

JUMP POINT

A ROBERTS SPACE INDUSTRIES PUBLICATION ISSUE 02.11

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GREETINGS, CITIZENS!

Day One of the experiment to publish **Jump Point** on the 3rd Friday, rather than the last Friday: It's still a rush to get it out the door. I knew that, but I'm glad we're not also publishing brochures or new versions of the game tonight.



We are once more deviating from our normal practice to give you a non-ship for the Work in Progress. I know we'll never please all the people all the time, but while it's no Retaliator, I hope you find it interesting despite its lack of wings.

Returning briefly to our Chutes and Ladders comparison from last month, a few of you started guessing which ship I was referring to that had just slipped a year. I actually had no specific ship in mind; those were somewhat random numbers. However, given its lack of appearance since last March, I don't think I'm giving too much away to note that the Idris sorta fits that description. As Bjorn Seinstra (F42 Lead Vehicle Artist) noted to me last week, the Idris is a massive undertaking, and it's not going to be ready for at least a few more months. And I'll simply say, no Retaliator for at least another couple of months, as well. As the saying goes, do you want it done quick or do you want it done right? You know what Chris's answer is, and that goes for everyone else associated with Cloud Imperium as well.

This month we've got the Orbital Space Platform Station (or whatever it's called) for the Work in Progress. Even if you aren't interested in the station itself, check out the

guns at the end of the article; those are the weapons you'll be using in FPS play in the near future.

We've also got Nyx and its asteroids, Gold Horizon (which made the platforms that dot Human space before the Emperor forced it out of business), and a Behind the Scenes look at how PAX-Australia's FPS demo was put together and run by the good folks at Illfonic — Redacted No Longer! Plus the third of four episodes from Allen Russell, and they get more legible every month.

I do appreciate the various suggestions about how to get **JP** done earlier, and then have a stress-free release on the appointed day. Sadly, that's just not going to happen. Everyone involved in **JP** also has about thirty other pressing tasks sitting on his or her desk, and so getting anything before it absolutely has to be done is wishful thinking. (Even more sadly, the same goes for me, so I can't point fingers.) I will be keeping it on Friday, though. As much as I enjoy putting this together (and I really do enjoy it), I'd just as soon have my weekend free. A Friday deadline always means I have Saturday and Sunday for other things. And we're not going anywhere near a variable/flexible schedule. If I don't have a hard deadline, I find it all too easy to slip, and slip, and slip the due date.

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

David

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PAGE 40:

DAVID SCOTT

PAGE 54, 56:

SEBASTIEN LARROUDE

PAGE 57:

DENNIS CHAN



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42
SQUADRON

STAR
CITIZEN

RSI
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SPACE
INDUSTRIES

FROM THE HIGHPOINT

A CLOUD IMPERIUM GAMES PRODUCTION. A STAR CITIZEN NEWSLETTER.
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Space Station/Orbital Platform



WORK IN PROGRESS



WORK IN PROGRESS

In the beginning (a couple of years ago), Corentin Chevanne, Art Director at Behaviour, created a beautiful painting of a space station. It's been used for various purposes since that time (including the station attacked in the first episode of Jump Point's *Void Rats* series by Doug Niles). Corentin started by creating six sketches for possible development.



WORK IN PROGRESS

Let's follow Corentin's process as he completes the platform chosen for the first orbital station.

[top] **Corentin:** I start by blocking the composition and especially the silhouette of the space station. The silhouette is one of the most important steps in designing an object.

In this case, it is finding the right balance between having an iconic global shape that you recognize from far off, along with the small bits that give a sense of scale but also can throw off your design if it makes it noisy.

At this point I played a lot with negative space to create a more iconic silhouette.

[bottom] This is where I started to add some volume and refined the design just by adding light to the silhouette. I played with brushes and small bits of texture to keep the sense of scale in the right direction.

[top] **Corentin:** I added small ships around the station to reinforce the scale and the composition.

[bottom] I traced a perspective grid and started designing and refining the different areas of the space station.



WORK IN PROGRESS



[top] **Corentin:** Refining the details – added some large panels on top of the main circle to add a bit of visual rest.

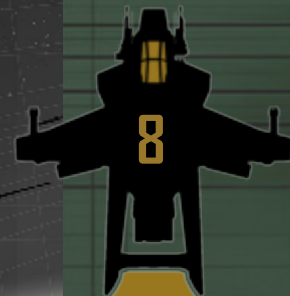
[bottom] Refining the details – worked a bit on the background to better suggest the main light source.



WORK IN PROGRESS

[top] **Corentin:** Refining the details – The final design is mostly blocked out. Added a new panel for visual rest and balance. Started a pass of small detail by applying textures on some areas to accentuate the sense of scale.

[bottom] At this point I modeled in 3D and integrated the 6 protruding sections around the circle, so the perspective is more accurate. A good pass on the planet clouds and atmosphere was done as well.



WORKING PRINCIPLES



[top] Corentin: First step into color. At this stage it's just exploration.

[bottom] Removed the background "nebulas" as they were attracting the eye too much. Spread the colors across the space station, smoothing them down and adding small variations in hues and brightness.



WORK IN PROGRESS

[top] **Corentin:** Color tweaking and refining details.

[bottom] Finalizing colors, adding small lights to add a bit of life.



WORK IN PROGRESS

Corentin: Final version.
Polishing the lighting and
colors, and the background
as well.

*And that's where it was left
for close to a year.*



WORK IN PROGRESS

About a year ago, Illfonic needed a station for its initial FPS arena, triggering this conversation:

Travis Day, Associate Producer, CIG: Hi, Kedhrin and Chuck! I wanted to introduce you to Corentin from Behaviour Interactive. He has been working on SC for a while now and created some beautiful pieces of concept art. We believe he would be a great resource for you guys as you go about building the space station.

Hi, Corentin, we checked with Mathieu and he indicated that you might be available to help out the guys from Illfonic by providing some concept pieces for their work on a space station for FPS combat. Sound like something you would want to take on?

Corentin: Hi, guys, I'm glad to work with you. I can start working on some concepts. Do you have any description of what this space station is exactly?

I would go with an exterior view first, to set the general architecture and mood. Any references, descriptions, directions on this? A Confluence or Jump Point article?

Harry Jarvis, Art Producer, CIG: David and Rob, can you get Corentin the ideas you had on the space sta-

tion Illfonic is starting on?

Chris Olivia, Chief Visual Officer, CIG: Are we starting with your Orbital Platform piece you did?

Corentin: My understanding is that this was to be a fringe/outlaw type station, in Pyro if I remember correctly.

Chris Roberts: For the FPS test I would prefer the station to be an outlaw / run-down station – not necessarily Corentin's nice pristine concept (which was really nice BTW, Corentin) – as that would make more sense in the context of a gun fight. Maybe an outlaw station that you're trying to capture?

Rob Irving, Lead Designer, CIG: Yeah. The station in Pyro (around Pyro IV) would fit that perfectly. So maybe a bit of the structural look from the initial UEE stations, but pushed more in the direction of the cobbled-together/modified-on-the-fly look of Spider. But definitely space, and not ground-based.

Kedhrin Gonzalez, Creative Director, Illfonic: That platform would be perfect as a pirate station!

Could you let me know if this is the general direction you'll go? If so, we can start planning around that.



WORK IN PROGRESS



Corentin: Here is what could be the large shot of the outlaw station. I started from the previous UEE orbital station to save time for the concept. I tried to represent the Pyro system, for example, including a bright nova behind the station. Also, the planet behind is not necessarily Pyro VI (I needed something to balance the composition there.) Pyro VI could be "off screen" and this could be one of its moons or something.

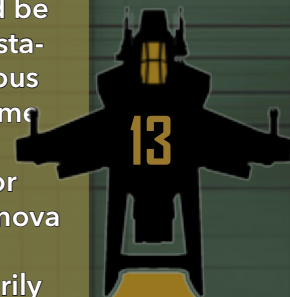
Chris O: Sweet! It would be cool to see a few trails of gaseous or oily streams coming off that station and ribboning off into the distance. Need to keep space thick with stuff to fly around!

Corentin: Here is the update of the outlaw station. I've had a hard time figuring out what the oil leaks look like. I'm still not fully satisfied; but it is probably something, if it's done ingame, that will need some further investigation.

I also added more debris floating around the station.

Chris O: Cool ... I was thinking more sinewy and less gloppy, like cigarette smoke trails. Or cloud tankish ...

Chris R: Yeah, less gloppy oil leaks – this looks like some kind of weird space monster blob! Station is awesome, though!



WORK IN PROGRESS

Corentin: I updated the smoke/oil trails and got rid off the golden blobby monster from outer space. :) I kept one on the left more gaseous, while the others are more liquid/oily.

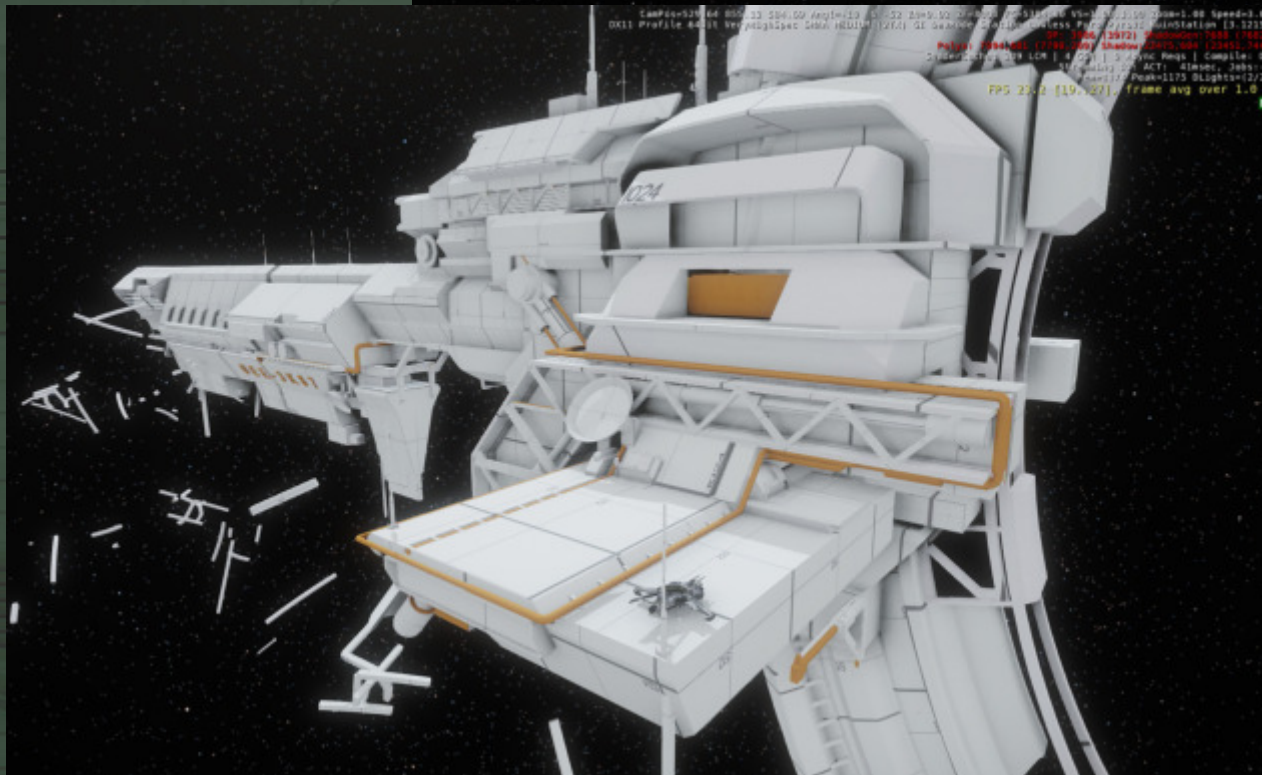
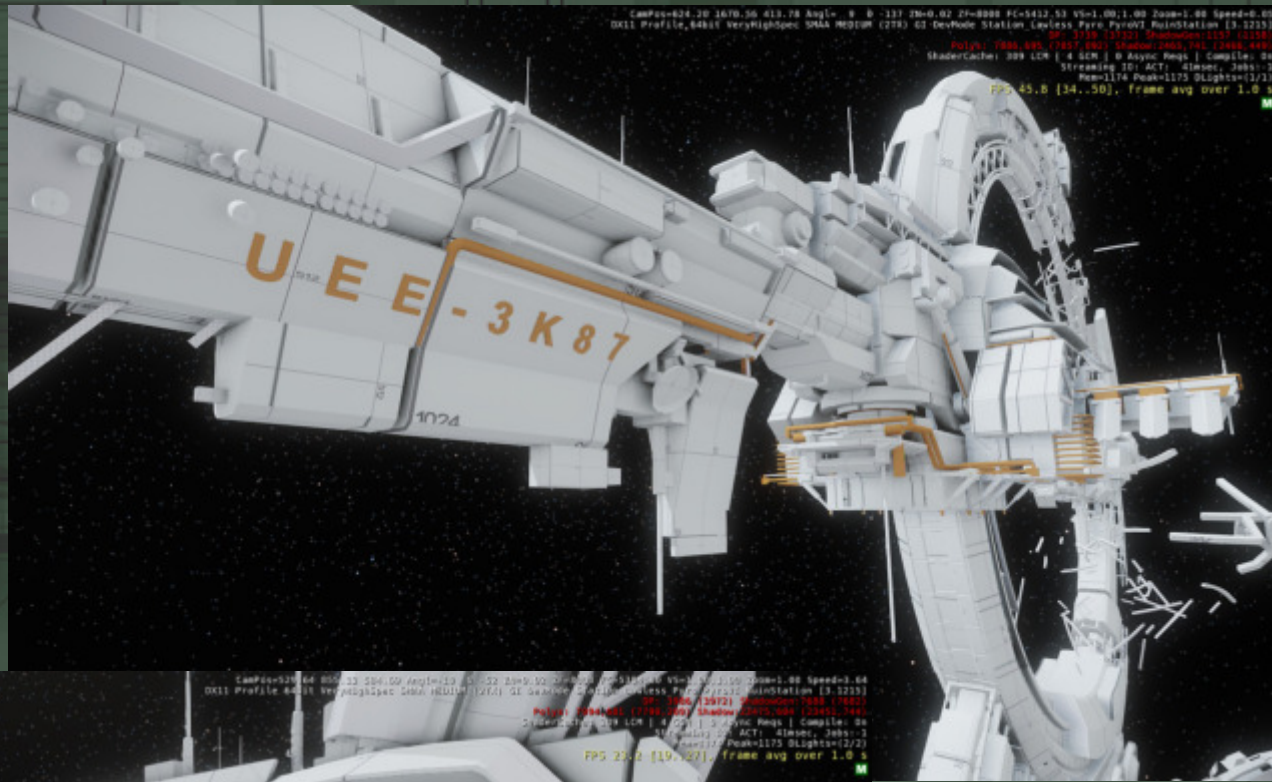
Corentin: Here is the first shot of the interior of the Outlaw Station. I chose to represent what could be an intersection between a small corridor (left and right) and a larger one that ends in a larger room. I also pictured a broken lift, in the foreground. Maybe it could still be useable (some mission like go there to activate the power back to the lift or something.) Anyway, it was more about creating a mood shot than a specific layout.

Cole Gray, Lead Artist, Illfonic: This is soooo cool. Love your work, Corentin.

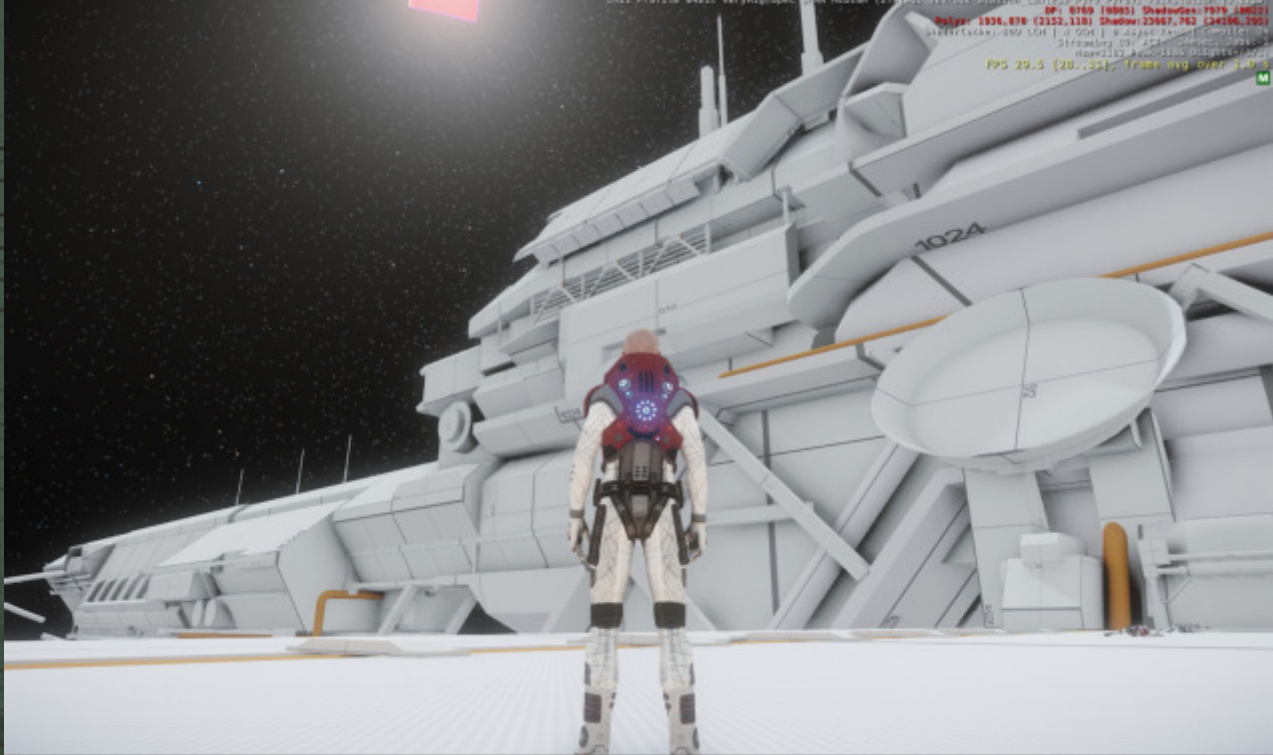
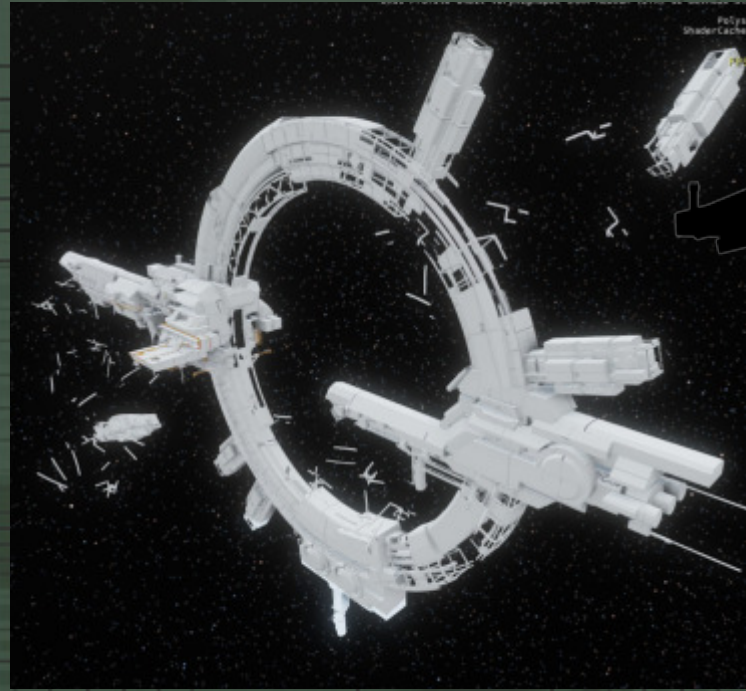
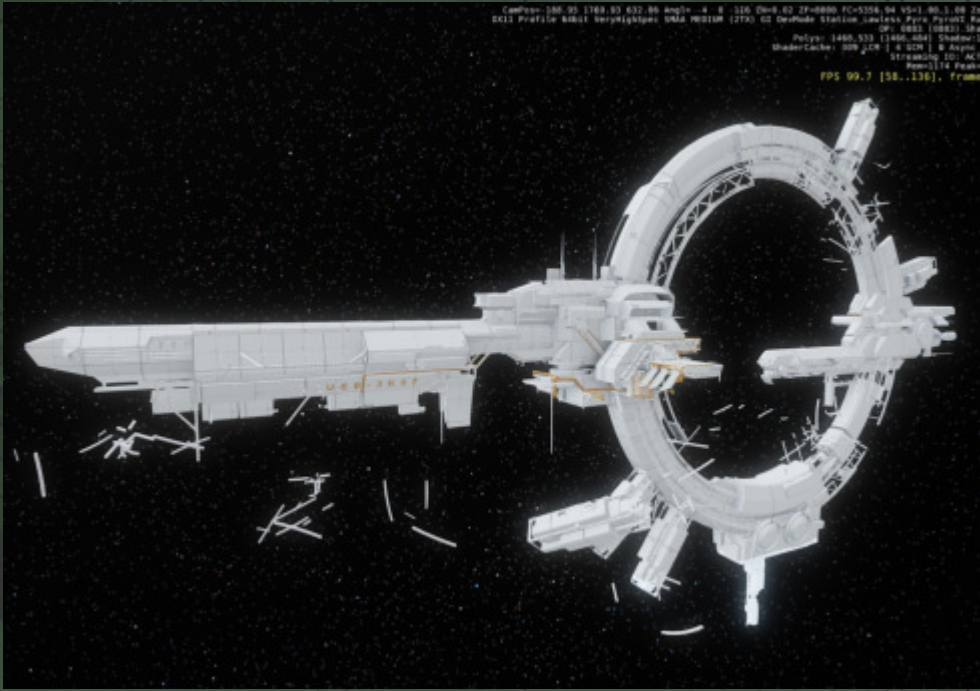


WORK IN PROGRESS

At this point, the torch was passed from Corentin to Ill-fonic and they began modeling the platform for the FPS. Here are a few pics of the model in progress (this page and next).



WORK IN PROGRESS



WORK IN PROGRESS

And here are a few early renders of the station exterior (this page and next).



WORK IN PROGRESS

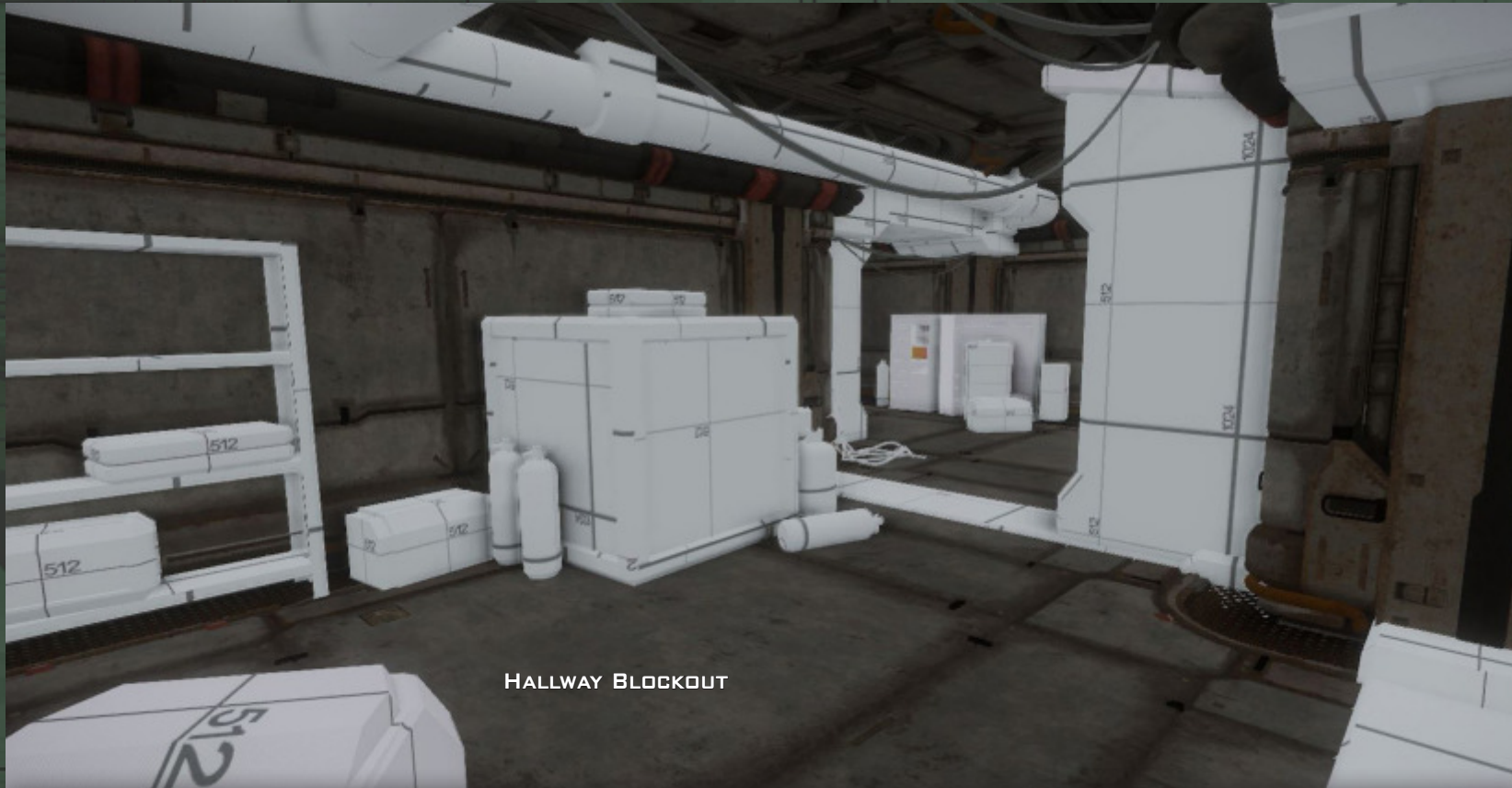


WORKING PRIORITIES



The view from a kilometer out, compared to Corentin's concept art.





HALLWAY BLOCKOUT

Illfonic began creating blockouts of various rooms in the space station, and recruited freelance artist **Atey Ghailan** to create concept art paintovers of a typical hall, room, medbay and hangar. Over the next several pages, we'll be following Atey's work and the feedback from Cole Gray at Illfonic.

HALL

Cole: To get you up to speed with what we've been doing, we've created a ton of blockout props. We've taken these props and set-dressed some areas to get a feel for what assets we still need to make, and if they work in the scene or not. We're nearly complete here and we have a handful of screenshots of various rooms, ranging from anti-gravity control rooms, to simple bathrooms. We'd like you to take these screenshots and do paint-overs, fleshing

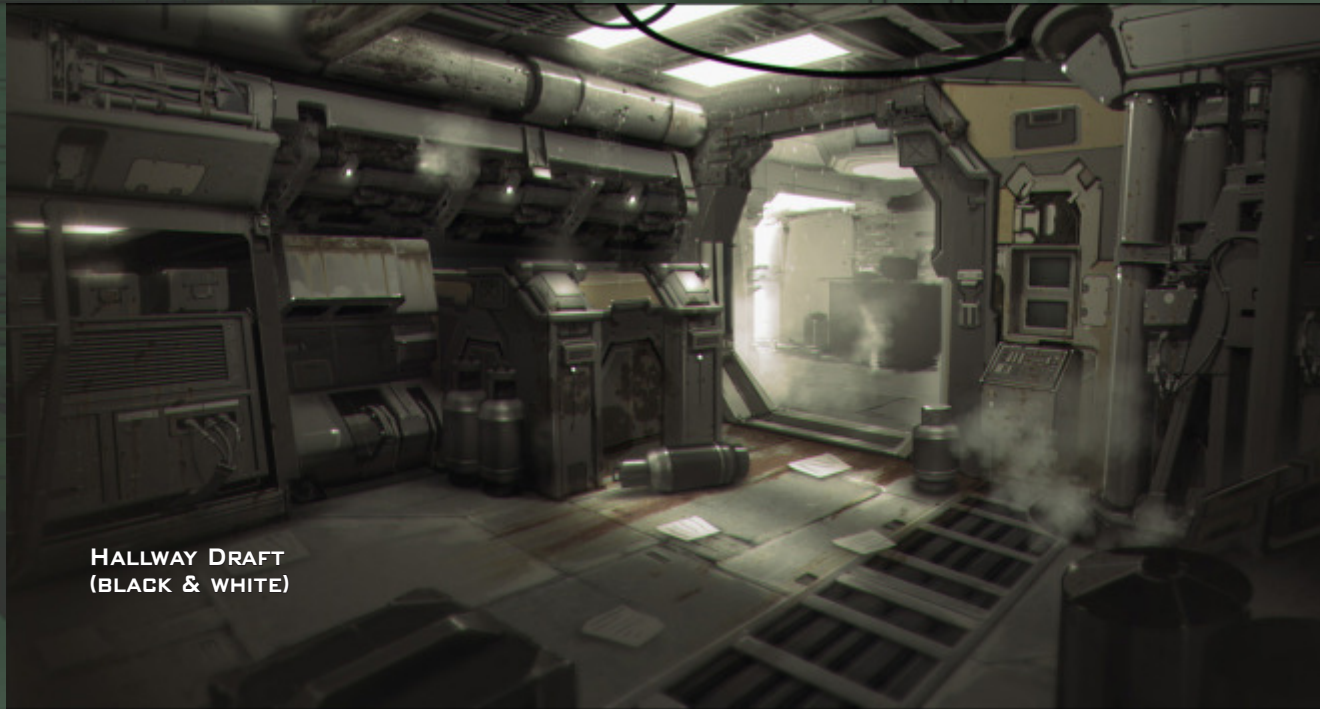
out the white meshes. Additionally, we'd like you to add lighting and any special FX such as steam or sparks. The idea is to get a "target end visual" for everyone to work towards.

To get started, I've attached a screenshot of our small hall. One of the main goals of this is to explore the meshes with the white developer texture, so that outsourcing can look at it as a reference of what the props need to look like. We don't need each prop to be an amazing masterpiece, but the props should lend themselves to a cohesive end result.

Feel free to add any details as needed to any areas that don't have the white developer texture, but we are mostly looking for mood pieces after the initial prop work has been done.



WORK IN PROGRESS



HALLWAY DRAFT
(BLACK & WHITE)



HALLWAY FEEDBACK



WORK IN PROGRESS

Cole: Try to only address the meshes with the white developer texture, and avoid altering the non-developer texture walls, ceilings and floors. Of course you'll probably need to paint over the finished parts due to prop silhouette and overall image cohesion, but besides this, let's try to avoid adding too much fundamental structure rework.

We'd like you to hit this with a black and white paintover first. In this paintover we'd like you to explore lighting. Then, once we have a good black and white painting, we'd like you to do color, but not for the initial image.

[After the b&w, Atey moved on to a room concept, next page.]

ROOM

Cole: VERY very nice. Much better!

So I think we're ready to move on to the next step(s):

1) I attached a screen shot with a paint-over talking about the monitors. I think we want to tweak those a tad, as they feel a bit too "fantasy sci-fi," i.e. *Star Craft*.

2) General cleanup and polish. Start working towards a final composition. Ideally we want this concept to be something visible to the public eventually (art dumps and such), so we want this image to sing.

3) COLOR! As far as colors go on this, I'm going to let you do what you do. The one thing I ask is we keep the saturation a bit muted. It's okay to create accent color, and use of color to create focal points, but overall we want to shoot for realism, and less video-gamey color extravagance. Think dark, dirty and dangerous.



ROOM BLOCKOUT



ROOM FIRST PASS
(BLACK & WHITE)



WORKING IN PROGRESS



ROOM DRAFT
(COLOR)



- Needs a little more color variation to separate forms a bit better.
- This image is pretty monochromatic. Some of the rust accents are the same color as painted decals.
- Nice color variation. More like this please!

Ballast: Feeding a led cluster though it looks a bit too much like a box with beveled edges.
If we could make the frame feel 30% lighter, and less primitive I think we could call this done.

ROOM FEEDBACK



WORK IN PROGRESS



ROOM FINAL

WORK IN PROGRESS



HANGAR BLOCKOUT



HANGAR DRAFT
(BLACK & WHITE)

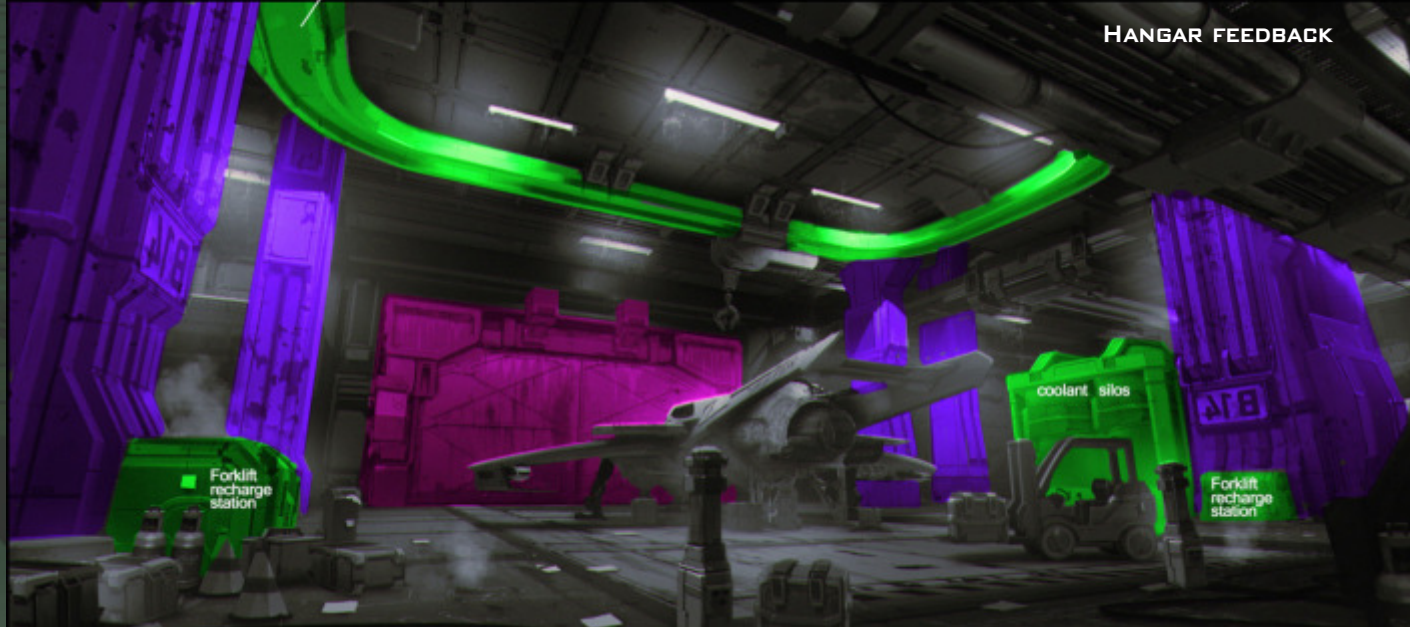
HANGAR

With this third area, Atey and Cole were communicating through notes on the images, as you can see on the next page. There were only three images created (besides Cole's painted-on notes) – a block-out, an initial black & white concept, and the final color concept.



WORKING DRAFTS

This track system needs a rework. Over the last few days we've been told this system needs to operate differently. See other image for direction on this.



WORK IN PROGRESS



HANGAR FINAL
(COLOR)



WORK IN PROGRESS

MEDBAY

By this point, Cole and Atey were in a groove, without much written discussion. The medbay only involved three images – a blockout, a black & white concept, and a color concept.



MEDBAY BLOCKOUT



MEDBAY DRAFT
(BLACK & WHITE)



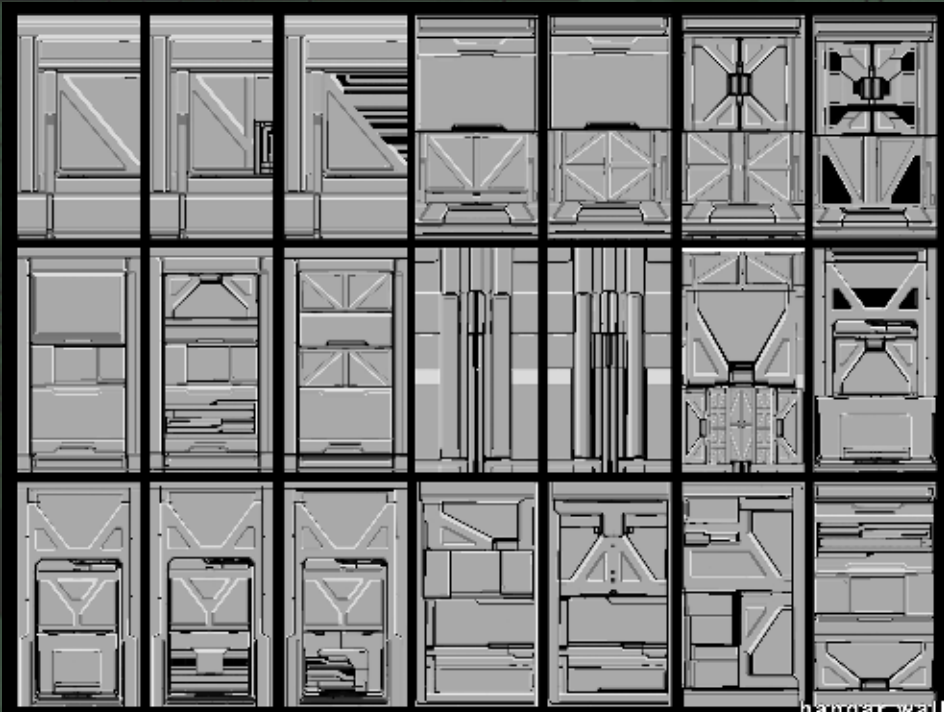
WORKING PRIORITIES



MEDBAY FINAL
(COLOR)



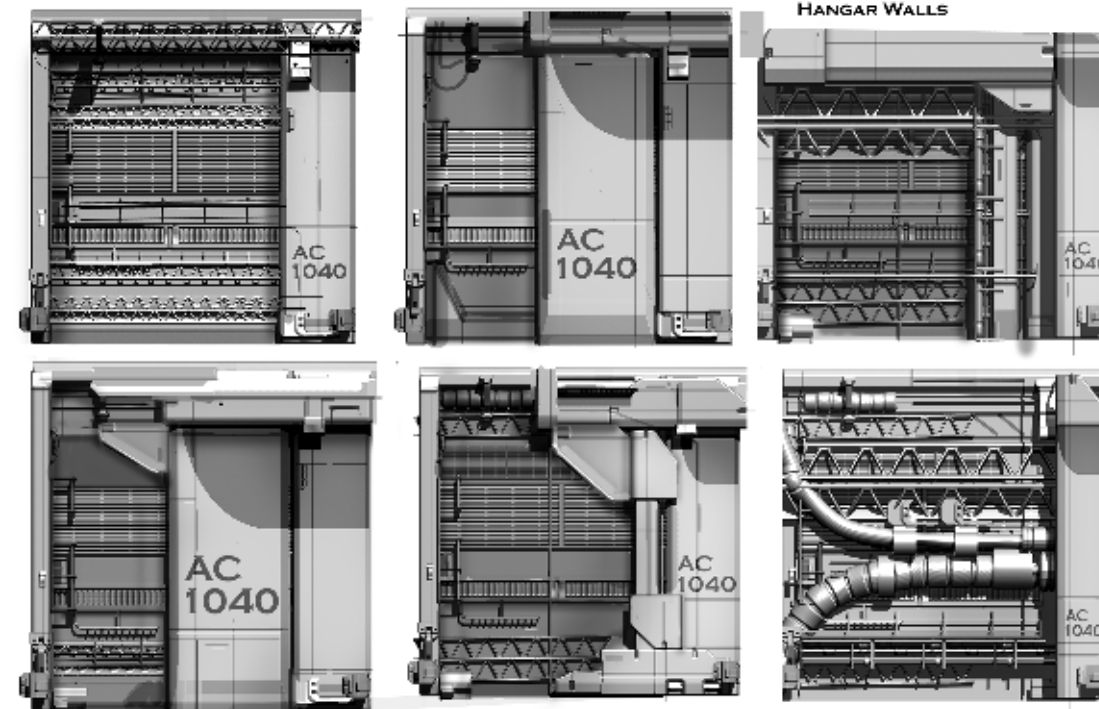
WORKING PRIORITIES



hangar wall

HANGAR WALL CONCEPTS

These next few pages illustrate some of the hangar detail work.



HANGAR WALL RENDERS

HANGAR WALLS



WORK IN PROGRESS

30

× Adjusted lights for more contrast.

× Made control tower lights cooler.

× Reduced frequency noise on the walls.

× Added some diagonal elements to the walls to break up horizontal elements and replicate the stair angles.

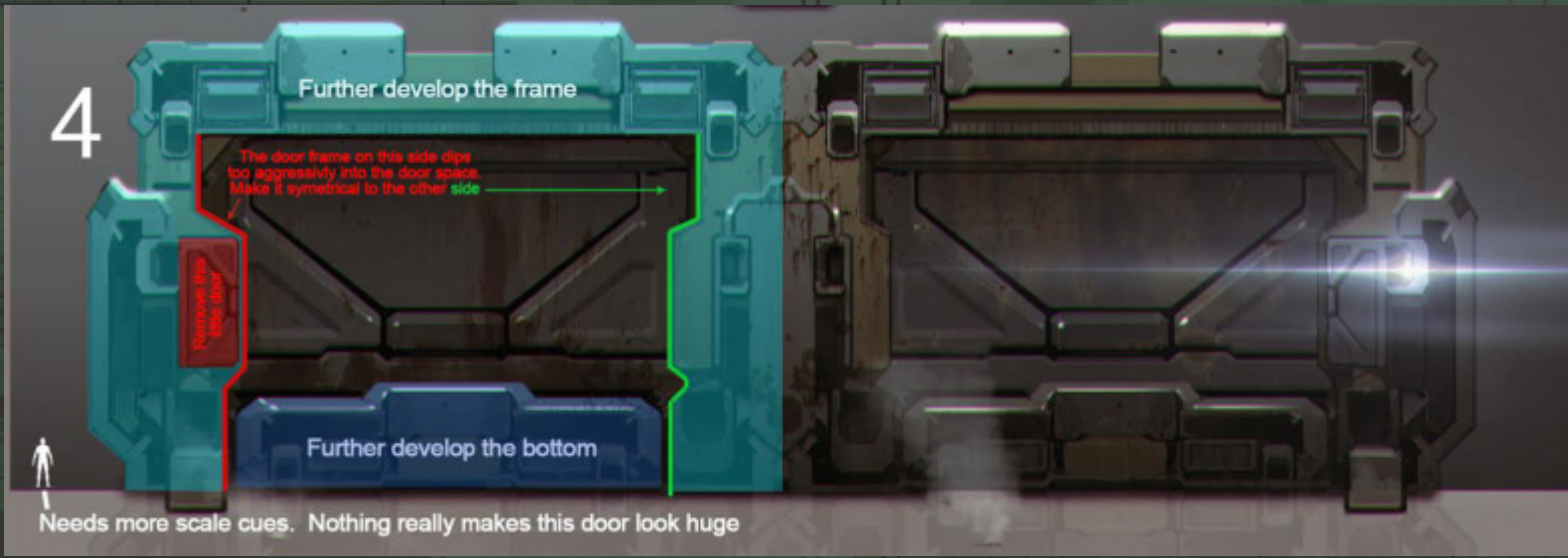
× Added decals for color and break up.

× Added more color on the walls for further breakup and eye rest.

REF:



WORK IN PROGRESS



FINAL (SO FAR ...)



WORKING DRAFTS

KASTAK ARMS DEVASTATOR-12 ELECTRIC SHOTGUN



WORK IN PROGRESS



Bits of interest and flavor from initial concepts.



Taking the original silhouette, and incorporating some of the interesting bits from above, and some of the forms from our concept exploration this is the direction we intend to go.



We'll finish with a few WIP images of the guns used in the FPS demo.

KA-D 12

Exposed mid energy cells



Exposed mid and rear energy cells



Animation / movement call outs



visibly depletes as energy is consumed (not seen in FP)

Rotates in-between shots to load a new charge into the chamber. (This is encased in a glass tube)

Flaps lift after shots to release exhaust / steam / smoke

Manual pump mechanism to load new shot into chamber.

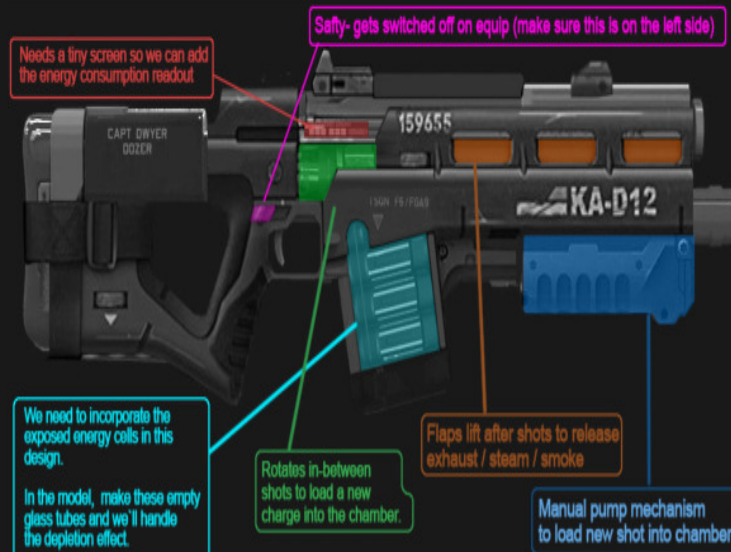
Concept Adjustments

Things that must remain intact:

- Silhouette must remain intact
- Exposed energy cells in the bottom area (non removable)
- Small screen used to monitor energy consumption (in red below)
- Rotatable, central charge loader. (in green below)



Animation Components



Needs a tiny screen so we can add the energy consumption readout

Safety- gets switched off on equip (make sure this is on the left side)

We need to incorporate the exposed energy cells in this design.

In the model, make these empty glass tubes and we'll handle the depletion effect.

Rotates in-between shots to load a new charge into the chamber.

Flaps lift after shots to release exhaust / steam / smoke

Manual pump mechanism to load new shot into chamber.



WORK IN PROGRESS

KA-D 12

Concept Adjustments



Animation Callouts



- 1) Gets pulled back between shots
- 2) Vents open to release heat / steam / smoke
- 3) Cells visibly deplete as weapon is fired.
- 4) Drum rotates after each shot (see above)
- 5) Energy meter depletes as weapon is fired
- 6) Saftey is turned off on weapon equip.

Electric Shotgun

(in-game model)



WORK IN PROGRESS



GEMINI
LH-86



COMBUSTION PISTOL

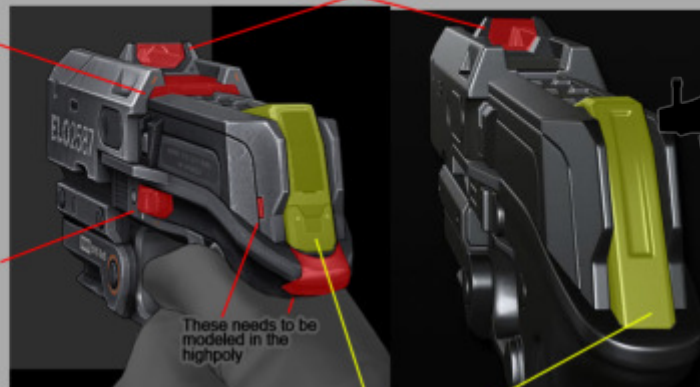


KLAUS & WERNER MODEL II ARCLIGHT LASER PISTOL

This needs to be modeled in the highpoly

This button looks a tad too large. Also the tab on the end needs to be tapered

Watch the ratios on the sight. The Highpoly is: too tall, not wide enough, and the top angles are too tapered.



These needs to be modeled in the highpoly

The tab on the back looks both too skinny, and too long. Its possible part of the issue is the tab on the highpoly has a bit too aggressive of an angle.

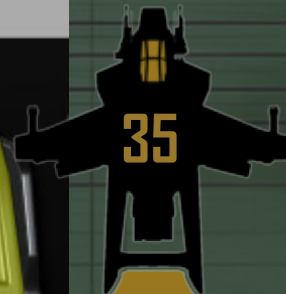


Marry these shapes together better than crashing them into one another.

Suggest: cutting a space into the hand guard for the upper shapes to sit into.



Laser Pistol

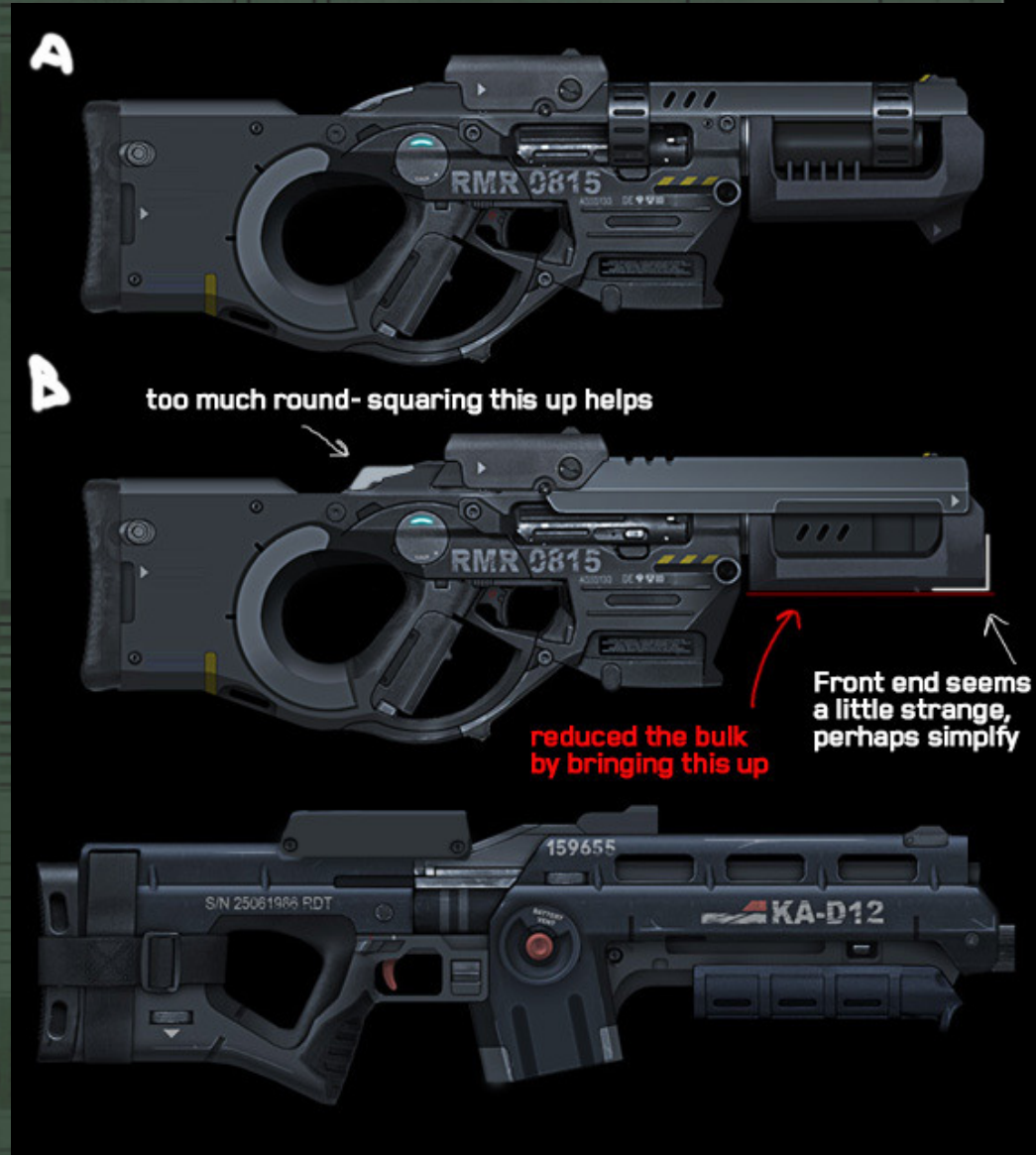


WORKING IN PROGRESS

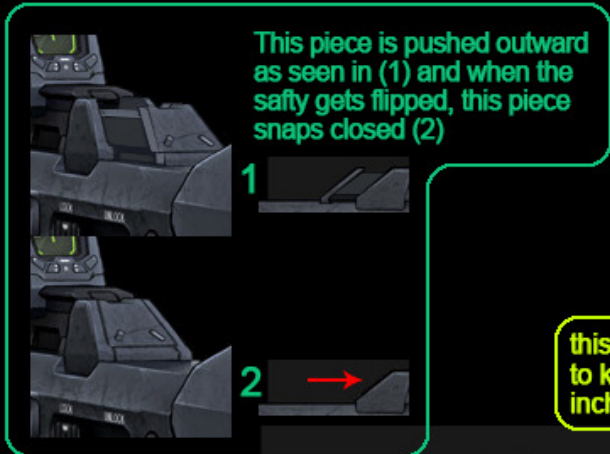
BEHRING
P45C
SUB MACHINE GUN



KLAUS & WERNER
ATT-4
LASER ASSAULT RIFLE



WORKING DRAFTS



This piece is pushed outward as seen in (1) and when the safety gets flipped, this piece snaps closed (2)



We need a little screen built into the side of this to serve as a power meter. We'll take care of the effect, all we need is a screen that looks turned off.

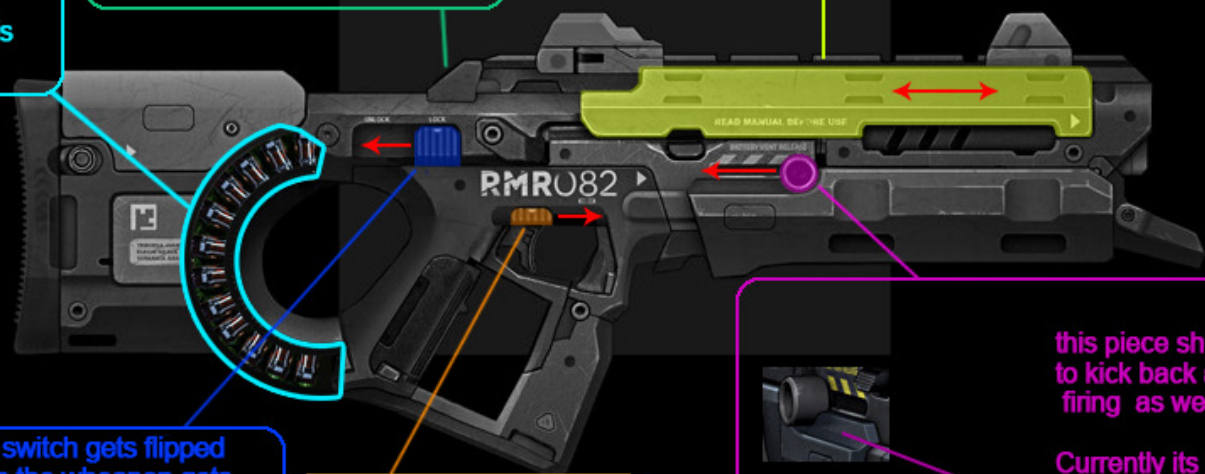
We need to incorporate the exposed radial energy cells into this design.

this entire piece should be able to kick back and forth about half inch during firing

This switch gets flipped when the wheapon gets equipped. It will serve the purpose of being the "safty"

This switch gets flipped when changing firing modes

this piece should be able to kick back and forth during firing as well.
Currently its blocked so it cant move



RMR082

Concept Adjustments



Animation Callouts



- 1) kicks back during fire animation
- 2) kicks back during fire animation
- 3) Depletes as weapon is fired
- 4) Gets flipped on weapon equip (safty)
- 5) Gets flipped when changing firing modes
- 6) Displays weapons charge amount
- 7) Is extended on weapon equip and snaps into place when safty is turned off.



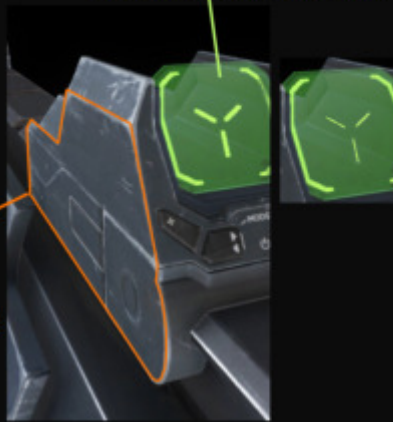
WORKING IN PROGRESS



More geometry detail

Add more geometry, to things like this to make this feel less like a plane, and more like separate mechanical components. make sure it catches light in interesting ways

Make functional reticle lines thinner



The tops need to have more small details created with geometry

ATT-4

LASER
ASSAULT RIFLE

In-game model (W.I.P.)



WORK IN PROGRESS



GOLD HORIZON

C O R P O R A T I O N



"Together, we will improve and expand mankind ever-outwards towards the endless gold horizon."

– Ivar Messer, 2546, speech on his ascendancy to Imperator

Gold Horizon, formerly the Gold Horizon Extrasolar Mineral Prospecting Corporation, remains a strong reminder of both unchecked greed and our civilization's thriving expansion into the galaxy. The company, named after a line from Messer's ascendancy speech, in some ways represents the best and worst of the era. It seems ironic to

today's historians that the same Messer government that inspired Gold Horizon's growth also brought about its end, and that those who ran the company were victims of the same brutality that affected the entire Empire.

Gold Horizon was founded as a dedicated prospecting corporation in the middle of the 26th century, intending to take advantage of the new government's series of tax breaks for asteroid mining concerns. The company found immediate success, buoyed by the discovery of the Grakneth lode, a high concentration of titanium-bearing asteroids in the outlands of the Terra System. Gold Horizon's mineral profits quickly lead to its establishment as

MEMORIALS

an industrial concern, producing pre-fabricated mining stations for quick deployment in newly surveyed star systems. At this time in history, interstellar claim jumpers had become ubiquitous, taking advantage of the long lead time between corporate surveys and the actual start of large-scale mining. With Gold Horizon's prefabs, an entire mining operation — complete with drilling rigs, storage and spatial defense perimeters — could be carried along with survey ships and deployed immediately. The project was another massive success for the company.

By Gold Horizon's second decade of operation, the United Empire of Earth had become an established reality and Human civilization had caught the terraforming bug. Observing that vast amounts of the Imperial economy were now devoted to supporting general expansion and terraforming projects, Gold Horizon opted to move from mining support into planetary transformation support. The result of this shift is the Gold Horizon Space Station, the distinctive ring-shaped platform deployed around the galaxy to house terraforming workers, their equipment and their support systems.

Unlike Gold Horizon's mining equipment, the Gold Horizon Station series was massive, with the ability to support hundreds of workers in their difficult task. These starside base camps purported to offer all the comforts of home, from semi-comfortable living quarters to fully equipped medical bays to dedicated entertainment arenas. As large-scale standardized terraforming equipment began to come into existence, it was designed to transit seamlessly through the Gold Horizon station systems that supported the first wave of 'spit and glue' biosphere conversions.

With two fingers directly on the pulse of the expanding empire, and a growing number of politicians in their pocket, Gold Horizon seemed to be an unstoppable juggernaut. The company took in billions from govern-

ment and private contracts (many rumored to have been acquired through bribes). Gold Horizon had its name directly attached to the reigning social movement and seemed as if it could do no wrong. That was until 2650, when CEO and majority shareholder Dennis Acevedo made a single, fateful decision: move the corporation's headquarters to Terra.

The Collapse

Historians remain divided on the reasoning for Acevedo's decision. Terra was an increasingly popular center of Human culture, but many in Corsen Messer V's circle of advisers feared that its popularity was also shifting the cultural focus away from Earth. Whether the company was seeking to reduce its overhead with the relocation or it was actively protesting the increasingly martial focus of the Empire's expansion is lost to history. Whatever the reasoning, the Emperor took note, and proclaimed Gold Horizon's move to be a personal affront. Government contracts completely ceased, and private developers were urged not to continue purchasing Gold Horizon equipment. In the space of just five years, Gold Horizon would be driven out of business.

In 2654 the Emperor delivered the coup de grace: the government nationalized all "terraforming support" concerns — that is, Gold Horizon's space platforms — ostensibly in the name of protecting the citizen settlers who would rely on them while laying claim to the new worlds. Gold Horizon found a significant portion of their assets frozen and the sum total of their long-term business plan completely untenable. Two CEOs, serving in rapid succession, attempted to right the ship with a move back to mining and then general heavy industry support, but nothing could stop the inevitable. Gold Horizon closed shop permanently in 2655.



Gold Horizon Today

In one light, the lasting impact of Gold Horizon is the simple fact that in 2944 trillions of Humans live on worlds that were uninhabitable centuries before. Even if mankind was destined to expand to the stars regardless, Gold Horizon's support backbone was still partly responsible for keeping Human worlds closer to one another than would have otherwise been possible. From that, it is not unreasonable to say that the geographic strength of the Empire today owes something to what the corporation enabled. Still, Gold Horizon's distinctive 'G-in-a-bell' logo remains a divisive symbol in today's society. As it has long-since entered the public domain, it occasionally reappears as an avant-garde fashion accessory (in the more conservative areas of old Earth, Gold Horizon purses and messenger bags remain big sellers).

History aside, a major lasting impact of Gold Horizon comes from the general indestructability of their stations. Dozens of surviving Gold Horizon stations remain scattered throughout the Empire, mostly in areas of space where terraforming began but was deemed unprofitable midway through the process. The stations

have become warrens for illegal activities. Inhabited by loners, survivalists, corsairs and worse, surviving Gold Horizon stations in distant systems can range from black market bonanzas to deadly battlegrounds fought over constantly by competing pirate shock troops.

In 2943, the United Empire of Earth Senate conducted an undercover investigation of the Gold Horizon bases and ultimately determined that it would not be possible to relocate civilians based aboard them. The formal recommendation was that the military pursue a campaign to destroy the remaining bases from space, although these plans have fallen by the wayside in the light of legal issues and the increased Vanduul threat.

Retraction

The Galactic Guide in the previous issue contained information that was not true. The article incorrectly identified the Sakura Sun Light Blossom as a shield generator, when, in fact, the Light Blossom is a power plant. Galactic Guide apologizes to its readers and regrets the error. This error will be corrected in subsequent printed materials.



FPS DEMO & DEVELOPMENT



BEHIND THE SCENES



LEE BEGINS THE ASSAULT

Space shooter, persistent universe ...and first-person shooter. Star Citizen will be all of that, and more. Hot on the heels of last month's PU demo, the team at Illfonic gave a packed house at PAX-Australia the first look at the FPS component of Star Citizen.

As with any other aspect of an ambitious game like SC, the demo did not have an easy birth. Many late hours of design, programming, art, audio and testing combined to create an action-packed invasion of a rebel space station by a Marine squad. We talked to Illfonic about getting ready for the demo.

JP: *Let's start with a simple question: What are each of you working on for the FPS?*

Kedhrin Gonzalez, Creative Director: I direct the overall vision of the FPS mechanics and implementation, as well as design the high level concepts for the fps portion of the game.

David Langeliers, Senior Producer: Currently I am working on creating a schedule for the release of the FPS module, and coordinating with the other studios concerning shared portions of the game.

Chris Arden, Art Producer: My role within Illfonic is that of an Art Producer for the FPS portion of *Star Citizen*. There are many studios involved in the development of SC across the globe. Most of my initial contribution was making sure we are on the same page with the other studios in terms of schedule and expectations.

Matt Hubel, Senior VFX Artist: I'm currently working on all of the weapon VFX for the game, as well as ambient and breakable effects. This includes muzzle flashes, impacts, full screen effects, and secondary weapon effects like ejecting shells and steam rising from gun barrels.

Rodney Houle, Lead Designer: I'm managing the design team and overseeing the levels. I'm also doing system design, which includes controls, balance and designing new gameplay features.

Dojun Lee, Lead Animator: I'm managing the animation team at Illfonic, and planning the mocap schedule and list, creating character and weapon animation, and working with designers and engineers to implement animation.

Cole Gray, Lead Artist: I'm currently working on spec'ing out the maps specifically for the FPS playable module. This involves leading our team of amazing artists to produce environments that look incredible and can plug into larger modular systems that will be the driving force behind developing the rest of the *Star Citizen* universe.

Paul Jackson, Lead Programmer: Initially a lot of the stuff we did was general FPS features we will need, like gravity boots and basic weapon mechanics. But as we started gaining momentum, a chunk of our time centered around



animation. We spent a while doing some R&D on how we would approach first-in-third in the most realistic way.

But really it varies too, I've personally worked on player physics a bunch, network optimization for anything FPS-related, input latency and frame-behind issues (super important to me), and a whole bunch of random core engine improvements.

JP: "First in third"? What does that mean?

Paul: That's what we sorta call it internally at least: the unification between what's going on in first and third person; no special (and often unrealistic) first-person animations like most games do.

Charles Brungardt, President: I deal with a lot of day-to-day business, making sure the project is running smoothly and in the right direction. I help with everything from assisting the production team and I also dive into programming as well. I've written some of the system for the FPS side of SC, but I also just make sure that everything



BEHIND THE SCENES

can come together with both Chris's and Kedhrin's vision, whether that is from code or production.

JP: *It sounds like we have the managers and leads here today. How many people do each of you have on your team? How many total people at Illfonic are principally working on SC?*

Rodney: There are three other designers, and one design intern.

Matt (VFX): I'm currently a one-man wolf pack.

Cole: Currently we have 7 artists that specialize in environment and prop creation.

Dojun: We have total 4 animators working on SC, including me.

Charles: We also have a UI designer / artist that falls into art as well.

Kedhrin: Yeah sometimes people are managed directly internally here or they're managed from another arm in CIG,

like Manuel Rodriguez is quite frequently (working on the lobby/backend stuff).

Charles: Manuel is like CIG Austin's adopted son. :) He's a network programmer; he wrote the matchmaking servers, lobby and various other major parts of the backend network for *Star Citizen*.

Paul: There are seven people on the programming team, including Chuck.

David: We have just over 30 people working on the *Star Citizen* team as whole. In addition to the art, design, VFX, engineering and animation staff, we also have myself and Chris Arden in production and Russ, our QA tester.

Charles: Yeah, thirty total, give or take. We often bring additional people in and out if needed.

JP: *What did each of you do for the FPS demo?*

Rodney: I did the initial plan and level layout. I also tuned all the weapons, grenades and gadgets.

Kedhrin: For the FPS demo, i worked with the team to make sure the overall quality — mechanics, visuals and planning — was maintained. I also looked real good on stage.

Paul: For the FPS demo I spent a bunch of time iterating on player physics to fix some of the issues it had, attacked any major bugs that came our way, and did some profiling in the last couple days that resulted in some nice FPS gains.

David: I supported the team while they implemented the various features and created the assets that were needed for



BEHIND THE SCENES

the demo. I also spent a good amount of time managing the logistics with CIG LA to make sure we were properly prepared to execute on stage at the event.

Chris: I coordinated the internal and external art development teams, as well as third-party outsource studios. This included working directly with CIG on how Illfonic can support the vision of *Star Citizen*.

David: Hmmm, that sort of sounded like I actually created the assets ... which is absolutely not the case. :)

Kedhrin: David did everything. ;)

David: And I cleaned the dishes once in a while. :D

Dojun: I hand-keyframed animations that we can't achieve from the mocap, and worked with engineers tuning all our animations in-game. I also worked with Austin/UK animation teams to resolve issues related to the in-game character.

Matt: I was responsible for weapons, grenades, breakable effects (sparks coming out of lights, glass/smoke exploding out of monitors, exploding oxygen tanks) and all of the ambient effects (things like dripping water, atmosphere and steam). I had help from another artist with the muzzle flashes for the demo as well.

Cole: I worked on developing the aesthetic that would result in the combining of everyone's efforts. This involved wrangling all the lighting and set-dressing and setting the quality bar therein. I was also in charge of make sure the weapons and gadgets were looking as good as humanly possible. This involved managing some of our artists here, who have become extremely adept at making high quality assets.



Charles: For the FPS demo I helped with bug fixing towards the end, wrote the breathing manager system, wrote the item loadout system and worked on various other changes in code for the design team. In addition, I also worked closely with the Animation team to make sure animations were going in the right direction. I helped as a tech producer pushing the programming team as much as I could, and helped to make sure the artists were getting all their sweet gadgets, weapons, etc. hooked up in-game.

JP: *It's obvious, but sometimes I can forget how much detail there is in a game like this. I wouldn't have ever thought of "breathing manager" as something necessary for a game. That's what controls how fast the PC is breathing? Fast after a sprint; slow, if you're trying to fine-tune your aim?*

Kedhrin: Exactly. The more you move; the more damage you take; and your overall situation affect your breathing, which can affect your aim and responsiveness. It also puts your breath's steam on your helmet glass. *Star Citizen* is digging into all the details no other games would dare to touch. :)



BEHIND THE SCENES

You can hold your breath to steady your aim too, but it's a lot harder to hold your breath if you're breathing heavily.

Charles: I created a system for playing breathing sound effects for dogfighting, but it evolved into so much more. We also had a stamina system for aiming (what Kedhrin is talking about) but eventually they started merging into one. So the breathing manager keeps beats of inhale / exhale. The faster you run, the more intense a sound it is. We created a whole scripting language for the designers and sound effects guys to be able to set rules on how heavily you breath, etc. The timing of the sound effect controls breathing on glass and also affects your animation as well (well not for the FPS demo, but soon).

JP: Which of you were playing in the demo at PAX Australia?

Rodney: I was.

Kedhrin: I was too.

David: And me.

Kedhrin: Rodney/Chuck/David/myself in this room.

Kedhrin: Two of our other guys were too — Nick and Russ — then 2 guys from CIG, Paul and Chris.

JP: If I remember correctly, there were eight player stations at PAX-AUS. Was it 4-on-4, or 8-on-NPCs?

Charles: 4 v 4; all players, no NPCs.

JP: Who led the team that we were tracking at the demo?

Charles: Rodney and Russ did. They were kind of the ones that helped orchestrate it all.

David: Rodney shot me in the face during the demo. :(

Rodney: Good!

David: Russ was the one who led the marine team during the demo and was calling out the tactics they were using for the attack on the station.

Charles: But both were Marines. Who led the Outlaws?

Kedhrin: Outlaws had no leader, bro.

Charles: I was team Marine. :)

Kedhrin: (laughs) But we didn't get to show off everything we had planned. My machine overheated on stage, so we weren't able to show off the body-dragging, which was a bummer.

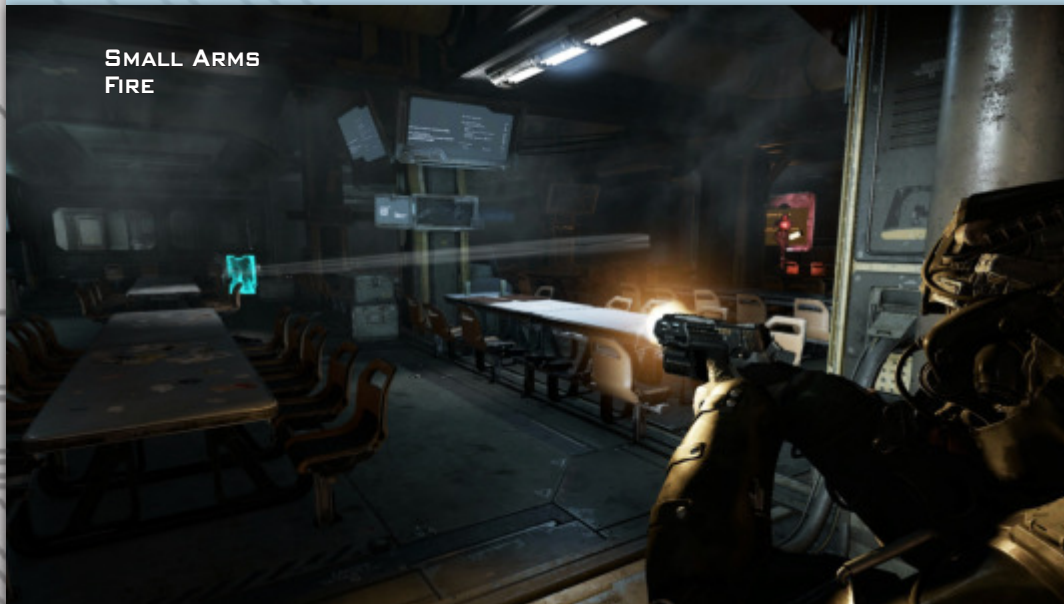
JP: What was the worst problem in getting the demo ready, or in running it?

David: The worst problem? Hmm.

JP: Or any problems that come to mind.

David: I'll let Paul and Chuck field that one.

Charles: I would say the rig. :)



BEHIND THE SCENES

We had the rig change four times on us, which cost us over a month of rework.

JP: "the rig"?

Charles: Basically, it's the skeleton in the character that animators use for animating.

Dojun: Yeah, updating the character rig in the middle of critical times. :(

JP: That was a problem for the PU demo, also.

Charles: That and also (which goes hand-in-hand with the rig) we are doing a one-character model for both first and third person. No separation. So we can't just move forward with either without the problems in both being fixed.

Paul: There were a couple of tricky threading-related issues that popped up, and we stomped all of 'em, luckily. Those tend to be some of the harder issues you run into. Like Chuck said, the rig iteration definitely slowed us down a bit, but it had to be done!

Charles: There was also a lot of R&D on using one model for first-person / third-person.

Dojun: Yeah, every time we update the rig, it comes with hundreds and thousands of animation retargeting processes for the new rig in Motionbuilder, which takes a long time.

Kedhrin: There were many challenges because there were so many new theories all coming online at the last minute, so we had to be on our toes to very quickly polish and make sure things were done right.



TAKING COVER

Chris: One of the more challenge aspects with getting the demo out the door for PAX-Australia was including all the features in the demo. This is in part because of the number of studios involved in the development of *Star Citizen* — we have to make sure that we all have a clear vision of what Chris Roberts wants in the game. One example is we are using a new rig setup that typically isn't used in FPS games. This includes making sure that all art in both first and third person is placed properly on the rig and displaying the appropriate art, animations, shaders, etc. This was a challenge both technically and artistically.

Cole: Our breakable light prefabs needed to be adjusted a few times due to me needing different things out of how they operated. As a result, anywhere these lights were placed, some got reverted to default, or rather "unlit," so we had to relight some things a few times. In the end, game dev is pretty organic at times and this is simply just the nature of development.



BEHIND THE SCENES

Matt: For me, the worst problem was related to the lens flares attached to the lights. Usually particle lights don't cast shadows, so our awesome engineers set up a way to use real lights for the muzzle flashes, instead of particle lights. It gives really beautiful shadows on your character and the environment when you're firing. The only problem was that lens flares have to be spawned from the particle system, and they actually spawn a few frames late. That resulted in some crazy timing problems and having to do some last minute adjustments.

Cole: This prefab problem would then extend to our computer consoles. We made something like 30-40 computer assets that would not only need screen variations, but also needed to be breakable. On one hand it was awesome because we had so many assets to play with, but on the other hand it was a challenge to wrangle a data set that felt like it kept growing exponentially.

JP: *You've already mentioned this a bit, but I'll ask it now: What was the most entertaining moment in the demo?*

David: Rodney shooting me in the face! Just kidding.

Rodney: People seemed to like the dead body doing cartwheels in zero G.

David: I thought the gravity getting shut off was amazing. The way all the debris lifts up off the floor looks awesome.

Paul: The zero gravity portion, for sure.

Charles: I would say when people saw the first point of contact. The crowd went nuts!

Matt: I'd say zero-G combat as a whole was the most entertaining part. The change in the dynamics of combat are crazy.

JP: I was wondering about the zero G ... it's neat to float in null gravity, but doesn't that make it really hard to dodge?

Kedhrin: Yeah people floating up in the air and trying to fight in full 360 degrees is the super fun moment, it completely changes the entire experience.

Dojun: Yeah, I would say zero-G combat.

Paul: Oh it's harder to dodge, but it's also harder for them to dodge! :) So your tactics change: hit them better and more than they hit you and try not to focus as much on movement as you would in gravity.

JP: *Are you anticipating some moments similar to the combat in Ender's Game?*

Cole: Yeah, *Ender's Game* is sort of an understatement. :P

Kedhrin: There will definitely be a lot of *Ender's Game* type of moments, and I think a big part of that will be revealed with the FPS Module release, too.



BEHIND THE SCENES

David: Meeting the fans and finally being announced as part of the project was a ton of fun as well. *Star Citizen* has a really great audience and it was great hanging out with all the Aussies after the show was over.

Cole: For me, seeing a ship land in a station, then have players on foot step our ready to get into a combat scenario showed something we hadn't quite seen in *Star Citizen* yet. This resonated with me because it was one of those moments when you start to see some really big things come together. I feel like you could squint and see what *Star Citizen* will be one day, and it's absolutely incredible.

Chris: For me the most enjoyable part of the demo was the battle in the mess hall. This was a part of the build that really showed off all the work we had accomplished. While some additional game mechanics sadly were not on display during the demo, it still seemed to be a hit!

That being said I think we also managed to get the core feeling of a suspenseful fire fight with actual consequences, instead of a run-and-gun style of gameplay that so many FPS games typically default to.

JP: *What useful lessons did you learn about the FPS from working on the demo? Is there anything you don't plan to repeat in further work on the FPS?*

Charles: I think one thing we learned from the demo is we are always going to face new challenges as we create these new unique systems. We aren't going to get it right the first time, but now that we have a solid understanding of the systems we need, it will be easier the next time around.



Cole: Proof out systems first, before creating large data sets that use these systems. I.e., measure twice, cut once.

Kedhrin: Making sure assets are done way before our deadlines is going to be more critical now that we saw first hand how much pain it caused to have things come in near the end.

Dojun: Our team still can achieve a lot of things within a tight deadline. :)

Matt: The most useful thing for me has been adjusting my workflow to constantly be aware of zero G. Every effect that I am making behaves differently when the gravity is turned off. Explosions are more spherical, blood hangs in the air ... So either I make two separate effects for each situation, or tailor them to change dynamically as the gravity changes. It adds a layer of complexity to the VFX that I have never seen in a game, and getting it right means really planning ahead when I make them.



BEHIND THE SCENES

Paul: One thing that helped the most was just getting iteration times down as much as possible, which is something you always go for, but we had it nailed down for FPS. Towards the end we could kick out test builds to everyone in less than 10 minutes, with a little coordination, which made our regular playtesting incredibly productive. We would find issues quickly and because we would test a handful of changes at a time, it was super easy to identify what was causing an issue.

JP: You're finally out from behind "Redacted." What was the deal there? Why the secrecy?

Kedhrin: Redacted came from us being a surprise with the FPS portion of the game, but after several leaks and loose lips, it just unraveled and became a funny badly kept secret. :P

Charles: I think the idea was to announce us a little bit earlier when we had something to show on the FPS. But then I think Chris saw the FPS becoming something special, so he wanted a bigger moment for us. Then it just became a joke.

JP: *Jump Point* didn't help. A couple of you came to Austin for an early summit, and we listed you in the group picture, before we knew any better.

Paul: It was pretty funny to see people on Reddit or the forums call that stuff out regularly.

David: The reason the Redacted name was being used is because of REDACTED

JP: What are the most interesting features to you about the FPS?

Rodney: For me, I really like how the weapon system is turning out. It really makes you aim down the sight and hold your breath. You can't just spray and pray from the hip, you really have to plan your shots.

Kedhrin: To me it's how the mechanics are built to essentially have an infinite amount of different scenarios in which you can play them. Most FPS games have a design methodology that really locks them into a specific type of gameplay, and as soon as you remove a game from its conditioned levels the game falls apart. The *Star Citizen* FPS mechanics are built from a sandbox perspective, and so the possibilities will be insane. From the animation-driven system, weapon/armor balance, and the immersive nature of their implementation, to the anxiety of death and space, to foot gameplay — it will make an experience never seen before.

Cole: The most interesting thing to me is the FPS's role in the *Star Citizen* universe as a whole. Combining crazy space dog-



ATT-4 LASER
ASSAULT RIFLE



BEHIND THE SCENES

fighters, with people floating around with guns, with decompression mechanics and push-pull mechanics, and the possibilities of what could happen with all of it is mind boggling.

Matt: I agree with Rodney. Also, the tactical gadgets available to you are really sick. All of these things add up to a tense, nerve-wracking playing experience, ending in a more rewarding victory.

David: I think one of the most interesting features is the shared first and third person rig & animations. Along with the helmet, it really adds a good feeling of immersion to the game to make you feel like you're there.

Paul: First-in-third opens up a lot of cool ideas and gives you a bunch of features just for free. Like dying in zero gravity and seeing your camera move, still where your eyes should be, attached to your dead ragdoll body, spinning across the room.

Also, I'm biased because I've done a lot of it, but the stuff we're doing with player physics is neat. Most games approach this simply by placing a capsule or cylinder around the player, and just move on. We're using the actual collision geometry that's used for the ragdoll for collisions against everything else. It's just now starting to mature, but this means that if you're visually capable of fitting into a spot then you will fit.

JP: *Where do you go from here — what's next on your task list for Star Citizen?*

Cole: making this ready for public consumption!!!



Kedhrin: Get this FPS Module super bad ace done and out the door! The rest of the mechanics get turned online, more weapons, more armor, more scenarios, players playing — me trolling players, lots of trolling.

JP: *Can you mention any of the additional mechanics that are planned?*

Matt: Yeah, we're polishing weapons like crazy, adding all the little subtle details to the FX and starting on some new weapons that are coming down the line.

Rodney: We are starting to lay out the levels for the FPS module release. We hope to start doing internal playtests on them next week. I'm really excited to be able to get it into the fans' hands to play soon!

Dojun: Adding all of our remaining features: tons of cool weapons, armors and a limb damage system.

Charles: I agree with the other guys. I can't wait to get this in the hands of backers! I know a lot of them are sharing their opinions right now and I think that is awesome, but I'm



BEHIND THE SCENES

looking forward to them playing it. Because we are having fun playing it here. Testing it and making it for them!

I also look forward to shooting Rodney in the face some more.

Rodney: Ha!

David: Revenge!

Matt: That should be a game mode all in itself.

Charles: Just so you know, when FPS first started working almost a year ago it was Rodney and me 1 v 1. I shot him in the face and he died in a doorway. The door just kept closing on his head. It was awesome. Eight months later we finally were able to play again. :)

Kedhrin: As long as Rodney keeps getting shot in the face we can all be happy.

Charles: I still hold that win over his head, even though I just got lucky. The game crashed not long after that

kill, so he didn't have a chance to respawn. Now Rodney kills me all the time.

Kedhrin: the rest of the mechanics, like push-pull in zero G, vent crawling while prone, limb damage and its consequences, and the overall existing mechanics getting dialed in and more refined as we go!

Paul: The next big feature we're going to start implementing is the zero gravity push-pull mechanics — being able to pull yourself through an environment using your hands to grab onto things and/or your legs to kick off from things. Just don't go too fast and/or hit fast moving stuff. That tends to make you dead.

Also: Fleshing out the player physics features. Player network optimizations. Game modes. Weapons. Gadgets. Items. Accessories.

JP: *This is great stuff — I really appreciate it. Thanks for your time, and I'm looking forward to seeing the next iteration.*



BEHIND THE SCENES

NYX SYSTEM DELAMAR

MINE CUSTOMS ENTRANCE



Nyx was discovered in 2582 during the height of the newly-formed United Empire of Earth's territorial expansion. The system consists of three unremarkable planets circling an F-type Main Sequence star. Astronomically, the most distinct aspect of Nyx is that it is located directly on the border of a dark nebula, which enshrouds the orbits of all three worlds. The nebula's gasses severely hamper visibility and significantly limit scanner use ... something the star system's few inhabitants rely on.

The system was first charted through a jump point in the Stanton System by solo navjumper Carla Larry. Carla's official claim doesn't specify much of interest in the system, writing that it "lacks significant mineral deposits or logical reason to apply the expense of terraformation."

Larry did make an attempt to formally name the star's three worlds Lou, Morgan and Ashley, apparently after three separate romantic conquests she was pursuing. As per normal policy, the UEE government has never recognized these names, and they have never been widely used. Whether the system's intrepid discoverer was able to impress any of their namesakes is lost to history.

In the last two centuries, Nyx has gained some additional utility as a waypoint on the Castra-Stanton run, with a significant credit value of cargo moving through the system at any one time. Small scale piracy is not uncommon, buoyed by the system's nebula, and travelers are warned not to veer off the standard spacelanes during transit of the system.

ELIHHHVVVVA

NYX I

The first planet in the Nyx system is a coreless, heat-swept world that was long ago picked clean of valuable minerals. Soon after the system was discovered, a routine survey revealed the presence of high-grade metals beneath the planet's surface. Once word got out, the planet briefly became the focus of a military-backed mining contract with Golden Horizon, and within fifty years, the planet was completely stripped of its resources and its material wealth shipped off to Kilian to help supply the Empire's growing war efforts. By 2630, Nyx I had been rendered permanently useless and little evidence of Human habitation remained.

NYX II

A smoggy, desolate world, Nyx II was once considered an edge case for terraforming. Thick clouds of acid and carbon dioxide surround the world and the planet is technically teetering at the inner edge of the system's green band. Nevertheless, a serious study was conducted as to whether or not it could be made inhabitable. The end result was that it could, but it would take generations of effort and provide little reward beyond the creation of a base particularly well hidden by nebula gasses. EVA on the planet itself is lethal; even if explorers are protected from the corrosive elements, they will be unable to function in the high-pressure atmosphere.

MARKET DEALS — NYX ASTEROIDS

SELL: BASIC FOODSTUFF	+2
SELL: LUXURY GOODS	+1
SELL: OXYGEN	+1
BUY: NARCOTICS	+1

ASTEROIDS & DELAMAR

A dense asteroid belt circles Nyx's star at roughly 8 AU out. The asteroid field is not a source of valuable minerals, but coupled with the nebula it has created a very good place to hide. An unknown number of small settlements have been established on asteroids in the area, all of which must import survival goods from outside the system (the only mercantile opportunity remaining in Nyx). These small asteroid bases, uncharted, are home to a variety of fringe colonists seeking anything from life outside the UEE to a platform from which to operate outside the law. Pirate raids in the system, typically conducted against the trans-Stanton shipping, are believed to operate out of larger bases in the field.

The highlight of these settlements is Delamar, the largest of the asteroids. The size of a planetoid, Delamar is hidden deep in the Nyx belt. The settlement was formed by free-thinkers during the oppressive Messer era and remains a hotbed for political radicals and anti-UEE sentiment to this day. As the 'place to hide' reputation of the Nyx system has expanded, an increasing number of criminals have moved in, the result being an ongoing conflict between small criminal groups and political radicals who feel that outright illegal activities undermine their message.

Delamar can be visited by anyone passing through the system, although there is a strong sense of paranoia. Everyone involved in running the station seems perpetually afraid of a massive police raid which they believe is constantly moments away from happening. The truth is that the moonlet is so well hidden and so difficult to reach that the UEE has never seriously considered dispatching forces to eliminate it (not to mention the fact that the dissidents remaining are fairly toothless, generally coming off in the media as protesting the government simply for the sake of protesting.)



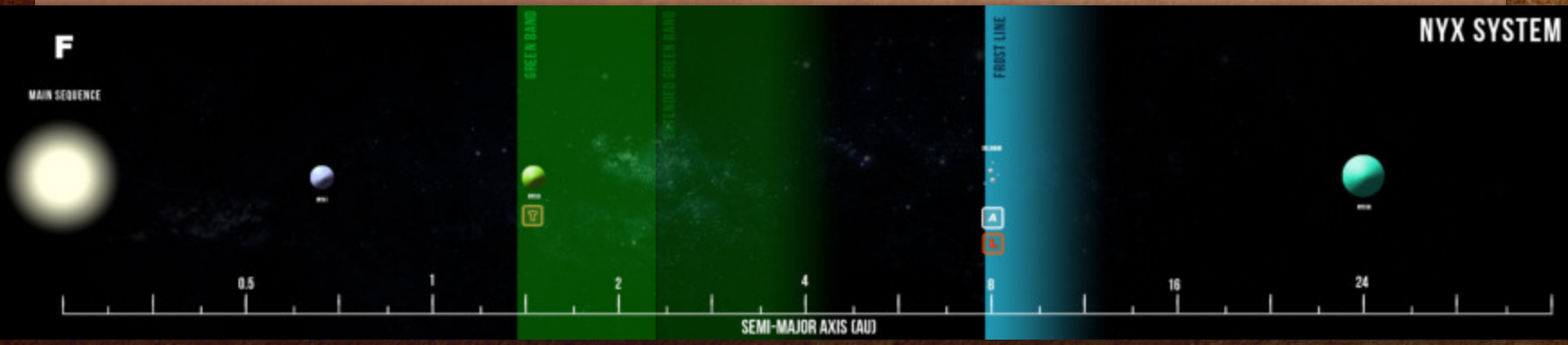
NYX III

The final planet in the Nyx System, located far from the sun's light, is an ice giant. A massive ball of frozen water and ammonia vapor, Nyx III is neither a candidate for terraformation nor one that contains any minerals or other resources worth extracting. The planet has no breathable

atmosphere. While a ship with an onboard life support could itself survive for a time on the surface, there is little reason to attempt such a feat. EVA would be impossible, and external ship repair would likely be easier in a vacuum.



DELAMAR-LEVSKI HUB



The Knowledge of Good and Evil



by Allen Russell

Part 3

Then someone walks up to me.

"Oh, you 'lone, Sister? Ain' i' late?" the man says.

Strangers don't just walk up to you in Bazaar Street.

"Or 'hapse you ain' Sister. Null tha'. is i' rat. Yeah. Gear rat. Street rat eve'." The man had taken another few steps towards me and stopped again when I backed away.

What did he say? All the panic of a few minutes ago shoots back into my mind and stiffens my spine. I don' eve' got a slag.

I turn to look at the man for the first time. He's rough and poor looking, but better dressed than I'd expected. He is shaved but unremarkable. I see the shadow of a face I remember well.

Boss Dirk.

"Ya remember me? Got. I remember you, rat. I remember that you owe me."

Dirk and I face off outside the rail station. It's dark now and only a few half-working shop signs illuminate the intersection we're standing in. We're like night and day. I've changed in every way imaginable and he looks just like he did back when I was a gear rat for him. The only difference is his clothes look newer. He'd gotten the jump on me and surprised me, but it seems like he's wasting that. He's just staring me dead in the eye with a grin on his face. He knows the score is 1-0 but it's like he's waiting for me to say something.

"Hello, Dirk." I strip him of his title and acknowledge him at the same time. He flinches. I put on my best imitation of Mom Super's passive expression and purposefully study him back.

Score: 1-1

"I knew i', bu' my boys didn' believe i'. See . . . 'm know you are smar' rat. Got lock on tha' long time ago. Yeah, a long time ago, green eyes. Never could hide those, could ya?"

CHRONICLES

Damn it. What did he mean about my eyes? Hell. Score: 2 - 1
“You know, debt like yours pile up over time. Interest. You los’ me a cool 20k cred deal long time ago an’ word on Bazaar says tha’ up got deals for mos’ tech’s except mine. Like ‘m got bad reputation on account a you.”

This is not good. Lost deals are more than their cred value and if what Dirk’s saying is true, I lost him a big break when that customer saw me beat up and blamed him. Chances are I never would have earned enough to pay him back. If I hadn’t been caught on the rail that day . . .

I hear footsteps behind me and feel the presence more than see it. Two others, at least. Unhappily close. I can’t let them get too close to me.

“Three of you? I thought you were more of a man than that, Dirk.” The thugs stop where they are. Score: 3 - 1

Dirk’s damn stare hasn’t left me. I can’t break focus or he’ll think I’m weak or can’t hold my nerve.

“I don’t have what you think I have, Dirk. No credits to my name. The Sisters don’t use them. Even this coat’s borrowed. I’m not good looking enough to sell for a slave. I’m not a rat anymore. So you have a deal to make or are you just sucking O2?” Straight bluff. Better than nothing. Score: I’m losing bad.

He laughs at me, looking away long enough for me to steal a glance at each of the thugs. Big boys, them.

I feel the sting of it before I realize what’s happening. Dirk’s backhand knocks me down. I clutch my face in pain and shock, knowing that if more is coming, I can’t stop it.

“Tha’ wha’ you think, rat? Tha’ them Sisters none work with creds? Wha’ you think all tha’ information them got for, looks? Sister’s got high-up clients. Keep ‘em secrets. Sell ‘em info. Manipulate people with damn information. Smug bitches.” He spits and takes his time before he looks at me again. “How ya think ‘em keep lights on an’ meals

cooked? Null tha’ free. Rat like you supposed ta know tha’. Got some ta teach you with, rat. An’ them Sister’s got ‘nough ta paid wha’ you owe me.”

“You can go to hell.”

His eyes are burning with hate. “Won’ hurt for me ta keep eyes ou’ on them rats you school some. Jus ta make sure them null gettin’ hurt none. Wouldn’ wan’ tha’, would ya, green eyes?”

Dirk’s thug pulls the child I’d stayed to help out from the shadows. A huge black eye and bruises on his arms.

“Le’ me go, ya slag fak.” The kid fights against Dirk’s grip. Dirk slaps the him hard.

I nearly scream at the sight of it. The kid just wants to learn something and these abusing faks are treating him like a piece of currency.

“Wha’ ya got say ‘bout knowin’ if ya don’t do wha’ ‘m tell ya there be more a tha same for tha whole lot a ‘em?”

He reaches into a pocket and pulls out a cube bigger than a fist and tosses it at me. I catch it and one of the corners jabs me in the palm.

“Take tha’ and pu’ i’ nex’ ta tha Sister’s precious Vault. Press tha’ button an’ wait till i’ blink at ya. Don’ mess with i’. Don’ scan i’. Don’ be rough with i’. I’ come back broke, or messed with or wrong an’ i’ gonna be them rats tha’ get i’. Like this one.” Dirk shakes the child by the arm.

I’ve got to distract them so the child can get away. I won’t have more of this on my hands. I don’t know how I’m going to do that flat on my back, but I have to think of something.

I see five figures come out from around the corner and suddenly they are running toward the scene Dirk and I are making. If they’re not more of Dirk’s men, then they might be slavers or worse. I brace and get ready to jump up and sprint.



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I tense my body for the jump to my feet but stop as I recognize the silhouette of Sisters in their habits with hoods up. The five black-clad figures surround me.

The commotion is almost enough to distract Dirk and the child pulls hard once, but can't break free.

The Sisters all look the same with their hoods up, but one speaks directly to Dirk. "What are you doing with that child?" Dirk grins and lets go. The kid runs for it.

The child's departure is hardly acknowledged by his thugs as I sigh with relief. I remember the cube I'm holding and stash it in my large coat pocket.

"Whatever your business was here, it is done."

Dirk spits on her shoe. "Null, bu' i' is now. See ya a' nex' school, Sisters."

My attackers leave without another word. A Sister offers me a hand. "Are you all right?" she asks.

"Yeah, mostly." Shock is starting to wear off and I start to tremble a bit.

The Sisters move to support me. "Time to get you home."

* * *

I stagger into my room and collapse. What the hell am I doing? How could I have gotten cornered out in the open? And Dirk knew who I was and that I live with the Order and . . .

I notice the cube thing in my pocket and feel compelled to take it out. 5x5x5 cm, only one button, and gloss black. Like nothing I've ever worked on before.

No big deal, right? Nothing I shouldn't handle on my own. Nothing in the Library can hurt anyone. It's just old stuff. Barely anything worth stealing unless you really like old gear and reading.

But that damn Vault.

All I've got to do is set the thing up in the Library and turn

it on. It will do whatever the hell it wants. But the rats will be safe. Dirk said they will be.

If I don't go along . . . The fak threatened my school and my kids.

But I'm doing this to keep the school open. Mom Super would understand, if I told her. And I just need to turn the thing on. Put it near the Vault. Easy enough. And if I get caught . . . I'm doing it to keep the school open. Mom Super would understand.

Dirk's threat hounds me.

The Sisters talk about information and the sacred freedom, but have got a giant secret vault thing in the middle of it all. What the hell is that all about? And what Dirk said about selling information and high-class clients and the Sisters' manipulation of people?

Somehow, I don't feel as safe as I used to, even in my own room. Feels like I'm being watched by Dirk or the walls or god, but that doesn't make sense.

The cube is black like a shadow, and I can't stop looking at it every other second. Snatching it, I put it in the drawer of my desk and close it. I let out the breath I didn't know I'd been holding. Amazing how such a small gadget can carry so much trouble.

The knock at the door makes me jump, but the pattern is familiar. "Come in."

Mom Super comes in looking concerned. "I've heard you had a run in with some rough men. Are you all right?"

"It was just an old misunderstanding, that's all."

"The bruise on your cheek and the situation you were found in speaks otherwise, young one."

"Really, it was nothing. I just need to be more careful not to be in Bazaar after dark. That sort of thing happens all the time if you're not careful, and I just made a mistake. Nothing to worry about."



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"All right. I will leave you to attend to yourself. If you have more you wish to talk about, I am always willing to."

As the door closes behind her I know that Mom Super has more questions for me than she asked. I know I have more questions than I know how to ask.

Just sitting here thinking about . . . all the "whys." I'm sweating. Fear, anger and shame all mixed into a toxic knot in my chest.

I get up and open my closet. The floor is mostly clean. I push what's there aside and crawl in. After what feels like hours I finally nod off in the only place I can think of to run to, and it doesn't help. Null a secure 'gainst your own mind. Don't exist, that.

Suddenly I hear my young voice in my head, "Ask the 'why's' an' you dies."

Like hell am I going to let threats and street rhymes start running my life again.

I get up from the floor of my closet and go over and open my desk drawer. I take stock of my options for a moment before I grab the cube and sit down at my work bench.

I'll start with passive scans.

* * *

Days have never felt as long as these do. I can barely eat. I've come up with nothing. Passives show nothing my eyes couldn't already tell me. The case is sealed tight. Even the button seems to be formed into the glass. No seams or joints to pry open. I haven't been this frustrated since I had to study Biology.

Things start to take a toll on me as I realize how trapped I am. I'm flying blind without more information. Dirk can hold his threat against the street children over me for years and continually get me to cooperate. It's too late to tell Mom Super. I still need answers though, and what he said about the Sisters has me doubting everything I know about them.

I get Mom Super alone in the meal hall after dinner the third night. "Mom Super, can I ask you about some things I've been wonder . . . thinking about?"

"Of course you may, young one. I will answer as best I can."

If I ask too directly about what Dirk said I'll give myself away, but I have to look inquisitive like I've been holding questions back.

"Only a few things I guess. It's hard not to, ya know? Things just come up. Like, what do you do with all the information you collect besides study it and put it on shelves?"

"We sell it, or many times give it away. Sometimes we simply keep it and do nothing at all with it."

That one stuns me a bit as I test Dirk's words against the ramifications of that claim. It sounds like a canned answer but it rings like the truth.

"How do you get all the stuff you collect in the Library? Just Pilgrimages?"

"Sometimes information is bequeathed to us. At times it is given freely. Other times it is given into our care at great price by the faithful or others. At times when information is received as confession, it is not to be released until morally necessary or after the confessor's death, and then always without connection to that person. It is one of our most sacred duties to ensure such things are not lost, but to acquire them often requires that we allow some stipulation and even restriction to certain information. That is what we keep in the Holy Vault."

"What does 'morally necessary' mean? I mean, what sort of thing could a person know that would be so important?"

"That is the first follow-up question you have asked." Mom Super caught my genuine curiosity by the tail like a cat nabbing a mouse. I sit frozen, trying not to react.

"It's a very good question," she continues. I let out the breath I'm holding. "Information of itself does not have moral



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character. It is the situations and circumstances surrounding information that determine its moral value. If it would be morally wrong for us to withhold or suppress something about a crime or event, then we cannot withhold it. If we have been sworn to the confessional about something that has no influence on the world, then that is reserved for a time. It comes to subjective assessments at times, so we must remain humble and vigilant of our own biases.”

That’s close to what Dirk described, but a whole lot different. “But what if information from the Vault or confessional or whatever would hurt people? Even if you released it for the right reasons? To manipulate things?”

Shit, did I just say that out loud?

“Is that something you’ve heard, young one?”

“Just once, Mom Super.”

For a split second, I think I see a tiredness on her face like I haven’t seen before. Maybe it’s sadness. After I blink, it’s not there anymore.

“Whenever the Order releases information from the confessional vault early, it must always have some sort of effect. If it were to mean nothing, then there would be no reason to release it. Those who entrust their secrets to us have the utmost faith in our stewardship and discretion.”

Mom Super sighs and takes a larger breath than normal.

“Some may see what we do as manipulation or meddling. Perhaps especially if they are on the wrong side of what is revealed. That too would be subjective, I think.”

Dirk had only given me a half truth and twisted it besides.

“That has to be really hard. Who decides if that happens?”

“I do,” Mom Super says quietly. “I think I will retire, young one. You should rest as well. Street school seems to take much out of each week.”

Even without trying to figure out what just happened to Mom Super, I’ve got a lot to parse. The Sisters do sell information, but it’s not back-alley trades like Dirk wanted

me to think. Sure the info from the Vault changes things when it gets released, or the Sisters wouldn’t lock it away. They’ve even got a hang-up about the freedom of info, so it’s got to be a big deal that the Vault exists at all.

If it’s all true, what she just told me changes everything but doesn’t make anything easier.

Cracking tough eggs is what a gear rat does, but it will mean covering all my tracks after I hack into the thing. I don’t call myself a gear rat anymore, but I sure as hell still have skills. More even, than I ever had as a rat, thanks to Mom Super.

I head back to my room. I can’t be stupid about this, but if what Mom Super said is true, then I can’t let Dirk have what he wants. A set of antennae and a MobiGlas can do a whole lot if you know how to make them dance right.

* * *

My active scanning finally shows me the innards of the thing, but what’s there doesn’t make sense. Why would you make a piece of equipment with a decryption suite, a tiny swap drive, a transmitter, and a power supply that will only last a few days? There’s no storage drive that could hold any reasonable amount of information. It doesn’t have the gear to transmit the information out to somewhere else.

I decide to turn it on. The cube starts to send signals on the same frequency that I’m used to seeing on my read-outs when I’m near the Vault. So that matches up, but too much still doesn’t.

I set my scraped-together diagnostic tool to imitate the Vault’s transmissions, my room being far enough away that I’m certain the cube can’t actually reach the real Vault with so little power. The cube’s transmissions start to cycle through known encryption handshakes. It’s trying to connect, all right. I pick a protocol that’s old and obscure for my decoy to use and wait. Almost two hours of nothing, then it happens. A sudden spike in the communication between the cube and my imitation Vault transmitter. Then suddenly nothing. And my gear stops responding.



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My setup is wiped clean. I panic and turn off my MobiGlas as fast as possible, hoping the wipe routine didn't jump the link to my more precious hardware. The cube's indicator light blinks three times and goes off, like an acknowledgment of what just happened.

It's an info-nuke! Dirk doesn't want to steal anything from the Vault. He's trying to destroy it!

My mind starts racing. Why would he do that? The information in the Vault has to be valuable, but you can't sell something you've destroyed. Dirk's only good for petty theft.

I stop and think about what I know about Dirk and realize it's all old information. Not as useful or complete as I would want. I've been assuming I knew what he wants.

Why should I care what he wants; this is an attack on the Sisters and feels all wrong.

* * *

I don't sleep. Can't sleep. I have to figure out why Dirk would want to wipe the Vault out. I have to get this cube back to Dirk and keep everything away from Mom Super. I . . .

I can't do this. I can't take this into the Library. I can't betray the Sisters and Mom Super. I won't. I'll find some other way to protect the children. They're street rats, maybe just warning them could be enough. What if it's not?

I have to break into the operating system of the cube and find out more about it. That might show me what's really going on.

The operating system turns out to be a labyrinth. This should be delicate work and I'm doing it with a sledge hammer. There's no time to be more careful. Every time I make too many mistakes it tries to wipe out whatever device I have connected to it. Whoever made this used some high-caliber tech and didn't skimp on accessories. Expensive, that. More than Dirk could afford, that's for damn sure.

I know I have to give it back to Dirk and he's sure to have some way to look at whether it's done its job. Eventually,

I find what I expect. Log files of everything it's done and every connection attempt and signal received since it was turned on. I even see the entry for the wipe it did of my original decoy. Still no clue as to why it exists or who made it. I edit the logs about my intrusion. Then I find a hidden partition with more logs. Then I discover a second operating system that only runs when the device isn't connected to anything. I sandbox that and get it to boot and find a whole new set of log files and double checks I bypass or change. I work forty-eight hours straight trying to make sure Dirk can't detect what I've done and leave the record of the falsely completed Vault wipe intact.

Then, just before I start my last script to cover my tracks in the software, I decide to run a full power scan of the insides again and take stock of what's there.

And I find something extra. After a while of looking at it I figure the only thing it can be, a write-once memory chip. The kind that only allows you to put information on it once and then the it's stored permanently.

If there are logs of what I did that the system put there before I could stop it, then I'm screwed and Dirk will know everything I've done and all my work to fake this is worthless.

* * *

The write-once memory on top of my guilt, the lack of sleep, and a bit of desperation push me to decide I'm going to stand up to him. I have to tell him I won't do this. To hell with him finding out that I've played with his toy. I'm not going to let myself get bullied by some low life and his thugs. I can warn the children and then they can take care of themselves until I come up with something better. I'm sure word's gotten out around the rat camps by now to stay away from Dirk.

Taking the ride to Bazaar Street feels different. Maybe it's the cube in my pocket. The rail car seems hot, but I'm the only one sweating. I've got a plan and an angle. There is even a slim chance of a way out. Walking out of the rail car, the open air is chilled. The Sisters and I head towards Work Row.



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There are still children there waiting for school to start, even in this cold. I make a mental note to bring jackets and some heat units next week as we set up.

The end of the alley darkens as three men stand blocking the way. I recognize them instantly. Dirk and his muscle.

The other Sisters look at me. This is still my turf to them, and they must not recognize them as the men who attacked me. I tell them to keep unpacking and go to face the trio alone, but two Sisters follow me. At least this time I have backup nearby and a way out behind me.

They form up behind me. A sign of support. A chip in the game of appearances that poor people play. They've come to my aid, and I almost betrayed them to Dirk's five cubic centimeter invasion.

Dirk locks on to them right away. "I'm got talk ta green eyes 'lone. You others can outbound."

"Yours first," I say.

Dirk shifts attention to me then gives a nod. The two thugs turn around and walk back around the corner, with one keeping an eye down the alley.

I give the Sisters my best try at a reassuring smile. They bow slightly and return to the work of settling the children for school a little further away. My hand reaches into my pocket for the cube. It's like holding a loaded gun I don't have control of. I swallow down my emotions and set my feet as I stop in front of them.

I look my old boss dead in the eye, "I won't do it, Dirk."

Everything is very still and very dangerous for what feels like minutes.

"Ya know, 'm think you smart some, green eyes. Guess not. Them rats gonna pay for this."

I look over my shoulder again at the students. "They aren't rats. They're children."

I return my attention to Dirk and barely see the shock pistol before it fires. My body convulses as I black out.

* * *

I wake up to the sound of crying and someone shaking me. I finally get my eyes open and sit up. Pain racks my body so much I almost puke. My eyes are adjusting to the darkness. Darkness? The shock pistol. Must have been out for hours. I see two sisters huddled together. One is where the crying is coming from. The other is consoling her.

I look around the normally orderly alley and see chaos. Clothes and scraps of clothes. Debris scattered.

And blood. Too much blood. I look at myself and the Sisters again. None of it seems to be from us.

I make it to my feet without falling back down and stumble over the a stack of crates in the middle of the empty area we normally use for our classroom. On it is a note.

"I've got your rats. Do it or they die."

Oh God.

It's me that cries now.

* * *

The rail ride back is endured alone in my own head, as my mind fills with panic and rage. Why couldn't I have just done what Dirk told me to? The rail car races its way along, but I silently will it faster.

Half running into the warm halls of the convent should have made me feel relief, but it only heaps on dread as I recognize one of our number heading off in the direction of Mom Super's rooms. Most likely to tell her what happened. I don't have time to think about that though, Dirk's threats are real now. He's changed more than I realized.

The others shepherd me to my room and at least one stays outside the door as I stumble though it. The uncommon sound of rushing feet comes down the hall just before



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Mom Super bursts in. She has right to do that anywhere in the convent, but she usually knocks on my door.

“Young one, are you all right? I’ve been told you and the others were confronted by a group of rough men. What happened? What did they want?”

Mom Super, panicked? I have to deflect this now.

“The Sisters report children have been injured or taken away by the same men who attacked you. Can you explain this?”

“Some thugs jumped us. They want us to shut down the school. We have to pay some sort of protection money and they’ll leave us alone. That’s all.”

Mom Super’s not buying it, “I don’t see how you could be this casual, young one. This is not some old secret of circumstance you should be keeping alone. You must tell me what they really wanted. Violence almost befell the Sisters on your behalf as well. That makes this a matter for the whole of this Order. It is a step too far to believe those men want only to extort some . . .”

“I’m taking care of it, all right! The kids are gonna be safe. It’s just thugs.”

I haven’t flown off the handle like that in years. Mom Super can see the wall I never let her past, and acknowledges it with a stern look.

“You want me to take your word without any explanation when I should be calling the authorities. I am charged with the safety of this Order and its members. What of these children? Is it so that you can protect them but you cannot protect yourself?”

“I’m taking care of it,” I repeat.

“I have a responsibility I cannot ignore. I should have already reported the assault and possible kidnapping. The police will have to know sooner or later.”

“The police getting into it will be a death warrant for those kids. You told me you wanted me to help you bridge the gap into Bazaar Street because you can’t understand it and I can. I’m the only one that can get those kids back.”

“What choice do I have then?” She pauses. “I expect to be told what has happened after it is settled.” Mom Super looks at me hard for a moment longer than comfortable and then leaves in anger.

Damn it all, she had to even bring trust into this? I feel the cube in my pocket nagging at me. I have to do it. Damn you to hell, Dirk.

* * *

I’ll have to wait a few hours till everyone is asleep. Mom Super’s suspicion means I’ll be watched if I try and go to the library now, and I can’t let anyone stop me. I lie down but can’t rest. Minutes pass as slow as hours, and my skin itches as the waiting ticks on. My alarm goes off and I roll out of bed feverish to be about my task.

The halls are empty as I make the trek to the library entrance. I’m half surprised when it opens for me. The lights in the library are dimmed to night settings. Weaving through the stacks to the Vault I see no one and jump at every sound.

I pull the cube out from the bag I’m carrying it in and place it on the desk nearest the Vault.

Even through the pain and fatigue induced haze I still stop my finger above the button just before I press it. I have to do this. For the children. I can’t wait or they’ll die. I close my eyes.

“Forgive me,” I say. Like the prayers the Sisters use, but to myself more than anything. Someone else responds as I feel a hand close around my wrist.

“Forgive you for what?”

To be continued



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