donation to Humanity.

After initial government surveys were complete, the system was declared an ideal candidate for settlement and opened to the public. Corporate and private interests sped to the system, eager to stake their claim. The ensuing battle for land and mineral rights grew so unruly that the UNE intervened and established a lottery to help arbitrate the disputes. After the first drawing took place, a myriad of loopholes and flaws were uncovered that had given some parties and companies unfair advantages which took years to be sorted. The government's failed attempts at mediation served to highlight both the impotence and inefficiencies of the UNE as it struggled to cope with Humanity's rapid expansion. Some historians theorize that the bureaucratic failings during Ferron's lottery fanned the flames of reform that eventually lead to the dissolution of the UNE and the formation of the UPE in 2523.

Despite its troubled start, Ferron was already on the fast track to prosperity due to its wealth of natural resources. Before long it was a bustling hub of mining and trade, and, in 2529, the system achieved represented status within the UPE. Centuries of success followed as the system provided the materials necessary for Humanity to conquer the stars. In its heyday, Ferron's population had grown enough to rival that of Sol and it was well on its way to becoming a political equal as well. But sadly, the system's success would not last.

The first reverse of fortunes occurred in 2791 when Messer XI falsely accused the system of being home to dissidents. Fearful of the Emperor, numerous wealthy Citizens and Messer loyalists fled the system, taking large amounts of funds and clout with them. When the eventual military strike did come, it was only thanks to the legendary bravery of the members of Squadron 74 and their heroic unwillingness to kill civilians that vio-

lence was avoided, but by then the economic and political damage to Ferron had already been done.

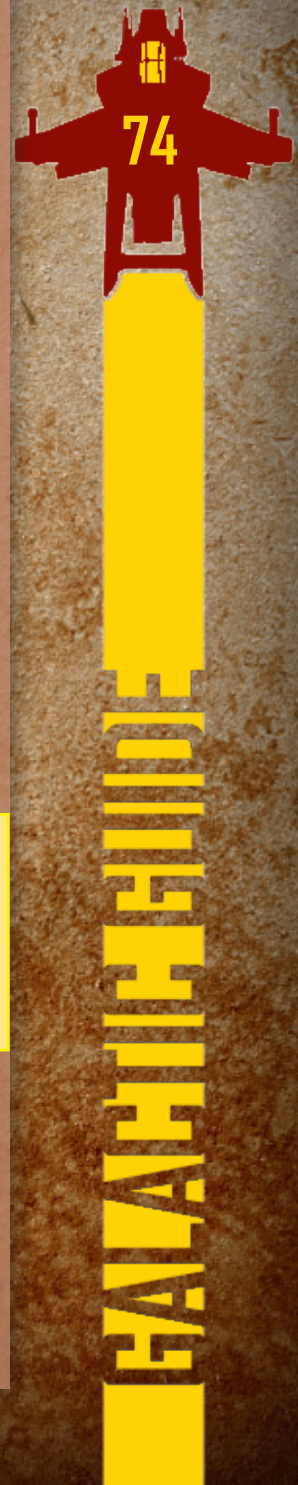
The next blow would occur in 2832 when Shubin Interstellar announced profit losses for the first time ever in the system. The mining conglomerate cited the depletion of a major mine as the cause and noted that more site closures were expected to follow. This would prove to be Ferron's death knell. Years of aggressive mining had taken its toll and the system by this time had been nearly picked clean. As fast as its rise to prominence had been, Ferron's fall from grace would be even faster. Within a single decade, the population of the system dropped by nearly half and its economic health dropped even lower. Today, it is only a shadow of its former glory, the bones of a vibrant system that bled itself dry of resources for the good of the Empire.

While Ferron is far from an ideal destination for the casual traveler, the system has drawn its fair share of visitors attracted by its historical significance, as well as more adventurous prospectors hoping to find some remnants of valuable ore that may have been overlooked.

TRAVEL WARNING The lack of drinking water on Asura has led to vicious infighting between encampments around the edge of Tram. For this reason, it is highly recommended that all visitors stay within the center of Tram and avoid traveling to the outskirts of the city without local guidance.

FERRON I

This dwarf planet sits closest to Ferron's main star. Uninhabitable and lacking in resources, only the scientific community gives Ferron I much thought due to unusual and so far unexplained variance in its magnetosphere.



FERRON II

In any other system, this coreless planet would be just another dead world, but in the Ferron System it was a disappointment. Ferron II lacked both easily accessible minerals and the right conditions for terraforming, which thrust it into the shadow of its resource-rich neighbor, Ferron III.

However, tough times in Ferron have caused people to give the planet a second look. Many are hopeful that new advances in mining technology may eventually lead to the planet being able to turn some kind of profit.

FERRON III (ASURA)

Once considered the system's crown jewel, the vast reserves of valuable ores and minerals that were discovered during Asura's terraforming process made it an economic and political powerhouse. During this extended economic boom, little thought was given to what would become of the world if the mines ever did run dry and only minimal secondary industries were established. Asura was a mining planet to its core, and for nearly four hundred years, every shred of planetary resource was dug up, harvested, refined, and shipped away until there was nothing left.

Depleted into a shell of the planet's former glory, the people descended into poverty. Nowhere is this better represented than in the rapidly deteriorating and crumbling infrastructure of the once great city, Tram.

With most of Asura's land set aside for mining, the stunning industrial megalopolis of Tram became the planet's financial and cultural center. Large factories, refineries and housing developments were interspersed with beautiful public parks. This visual harmony between nature and industry inspired 27th century poet Lelani Toan to describe Tram as –

Balance, beauty both created

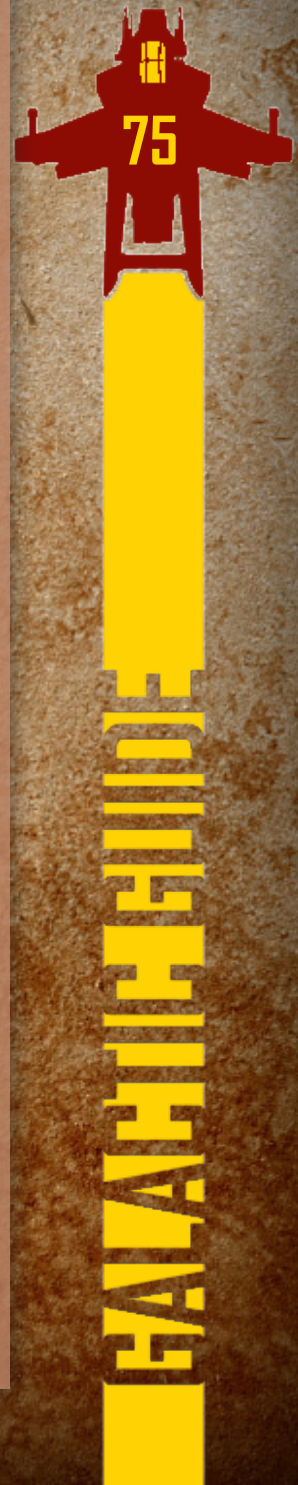
Through industry of man which elevated

This random rock that within teems

Building blocks for a city of dreams.

Now, life in Tram is considerably harder. Today, the city is mostly shuttered and abandoned, and its skies are a near permanent gray from all the toxins that have been carelessly pumped into the atmosphere by heavy industry. Water is in constant demand, as most of the natural supply has been equally contaminated. And as for the population that does remain, while some civilians still eke out a living with repair or refueling stations, criminal enterprise has surpassed any legitimate business as the main industry.

Visitors should be cautious when moving around the city as an ongoing police strike has considerably increased the chances of being accosted, particularly when entering the city's parks – now a hotbed of illegal activity. Those looking for deals should visit one of the planet's mining superstores where equipment sits gathering dust. Remember to take a trusted friend, co-worker or hired guard along. Criminal elements have been known to target guests who make significant purchases at local establishments.



FERRON IV

The swirling surface of Ferron IV is a beautiful sight that pilots have learned to enjoy from a safe distance. The gas giant's thick layer of metallic hydrogen behaves as a giant electrical conductor, which can be severely problematic for a ship's sensitive avionics. Bands of outlaws have been known to lurk on the fringes of the electrical field, waiting to prey upon malfunctioning ships.

HEARD IN THE WIND

"How can we be expected to protect the people of Tram, when it's the damn people of Tram who are killing us?"

- Clair Slovonik, Former Tram Police Captain,
Governors Council Meeting, 05.22.2936

"For Ferron to return to its former greatness, we must strive to resurrect its most valuable commodity – the industrious nature of its Citizens."

- Paul Dibly, Former Governor of Tram,
Re-Election Speech, 09.17.2912



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Brothers in Arms

by Andy Rogers



CHRONICLES

Part 4

A recorded hymn played as they sent Arun “Boomer” Ainsley into whatever great adventure awaits in the everafter. Gavin set the service in the Rhedd Alert hangar, and the recording sounded terrible. The last somber note rebounded off the room’s hard surfaces and harsh angles.

He wished they could have had a live band. He would have paid for an orchestra, if one were to be had on the orbital station. Even a bugle would have been better tribute for the man who had brought Dell into his life. For the man who taught him and Walt so much about living a free life in the outer systems.

Dell’s arm felt small around his waist and Gavin pulled her in close to him, unsure if that was the right thing to do. He turned to kiss her hair and saw Walt’s lean form looming

beside them. Walt’s face was fixed in a grim mask.

Gavin knew his brother well enough to know that Walt was berating himself inside. He didn’t deal well with guilt or responsibility, and Gavin suspected that was a big part of why Walt always ran.

The gathering started to break up. Pilots and the hangar crew busied themselves with tasks around Rhedd Alert’s battered fleet of fighters. Dell didn’t move, so he stayed there with her. Walt rested a hand on his shoulder.

“Gavin. Oh gods, Dell. I can’t tell you how sorry I am.”

Jazza leaned in and spoke in a low tone, almost a whisper. “Landing gear up in ten, boss. Your rig is on the buggy.” She motioned with her chin to where his ship waited.

Dell turned into him and squeezed. “Be careful.”

"I will, babe."

"You come home to me, Gavin Rhedd. I'll kill you myself if you make me run this outfit on my own."

He pressed his lips to the top of her head. Held them there.

"Wait. What?" Walt's jaw was slack, his eyes wide. "Tell me you aren't going back out there."

Jazza bumped Walt with her shoulder, not so much walking past him as through him. "Damn right we are, Quitter."

"You know what? Screw you, Jazz. All right? You used to quit this outfit, like . . . twice a month."

"Not like you. Not like some chicken sh—"

"Jazz," Gavin said, "go make sure the team is ready to roll, would ya?" With a nod to Gavin and a parting glare at Walt, she moved away into the hangar.

"Let it be, Walt. We really do need to go. After last time, we can't risk being late for the pickup."

"Screw late!" Walt's eyes were wide and red-rimmed around the edges. "Why the happy hells are you going at all?"

"Walt —"

"Don't 'Walt' me, Gavin. There is a pack of psychopaths out there trying to *kill* you!"

"Walt, would you shut up and listen for two seconds? We don't have a choice, okay? We've got everything riding on this job. We're months behind on this place and extended up to our necks on credit for fuel, parts and ammo."

"They can damn well bill me!"

"No," Gavin said, "they can't. Your shares reverted back to the company when you quit. But I'm legit now. You think we lived life on the run before? Just you watch if I try to run from this."

Walt turned to Dell for assistance, "Dell, come on. You gotta make him listen to reason."

"Boomer's shares transferred to me when he died," Dell said. "We're in this together."

"Okay, boss," Jazza called. The three of them looked to where she stood with a line of determined crew. "It's time."

* * *

Walt watched the big bay doors close as the last of Gavin's team left the hangar. His fighter and the few remaining ships looked small and awkwardly out of place in the big room. Standing alone next to Dell gave him a great appreciation for that awkwardness.

"I'm so sorry, Dell. If I'd been there —"

"Don't," she stopped him with a word, and then continued with a shake of her blue-tipped hair. "Don't do that to yourself. I've been over the tactical logs. He got beat one-on-one, and then they OK'd him. There was nothing you could have done."

"I still feel rotten," he said. "Like, maybe if I hadn't left . . . I don't know."

"Gavin blames himself, too. That's just the way you two are built. But believe me, there was never a soul alive able to keep my dad out of the cockpit. He was flying long before you Rhedd boys tumbled into our lives."

That gave him a smile. A genuine smile. It seemed to brighten Dell's mood, so he did his best to hang onto it.

"Come on," she said. "It's been a long couple of weeks. Join me for some coffee?"

He did, and for a time they spoke softly at the tall tables in the hangar's kitchenette. Dell caught him up on life aboard Vista Landing since he had left. She was clearly exhausted and not simply from a sleepless night and her



CHRONICLES

father's funeral. Her shoulders sagged, and dark circles under her eyes were the product of weeks of labor and worry. The constant apprehension of the Hornets' vicious attacks had apparently exhausted more than just the pilots. It seemed odd that the attacks felt strangely personal.

"You know what I can't figure out?" he mused aloud. Dell looked at him, tired eyes politely expectant. "What the hell are these guys after?"

She nodded, "Yeah. There's been a lot of speculating on that question."

"And?"

"Hard to say, isn't it? Could be political wackos opposed to the research in Haven. Or maybe it's one of the old gangs that don't like us going legit. Could be it's a group of Tevarin lashing out against UEE targets. Who knows?"

"Naw. If they were Tevarin, we could tell by how they fly."

"Then you tell me, if you're so smart. I mean, you were out there. You fought them."

Walt shrugged and took a sip of cooling coffee. Something she said nagged at him. "Hey, you said you had navsat tactical logs from the fight, right?"

"Yeah." What remained of her energy seemed to drain away with that one word. Walt cursed himself for the insensitive ass that he was. He'd just asked her about recorded replays of her father's murder.

"Dell. Ah, hell . . . I'm sorry. I shouldn't have asked."

"It's okay," she said. "I've been over and over them already. Really, I don't mind."

They moved to a console and the lights dimmed automatically when she pulled up the hangar projection. She selected a ship, and oriented the view so that the hologram of Boomer's Avenger filled the display. No, Walt reminded

himself, it wasn't Boomer's ship any more. Dell was his heir and – along with his debt – Boomer's assets now belonged to her.

Dell bypassed the default display of the structural hard-points and dove into the ship's systems. Something caught his eye and he stopped her. "Wait, back up." She did, and Walt stopped the rotating display to look along the undercarriage of the ship. He let out a low whistle.

"That, Walter Rhedd, is a Tarantula GT-870 Mk3."

"I know what it is. But where did you get it?"

"Remember those pirates that gave us so much trouble in Oberon? I pulled it before we sold the salvage."

He certainly did remember, and the bastards had kicked the crap out of two of their ships with their Tarantulas.

"How'd you get it mounted on an Avenger?"

"Hammer therapy," she said. He gave her a confused look, and she held up one arm, curling it to make a muscle. "I beat the hell out of it until it did what I wanted."

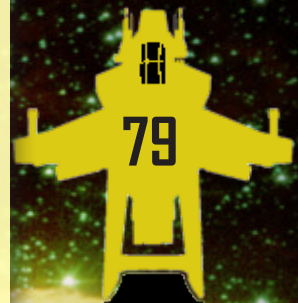
"Damn, girl."

"Did you want to see the flight recorder?"

They watched the navsat replays together in silence. It looked like one hell of a fight. Chaotic. Frantic. The Rhedd Alert fighters were hard pressed.

Jazza had moments of tactical brilliance. As much as she rubbed him the wrong way, Walt had to admit that she made her Cutlass dance steps for which it wasn't designed. Gavin orchestrated a coherent strategy and had committed extra fighters to drive off the attack. Something was wrong, though. Something about the fight didn't make sense.

Walt had Dell replay the scene so he could focus on the marauders. It didn't look like much of a fight at all from that perspective. It looked more like a game and only one



CHRONICLES

team understood how all the pieces moved. The Hornets flew to disrupt, to confuse. They knew Gavin would send a force forward to protect the transport. He'd done it every time they had met.

"See that?" he said. "They break apart there and get called immediately back into formation. They never leave a flank exposed. Our guys never get a real opening." He pointed out one of the attacking Hornets. "That one calls the shots."

"That's the one that OK'd Boomer."

Reds and greens from the navsat display sparkled in Dell's eyes. Her voice was emotionless and flat. Walt didn't want to see her like that, so he focused again on the display.

The marauder he'd identified as the leader broke from the melee. Gavin gave chase, but from too far behind. Boomer intercepted, was disabled, and his PRB flashed red on the display. The Hornet took a pass at the transport before turning to rejoin its squad. Then it decelerated, pausing before the overkill on Boomer.

"Why take only one pass at the transport? They've hit us, what? Six times? Seven? And once they finally get a shot at the target, they bug out?"

"You said, 'us'," Dell teased. "You back to stay?"

Walt huffed a small laugh. "We'll see."

"We've been lucky," Dell offered in answer to his question. "So far, we've chased them off."

"You really believe that? They had this fight won if they wanted it. And how do they keep finding us? It's like they've taken up permanent residence in our damned flight path."

That was it. He had it. The revelation must have shown on his face.

"What?" Dell asked. "What is it?"

"Back it up to the strafe on the Aquila."

Dell did, and they watched it again. He felt like an ass for making her watch the murder of her father over again, but he had to be sure of what he saw.

And there it was. Strafe. Turn. Pause. A decision to commit. An escalating act of brutality. And then they were gone.

"She's not after the transport at all. We were her target this whole time."

"Wait," Dell said, "what she? Her who?"

"Please tell me your ex hasn't drunk himself out of a job with the Navy."

"Barry? Of course not, why?"

"Because I just figured out who killed your father."

* * *

Morgan Brock called the meeting to a close and dismissed her admin team. Riebeld caught her eye and lifted one hand off the table – a request for her to stay while the others shuffled out of the conference room.

Riebeld kept her waiting until they were alone, and then stood to close the door.

"I take it," Brock said, "that our Tyrol problem persists despite the escalation?"

"I got word during the meeting" – he took a seat beside her at the table, voice pitched low – "that they should be making the jump to Nexus soon."

"Our discreet pilots? Are they deployed or here at the station?"

His answer was slow in coming, his nod reluctant. "They are here."



CHRONICLES

Brock checked the time. Did some mental math. “Disguise the ships. We will leave at 1700 and meet them in Charon just inside the gate from Min.”

“Morgan,” Riebeld’s eyes roamed the room, “these guys aren’t taking the hint. I don’t know what losses we have to hand them before they back down, but . . . I don’t know. Part of doing business is losing bids, am I right?” She didn’t disagree and he continued. “Maybe . . . Maybe we ought to write this one off?”

“A comfortable position to hold in your seat, Riebeld. Your commission is based on the contract value. I barely turned a profit on that job for years. I did it willingly, with the expected reward of windfall profits when traffic to Haven surges.”

“I get that,” he said. “I really do. But at some point we have to call it a loss and focus on the next thing, right?”

“Then suppose that we let the Tyrol job go, and Greely and Navy SysCom see what they want to see from boutique contractors. I can already imagine anti-establishment politicians pushing for more outsourced work. Hell, they will probably promise contracts to buy votes in their home systems.”

She watched him squirm. It wasn’t like him to wrestle with his conscience. Frankly, she was disappointed to learn that he’d found one.

“If Rhedd Alert won’t withdraw willingly,” she said, “then they will have to fail the hard way. Prep the ships, Riebeld. We have done very well together, you and I. You should know that I won’t back away from what is mine.” He seemed to appreciate her sincerity, but Brock wanted to hear the cocksure salesman say it. “Are we clear?”

“Yes, ma’am,” Riebeld swallowed and stood. “Perfectly clear.”

* * *

“Any luck?” Walt pulled up Barry’s record in his mobiGlas and hit connect.

Dell sat at the hangar console trying to reach Gavin and the team. Her brow furrowed in a grimace and she shook her head.

“Damn. Okay, keep trying.”

Barry connected. The accountant wore his uniform. He was on duty, wherever he was, and his projected face looked genuinely mournful. “Hey,” he said, “long time no see, man. Listen, I can’t tell you how sad I am about Boomer.”

“Thanks.” Barry had known Dell and Boomer for most his life. He’d probably been torn between attending the service and allowing the family to grieve in privacy. Regardless, commiseration would have to wait. “We need your help, Barry. Please tell me that you have access to the proposals for the Tyrol contract.”

“Of course I do. And who’s we? Are you back with Dell and Gavin?”

“I am,” he felt Dell’s eyes on him when he said it. “Anyway, we need a favor. I need to know the ship models and configurations proposed by the incumbent.”

“Morgan Brock’s outfit, sure. No can do on the ship data, though. That information is all confidential. Only the price proposals are available for public review, and those only during the protest period.”

“Come on, Barry. We’re not talking trade secrets here. I could figure this out with a fly-by of their hangar in Kilian. I just don’t have time for that. I *need* to know what ships those guys fly.”

Barry breathed out a heavy sigh, “Hold on. But I can’t send you the proposals, okay? You guys are already on thin ice with this contract as is.”



CHRONICLES

"Tell me about it. And thanks, I owe you huge for this."

Walt waited, throat dry. He scratched at a chipped edge on his worn mobiGlas with a fingernail.

"All right," Barry read from something off-screen, "it looks like they're flying a variety of Hornets. Specifically, F7As. I can send you a list of the proposed hardpoints, and I happen to know that Brock herself flies a Super Hornet."

The mobiGlas shook on Walt's wrist. His face felt hot, and he forced his jaw to relax. "Barry, if you have any pull with the Navy, get some ships to Tyrol. It's been Brock this whole time. She's been setting us up to fail. And she's the bitch that OK'd Boomer."

* * *

"I'm going, Walt. That's final."

Walt rubbed at his eyes with the flat part of his fingers. How did Gavin ever win an argument her? Forbidding her involvement was a lost cause. Maybe he could reason with her. "Listen. When's the last time you were even in a cockpit?"

"I know this ship. I was practically born in these things."

"Dell —"

She threw his helmet at him. He caught it awkwardly, and she had shed her coveralls and was wriggling into her flight suit before he could finish his thought. She stared at him with hard eyes and said, "Suit up if you don't want to get left behind."

Dell was as implacable as gravity. Fine. It was her funeral, and he realized there was no way his brother had *ever* won an argument with her.

They finished prepping in silence. Walt pulled the chocks on her Avenger when she climbed up into the cockpit. He gave the hulking muzzle of the Tarantula an appreciative pat. "You have ammo for this bad boy?"

"I have a little."

"Good," he smiled. "Let's hope Brock isn't ready to handle reinforcements."

Walt mulled that thought over. It was true that Gavin had split their team in each fight, but Rhedd Alert had never sent in reserves. Each engagement had been a fair and straightforward fight. Brock wasn't likely to know anything about their resources, however limited, beyond the escort team. That could work to their advantage.

In fact, "Hey, Dell. Hop out for a tick, will you?"

"Like hell I will." The look she shot down at him was pure challenge. "I said I'm going and that's that."

"Oh, no. I've already lost that fight. But you and your cannon here got me thinking about those pirates in Oberon. Tell me, did we ever find a buyer for that old Idris hull?"

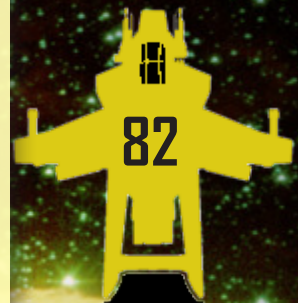
"No. It's buoyed in storage outside the station, why?"

Dell looked at him skeptically and he grinned. "We're going to introduce these military-types to some ol' smugglers' tricks."

* * *

Gavin held the team at the edge of the jump gate between Min and Charon. "All right gang, listen up. You know the drill and what might be waiting for us on the other side. Jazza, I want you and Rahul up on point for this jump. I'll bring the *Cassiopeia* over after you and the rest of the team are in. Anyone not ready to jump?"

His team was silent as they arranged themselves into position with professional precision. The pilot aboard the *Cassiopeia* sounded the ready and Gavin sent Jazza through. The others were hard on her heels, and Gavin felt the always-peculiar drop through the mouth of the jump gate.



CHRONICLES

Light and sound stretched, dragging him across the inter-space. Another drop, a moment's disorientation, and then Charon space resolved around him.

Without warning, Mei's fighter flashed past his forward screen. Incandescent laser fire slashed along the ghost grey and fire-alarm red ship, crippling Mei's shields and shearing away sections of armored hull. Mei fired back at a trio of maddeningly familiar Hornets in a tight triangular formation.

Jazza barked orders. "Mei. Rahul. Flank Gavin and get the *Cassiopeia* out of here. Gavin, you copy that? You have the package."

He shook his head, willing the post-jump disorientation away. He didn't remember bringing up his shields, but they flashed on his HUD and his weapon systems were armed.

"Copy that." Gavin switched to the transport channel, "*Cassiopeia*. Let's get you folks out of here."

The crew onboard the UEE transport didn't need any more encouragement. Gavin accelerated to keep pace with the larger ship as two Rhedd Alert fighters dropped into position above and below him. Together, they raced toward the jump gate to Tyrol.

The Hornets wheeled and dropped toward them from one side. Gavin's HUD lit up with alerts as Jazza sent a pair of rockets dangerously close over his head to blast into one of the attacking ships. Her ship screamed by overhead, but the Hornets stayed in pursuit of the fleeing transport.

Alarms sounded. They needed more firepower on the Hornets to give the *Cassiopeia* time to get clear. He yelled a course heading, and the *Cassiopeia* dove with Mei and Rahul on either flank.

Gavin pulled up, turned and fired to pull the attention of the attackers. He spun, taking the brunt of their return fire on his stronger starboard shields.

The impact shook the Cutlass violently, and his shield integrity bar sagged into the red. Gavin turned, took another wild shot with his lasers, and accelerated away from the *Cassiopeia* with the Hornets in close pursuit.

* * *

Navsat data from the Min jump gate crept onto the edge of Walt's HUD. Several seconds and thousands of kilometers later, the first of the embattled starships winked onto the display. His brother and the Rhedd Alert team were hard-pressed.

Walt watched Brock and her crew circle and strike, corralling the Rhedd Alert ships. Gavin tried to lead the attackers away, but Brock wouldn't bite. By keeping the fight centered on the UEE transport, she essentially held the transport hostage.

Time to even the odds.

Jazza tore into one of the Hornets. Walt saw the enemy fighter's superior shields absorb the impact. He marked that Hornet as his target, preparing to strike before its defenses recharged.

He killed his primary drive and spun end to end, slashing backward through the melee like a blazing comet. His targeting system locked onto the enemy Hornet, and his heavy Broadsword laser cut into it in a burst of flame.

Mei's battered fighter dove through the streaming wreckage, but the Super Hornet, presumably Brock, waited for her on the other side. A blast from her neutron gun tore through the Rhedd Alert ship. Mei ejected safely, but their team was down a ship.

"Gods," Gavin's voice was frantic. "Get the hell out of here, Walt. Form up with the transport and get them away from the fight."

Walt ignored him. He came around for another pass and triggered his mic to an open-area channel. "The game's up, Brock."



CHRONICLES

His words cut across the thrust and wheel of close combat, and for a moment the fighters on all sides flew in quiet patterns above the fleeing *Cassiopeia*.

“You know,” Walt said, “if you wanted us to believe you were after the transport, you should have saved your big guns for the *Cassiopeia* instead of overkilling our friend.”

“I suppose I should be disappointed that you have found me out,” Brock’s voice was a pinched sneer, and every bit as cold and hard as Gavin had described. “On the other hand, I’m glad you’ve shared this with me. I might have been content disabling the majority of your so-called fleet. Now, it seems that I will have to be more thorough.”

She fired, he dodged, and the fight was on again in earnest. Walt switched his comms to Rhedd Alert’s squad channel. “Brock was never after the *Cassiopeia*, Gav. She’s been after us.”

“Maybe I’m a little distracted by all the missiles and the neutron cannon, but I’m failing to see how that is at all relevant right now.”

“We’re no match for the tech in her ships. If she goes after the transport, they’re toast.” He rolled into position next to Gavin. Together, they nosed down to strafe at a Hornet from above.

“Great,” Gavin said, “then why did you tip her off?”

Walt suppressed a wicked grin. “Because,” he said, “she can’t afford to let any of us get away, either.”

“If you have any brilliant ideas, spit ’em out. I’m all ears.”

“Run with me.” For all Walt knew, Brock could hear every word they were saying. She would tear them apart if they stayed. He had to get Gavin to follow him. “Run with me, Gavin.”

“Damn it, Walt! If you came to help, then help. I’ve got a pilot down, and I’m not leaving her here to get OK’d like Boomer.”

“This ain’t about doing the easy thing, Gav. Someone I truly admire once told me that this game is all about trust. So you ask yourself . . . do you trust me?”

Gavin growled his name then, dragging out the word in a bitter, internal struggle. The weight of it made Walt’s throat constrict. Despite all of their arguments, Boomer’s death and his own desertion when things got hard – in spite of *all* of that – his brother still wanted to trust him.

“Trust me, Gavin.”

Brock and her wingman swept low, diving to corral the *Cassiopeia* and its escorts. Jazza redirected them with a blazing torrent of laser fire and got rocked by the neutron cannon in return. The shields around her battered Cutlass flashed, dimmed and then failed.

Walt gritted his teeth. It was now or never.

“Jazz,” Gavin’s voice sounded hard and sharp, “rally with the *Cassiopeia* and make a break for it.”

Walt pumped his fist and accelerated back the way he’d come in.

“Walt,” Gavin sounded angry enough to eat nails, but he followed, “I’m on your six. Let’s go, people! Move like you’ve got a purpose.”

Walt pulled up a set of coordinate presets and streaked away with Gavin close behind him. The two remaining Hornets split, with Brock falling in behind Gavin to give pursuit. Even together he and Gavin didn’t have much chance of getting past her superior shields. Instead, he set a straight course for the waypoint marked at the edge of his display. When incoming fire from Brock drove them off course, he corrected to put them directly back in line with the mark.



CHRONICLES

Brock was gaining. Gavin's icon flashed on his display. She was close enough to hit reliably with her repeaters. As they approached the preset coordinates, Walt spotted a rippling distortion of winking starlight. Correcting his course slightly, he headed straight for it. Gavin and Brock were hard behind him.

"Come on," Walt whispered, "stay close."

On the squad display, he saw Gavin's shield integrity dropped yet again. Brock was scoring more frequent hits.

"A little farther."

Walt focused on the rippling of starlight ahead, a dark patch of space that swallowed Charon's stars. He made a slight course correction and Gavin matched it. Together, they continued their breakneck flight from Brock's deadly onslaught.

The small patch of dark space grew as the three ships streaked forward. Walt opened the squad channel on his mic and shouted, "Now!"

On his HUD, a new ship flared onto the display. It appeared to materialize nearly on top of them as Dell's Avenger dropped from her hiding place inside the blackened hull of the derelict Idris.

Walt punched his thrusters. The lift pressed him into his seat as he pushed up and over their trap. He heard Dell shouting over the squad channel, and he turned, straining to see behind him. Bright flashes from Brock's muzzles accompanied a horrible pounding thunder. Dell had left her mic open and it sounded like the massive gun was threatening to tear her ship apart.

* * *

"Heads up, Gav!"

Dell's voice hit Gavin like a physical blow.

He saw his brother climb and suddenly disappear behind an

empty, starless expanse. Then Boomer's Avenger materialized from within that blackness, and Gavin knew that his wife was inside the cockpit. She was with him, out in the black where veteran pilots outgunned them.

His body reacted where his mind could not. He shoved down, hard. Thrusters strained as he instinctively tried to avoid colliding with her. A brilliant pulse like flashes of lightning accompanied a jarring thunder of sound.

Gavin forced his battered ship to turn. The Cutlass shuddered from the stress, and Gavin was pressed into the side of the cockpit as the nose of his ship came around.

He saw the first heavy round strike Brock. The combined force of the shell and her momentum shredded her forward shields. Then round after round tore through the nose of Brock's ship until the air ignited inside.

"Dell" – the flaming Hornet tumbled toward his wife like an enormous hatchet – "look out!"

Brock ejected.

Dell thrust to one side, but the Hornet chopped into the hull where she had hidden. The explosion sent ships and debris spinning apart in all directions.

"Dell!"

He swept around to intercept her spinning ship. Walt beat him there. Thrusters firing in tightly controlled movements, Walt caught her Avenger, slowed it and stopped the spin.

Gavin rolled to put himself cockpit to cockpit with his wife.

"Dell?"

She sat in stillness at the controls, her head down and turned to one side.

"Come on, baby. Talk to me."

She moved.



CHRONICLES

With the slow deliberateness of depressurized space, she rolled her head on her shoulders. When she looked up, their eyes met. Dell gave him a slow smile and a thumbs-up. He swallowed hard, and with one hand pressed to his heart, he shut his eyes silently in thanks.

Gavin spun his Cutlass and thrust over to where Brock floated nearby, his weapons systems still hot. He paused then, looming above her as she had hesitated over Boomer.

Her comms were still active. "What now, Rhedd?"

He remembered her from the meeting with Greely. Tall, lean and crisp. She seemed small now, drifting not more than a meter away from the battle-scarred nose of his Cutlass.

"Gavin?" Dell's voice sounded small after the ruckus of the fight.

Walt eased into view alongside him. His voice was low and calm, "Easy, buddy. We weren't raised to OK pilots."

"She's not worth it," Dell said.

Brock snarled, "Do it already."

He had studied Brock's reports for months. She had more ships and more pilots than he could ever imagine employing. What drove her to harass them and kill one of his crew for this job?

"I just want to know why," he asked. "You've got other contracts. You've probably made more money than any of us will see in our lives. Why come after us?"

He held Brock's eye, the lights from the Cutlass reflecting from her visor.

"Why?" she repeated. "Look around you, Rhedd. There's no law in these systems. All that matters here is courage to take what you want, and a willingness to sacrifice to keep it."

"You want to talk sacrifice?" he said. "That pilot you killed was family."

"You put him in harm's way," she said, "not me. What little order exists in these systems is what I brought with me. I carved my success from nothing. You independents are thieves. You're like rodents, nibbling at the edges of others' success."

"I was a thief," he said, "and a smuggler. But we're building our own success, and next time you and I meet with the Navy," Gavin fired his thrusters just enough to punch Brock with the nose of his ship, "it'll be in a courtroom."

She spun and tumbled as she flew, growing smaller and smaller until the PRB on his HUD was all he could see.

* * *

A pair of Retaliators with naval designations were moored outside the Rhedd Alert hangar when Gavin and the crew finally limped back to Vista Landing.

Crew aboard the *Cassiopeia* had insisted on helping with medical care and recovery after the fight. The team scheduled for pick-up at Haven was similarly adamant that Rhedd Alert take care of their own before continuing. Technically, no one had checked with Navy SysCom.

Did the Navy fire contractors face to face? For all he knew, they did.

Gavin saw to the staging of their damaged ships while the others hurried the wounded deeper into Vista Landing. When he'd finished, he exchanged a quick nod with Barry Lidst who stood at ease behind Major Greely.

"Major," Gavin held out his hand, "I assume someone would have told me already if I was fired."

His hand disappeared in the major's massive paw. "I suppose they would have, at that."



CHRONICLES

“Then to what do we owe the honor?” Dell and Walt joined them, and Gavin made introductions.

“I first, then ‘we,’ ” Greely repeated, “I like that, Rhedd. I appreciate a man who accepts consequence personally but insists on sharing accolades with his team. Tell me, son. How’d you get Brock?”

Gavin nudged his wife. With a roguish grin, Dell pulled her arm from around Gavin’s waist and stepped over to pat the Tarantula on her battered Avenger.

“Nice shooting, miss.”

Dell shrugged, “Walt pulled my tags, nav beacon and flight recorder before we left. I was sitting dark inside a decoy when the boys flew her right down the barrel.”

Barry leaned toward Greely and in a completely audible whisper said, “It might be best if we ignore the illegal parts of that.”

Greely waved him off. “This is what the ‘verse needs. Men and women with the courage to slap their name up on the side of a hangar. A chance for responsible civilians to create good, honest jobs with real pay for locals. That an ex-military contractor tried to muck that up . . .”

Gavin and the team got a good, close look at what angry looked like on a Navy officer. It was the kind of scowl that left an impression.

“Anyway,” Greely composed himself, “not a soul in the ‘verse would blame you for writing us off as a bit of bad business. I’m here to ask that you stick with it.”

Gavin was reluctant to bring their financial situation up in front of their one paying client, but they were tapped out. Rhedd Alert didn’t have the Cred to buy ammo, much less repair their downed fighters. “Actually, sir. I think we may need to find something a little more lucrative than getting shot up by disgruntled incumbents.”

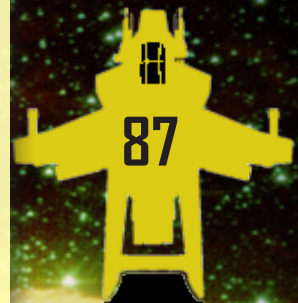
“About that,” Greely rested his hand on Gavin’s shoulder. He led him to look out one of the large hangar windows at the Retaliators buoyed outside. “My accountant tells me there may be some room to renegotiate certain parts of the Tyrol contract. But that job won’t be enough to keep your team busy now that Brock’s out of the way.”

Gavin laughed. “On that point, I most certainly hope you are right.”

“Well . . . I’ve got more work for an outfit like yours. I hope you’ll accept, because you folks have surely earned it. Tell me, Rhedd, are you familiar with the Oberon System?”

Behind them, Walt dropped his helmet.

The End



CHRONICLES