JUMP P✦INT

IN THIS ISSUE

GREETINGS, CITIZENS!

Ya know, you try to schedule something important like **Jump Point** so that it isn't clashing deadlines with anything else, and then they go and schedule ... what is it called? ... Gamescom on the very same weekend, with no regard for the feelings of those who are trying to support both of them. I find it very inconsiderate, indeed.

As usual, I got a lot of help in getting this done, but everyone was muttering something about having to work on Gamescom, and I just wish they'd move it to ... well, to sometime convenient. I wonder when that might be?

My own muttering aside, I very much appreciate Tyler taking time to run all over Grim HEX to grab screenshots (and then going back when *those* weren't the shots I wanted, but *these* instead). He is ever-ready with a "no worries!" when I know full well he's been up, here in Austin, since dawn in Europe.

And as I write this, I can also hear the cheers of everyone who isn't focused on getting **JP** done, as we hit another one out of the park over in Germany.

So maybe Gamescom is worth it, too.

As out title suggests, this **JP** focuses on Grim HEX, with over thirty pages exploring the design and development of the pirate base, plus the focus of a new feature (new to **JP**) that will appear from time to time: an Observist Dark article, rather than a Galactic Guide. We still have plenty of systems that we could profile in GG, but we don't want
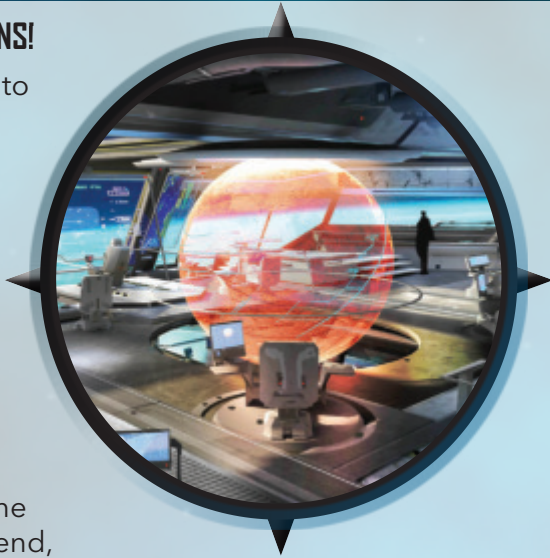
to get too far ahead of ourselves. We won't be opening some of these systems for awhile, and it would be better for all concerned if we don't try to define the details of systems months before we actually reach them.

So instead, we'll give you occasional Observist articles, or (as with this issue) an Observist Dark article, exploring some of the, well, darker locales in the 'verse.

Meanwhile, we've also got a Portfolio on Argo Astronautics, maker of the recently arrived utility vehicle that I predict nearly everyone will stow in their hangar, just because it's so useful from time to time. And Behind the Scenes, we discuss a couple of basic but very significant developments. We have a female avatar now, which means you soon (not yet, but soon) won't be seeing the same guy so often as you play the game. And sometime after that you'll be able to customize your character's face and head, which will make the game even more varied.

And last but not least, this issue has the last chapter in Adam Wieser's short story, "Instrument of Surrender," a good read from start to finish. I look forward to an equally interesting story beginning next month, which is about ... well, I'll let you discover that next month.

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

David

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Grim HEX

INITIAL

The new pirate base Grim HEX is big. Really big. So big that a normal WIP would take about 300 pages to cover it the way we normally do. Instead, we're going to show you the initial concept for the station, followed by intermediate work as the station came together, and then current screenshots as the station is about to become playable. In fact, that's how we'll label the images: **INITIAL**, **INTERMEDIATE**, **CURRENT**.

Grim HEX has been primarily constructed by **Level Designer Clement Melendez**, especially the early work. He is also the lead author of the design briefs that run throughout this article. The first brief basically corresponds with the **INITIAL** screenshots, while he created the second, updated brief about the time that the **INTERMEDIATE** screenshots were taken.

Initial Pirate Base Brief

This is a first proposal for the art team and directors for the theme and high-level layout of the pirate base that's supposed to be the criminal equivalent of Port Olisar. Everything is up to change based on feedback, concepting and iterations.

The requirements (below) and general suggestions I've gotten lead me to come up with a design that may be a bit too 'landing-zone-y' (as in custom/unique) compared to Port Olisar, and not so flexible for the room tileset system (which was supposed to feature a common exterior but allow any number of interior layouts). Let me know if that's not the direction I should have followed — I'd be happy to course-correct or do another one.

REQUIREMENTS

- 64 bedrooms to spawn players
- 32 small landing pads (EDIT: More flexibility here; can be fewer because it's a cheap location)
- 8 large landing pads
- 32 ship spawners (consoles to select ship)
- Luke (**Luke Pressley, Lead SC Level Designer**) mentioned he would like to see a more vertical environment to contrast with Port Olisar
- Luke mentioned he would like to place it in the asteroid belt of Yela, in/around the big rock that hit the planet and created the asteroid belt in the first place
- Ian (**Ian Leyland, Environment Art Director**) mentioned to avoid too much interior/exterior visibility for performance/vis-areas (limited ways to see interior from outside)
- Ian mentioned that it would re-use the Nyx tileset
- Todd and Andreas (**Todd Papy, Design Director** and **Andreas Johansson, Lead Level Designer**) mentioned having shops in it (a big contrast with the current implementation of Port Olisar)
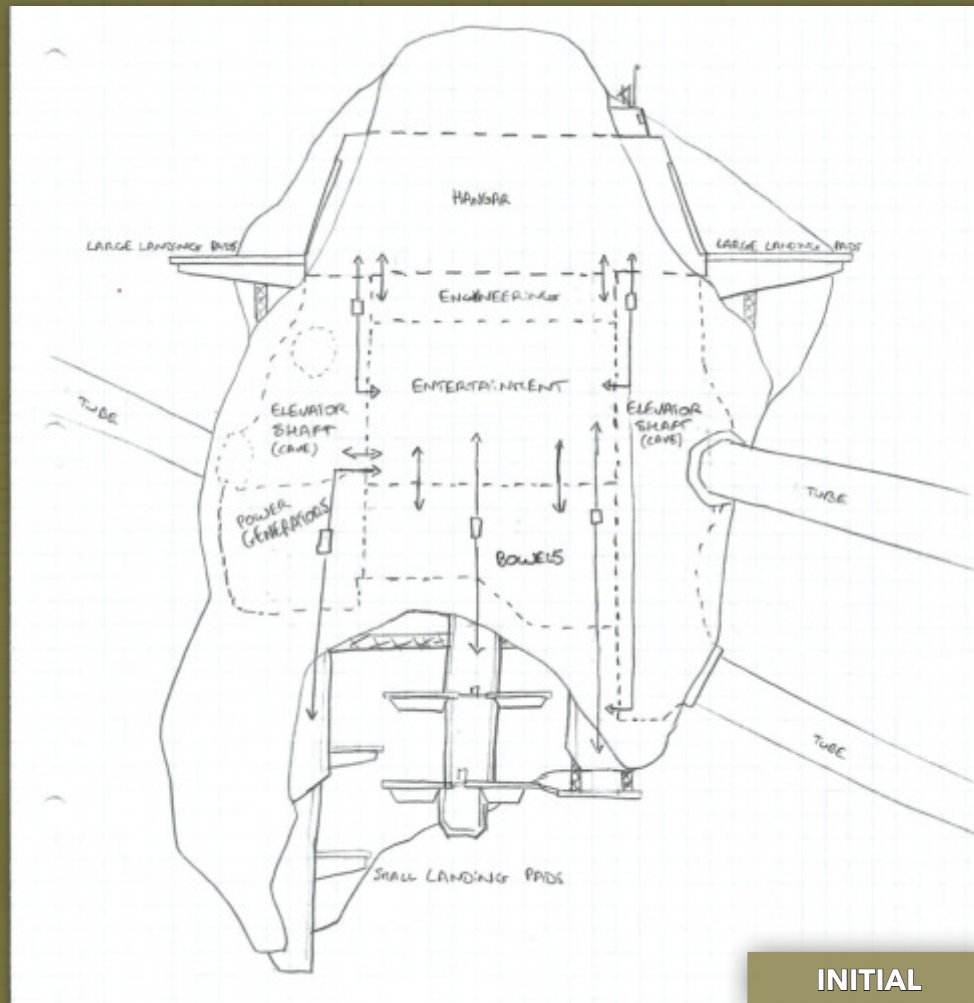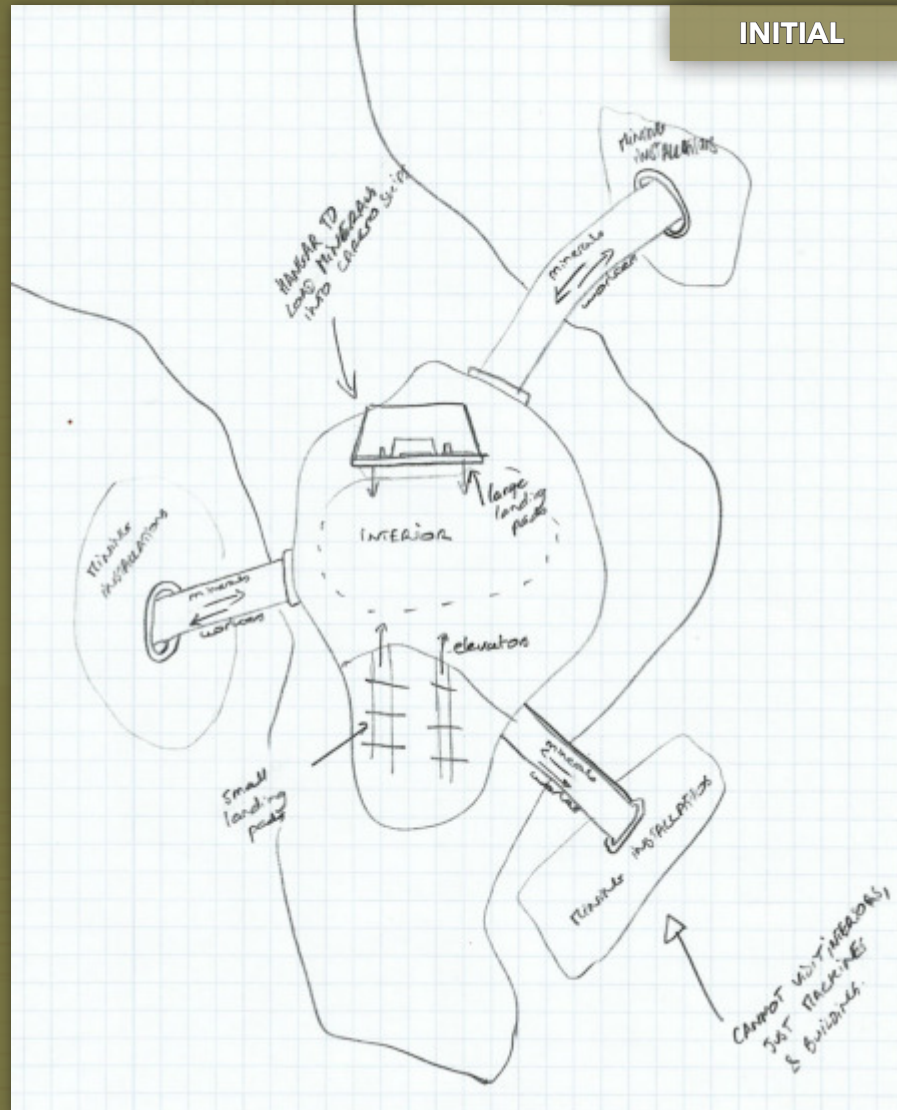

INITIAL

Main Proposal

This pirate base is actually an old abandoned mining hub, located on a small asteroid hidden within a much bigger asteroid. The mining facilities were abandoned long ago and pirates set up a base of operations there, which offers illegal/frowned upon entertainment (adult, gambling, ...) and provides services with no discrimination against criminals.

Backstory. The base was initially a hub for mining installations built on the surface of the giant asteroid. Each 'tube' that connects the two is surrounded by mining installations, and was used by miners to get to the mining sites, and to bring minerals back to the hub (where they would be loaded on cargo ships). When the mining installations were abandoned, criminal elements took hold of the place for their own use.

Verticality. The base is carved inside a small asteroid and extends to both ends. At the bottom there are a lot of landing pads for small ships; at the top, large landing pads for cargo ships, leading to the hangar and storage facilities. The interior of the base is elongated to connect those two ends, and so all areas are spread around on multiple floors. Elevators allow vertical travel from top/bottom landing pads to the interior of the base.

Aspect. The base is not generally too dirty or un-maintained, although there is definitely less emphasis on cleanliness and grandeur than in Port Olisar. No trash or stains everywhere, but a bit more graffiti and traces of wear & tear. Some of the out-of-the-way parts of the base, including ceilings in large rooms, have exposed rock surfaces to remind players that it is carved out of a rock, but the core of it (e.g., the entertainment area) would feel less rough than Nyx does. The more you go away from the central spaces, the more you should see rock surfaces. In general, weak critical components of the base (like cables, relays, panels, ...) that shady visitors could tamper with or try to steal/salvage are out of reach or behind grates/covers, so not much is exposed and lying around unless it's undergoing temporary repairs. Also, glass is rare in here, because it is fragile and costly to repair.

Defenses. The base doesn't feature any large window bays or other similar weak points, and is in general fairly hidden in the asteroid field so it's not too easy to spot. Defense turrets are spread around on both asteroids, and there are multiple ways to approach the base proper, avoiding bottlenecks in case of raids by the authorities. Since it's located in an asteroid field, it is shielded as much as possible against impacts with rocks of all sizes: it is placed within the curve of a large asteroid, using it as cover; the exterior of the base features few windows or weak points; the rock in which the base is built is attached to the bigger asteroid with cables to keep it safely centered and dampen impacts with other asteroids (rare but possible).

Services. While it's seeing a decent number of visitors, it doesn't look like business is booming: some shops are closed and looking a bit abandoned (no light, fences/shutters covering the front, ...). This is useful to indicate locations that this sort of place should offer, but that we cannot build/flesh out right now (e.g., a closed strip club or gambling den) and leaves room to be opened in the future if needed. Some other locations are closed to anyone not privy to the business conducted there, and the doors locked and guarded. In general, there should be an alternative for every service obtainable at non-criminal stations, however what you can buy/sell there could vary (more exotic, less quality, more expensive, ...) There are some extra entertainment sources that do not belong at other locations in the 'verse (illegal, violent, frowned upon, ...).
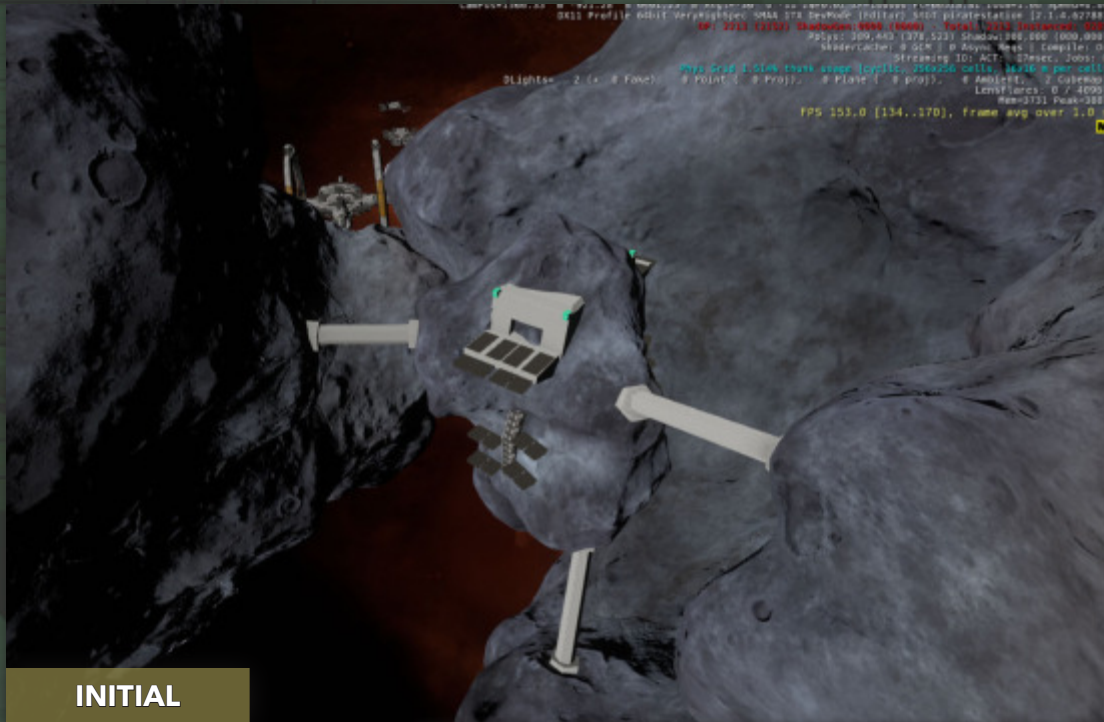
INITIAL

TETHER CABLES/TUBES

The smaller asteroid which contains the pirate base is attached to the giant asteroid around it by tether tubes, which both allow the base to not collide with the asteroid by keeping it centered, but were also used to transport miners and minerals back and forth from each mining site located around the anchor point, on the giant asteroid. Players would not have to see the inside of those tubes though – it would mostly be communicated by showing the old platforms for boarding shuttles that travelled those tubes, etc. The tubes are sealed by heavy doors.
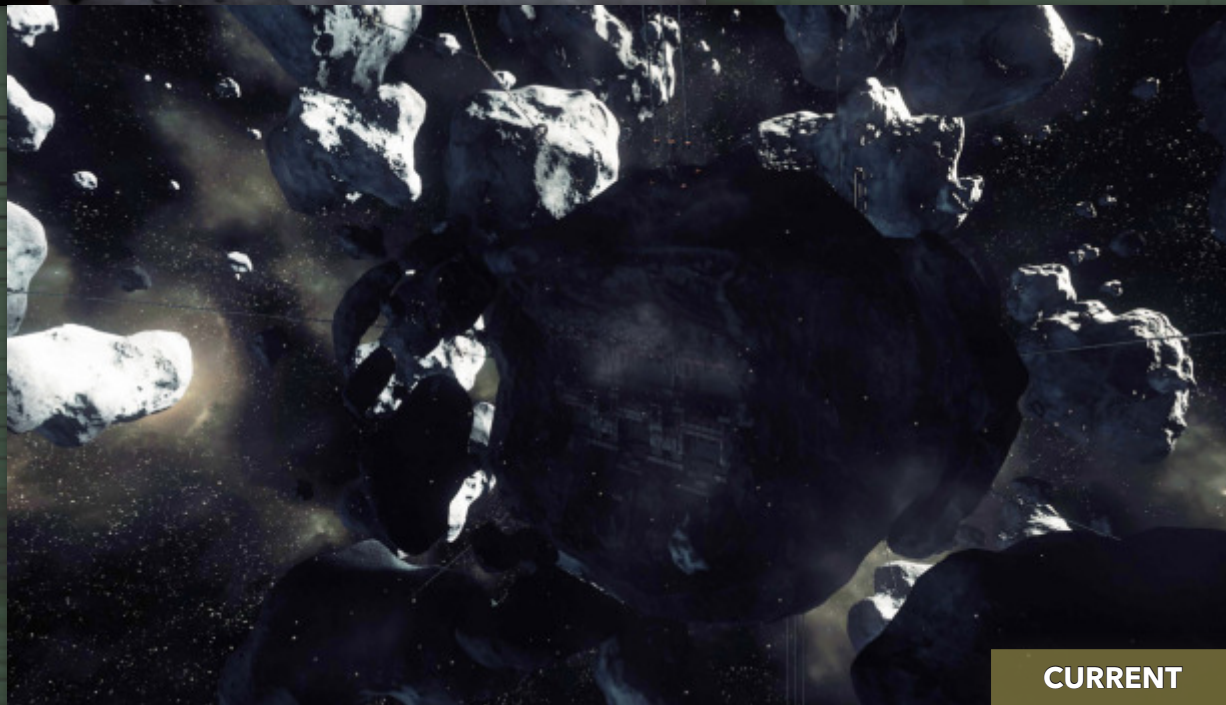
Hangers
(not currently accessible)

CURRENT

WORK IN PROGRESS

Area Themes

It's a bit early to flesh those out in too much detail, but I took the liberty to dig a bit deeper into each area's theme and purpose. Also, some of these areas may be completely off-limits/not built in game (e.g., behind a closed gate with the name on it) but mentioned to tie the function of those areas together in a coherent whole.

ENTERTAINMENT

It used to be where the miners would eat, meet and enjoy distractions, and has turned into a sort of criminal mall, with a market on the bottom floor and shops on every floor above.

Elements

- Open market on the ground floor (market stalls like in Nyx) featuring misc. or rare goods (e.g., plants, food, parts, electronics, equipment, weapons)

- Repair and refuel shops (which operate directly on your ship where it is parked) are found near the elevators. You have to enter the entertainment area to get to them, tempting you to spend money in shops/market, but they're not far so you can get your ship fixed/fueled and go quickly if you're in a hurry.

- Shops, some of them closed/abandoned but their façade displaying what they used to offer:

  > Bars, fast-food joints, weapons shop, cheap clothing shop, spare parts shop, casino, etc.

  > Hotels/inns (2 to 4 of them, with a total of 64 bedrooms)

  > Trading office

  > Medical store/surgery
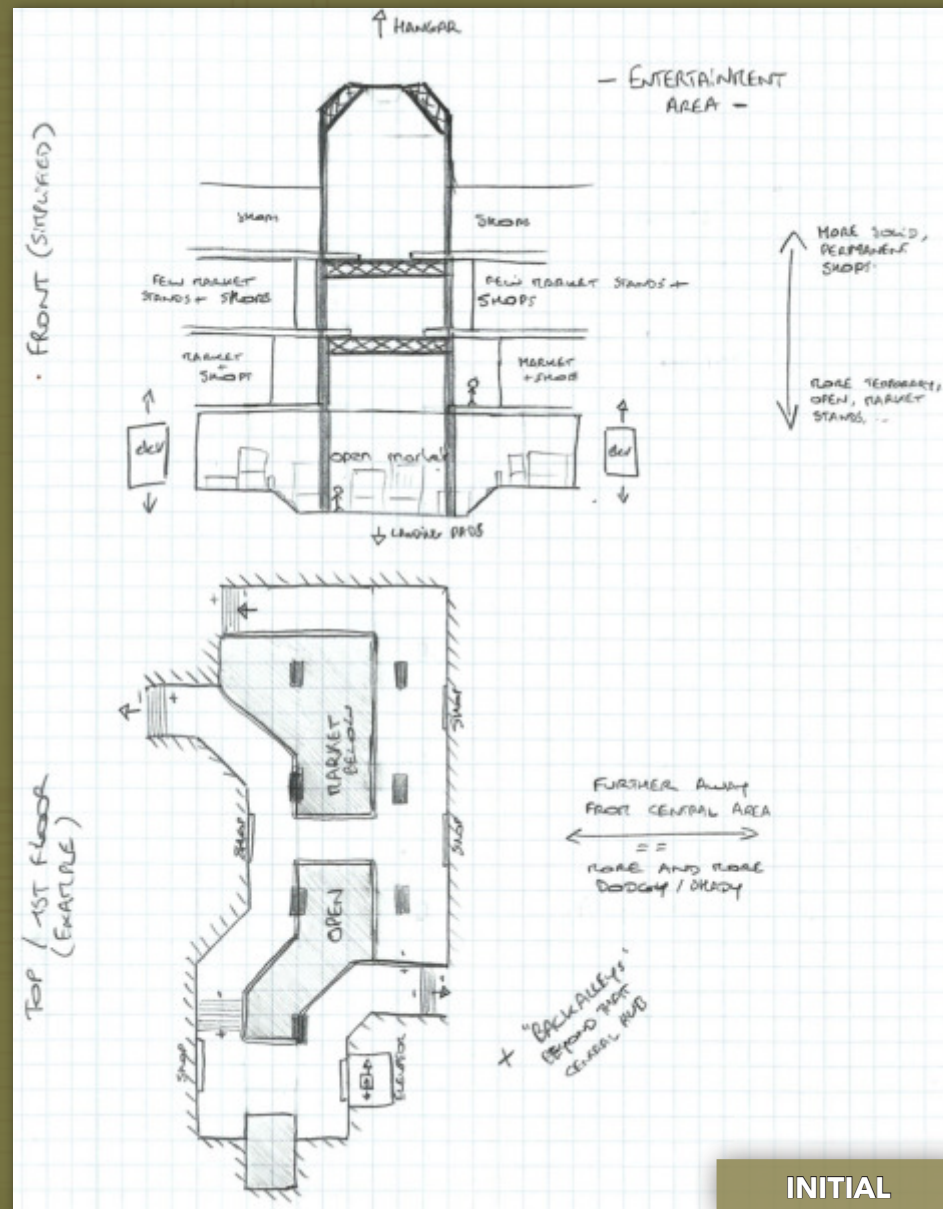
INITIAL
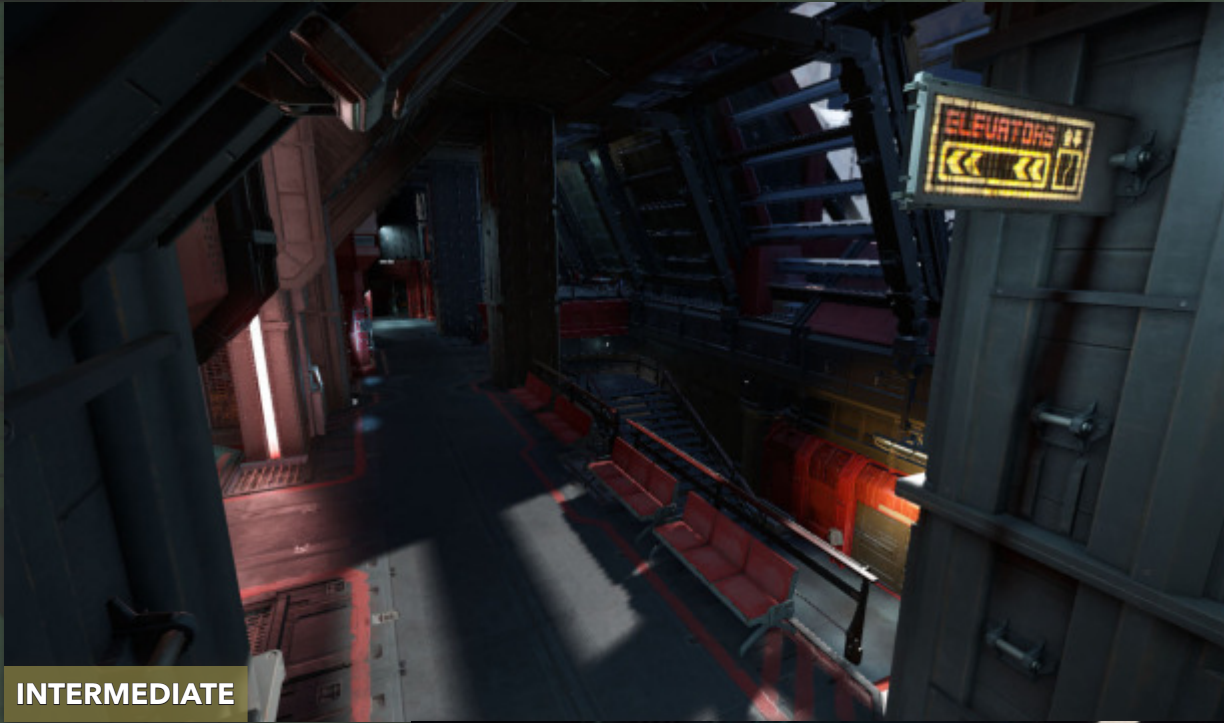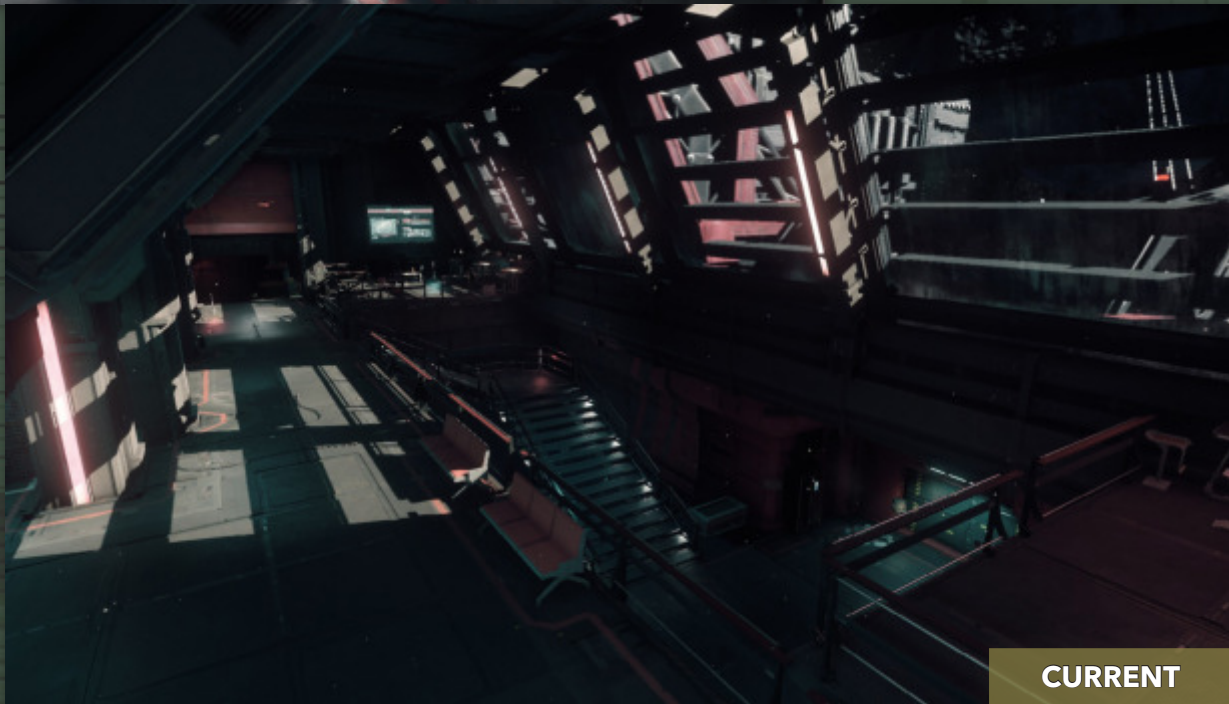
INTERMEDIATE

CURRENT

WORK IN PROGRESS

INTERMEDIATE

CURRENT

HANGAR

It used to store minerals and load them into cargo ships, which is why all of the large landing pads are located around it. Nowadays it serves mostly as cargo storage, and players can't actually explore it. Players who land their ship at the top of the base can see the interior of the hangar through bullet-proof glass when they pass through side rooms to get to the elevators/stairs down into the base itself.

Elements

- Control room/tower overlooking the hangar & landing pads (cannot visit interior, shutters over windows)

- Communication antennas/towers

- Visitor entrances (each corner of the hangar), with elevators and stairs around the shafts

- Hangar (only seen through windows of visitor entrances), full of cranes, containers, vehicles ... and with a large closed gate on both sides

INITIAL
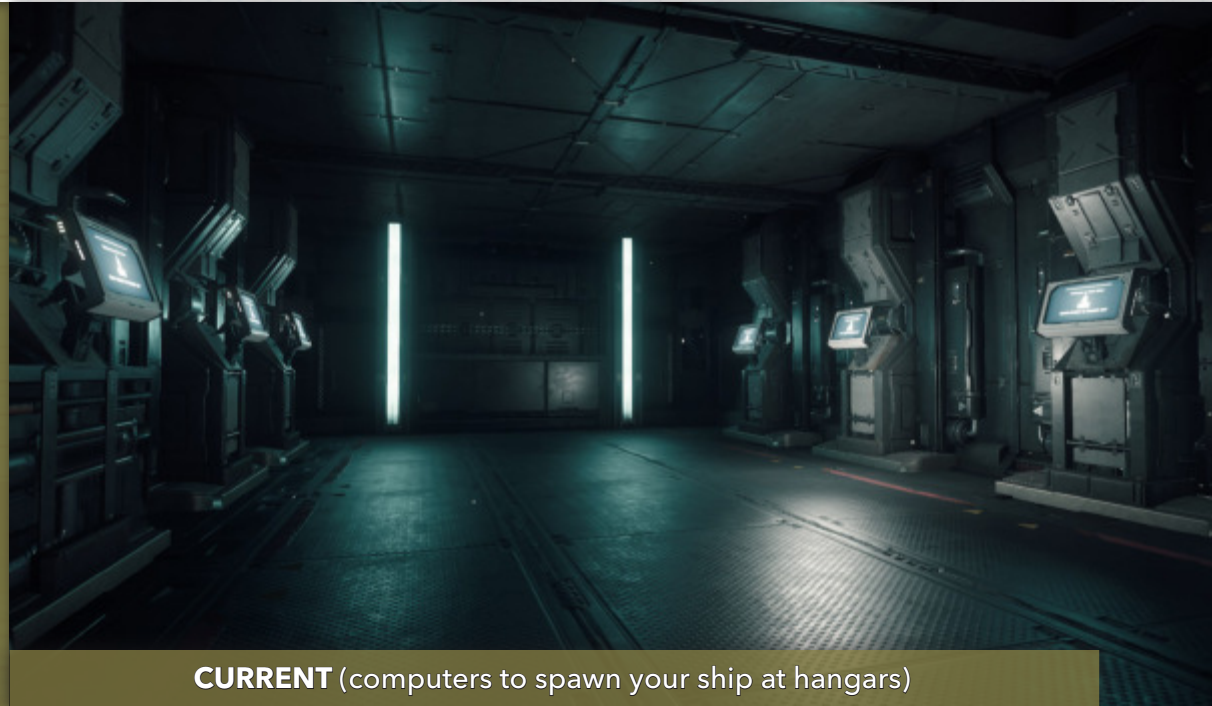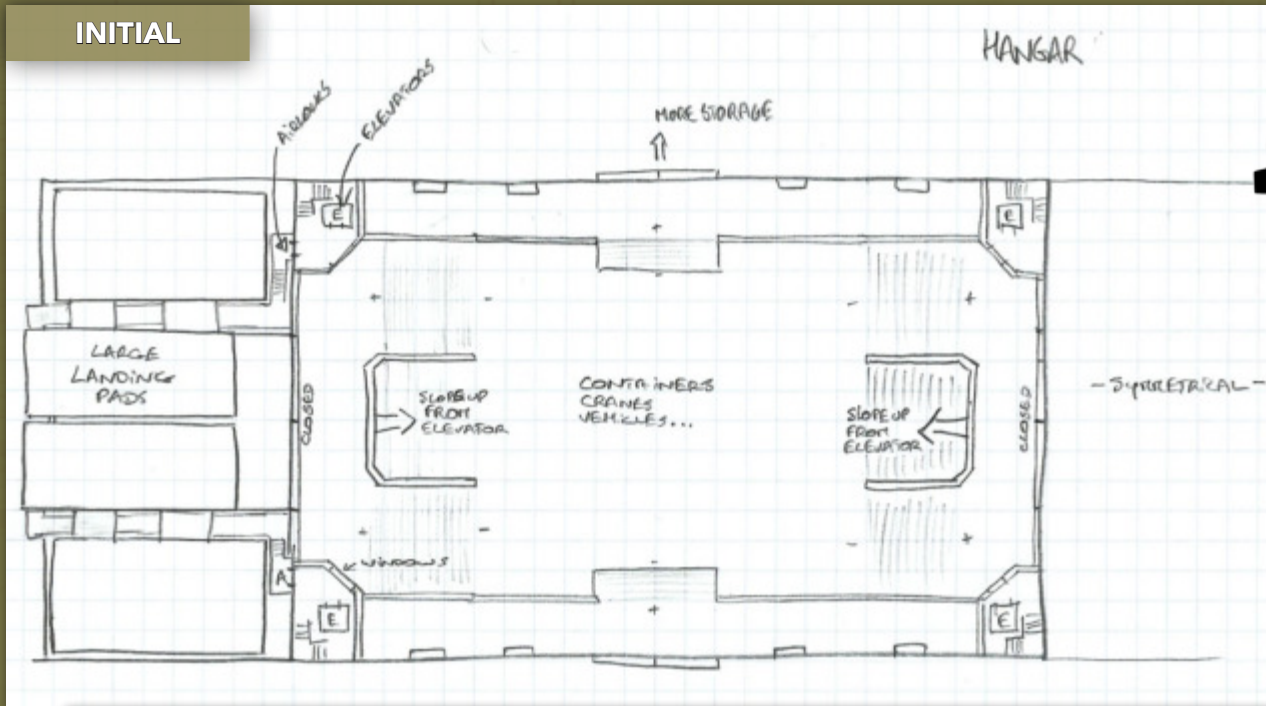
CURRENT (computers to spawn your ship at hangars)

WORK IN PROGRESS

INTERMEDIATE

The top floor where you summon your ships and head outside; the catwalk leading to the airlock. The computer terminals for spawning ships (previous page) are just out of frame.

CURRENT

BOWELS & ENGINEERING

The interior spaces around the entertainment area, remnants of the maintenance/machinery floors of the base when it was used as a mining hub, are much more claustrophobic, maze-like, run-down, rough (some exposed rock surfaces, rusty walkways, and so forth), while not overdoing it. See Nyx as reference, but with more hard metallic surfaces and fewer rock tunnels. If we want to establish a population of full-time residents in this base, that's where their homes would be found, built in old maintenance rooms and storage areas.

Gangs own those areas, so you run into shady groups of people when travelling down the corridors. Most visitors would not go through here, but this is where one can obtain the most illegal/cheapest goods.

CURRENT

CURRENT (airlock)

Elements

Some sellers/services use market stalls in corridors and dead-ends, others are found behind guarded doors or back-rooms. This is the equivalent of the back alleys in ArcCorp, but worse.

The engineering sector (between the hangar and the entertainment area) would have a similar look but be patrolled by hired guards and require clearance. That's where the controls for lighting, oxygen, and power would be located, and no visitors are allowed access.

- Shops, some of them closed/abandoned but their façade displaying what they used to offer:
  - > Bar (shady), fast-food stands
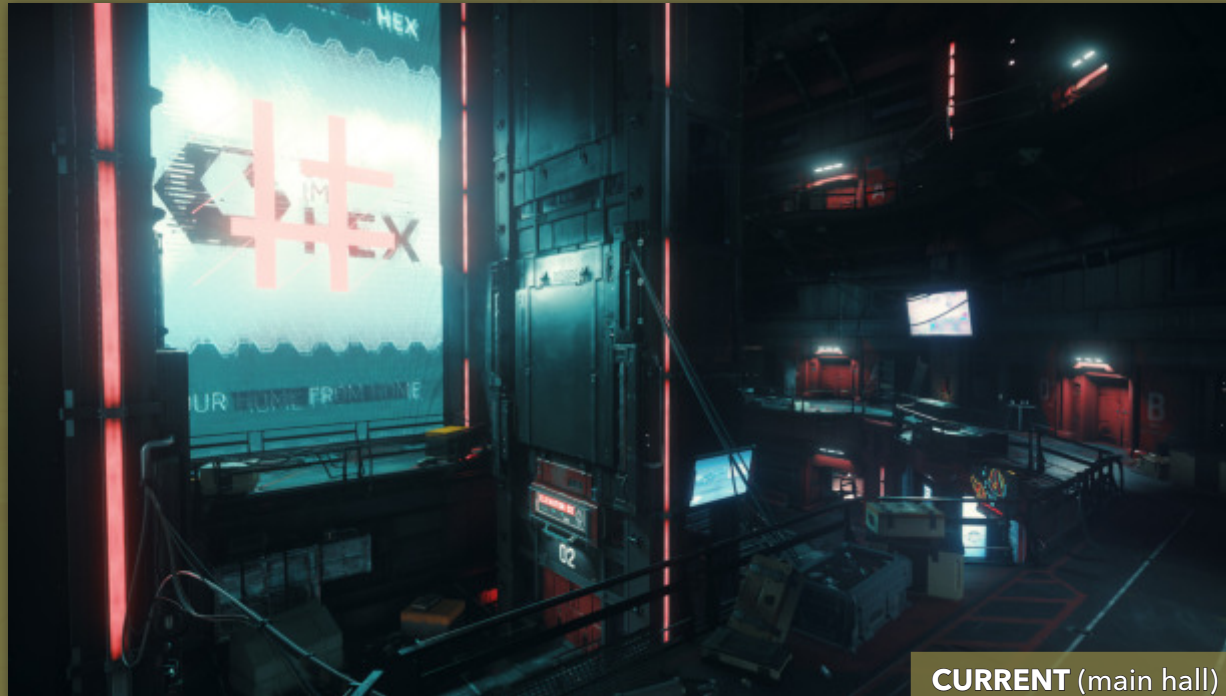
CURRENT (main hall)

CURRENT (back hallway)

> Hotel/inn, of poorer standing than in the entertainment area (even if just communicated with ambient audio and poor lighting)

- Non-advertised services, found in dead-ends, behind guarded doors, in back rooms of other businesses

  > Gambling den

  > Illegal goods (drugs & chemicals, exotic species, etc.)

- Resource transfer room (?), one of the rooms where resources mined on the giant asteroid are delivered to the mining hub through the tether cables connecting the two.
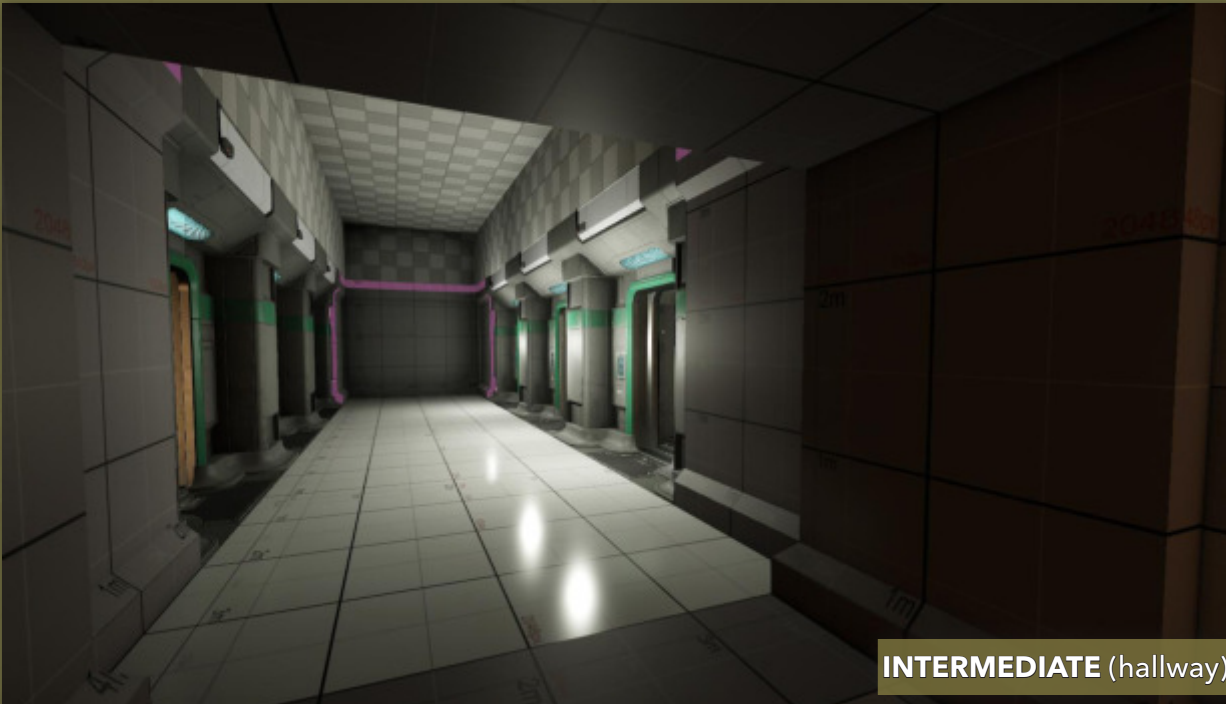
INTERMEDIATE (hallway)

CURRENT (hallway)
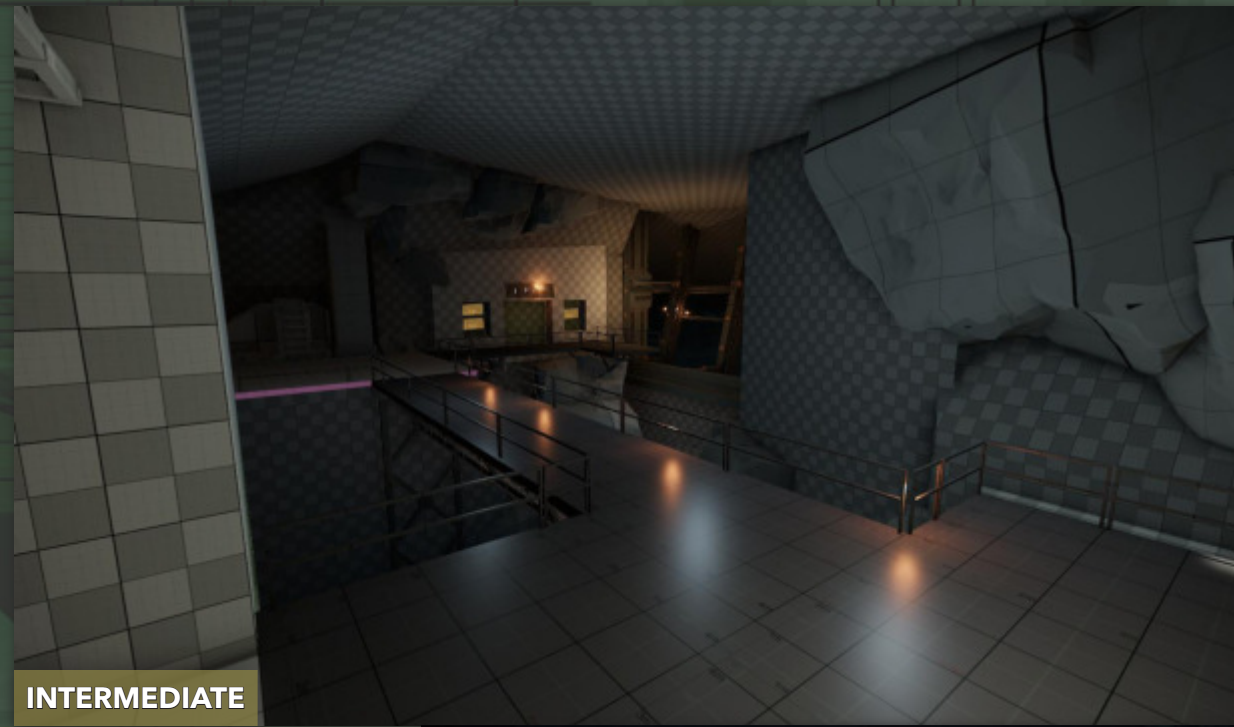
INTERMEDIATE

HUB hallway

CURRENT

16

WORK IN PROGRESS

INTERMEDIATE

Outside of the weapon/armor shop

CURRENT

WORK IN PROGRESS

17
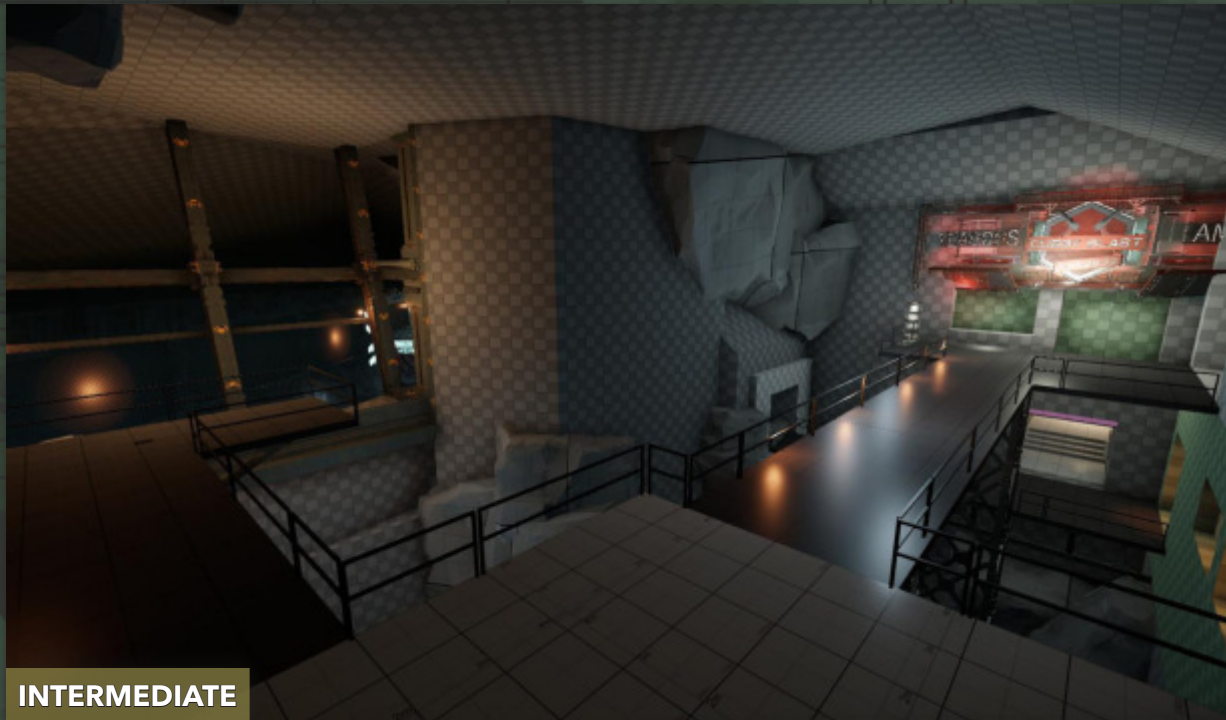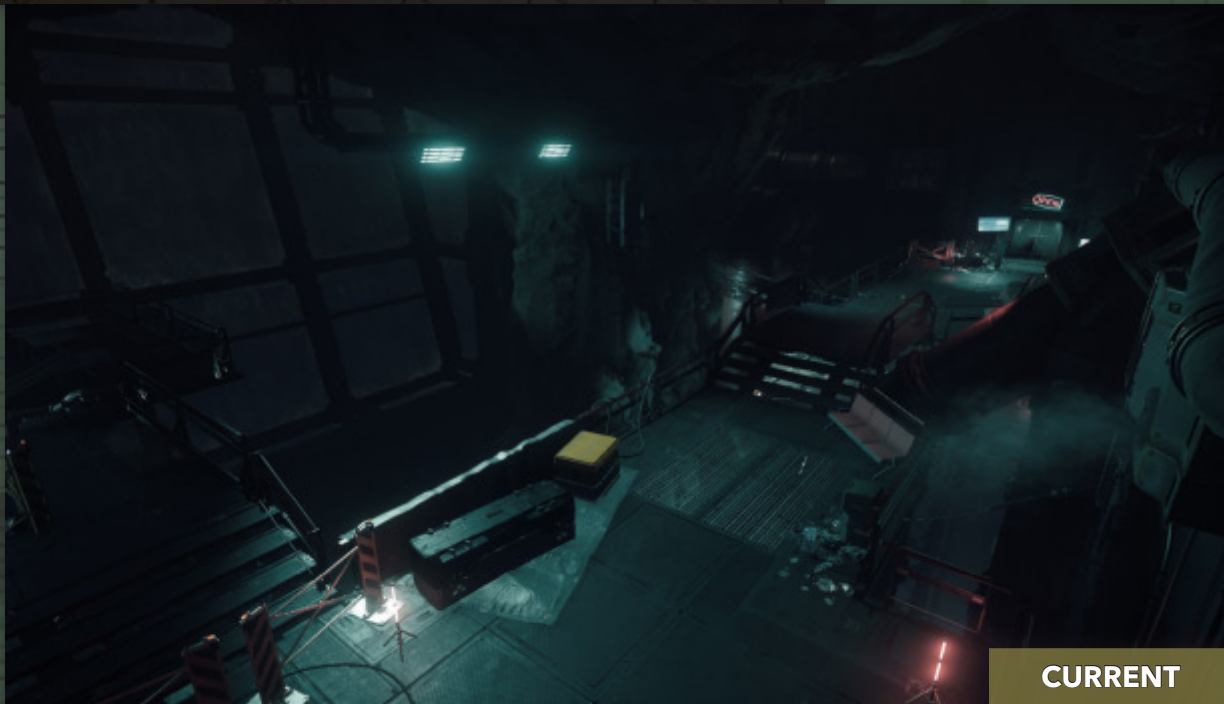
INTERMEDIATE

Hallway outside the clothing shop

CURRENT

WORK IN PROGRESS

18

LANDING PADS

At the bottom of the base, columns of small landing pads built around elevator shafts allow visitors to park and lift up to the core of the base.

Elements

- Small landing pads (32 of them, grouped around 2 to 4 elevator shafts)

- Large elevators (see Nyx) with windows leading up to the interior of the base

- Refueling equipment/pipes/fuel tanks (but shop is elsewhere)

- Repair equipment/cranes/drones (but shop is elsewhere)

INTERMEDIATE (spawn location)

CURRENT (spawn location)

GIANT ELEVATOR SHAFTS

On both sides of hangar and core areas below are two huge elevator shafts carved into the rock. In each, a massive elevator was used to carry minerals up to the hangar, and secondary (human-sized) elevators allow travel from the hangar to engineering and entertainment sectors. Visitors who take those elevators witness the scale of the shaft and the connection points for the tubes, where in the past miners boarded shuttles to get to the mining installations, and where the minerals from those mining sites were received and loaded onto the large elevators, transferred to the hangar and onto cargo ships.

Elements

- Tube connections (shuttle platform, machinery to receive minerals through the tube and move it to the elevator) closed by massive doors (cannot be entered)

- Large elevator used to carry minerals from tube to hangar

- Small elevators and staircase used by personnel to get up and down between hangar, engineering and entertainment sectors

HANGAR

CAVE

ELEVATOR

ENGINEERING

ENTERTAINMENT

CLOSED

TO MINING INSTALLATIONS

BOWELS

LANDING PADS
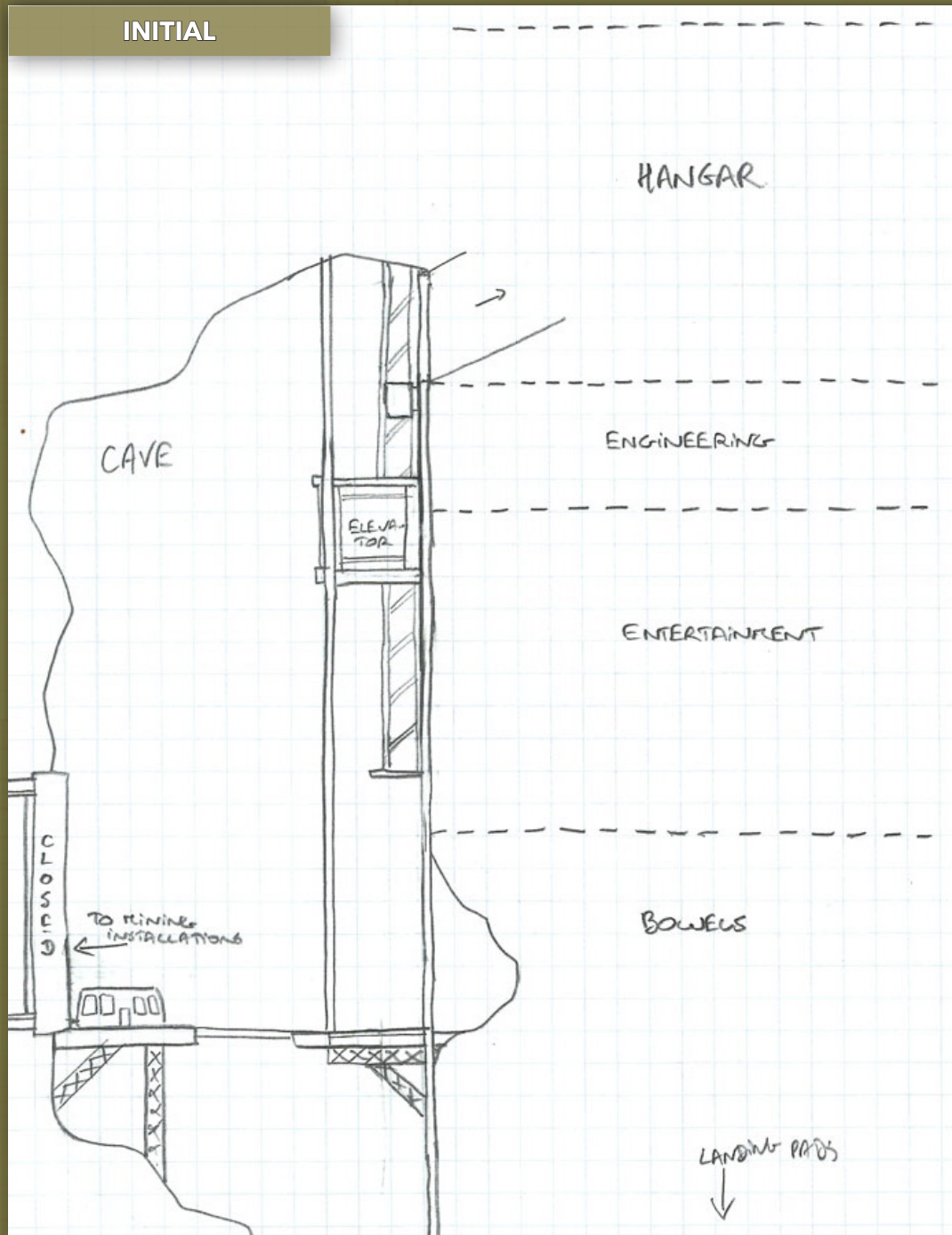
INTERMEDIATE (personal elevator)

CURRENT (personal elevator)

GENERATORS

Below one of the elevator shafts is a large cave hosting the generators that power the base. This part would probably be off-limits, but could be a cool sight if the elevator shaft above extended into that cave and the generators could be spotted from up high.

INTERMEDIATE

MINING INSTALLATIONS

Around the anchor points of the tether cables are some basic mining installations. Those are background; they cannot be entered and serve to explain the original purpose of the base.

CURRENT

DISCUSSION OF INITIAL DESIGN BRIEF

Luke P: It would be interesting to have hangars rather than landing pads (possibly not for the Starfarer). It will mean having fewer pads I imagine, but we need to address the fact that without a Green Zone around the base (and we don't currently have static turrets for defence), players will be defenceless on take-off. Not only this, but seeing as they are criminals they would be fair game for "good" players who could use this for griefing if we don't allow some cover during take-off.

It would also just be good to prove these out – the internal doors to the hangar would only open for the player allowed in so he can manage better those getting on (as in the case of the bedroom doors which we can help with). The doors to the exterior would only open for those exiting.

Clement M: Good point, I forgot about the other players screwing up with your ship before you've taken off. Maybe something where ships could burst out of cavities in the asteroid, and it would be hard to keep track of which one the next ship will come out of, etc. This also means they should face empty space to allow fast take-offs.

Meanwhile, how are the force-fields in hangars supposed to work? For example, we have some environments where there's the standard blue force-field preventing decompression but allowing ships to pass through – is the idea that it can be shot through or not? Could it allow ships to leave but not to be shot? Or would it be safer to go for actual gates?

Luke P: This has never been done properly in-game, though it would be worth asking someone how they are doing the one on the Idris. I can't think what tech would be needed or whether we could get away with a plane which was impenetrable to anything one way and let stuff pass through the other way (so you can deal with spawn campers to some extent). Its material would need to act like shields or the holosphere around AC maps.

Clement M: I'll check with John Crewe (Senior Technical Designer) to see how they're doing it. I think this could look cooler than gates, be easier to work with/less time wasted, and less of a telltale of where ships will come out of if we can go that way.

Todd P: Some more notes:

Consider ways to allow for more than X ships by letting players land and exit the landing zone then lowering/sliding their ship into a sort of storage (away from view) and doing the same again when they want to leave. This would modify the queue from 'too many people in the base, can't land' to 'have to wait for a ship to be done landing/leaving to free a slot for me'.

Could do gravity at different angles when landing, so you could see another ship landing above you at another angle, if we do use those EVA areas to connect sections of the base together (because then we don't have to worry about aligning those back to -Z).

Luke P: I did attempt gravity at diff angles. It defaults to always pulling -Z. You would need your tech guys to give us something for this – same with creating poly shapes rather than just cubes.

Clement M: True, the player movement was a problem last time I tried too, couldn't move on any plane that was completely perpendicular to the Z axis. Oh well, we'll ask and can always fall back on aligning them; it doesn't change too much.

Luke P: Even rotating them off 90 degrees causes them issues – they are always a box aligned with X and Y.

Clement M: Yeah it works for rigid bodies to change the forces in the box so they don't point towards Z but instead X or Y or both, but the player movement code will not play ball. You fall correctly aligned to that surface, but then can't move at all except by jumping.

Meanwhile, I've given a bit more thought to how to tackle the problem of landing pads and griefing, and considering Todd's point about trying to make ships shelve themselves to allow more parked ships than the max number of landing pads. Here are the pros/cons of the different approaches I considered:

Individual cavities with force fields that block projectiles

+ Fast landing/take off (no waiting for gates to open)

+ Force-field visible from afar

− Hard to differentiate entrance vs. exit

− Needs signals to indicate which is free to land at

− Can still enter & shoot ships

− Other ships can mess with shelving process (e.g., enter and destroy ship while it's being transferred, or land multiple ships on one landing pad)

Individual cavities with gates

+ Protected from being shot at when closed

+ Can open only entrance or exit, or use both as the same

+ Cannot mess with the shelving process (only starts when doors are closed and players all exited in air-lock)

− Slower to enter/leave due to gate animations

− Still need to indicate when it's ok to enter or when it's opening to let a ship out

− A gate opening is a telltale of a ship about to come out so can be easily targeted

− Can be abused (e.g., player going AFK when in there so cannot be opened for another ship)

Group cavities, with force-fields that block projectiles, and both sides open (tunnel with force-fields at each end and containing X landing pads)

+ Lots of parking in a limited space

+ Possible to have ships parking at different angles (e.g., on surface of tunnel so can be upside down from one another; needs tech work)

+ Easy to enter and leave

+ Puts the responsibility of finding a free spot to park on the player, not on the system

− Players can do flybys in the tunnel to damage/kill other ships parked there

− A lot of potential interference with the shelving process (e.g., ships trying to land on a pad that's already bringing up a ship, etc.)

− Can lead to accidental collisions between multiple ships trying to leave/enter since can travel both ways

Group cavities, with force-fields that block projectiles, and only one side open (cave with landing pads all around but have to exit the way you entered)

+ Lots of parking in a limited space

+ Possible to have ships parking at different angles (e.g., on surface of tunnel so can be upside down from one another; needs tech work)

+ Easy to enter

+ Puts the responsibility of finding a free spot to park on the player, not on the system

+ Much trickier to do flybys on parked ships

− Trickier to leave if you didn't let your ship be shelved and restored rotated 180 degrees so it faces the exit

− A lot of potential interference with the shelving process (e.g., ships trying to land on a pad that's already bringing up a ship, etc.)

− Can lead to accidental collisions between multiple ships trying to leave/enter at once

Network of tunnels containing landing pads scattered around the galleries

+ No easy way to grief parked ships from afar

+ Lots of parking space

+ Matches the 'ant colony' theme that surrounds the base as a whole

− Can be hard to navigate for slightly bigger ships

− Needs a huge amount of space (asteroid would be much larger than anticipated and could lead to scale issues between interior and exterior, with lots of traveling on foot/EVA to connect the two)

− Can still lead to collisions when two ships travel the same tunnel in opposite directions

− Hard to locate your own ship or know how your current position relates to the exit

Landing pads in mining installations around tubes, use shuttles to get to hub

+ Can do a lot more parking for ships of all sizes

− Would take a long time to reach shops etc. and to go back to your ship in case of emergency

− Would most probably rely on vertical landing as in Nyx, which was pointed out as a bit finicky and ideally avoided for small ships

So I think Luke was right to bring up gates – the individual cavities with gates just seem like the most suitable solution for those requirements, and the one where we can enforce the most security in the process of shelving ships (by forcing players out of the landing pad before proceeding, and being sure no other ship can interfere). It'll need some visual language to allow players to figure out which ones they can enter and which are about to spit out a ship, etc. but that seems like the least evil of those solutions. Let me know if you had something else in mind. I'm still considering what to do for the large ships and Starfarers, and how to implement some of the other feedback I've gotten so far.

I asked John Crewe. At the moment at least, there is no design for a forcefield that blocks projectiles but lets ships pass through. Probably another reason to go with gates instead of fields.

Luke P: The way I approached Olisar was that no one should be landing back at it – that blocks a valuable spawn point. We were actually considering adding "parking spaces" around the shopping area, so you can either run to the shop from the spawn point or if you're returning there are parking spaces that allow much faster access to the shops.

I'm okay with one-way force fields or doors on the "spawn" pads. Then a slightly covered area for parking, but at least then you know the risk you're taking leaving your ship there.

Clement M: I see, makes sense. Even if we have quick parking spots that are more exposed, I'd still be tempted to allow for long-term parking (maybe even for a fee, I don't know), so people who go to the outlaw base to enjoy a good time don't have to freak out about their ship being exposed all the time. I'll try to find a middle ground.

CURRENT (from Grim HEX, toward Stanton and Vela)

Intermediate High-Level Concept Update

The base is a den of criminals of all kinds, and offers services and goods that can't be found in lawful locations.

The plan is to make this location a very small playable space inside an old facility carved in an asteroid, with a limited assortment of hangars/pads that's barely enough for 24 players to go in and out of the base. Due to the problematic scale differences between hangars/pads/ships and the small playable space, fake elevators that teleport the player to hangars will be needed, as well as tech to handle parking in/flying out of hangars.

SHOPS

- Security/bounty/hacker's shop (extra small) to set/clear bounties and wanted levels

- Racing kiosk (small or extra small) – where to register for the races

- Bar (medium), with a back entrance

- Weapons (small)

- Armor (small)

- Clothing (small or medium)

GAMEPLAY BEATS

- Dodgy electronics shop where Ruto (PU character) or similar character offers to clear a player's wanted level for a fee. Could also forge ownership documents and such.

- Racing games run regularly through the asteroid field nearby, with consequences/unlocks in the station itself (e.g., comments at the bar, new missions unlocked, …)

- Shops that sell illegal goods and have limited stocks and variety, and tend to have the more exotic goods in the back. Sellers sometimes stand around in the HUB to sell rare illegal goods, drugs, etc.

- Shops have defenses/security detail/a lockdown mode that protects the goods from being stolen in case of attacks, as well as the owner's life.

- Criminals give players missions to run in UEE space to tempt neutral players towards crime. In general, a good place to get shady/criminal missions.

- Sometimes when picking up a ship at this location, a tracking device is installed on it or its valuable cargo. If the player does not spot the device, pirates ambush the player later on in space to try to steal its cargo. Creates risk for using those locations. The rate at which this happens may depend on your reputation as a criminal – only neutral/lawful could become targets of this trap.

INTERMEDIATE (HUB)

STRUCTURE BACKGROUND

Housing Exchange or HEX

BRIEF FUNCTION: Worker's Residence/Transport Hub

GENERAL DESCRIPTION: A style of cheap stations that are built into hollowed asteroids to save money on construction materials. Though intended for lower incomes, the simplicity of their build made them easy to maintain and their signature hexagonal honeycombed pieces made them exceedingly durable. They tend to be one of the cleaner and more dependable options, if not exactly comfortable. They can be scaled to any size, but HEXs all feature affordable housing pods for temporary workers as well as some shopping and entertainment options. They were basically spots for miners, haulers, etc. to park their personal ships and then take shuttles to whatever mining facility they were on, or board larger ships they were heading out with. This style of construction has been adopted by a bunch of different manufacturers because of their relatively low cost to build and operate; you can find these stations in various forms all over the universe, both legitimate and illicit.

The owners technically closed the station three years ago, and the stores hastily cleared out when the first squatters moved in.

CORPORATION NAME. Everline Structures Incorporated (ESI). Providing worker accommodations for forty years.

2D LAYOUT

The initial paper sketches widely differ from what the base turned out to be after iteration through direction and layout, so instead of drawing the existing whitebox layout in minute detail, I'll only provide an overview of the asteroid and each area and how they connect to one another.

LANDING PADS

2 real elevators

4 fake elevators

HANGARS

HUB Beds & Shops

View into racing tunnel
Jump to starting grid

STARTING GRID

Abandoned shaft (EVA)

ABANDONED ENTRANCE

INTERMEDIATE (overview)
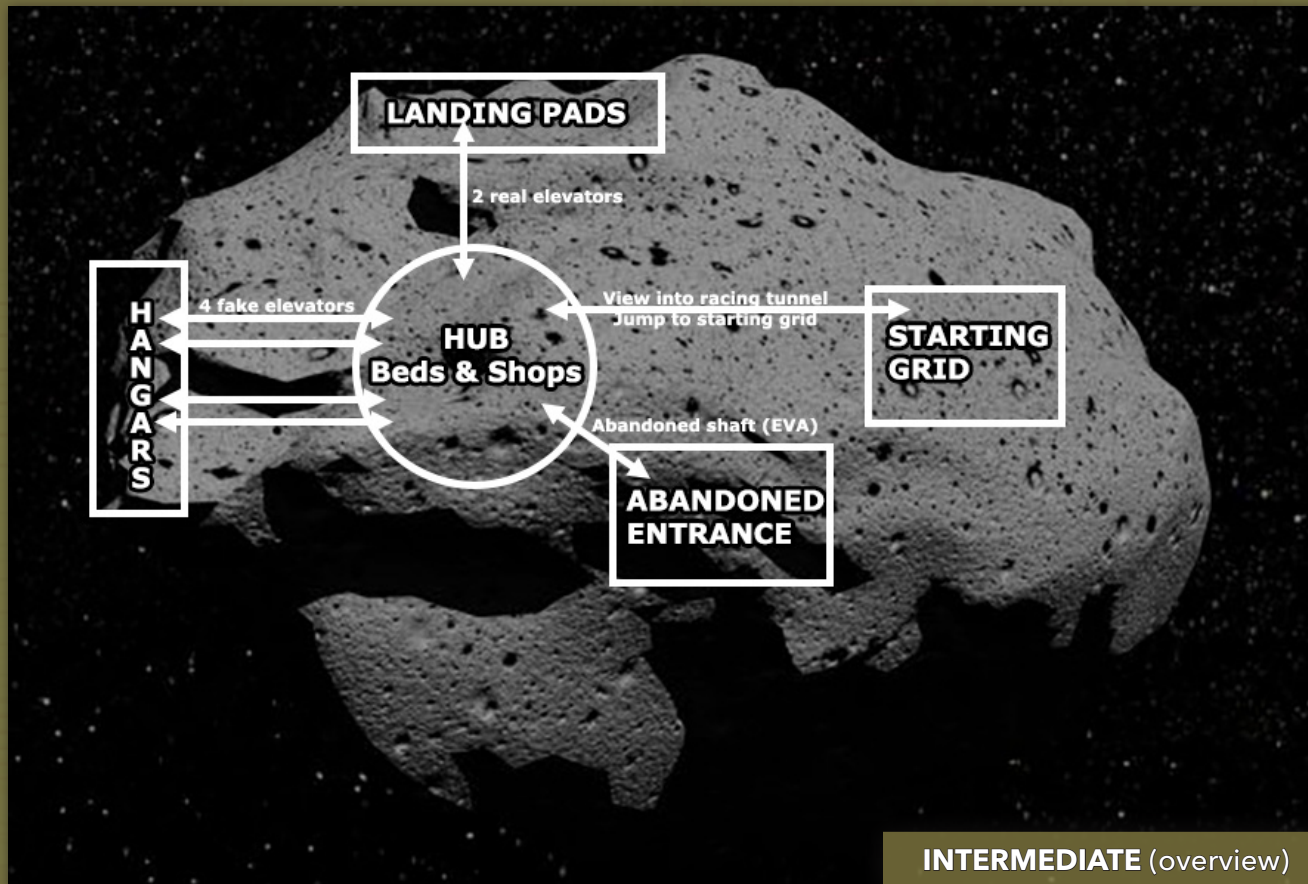
HUB
(BEDS AND SHOPS)

- Free usage of bed-rooms (24 available)

- Allows criminals to respawn when all other existing locations don't want their presence

- Small/medium shops provide illegal/exotic but limited stock

INTERMEDIATE

INTERMEDIATE

LANDING PADS

- Connected to the HUB via 2 real elevators

- Allow players to park their ships for a quick run to the bar to get missions or to the shops

- There is a docking bay to the side but it is damaged (so don't have to worry about the proper docking mechanic just yet)
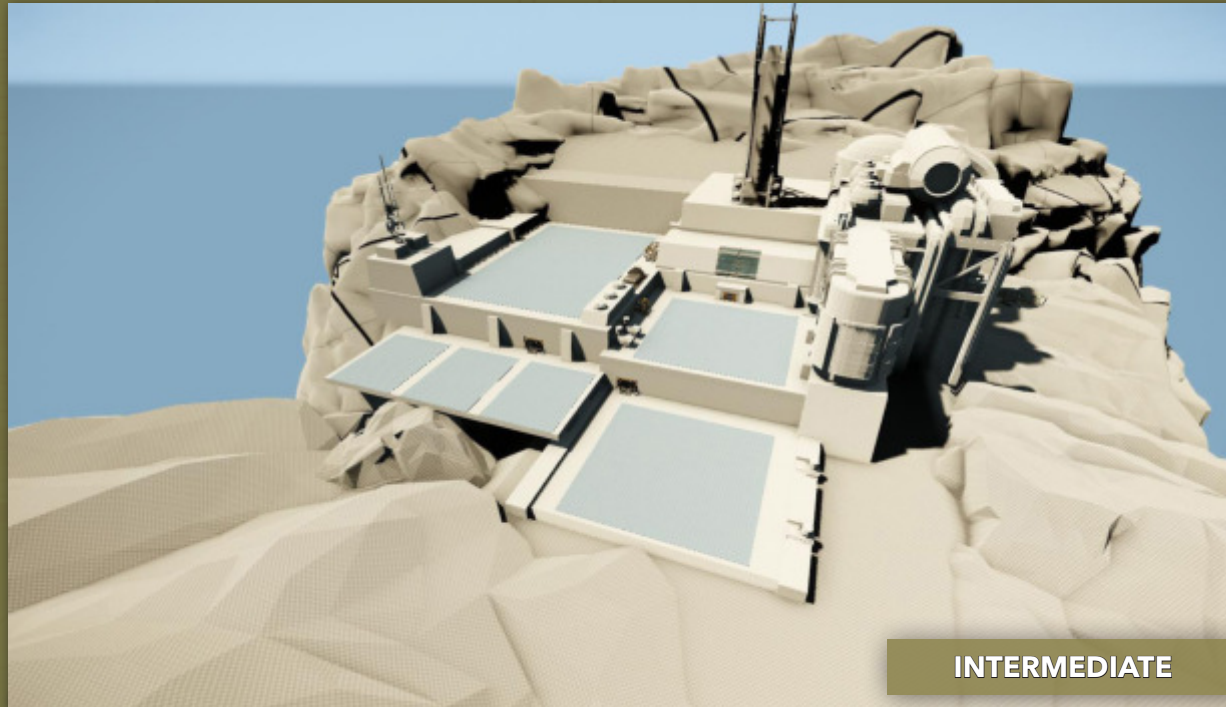
INTERMEDIATE

INTERMEDIATE

WORKINPROGRESS

ABANDONED SHAFT

- Players can leave their ship floating there to EVA into the abandoned shaft and reach the HUB without using elevators/going through the main entrances

INTERMEDIATE

INTERMEDIATE

HANGARS

- Allow players to spawn their ships and fly off, or store their ships

- Connected to the HUB via fake elevators to solve the size difference between the two spaces

INTERMEDIATE

INTERMEDIATE

RACING TUNNEL/ STARTING GRID

- Starting grid/finish for races related to this location

- Interior of the tunnel is visible from the HUB so players can watch racing ships pass by and finish races

INTERMEDIATE

INTERMEDIATE

Current Status

There is still plenty of work to do on Grim HEX, but it's close to being available for play. We've already seen several screens in the previous pages comparing Current status to the Initial and Intermediate stage.

Here are a few more screens, to highlight the work that Clement and the rest of our pirate base designers, artists and others have been producing. Enjoy!

CURRENT (hidden cave in the asteroid)

GR IM
HEX

YELA TRAJECTORY MAP

DEPARTURES - TIME TABLE

LOCAL

SOLAR SYSTEM

DAILY
EXPRESS
SLOW

MONDAY ONLY
SUNDAY ONLY
SATURDAY ONLY
FRIDAY ONLY

CURRENT

34

WORK IN PROGRESS

CURRENT
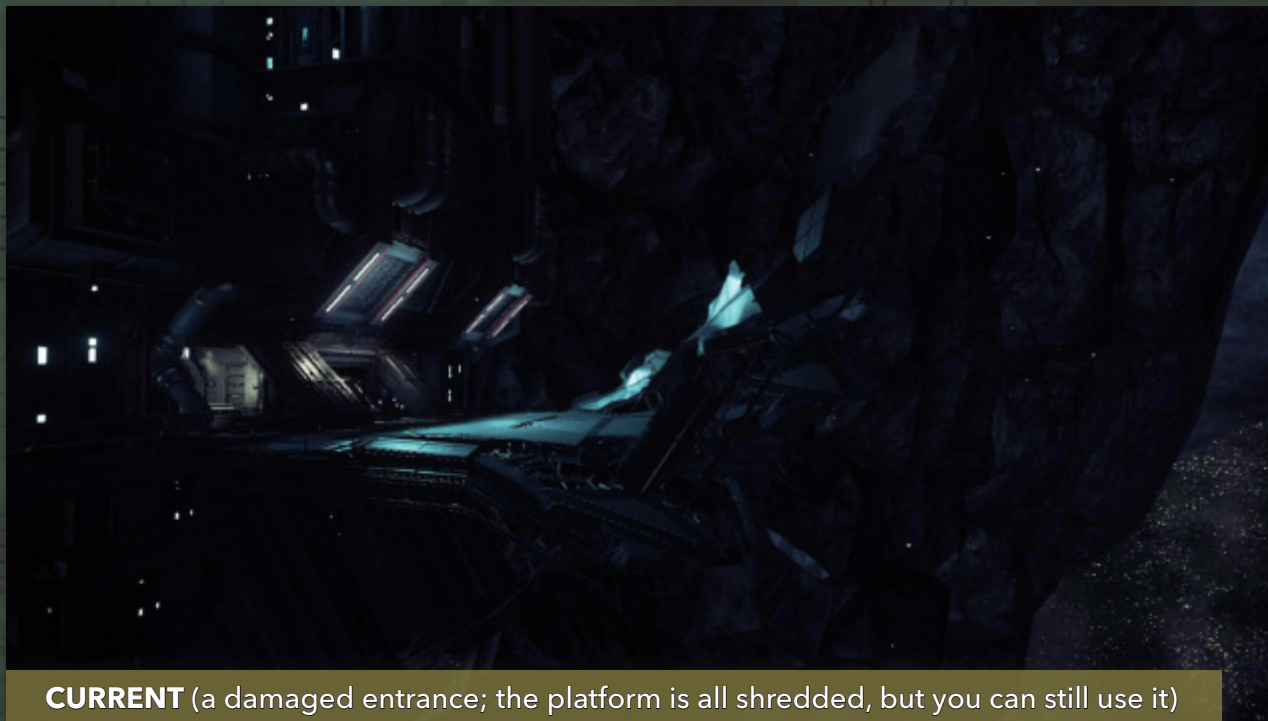
CURRENT (a damaged entrance; the platform is all shredded, but you can still use it)

CURRENT (hallway outside clothing shop)

CURRENT (the back of the clothing shop, where the shopkeeper lives)
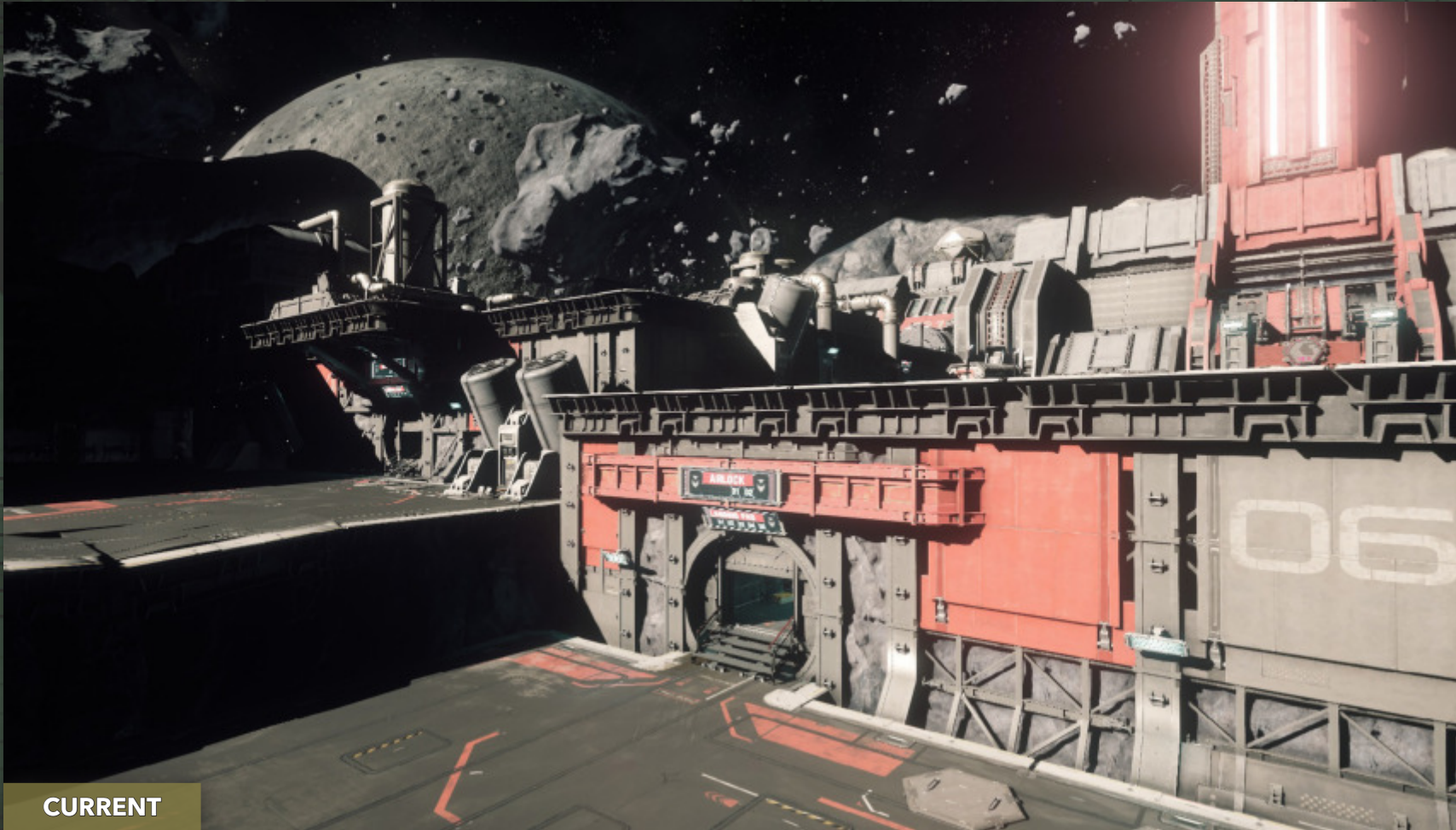
CURRENT

Time to Go

While it may not be a well known company among the general population, since their products are traditionally manufactured for industrial purposes, it is almost a guarantee that Argo Astronautics' hard work and effort has impacted your life. From the fresh shipment of beans in your morning coffee to the connector ferry you take to the office, Argo has become an institution in its seven centuries of existence, thanks to its varied line of rolling stock, shuttles and utility vehicles. Yet as widespread as the company is now, it all started with a single train.

In 2243, after close to one hundred years of moving people and cargo across the expanses of North and South America, the aging and complex Trans-America maglev rail line was in desperate need of an overhaul. Spanning from Barrow, USA, to Punta Arenas, Chile, it was the third longest stretch of continuous mono-track on planet Earth and transported tons of freightage daily. However, with sub-orbital transfers gaining a larger share of the overall cargo shuttling market, and the train crossing through so many different territorial governments, few companies

wanted to take on the herculean task of upgrading the complex line.

While various governmental bodies tried to gain traction for investment into the infrastructure, the plans never gained the critical mass needed to achieve funding. All eyes had turned to the new growing community on Mars, Meanwhile, the new, faster quantum drives from RSI drove more interest, and with it money, toward establishing our place in the solar system, and focusing further and further away from Earth. As delays and breakdowns on the rail line became more and more frequent, it seemed like its fate was sealed. However, a young train engineer thought she had the solution.

A Step in the Right Direction

Alana Redmond had grown up on the Trans-Am line, spending much of her youth accompanying her mother, who worked as a shift manager aboard the train. Moving from town to town, Alana was fascinated by the way the rails served to bring the world together. How, even as data and information could be beamed around the globe almost instantaneously, it still took people like her mom working tirelessly to physically move goods from one continent to another. It was a fact she would happily discuss with anyone who asked what it was like to ride the rails, so it was little surprise to her family that after finishing her studies, Alana began working at Trans-Am as an assistant engineer.

It wasn't uncommon for the crew to have to halt the train to make emergency spot repairs of the aging mono-track when their sensors detected vibrational anomalies from coils warping out of alignment. Difficult and requiring exact precision, the patching process would set the whole schedule back as the prepping, bonding and aligning all took time. Plus, the older the track got, the more patching they were required to do, which compounded the delays. This meant that a single patch could lead to a huge monetary loss for the run, but to continue on without repairing the line was risking a complete break and even bigger delays.

One day, while waiting for a levitation coil to set, Alana noticed a piece of scrap metal that had been twisted by the magnetic forces from where a train had inadvertently run over it. The curve of bent metal was about as good of a result as the repair equipment they were using on the composite patch. The wheels in her head began to turn and she theorized that she could use the forces being generated by the train to complete the patch instead of the current process, which was time and labor intensive. Inspired, she drew up her plans immediately, even though she knew she couldn't test her idea on an active run. Instead, she reached out to a friend who worked in the stock yard and sorted out some time with one of the retired engines. With design specs and a test track, Alana cashed in all her saved up vacation time and spent two weeks fusing track bond.

When the time was up, she knew she was on to something, but had a choice to make. Nervous and excited, Alana quit her job and used all the money she and her mother had saved up to begin working on developing her new patching process full time. Six months later, in September 2243, a patent was filed by AR-Go Technologies for an automated mono-track repair system that could be mounted to a rail car. The company's name was a play off Alana's initials, an idea compliments of her mother. Not only could the system she developed replace the traditional patching method, but by equipping all the cars with the tech, the line could be rebuilt to almost like-new conditions while the trains continued

to run, prolonging their operation indefinitely while also finally allowing for some of the newer generation super-conducting trains to use the older mono-track as well.

Demand for the repair system was enormous, with orders coming in from every major train line.

AR-Go Technologies became a massive success and single-handedly revitalized the rail industry almost over-night.

Next Stop

Over the next several decades, Alana and AR-Go Tech-nologies continued to introduce new innovations – a faster cargo latch and lock method, new passenger man-agement systems, and a vibratory recharger just to name a few. Eventually, with the acquisition of Todairo Manu-facture and a name change to Argo Transportation, they would transition to producing full rolling stock themselves. The exacting standards and durability of the maglev cars they produced quickly made them an industry leader. This rapid success and expansion would eventually lead to Alana's boldest (and last) project with the company she founded. A project that would take AR-Go in an entirely new direction – off-world.

Port Retanus, Mars had grown large enough that the city was seeking bids for a public transit system. Though Argo had never before built a complete transit system from the ground up, Alana's impassioned presentation to the city's governing board saw to it that they won the contract. Sad-ly, she would not live to see her vision for what she called a "radial networked transit hub" come to fruition, but the Port Retanus Rapid Transit System is still heralded to this day by city planners as one of the most elegant public transportation designs.

While Alana Redmond was no longer there to oversee operations, Argo's success on Mars ensured that the com-pany would be able to continue to move along without her. Other major contracts on several planets would soon follow, including the Prime Transit Metrorail on Terra and the Municipal Transit Line on Angeli. However, following Alana's lead, the new leaders of company would soon take another major step forward as, for the first time, they would leave the rails behind.

Going Farther

Seeking to further improve their services and networks, Argo had a dedicated team of designers seeking problem spots that could be candidates for improvements. While analyzing delays with their cargo trains, they discovered that the biggest impact to schedule was often not with their rail systems, but with hold-ups incurred during the transfer process at various ports. Moving goods on and off the trains could take significant time and often be subject to a wide array of traffic problems. In order to streamline the process, Argo sought a way to control the transfers themselves.

The solution was found in the purchase of Telluman Ship-works, a struggling company that manufactured recre-ational shuttlecraft. Retrofitting Telluman's facilities on Cas-sell, Argo's engineering team created an orbital utility craft (OUC) that could move cargo storage containers directly from long haulers onto their train cars. Incorporating their lock and latch system into the craft's frame, it streamlined the loading process significantly. It wasn't long before the OUC found a wider audience than just Argo's own transit systems.

As more and more pilots experienced the rugged ease with which the OUC operated, they soon started pur-

chasing the crafts secondhand and outfitting them for their own purposes. Argo, seeing that the demand was there, ramped up production and in 2619 released the Argo Multi-Purpose Utility Vehicle, their first publicly available model. At the time of the craft's initial launch, only a cargo module was available, but before long, people carriers, recovery pods, repair modules and more varieties were sold. If there was work to do, there was an Argo to do it.

The success of the MPUV led Argo to continue to expand their ship department till it overtook their ground transit division. A restructuring of internal priorities led to one more name change, and in 2665 the Argo Astronautics name that graces so many transportation mainstays emerged.

Today, Argo produces a wide range of utility crafts and transport vehicles – from shuttle crafts and low-atmosphere skippers to reentry pods – all working together to get the people and goods of the Empire where they need to go. Even the military has come to depend on the MPUV for their utility needs. And while Argo Astronautics' scope has certainly expanded from the days of Alana, their dedication to ensuring things are done the best way possible still remains well and firmly intact.
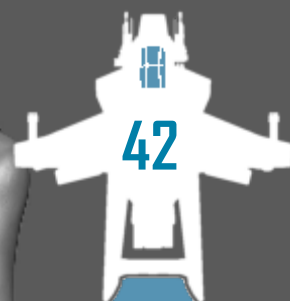
Character Building:
Female Avatar &
Plans for Character Customization

*Character Artist James Ku has been hard at work on yet another important element of Star Citizen — the base model for female characters. James wasn't available to discuss his work, but we were able to check in with **Character Art Director Josh Herman** and **Computer Graphics Supervisor Forrest Stephan** on what we've accomplished recently in this regard.*

JP: *Before I start, let me get a quick handle on things. What role did each of you play in this task? And what role did James have?*

Josh H: My job as the character art director was to get the references for what we want the female to look like, look through the old versions that we've done and give our artist James Ku something that seemed like a good starting point to move forward with. I also gave critique and feedback as WIPs came in, though James didn't need much.

Forrest S: As CG Supervisor I helped work with Josh and James to get the female avatar through the character pipeline. That includes everything from setting James up with

the right skeleton rig and proportions for the first Zbrush stroke, to finalizing the character in-engine to match the required visual fidelity in real-time, along with the design specifications for game play.

This also included working closely with James in providing the necessary skeleton and proportions to ensure the character will work with Animation.

Josh H: James was responsible for the creation of all the art of the female body, the high resolution sculpt, low-res game mesh, textures and implementation into the engine.

JP: *So James did most of the hands-on work, and y'all were directing him as he went?*

Josh H: Yes, James did all of the hands-on for the creation of the art asset.

Forrest S: Once we have the high-poly sculpt, I review the model from a technical art perspective, while Josh tackles the review from a purely art standpoint with a focus on the anatomy and visual direction.

JP: *Given how long it's taken to get a female avatar into the game, I would guess it's not a trivial task. Why is it difficult? What all is involved?*

Josh H: Females are always more difficult than male characters – they are always heavily scrutinized in shape, size and proportions. It's a challenge to create a realistic female that everyone likes. They should be attractive, but not overtly sexual. We wanted our female character to have a natural look, yet also be appealing.

This happens not just with females, but also males. Everyone has their own personal tastes, so creating a "base" male/female is about creating something that everyone likes – which is not always easy. :)

JP: *I've seen plenty of games with extremely sexualized female characters – large busted, few clothes ... would that have been any easier?*

Josh H: A lot easier. That's a very narrow type of character.

JP: *Why is that?*

Josh H: When you look at the range of shapes and characters, for something that is on the end of the spectrum and is very sexual or has specific proportions, you have a very clearly defined look. If you think of it like a bell curve, there's a lot less information and references at the ends. Whereas the middle has a ton of information. Everyone knows what the polar ends of that curve look like. It's once you get to the middle that it gets muddled and more opinions come into play.

JP: *For comparison, please remind me – how many male avatars do we currently have available for players?*

Josh H: Currently we just have one base male body.

Forrest S: We have one male body and one female body.

Josh H: We are working on getting skin tones in place so players can choose their skin tones.

JP: *How about heads – just the one head, also?*

Forrest S: We have scanned over a 120 heads. The female heads are modularly supported for the female body. This means any female head can fit on the base female.

Josh H: Heads-wise, we will have a selection. Some of our heads are for big name actors, so they won't be playable, but we are looking to have a quality number of choices for the players.

JP: *Then it's a significant step to get an avatar that half the world's population can identify with.*

Josh H: I think it's a very big step to get the female player into the game. It may not seem like it, but it's a large amount of work from many different departments – character art, animation, etc.

We've broken the heads up into two categories; story-driven characters and NPC characters. The story-driven character heads will only be used on that particular in-game character. The NPC heads will be randomized on the base bodies (male and female) on non-critical story characters across the universe.

JP: *Are the male heads modular as well, or is that still to come?*

Josh H: The male heads are also modular.

JP: *Is this same limit placed on our NPCs? Or are some of them based on different basic bodies?*

Josh H: We currently have one naked body for all the characters. But we can give story characters different proportions by just changing their clothing. We don't have to see the body underneath to make someone heavyset or very skinny.

JP: *Is it the longterm plan to have a single avatar (for each sex) that you can modify when creating your character, or are we planning more basic avatars in the future?*

Josh H: We're already looking into getting multiple body shapes in the future. But right now we're making sure everything works with one body type per gender.

JP: *I think this answers another question I had – I've seen at least one female character in the game (in the Cutlass commercial?). And there are female characters in* Squadron 42. *It sounds like it's much easier to create a specific character than it is to create the base upon which all other characters (of that sex) will be built.*

Josh H: Correct. A base body is harder because every player is going to be looking at it all the time.

Current final Version
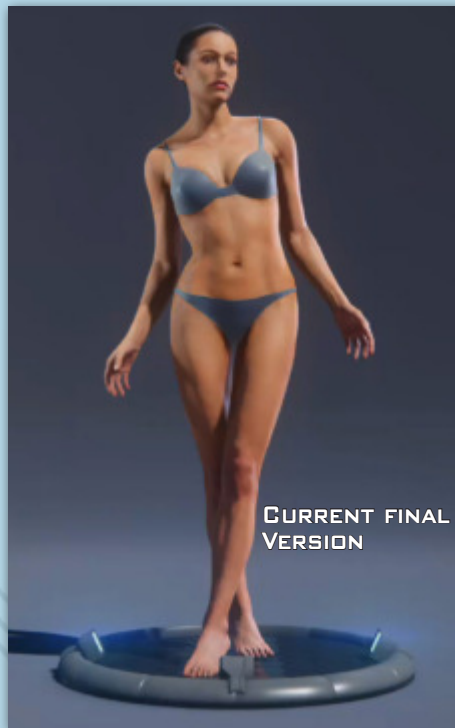
It also needs to be neutral enough that it can fit into any armor or clothing, and not look awkward.

Forrest S: The previous characters where not necessarily specific individual characters. They were using the legacy female character and non-polished NPC heads. Their hair was also placeholder material, made in-house.

JP: *Do we currently have different clothing for female characters, or is that still to come?*

Forrest S: Go for it, Josh. :)

Josh H: It's still to come. Since we are just completing the new female, we adjusted proportions slightly. This meant

that all costumes and armor were on hold for a while until we got these locked in.

JP: *"We adjusted proportions slightly" ... on what?*

Forrest S: The legacy character had incorrect proportions on the torso, making the legs look shorter than they actually should have been.

Josh H: The lengths of the torso and legs were changed to fit a more classic proportional system.

Forrest S: Josh and James were able to pinpoint the issue with the anatomy early enough that we adjusted the proportions in the high poly sculpting phase.

This impacts other disciplines, however. When a character's body changes joint locations, this requires us to go back to the skeleton, and John Riggs, our Technical Rigger, must make the necessary changes.

Once the skeleton rig has been updated, the animations get re-exported to support the new skeleton.

JP: *Is this just the female character, or both?*

Forrest S: The female character. The new male character will not go through proportional changes.

JP: *So now that we have a female avatar, we're going to start creating clothing that is suitable for both male and female? Or we'll have two versions of all clothing now?*

Josh H: Clothing will be created for both the male and the female. New assets will be created to fit the female body. So even for "Leather Jacket" there will be a male and female version of that same jacket.

Forrest S: We expect to have just as many female clothing items as male clothing items.

Josh H: It's possible that we'll have some custom items for males or for females. But we will make sure that both genders have a good selection of clothing.

JP: *How did we determine what the precise look of our new avatar should be? Poll 1000 random citizens? Consult a clothing store? Scan the first 100 women who walked past the office?*

Forrest S: We consulted in-house, with CR having the primary influence. We scanned through reference and discussed it internally to ensure we were all on the same point in terms of clear direction. We knew we wanted the female character to look believable.

JP: *I've gotta ask, because our readers will want to know — how much input did any of our female staff have on the final decision?*

Forrest S: We did have the female staff members to have more pairs of fresh eyes on the mesh, along with other character artists. We got a wide range of input and comments. All were helpful.

Sometimes it's helpful to step back and get fresh opinions. Especially if someone can look at something at a much higher level, because sometimes we developers look very micro and concentrate on the detail. Though James Ku does a phenomenal doing both, which is what made him perfect for this task. The results speak for themselves.

JP: *What has he done before this?*

Forrest S: James worked in film and VFX, including creating digital doubles.

Josh H: Something that is unique to *Star Citizen* is that our 1st and 3rd person cameras don't use separate meshes or animations. This means that whatever your character is doing in 3rd person can also be seen 1st person as well, at the same time. The challenging aspect of this is that all the hands and gloves on our characters need to be built to be seen up close at all times.

JP: *So, once you had direction on what she should look like, how did you make it happen?*

Josh H: After the sculpt is approved, James moved on to texturing. This is both the surface quality of the skin as well as the coloring.

JP: *What things are the same in the process for male and female characters? What things are different?*

Josh H: The process itself is very much the same as creating the male. All of our assets follow the same pipeline and go through the same series of steps to completion. Each asset is unique, so each asset will present its own challenges along the way.

One of the things that was new to the female was that we were fitting her to an existing rig. Typically, when you're making a base character you are going to create the rig after you make the model. But in this situation it was reversed since this is an reworking.

JP: *Before you go farther – what's a rig?*

Josh H: A rig is a skeleton for the character that has animations played on it.

JP: *So by the time we made this character, we had already recorded and polished a set of animations for it?*

Josh H: We did end up adjusting the proportions slightly to make her a bit more appealing. This involves the rigging team adjusting the skeleton to the new model, as well as the animation team re-targeting the existing animations to the new skeleton.

JP: *Why did we have a rig already, but not a character?*

Josh H: There have been a few previous female models, but most of the work has been getting the male characters up and running, including rigging, animations, items, interactions with items, etc. Not as much had been done for the female. It makes more sense to get one working, and then match your other characters to that.

JP: *What do you mean by "more appealing"?*

Josh H: More natural looking and closer to what we would want for a universal base. Making sure they don't have any unnatural proportions. More naturally appealing, not sexually appealing.

JP: *Any last words?*

Josh H: I'm very happy with how the female has come out and I'm looking forward to getting her out into the 'Verse!

Plans for Character Customization

The Art department (and other devs) have been working to make custom avatars available to you. Here's an update on how that's coming, with answers to backer questions from Sean Tracy, Technical Director, Content.

TheDeadlyKenny: *So we know that character heads will be scanned in, however will we be able to manipulate these scanned versions to customize them to create our own characters or will we only be able to select a specific set?*

Sean T: We've already scanned in over 120 heads.

Many of these heads and faces are meant for SQ42, as we have specific casting for parts within the game. However, a good section of these heads are dedicated to the players and the PU (and even for background NPCs).

We work in a tier structure, where a Tier 0 is the highest fidelity. This tier is expensive in terms of CPU performance, so we keep these to a minimum.

The next tier down is a Tier 1 — the player is a Tier 1, but many of the other actors are also Tier 1, so this isn't low fidelity by any stretch!

Of course we don't really want people selecting Gary Oldman's head and modifying it for their own uses (I'm not sure Gary would like that either!), so instead we use other profiles for the T1 versions that the player will choose from.

You will be able to pick from a set of at least 18 profiles, split between male and female, but we plan to add more of the background profiles that we've recorded to the set of player profiles.

Once you select a face, you can (within certain limits) modify the control joints via grouping, or possibly even individ-

ually, to form your own customized face.

Ghazlawl: *Two questions: is customization of facial features, hair, etc. planned? If so, what level of customization can we expect?*

And what about facial tattoos, scarring, etc.? Will we be able to add them during character creation and alternatively, will we be able to have any scars we acquire removed in-game?

Sean T: Beyond the positions and offsets of the facial skeleton we will allow setting of eye color, skin tone, tattoos, makeup and facial hair. Hair on top of the head will be selectable at this point, and we are trying to work in customizing of the current hair styles. Games like Black Desert Online do a great job of this and I hope that we can fit this in.

Further, we're considering ideas for scarring, which is slightly more complicated than a face tattoo. A face tattoo only affects the diffuse and we already have rendering tech online to handle this, but for a scar (unless you are happy with a fake looking mark), we'd like to be able to project normals from a decal into the face. The issue this presents is that our facial tech depends on tangent update from the blendshapes, meaning we don't just deform the face — we adjust the normals for shading based on the underlying blendshape. This gives far more fidelity when shading, but comes at a cost. Dropping a decal on top of the face with new normals on it would break this down. We'd love to add the scarring, but at this point I can't promise it anytime soon.

Ghazlawl: *Will we be able to change our features in the future by visiting a facial reconstruction doctor, barber shop,*

etc.? If so, would doing so have any effect on NPCs, security or bounty hunters recognizing us?

Sean T: Yes, you will be able to change your features in-game at a medical reconstruction type center. It's up to Design where/how you might do your hair, but I expect it would be in the same place as the face (refer to CR :)).

As far as recognition by NPCs and bounty hunters goes, I hadn't personally considered this. I don't expect that this would have an effect (though it's not outside the realm of possibility), but it's something that would be best built in once both AI and facial systems are online, as they would need to communicate with each other.

Ghazlawl: Are there any current plans to include the following hair styles:

• Mullet

• Afro

• Pompadour

• Mohawk

• Long-Ass Braid

• Fu-Manchu

• Gimli's Beard

Sean T: We've only signed off on a few specific styles of hair at this point, Mohawk being one of them. You have to

consider that with each style comes its own complexities. A Long-Ass Braid needs rigging, whereas a shorter hair style is significantly easier to deal with.

The real challenge we're up against (though we have some interesting tech we'd like to try) is not having to remake every single haircut for every single face. Imagine having to program 30 hairstyles across 125 or more faces!

We are continuing to explore a system to wrap the hair to the head regardless of shape.

Our animation goes to such fidelity that we even have a scalp bone, as when you raise your eyebrows we have the whole scalp move as it would. Again this presents a challenge in the rigging/skinning of it, and in just the overall asset load itself.

For those interested, the thinking is that we use a singular asset per hair style. We then create morph targets OR use

our run time rig for bone offsets per head. From there we then trigger the morph or joint offset based on the face that it's attached to and voilá — a single asset that fits all heads. I've simplified this, obviously, but that's the basics of it.

Lt.CDR Draco: How will longer hair styles be handled with EVA suits? Bonus follow-up question, how long will hair-styles get?

Sean T: Hair, long hair at least, I expect will be simulated in zero g. More importantly, consider alien races that may or may not have long attachments that need to do the same.

The problem that arises is that of usually having your helmet on when you're in zero g. We currently, as is a bit too noticeable in 2.4, hide the hair completely when something is attached to the head's item port (like a hat, snoopy cap or helmet). I expect we will continue to do this and thus you will not see hair inside the helmet.

I would very much like to have areas in the game where there is zero g but still breathable air, and in those areas I do hope we can simulate the hair the same way as we do in gravity.

Rod65: How common will certain face and head features be within the game world? In other words, will we see identical faces often or not?

Sean T: We call this art fatigue. Since in the next iteration that players will see, you will select a base face from a finite set, there will be some similarities between people, but I expect with the joint customization and then further with selection of eyes, hair and even tattoos, it will end up making everyone quite unique.

Perry Hope: Wouldn't it be nice to get some faces from your backers? Is that even possible?

Sean T: We've talked about this many times, and all it would really take is getting our scanning system to a place where the backers could visit, but it's a bit more grueling than just sitting down and getting a picture taken. We have many expressions that we need to capture for the full fidelity and it can take an hour or sometimes more to record a single profile.

Perry Hope: Can you tell us what is the hardest part of char creation and why?

Sean T: The last 20% is the hardest.

If you had asked me a few months ago, I would have said getting the pipeline set up in such a way that a few people can finish hundreds of head assets. But having now set up that pipeline and seeing it running in full swing, I can say that the harder part is the final bits of polish.

This is hard (in my opinion) because of the insanely subtle nature of updates and changes that get made. Each change in that last 20% by itself is tough to notice, but once it's all together after having that polish time, then it's easy to see the difference in the last 20%. Because of the subtle and very iterative nature of that last 20%, I would say that's the toughest part.

Coopernicus: How soon will we begin to see these new heads on NPCs or players in the PU? That would make for some nice variety. And how editable will they be once implemented for character creation?

Sean T: Soon. We have many of them already and are more concerned with performance at this moment rather than adding many new faces to the universe.

Once we have performance under good control, you can expect more and more faces to get added, but right now it's better for us to stick with the one "male09" face that we

use so that everyone has a shared face and we can profile the performance on just that one face.

BigDave: *Will there be preset faces of Chris, Ben, Sandi and other CIG staff available for use on our own characters?*

Sean T: YES! I won't say who, but we have some of the CIG staff scanned already (and two of them will be immediately available to players once we roll out the facial selection) – and Sandi is a character within *S42*.

L'Mac: *Will the faces we see on our characters, other players, and regular NPCs be of the fidelity we saw on the character in "Pupil to Planet" (or better), or more simple, like the characters in the Morrow Tour video?*

Sean T: The pupil to planet face was a well polished Tier 2! So you can expect higher fidelity than that on the faces for players.

Let's talk a bit about Morrow Tour! Remember how I mentioned getting a pipeline developed for having a few people implement hundreds of heads? Well, that was really the test of the pipeline in its earliest stage. The characters in Morrow Tour were raw deliveries (that were never considered finished by any stretch).

NO character in *S42* will end up looking like those did, since all the characters have already had much more time spent on them to work out the last 20%.

So the next time you see these characters in game, you

can expect the fidelity that we've promised, but which we knew would take a few more months to get to across all the faces.

Kyran: *With a large number of incredibly detailed characters at once, both NPC and player, what's the design plan to keep this from blowing up client resources within the persistent world game?*

Sean T: I'm glad you asked!!

This is very important question and has been considered since the start.

The technology plan has already progressed quite far along, as we can already support the content we've made. But we are about to make one last big push which will take us through to final.

First off, let's start with how expensive one of these heads

was at this time last year.

A Tier 0 (Bishop, for example):

The mesh was 40K polys over 440 blendshapes! We then had to add the hair and scalp, and to get proper deformation needed to add a number of blendshapes to the hair too. This bloated the mesh to over 300 MB, not even counting the cost of the LODS that would have to exist additionally.

Since we only have so much video memory to use, we would never be able to have more than one or two faces in a scene at one time, doing it the classic way. We'd be lucky to have one.

Second was the texture cost. Since we do 44 different areas of blended wrinkles AND blended diffuse, our texture cost was quite high as well. 96MB to be precise, in blend textures only! Add the base diffuse, normals, spec, transmittance and scattering mask and we were nearing 150MB of texture memory per head.

To give some context to the numbers, we almost took up with one head as much video memory as was budgeted for an entire scene in *Crysis*!

So, the first thing to do was fix up the mesh cost.

Our graphics team came up with a great method to compact the cost of the corrective blendshapes so that it was reduced from the 300MB mesh to just over 30 Megs. This was a GIGANTIC win – anything that saves 90% of the memory with zero change in fidelity is something to celebrate.

It also now meant that we could support as many blendshapes as we wanted without a major impact on the mesh size.

Having fixed the mesh cost, another win came out of the graphics team. They came up with a very clever solution to reducing the texture memory with what I consider negligible quality impact. They came up with a system that stores the base map's high frequency detail at high res and merges the base and blends at a reduced resolution. This took the cost of the blend textures from 72Mb to 6!!

This originally was one thing that was very different between tiers, as a Tier 0 would have "triple wrinkle mapping" or 44 areas with both normals and diffuse blends; a Tier 1 would have 28 areas "double wrinkle mapping" with just normal blends; and a Tier 2 or 3 would have "single wrinkle mapping" with just 8 areas.

Since this gigantic save (and even more coming), we've upgraded the T1s to include the animated diffuse, as we all feel it adds so much and the performance cost is far reduced from what it was originally.

Finally let's talk animation data. Having a rig of over 500 joints causes animation data to be quite large. Storing animations for each of the heads quickly gets to be a massive amount of data.

Our R&D animation programmer, in concert with 3lateral, has now implemented the five heads with the run-time rigging technology enabled. This allows us to share ANY facial animation between any faces and still retain full support for wrinkle, blendshapes, tangent updates and all. It even exposes more powerful tools, like more sophisticated look-at controls at run time that aren't driven by a "look pose" but rather driven by the joint, and thus takes the fleshy eye corrective morphs into account at full fidelity. I expect we will talk about this further once we've rolled out the system to every face, but it's something quite novel and very powerful.

Consider that this for the base feature set reduces memory footprint by a factor of N, where N is the number of heads you have. This is the definition of a highly scalable system. One other huge win that we hope to garner from the system is customization that allows the player to adapt the control joints on the rigs. We then write out to the player persistence these offsets (in a clever manner) and we can then drive that fully customized head in the same way and without needing any bespoke animations.

The process for converting the heads is not an overly difficult one, but anytime we are making massive changes to 100+ head assets, we like to do this carefully. I expect we'll demo this very soon.

Felicia FasterThanLight: The two character design approaches I'm familiar with are the traditional "choose from a number of presets" approach or the newer one, actually being able to edit vertex points within certain ranges, like in Black Desert. Which approach is Star Citizen *going to use? Or has the crew come up with an even more diabolical approach that will knock our socks off?*

Sean T: As we talked about previously, it's a bit of both, and then combined with some diabolical German engineering.

Currently the plan is for you to select a face, edit the "vertex points" (we call them control joints), either as a group or individually (we have over 150 control joints). So you

would get access to pretty much any area of the face – but of course we haven't seen how granular it makes sense to go yet; the most granular would even allow for changes to the tongue and Adam's apple! So you can imagine that 150 areas on the face is likely a bit too many to expose. We will work on this until it's fun to do and not overwhelming! We are also exploring not just starting with a "base" head but rather something like selecting two and blending between them and then having the player edit from there. I like the idea of almost selecting parents, but again this isn't necessarily a requirement for the system, just an interesting idea to go beyond the already large selection of faces.

Grim HEX

Greetings, traveler! There are many exciting and different places to explore in the universe, and we here at THE OBSERVIST are honored to act as your guides. However, this is no ordinary guide. This is a guide for the traveler who is looking to visit locales that are a little more off the beaten path, a little more wild and unpredictable. This is OBSERVIST DARK, your trusted chronicler of the systems, planets and stations where safety is not guaranteed.

Yela

Today we travel deep into the heart of the Stanton system, where near a moon of Crusader (Stanton II) drifts a station formerly known as Green Imperial. A Housing Exchange (HEX) built by Everline Structures Incorporated soon after the system's discovery, it was intended to house the influx of miners coming to work the asteroid belt surrounding Yela (Stanton 2c). Like other HEXs, it was economically built into a hollowed asteroid using the signature honeycombed, prefabricated housing pods, providing a clean and affordable, if not exactly comfortable, living option to the scores of workers arriving everyday. Unfortunately, when the mining opportunities in the belt began to dry up a few decades later, the station began to take a turn for the worse.

As the jobs in the area went away, the station began declining, and so did the clientele, slowly transforming Green Imperial from a temporary housing unit into a market for contraband, drugs and petty crime. With no real economic

incentive to maintain it, it was too much of an insurance nightmare to try and clean out the unsavory element that had taken root. Stating that it had become a liability, the Housing Exchange officially closed the station in 2938, and the few remaining legitimate residents and stores hastily cleared out. Abandoned, the station quickly fell into decay.

Grim HEX

That however, is not where the story ends. Squatters, transients and people with nowhere else to go began to take up residence in the abandoned station. A new economy began to emerge as folks brought scavenged and black market items to sell, so it wasn't long until word spread that there was a place in Stanton away from the watchful eyes of the authorities, where people could go to enjoy themselves or do some more illicit shopping. This influx of visitors has given the station a new life in recent years and along with it has come a new name.

During its years of disuse, many of the signs around Green Imperial became damaged, including a prominent central screen that overlooks that main atrium. The display glitched in such a way that it displayed only some of the letters in the station's name: GR___ IM_____ HEX. Someone must have noticed that the accidental title fit well with the station's current appearance, and the name stuck. Today, pretty much everyone in the know refers to the outpost as Grim HEX, and even all the rest of the signs have been hacked, scratched and spray painted to match. You'll want to make sure you use the right name when you're asking for directions.

And if you're looking to meet some colorful people with varied and interesting life experiences, go shopping for products that are hard to find anywhere else in Stanton, and watch a dangerous bareknuckle race, then you're definitely going to want to learn the coordinates for this out-of-the-way stop.

Probably one of the most difficult things about any trip to Grim HEX for most law-abiding people is finding it. Most current SkyLine maps no longer have the old HEX station listed, so its location has become a strictly word of mouth or darkspec affair. (Note, for legal reasons, OBSERVIST DARK cannot provide the coordinates ourselves, but rest assured, it is a pretty easily found secret to those who are willing to look.) Nestled into a nondescript section of Yela's asteroid ring, the station can be hard to spot until your ship draws close. Don't worry about finding authorized parking, as it is pretty much a free for all, just grab any spot you can find. The system's antiquated auto-storage system should take care of the rest. Once you touch down, it's a good idea to activate your ship's security protocols. While the local gang who currently controls the area, the Nine Tails, enforces some semblance of a truce among those who frequent Grim HEX, if you dangle yourself out as easy pickings, anything that happens to you is considered fair game. Same goes for personal security. It would not be out of place to carry a firearm while visiting. But all that said, if you keep your wits about you and don't wander into some of the station's cordoned off and disused cargo areas alone, you can reasonably expect to have a safe and successful visit. After all, too many of their customers dying is bad for business.

Your Home Away from Home

From the landing area, you will go through the airlocks to a large lounge area. And while you may see a few strung out patrons hanging out up here, I would recommend heading straight for the elevators so you can go directly to the lower levels where most of the real action is happening. Once you travel down to the main atrium level, you'll find rooms for rent, various substances to purchase and imbibe, and a

rotating selection of sellers looking to unload their goods. Since it's hard to say who might be selling what by the time you visit, I am going to stick to highlighting a few of the more long-lasting sellers of interest.

If you're on the hunt for a new look or maybe a severe discount on whatever cargo an unfortunate hauler was moving through the area, make your way to the small hallway off to the right of the elevators. There, past the dumpsters, you'll find a clothing stall called **KC TRENDING**, a name that's stuck with the store from back when the station was still legit. A mismatched collection of offensive band shirts, leather coats, and stolen Casaba cast-offs, there are some good finds waiting to be discovered if you're willing to dig around. Be sure to check clothes for tears and blood stains before making any purchases, and be careful not to trip over **REEDY** who can often be found sleeping in a small nook in the back. The KC Trending Employee of the Month photo on the wall indicates that he's been working there a while, but during my brief visit, it wasn't quite clear if he was running the place or just living there.

From there, if you head back into the atrium and up near the large display you'll find a back area that is home to **ARMOR AND WEAPON DEALERS**. A shifty guy named **SKUTTER** was eager to show me the assortment of weapons he had on hand for sale. Beyond the impressive and deadly array on display, there were a few locked crates around that he promised held "some real serious s**t."

If shopping isn't your thing, there is plenty of entertainment to be found if you know where to look. The original HEX bar is still up and running, serving honest drinks to a less so clientele. Named the **OLD '38** after the first owner's prized 2838 Origin racer, the place is run by **TREVOR 'GUS' WHEATLEY**, who's been here since nearly the beginning. He's weathered the highs and lows of Green Imperial and seems dead set on sticking out this low and keeping the place going. As he often reminds his patrons, "I don't care who's buying the drinks, as long as they're buying."

And while Gus may not be willing to chat with you, there are plenty of others willing to share if you're buying. For the price of a few bottles of beer, I learned how to tell the good WiDoW from the bad, how to load a P4-AR with one hand, and where in Grim HEX I should go if I wanted a decent grilled cheese. I also bought a drink for an elderly man who apparently runs the local used computer parts kiosk. He didn't say much, and spilled his beer from the shake in his hand, but a lot of the other patrons were buying him drinks, so I figured I would follow my own frequent advice and 'do what the locals do.' I'll admit that it warmed my heart a bit that even out here in the darker parts of space, you can still find kindness.

My last stop, and probably the biggest draw on Grim Hex, was to the **RACING PIT**. Here (self-proclaimed) numbers whiz **LUCA BRUNT** runs the book and organizes the races through the 'clutches' that drift close to the station. These large stability rings are left over from the Yela mining operation that used them to anchor drifting asteroids while they were being drilled out. Today, they've become a makeshift course that offers some real thrills to watch, and for those brave enough, to fly. If you do intend to make a wager while visiting, Luca Brunt will turn down his music long enough to explain that the Nine Tails take paying off debts very seriously.

Let's just say that even losing a bet at Grim HEX was a pretty thrilling experience, something that's really worth traveling to observe for yourself.

OBSERVIST DARK

The Observist

INSTRUMENT OF SURRENDER
BY ADAM WIESER

Part 4

"Concentrate fire; too many shots are missing the stern," Commander Wallace barked as she looked out to survey the battle. Hypnotic waves of laser fire flew between the two ships. For a brief moment, she forgot about the death represented by each streak and was lost in its strange beauty.

This was it. *Crescent*'s chance to stop the Tevarin capital ship from attacking Crion. The Tevs were trapped between them and a swathe of anti-ship mines. Since its powerful phalanx shield could only defend one side at a time, it was deployed between their bow and the minefield, exposing the ship's stern for attack.

"Signature spike . . . starboard side, main cannon," cried Starman Daughtry.

The warning returned Commander Wallace to reality. She checked their angle then made a quick calculation, "Forward another 1,000 meters, adjusting yaw plus ten. Full strength to bow shields."

The massive ship lurched forward and turned just as the Tevs took their shot. The blast sailed narrowly passed their starboard side. The crackle of shield energy showed just how close the barrage had been.

Coburn bellowed from his terminal, "Tev shields have swung again. We've got an angle on their starboard side thruster."

Commander Wallace looked to the hologlobe. Coburn was right.

"Reduce bow shields to 50% and divert to the railgun. I want that starboard side thruster non-existent, clear?"

"Railgun's up!"

Coburn looked to Commander Wallace. She'd let him have this one.

"Call it."

Coburn grinned. "Fire!"

Wallace watched the railgun shot sail through space and punch through the thruster. Multiple internal explosions detonated inside the gaping hole until the whole thing finally went up.

The bridge exploded into cheers as Wallace sank against the railing, breathing a sigh of relief. The Tevs would have a tough time navigating out of this asteroid belt without that thruster. Let alone executing their intended attack on Crion.

"They're launching ships, sir!" called Starman Tillman.

Tevarin fighters and boarding vessels poured into space and then scattered. A few disappeared on the far side of the Tevarin ship to disarm the anti-ship mines. Meanwhile, the majority of the ships set their sights on *Crescent*.

"Coburn, lock us down. We can't let any —"

But Coburn cut her off. "Got a report from Hernandez in sector six. They already caught a Tev."

That must have been our saboteur, she thought. *Who knows how many have already infiltrated.*

"Seal all bulkheads and get Marines to search every inch of this ship, starting with sectors housing major components or connected to the bridge."

Suddenly, the phalanx shield materialized between *Crescent* and the Tevarin ship. Doing further damage to them just got a lot more difficult.

Then the realization struck Commander Wallace. While crippling the Tevarin ship might mean Crion was safe, it also ensured the Tevs would bring to bear everything they had against *Crescent*.

With what that boarder did to our power and their blown thruster, neither of us are leaving this area anytime soon, she thought. *At least not both of us.*

* * *

"Paredes! Stand the hell down."

Drahk remained motionless on the floor as the Marine with the black eye trained his gun barrel at Drahk's head. He had just seen the Marine knock the other Human unconscious and the anger in his fleshy expression showed that it wouldn't take much for him to snap again. Although it seemed another younger Marine was trying to talk him down.

An older Marine pushed his way to the front, "Paredes! What the hell you doing?"

The one known as Paredes slowly lowered the weapon. The older Marine looked over the scene.

"On your feet, now!" the older Marine yelled, but Drahk stayed on the floor. Command training taught those whose spoke Human to keep it a secret. It might be the only advantage he had in this entire situation.

"He said get up," Paredes jammed the butt of his rifle into Drahk's back. "Get up!"

Paredes hit him harder. Drahk slowly eased himself up, making sure his hands were visible the entire time. Paredes pushed him against the corridor wall.

Meanwhile, the older Marine checked the unconscious Human. "Hope it was worth it, Paredes. Now someone's gotta carry him back to the brig. Wanna guess who that's gonna be?"

Paredes opened his mouth, then thought better of it, "Yes, sir."

"Let's go. We've already wasted enough time."

Paredes slowly stepped away from Drahk, slung his gun behind his back and lifted the unconscious Human.

"Come on, move," said the older Marine.

Drahk stepped forward then caught himself. The older Marine eyed him — *did this Tev just understand me?*

Klaxons erupted up and down the halls.

"Hold up, people." The group turned towards the older Marine, checking his personal data device. "Change of plans. Anti-boarding protocol is in effect. We need to sweep this sector immediately."

Drahk was glad his helmet's visor was so dark. It helped hide his smile. This had to mean the warriors of Rijora were coming.

"Sir," said Paredes, "the hell we supposed to do with these two? The brig's no where near our sector."

The older Marine shot him a look. "Shut up and follow me."

*   *   *

A rumbling roused Hickory. He regained consciousness face down on a cold floor, his head throbbing and full of fog. He rolled onto his back and then sat up, blinking rapidly to bring his eyes into focus.

Well, one thing was certain, he wasn't in the brig. Through metal latticework, the ship's half-filled cargo bay came into focus. As he scanned his surroundings, the intensity of the light forced him to close his eyes again.

A cage. They put him in a cage.

Hickory's hands gently probed the side of his head, wincing when he found the spot where he'd been struck. Guess it could be worse. Nothing was broken, and he remembered everything up until the kid cracked him across the head.

Once the wave of pain passed, he spotted a strange form through the latticework on his left.

It was the Tevarin, sitting there serenely. Helmet in its lap. Eyes closed. Meditating or praying or whatever it is they do.

He grabbed the cargo cage door and shook it. It barely gave. Minimal movement meant it was well built with a strong lock. Luckily, his hand could fit between the slats in the latticework. So he reached through and felt the front of the metal case housing the lock. Then breathed a sigh of relief. There was a keyhole.

Hickory pulled his hand inside the cage. Then sat with his back to the door. That's when he saw the Tevarin eyeing him suspiciously. Hickory didn't trust the Tev either, but knew he could be helpful. Especially since he spoke Human.

"Seen any guards around?"

The Tev shook his head.

"Keep an eye out for me," he reached into the right sleeve of his spacesuit. "Any idea why they threw us in here? I missed that part."

After a few moments of silence, the Tev decided to respond, "They were called into battle. Brig was too far away."

Hickory pulled the multitool from the hidden pocket in his sleeve. Then thumbed through various tools, "Gotta say. Your accent's interesting."

"Not Human enough for you?"

"No, that's not what I meant. It's just, I've only heard it one other place . . . Olympus. You spend much time there?"

The Tevarin opened his eyes and looked at Hickory for a moment before going back to meditating, "My youth."

"Lived there myself for a few years while I was, well . . . it's a good place to go unnoticed."

"Yes."

Hickory had seen plenty of Tevs on Olympus. He'd seen how horribly most of them were treated, but also how they acted when the tables were turned. He found the rake on his multitool and locked it into place, "I'm Hickory, by the way."

"Drahk."

Hickory carefully slid his hand between the cage's chain-link. Then angled the multitool back towards the keyhole. Suddenly, the ship shook. The multitool slipped from his hand. A metallic thud from the hull echoed across the cargo bay. He glanced through the cage's slats to see it tumble well out of reach.

A string of expletives poured from his mouth. Hickory turned to see Drahk drop to the floor, and use his long, lean arms to grab the multitool. "You're a lifesaver, Drahk."

He extended his hand only to realize Drahk wasn't giving it back. Instead, he flipped through the various tools. "Am I?"

Hickory felt a lump in his throat. He watched as Drahk returned to the rake and examined the series of bumps on its end. Then slipped his arm through the latticework.

What was he doing? The Tevarin had obviously never picked one of these locks before.

Then he began to worry. How strong were Tevs? What if he severely bent the tool? It would destroy any chance of either of them escaping. Hickory couldn't take it anymore. "Careful, you can't force it. It's a touch thing, more slow and steady."

Drahk glared at Hickory while continuing to work the lock.

"What? I'm trying to help. See, it's just . . . I need to get out of here. I can't die like this."

"Death is not to be feared; it is but a truth. The Rijora has guided me from its grasps many times today. Now it's brought me the tool needed, so I can escape and help destroy this ship."

Hickory wasn't sure what expression was on his face, but Drahk read it plain as day. "Maybe you'd understand if you had faith in anything but yourself."

"Fat lot of good your Rijora's done for you. Put you on the losing end of two wars."

"Two wars?"

Drahk eyed him with a mix of interest and suspicion. It took Hickory a second to realize.

That's right, how could he know?

"The war . . . it's over."

*   *   *

The bridge swayed slightly. Another blast from the Tevarin cannon had caught *Crescent*'s starboard side flush.

"How are the shields holding up?" asked Commander Wallace.

"Down to 43% effective."

"We need that battery bay back online."

Coburn checked his personal data pad. "Everybody in that sector who can fix it is fixing it. Marines are still completing their searches. Until we're certain no other Tevs are on board, it'd be risky to open bulkheads so others could help."

Commander Wallace consulted the terminal before her, comparing their accumulated damage to the Tevs. "Fine, but the second we're clear get some help there immediately."

"Switch up your flight path, Ayers!" bellowed Coburn. "You're falling into a pattern even I can crack."

Crescent had to duck and dodge fire from the Tevarin ship, while also trying to outmaneuver the phalanx shield so it could deliver damage of its own. Ayers had done an acceptable job of randomly moving the ship so far, but it was clear he was growing weary. According to the data, *Crescent* was starting to take more hits than it delivered.

Suddenly, alarms screamed. No, it couldn't be . . .

"Got a breach! Multiple contacts in Sector Six . . ."

Commander Wallace and Coburn locked eyes. So much for restoring the battery bay there. Wallace didn't need to do any calculations to know their chances of surviving had just dropped dramatically.

She did everything she could do suppress that numbing fear that was growing before speaking, "I want fighters and any turrets to protect that sector from more boarders. If that's their foothold, I want to cut it off. We'll never survive if they overrun this ship."

*   *   *

Cargo crates rattled around them, a sign the battle was intensifying. Drahk had been silent since the Human told him the war was over. He just couldn't shake the feeling that it was true. He couldn't remember a time where they'd gone so long without receiving a transmission from Corath'Thal.

Of course, he would be foolish to just take the Human's word. He looked to Hickory, who was nervously drumming his fingers against the cage. The human seemed unreliable at best.

"How would you know the war is over?"

"I found the Instrument of Surrender while salvaging a military wreck in system. Ship must've gotten fried by an electrical storm before broadcasting the news."

The Instrument of Surrender was the sacred Rijoran text used to end conflict. Still, having it meant nothing unless signed by their holy leader. So he kept pressing, "Really? Authorized by who?"

"Pakal'Dor."

A sense of relief swept through Drahk, "What you saw was a fake. Only Corath'Thal can validate the Instrument of Surrender."

"That'd be tough, I think." Hickory said as he shifted and stretched out his back, "Corath'Thal's atomized. Supposedly, he planned some big attack and got tuned up. Apparently he didn't take it so well, so he led the few survivors to your homeworld and rammed their ships into the ground."

Hickory glanced at Drahk, who was completely immobile. Inscrutable too.

"So I don't know, I guess Pakal'Dor was next in line for command? Tevarin military's more your thing, so you tell me."

It all made sense now. The truth was staring him in the face but he didn't want to accept it. If true, Corath'Thal had brought immense dishonor to himself and the Tevarin people.

The Rijora strictly forbids suicide in battle. It decreed — *Honorable surrender, over all, when one's back is against the wall.*

As the reality set in, Drahk realized it was more important than ever to escape this cage. Only he could save his fellow fighters from the disgrace of fighting for a dishonorable leader.

"Do you have it? The Instrument of Surrender."

"On my ship."

"Here?"

Hickory shook his head then pointed to a data pad build into his suit, "But I know exactly where it is."

Drahk held up the multitool and Hickory's eyes went wide.

"I'll help you off this ship, if you get me that Instrument of Surrender."

Hickory nodded, "Sure."

Drahk extended the multitool. Hickory took it and went to work on the locked cage door.

*   *   *

Wallace watched *Crescent*'s shield ripple as it absorbed another blast. The shield's overall efficiency ticked down another percent. She knew this firing back and forth was unsustainable. They were going to lose.

Coburn hurried to her side, which wasn't a good sign.

"Report from Sector Six. Hernandez lost three, forcing him to fall back to the main hangar. His team's working with

the flight crew to secure the area, but it's only a matter of time before the Tevs attempt to breach it."

The terminal before Commander Wallace beeped. She looked down and scanned the results. Earlier, she had noticed something about the phalanx shield. Every time it absorbed a blast a stream of energy from the ship swiftly repaired the damage and returned the shield to full health. So she stitched together a series of scans. Together they traced those energy streams back to specific areas of the ship. Maybe if they attacked those locations, they could take down the shield.

"Commander, did you hear what I said?"

"These points. You see them?" Coburn nodded in response. "That's where the power to the phalanx shield is coming from."

"Incoming!"

Wallace and Coburn looked up to see a Jackal on a strafing run to attack the bridge. Barely above *Crescent*'s surface, it fired from both barrels while expertly swinging its small phalanx shield from side to side to deflect incoming attacks.

"Focus fire. Take that thing out, now!" cried Coburn.

Shots from the Jackal tore into the ship before the bridge, only for it to enter a sudden and dramatic spin. A shot had clipped its wing. The Jackal desperately tried to stay on course, but instead corkscrewed down, crashing into *Crescent* just before the bridge.

The blast shook the ship. A cloud of debris plumed up and blocked the bridge's view of the battle. Coburn got back to his feet, "We need to do something or we won't last much longer."

Commander Wallace nodded, "Get Villar these coordinates. Let's take out that shield."

"Are we looking at the same shield?"

Wallace nodded. "Ayers, turn to heading 273. Redirect shields fore . . ."

Everyone on the bridge paused. A few exchanged baffled glances.

"Confirm . . . 2-7-3, sir?" Ayers said, his voice faltering.

"That's heading right at it," Coburn said. Wallace turned to him expectantly. He finally mustered a "Sir."

"Confirm." Wallace said loudly while staring down Coburn. "Like you said, we have to do something."

"Killing ourselves wasn't what I had in mind."

"We push through the shield, hit those points, and maybe we can start doing some real damage."

"Unless they chew us up first."

"Well, make sure that doesn't happen." Wallace looked around.

Everyone was still frozen.

"You got orders, people. Act like it," she yelled. Coburn broke away and went back to his terminal.

"Villar, I'm gonna need all weapons to have that updated targeting solution ready to fire on my command."

* * *

Drahk managed to stay on his feet. Hickory wasn't so lucky. Moments earlier, a massive blast had rocked the ship, sending him flying off the wall and onto the floor. Luckily, the Human had found a helmet in the cargo hold to help cushion the blow.

He hustled over and helped Hickory to his feet. Together they continued towards their one hope — the hangar. Even though it would be crawling with personnel, it was their only chance to get off this ship. As they moved, Hickory kept fiddling with the settings on the helmet.

"To the right," Hickory called.

Drahk rounded the corner and slowed. At the end of the hall was a bulkhead door bearing the scars of a breach. The two slowly approached the gaping hole in the door. Shouts and scattered weapon fire echoed from inside.

"My people have breached the hangar."

He snuck up to the hole and scanned of the hangar. Human and Tevarin bodies littered the floor, leaving a trail of corpses that told the battle's tale. A series of makeshift barricades had been built but overrun. The few Human survivors were hunkered down either alone or in small groups, desperately firing at anything that moved. Drahk watch Tevarin warriors run between cover spots, working to outflank the remaining pockets of resistance.

"Any ships?"

"One, on the far side. Never seen one like it before."

Hickory peered into the hangar. "Damn. It's just a utility vehicle."

"Can you fly it?"

"Of course. That's not the problem."

"What is?"

"It's unarmed. Shields are minimal, at best."

"Yes?"

"You know there's fighting going on outside." Hickory nervously looked to Drahk, "How we doing this?"

"As fast as possible. Stay low and follow me."

Drahk stepped through the breach, then hurried to a makeshift barricade hastily assembled to guard this door. Moments later, Hickory joined him.

The ship sat directly across the hangar, but a wide open area lay between them. There was no way they could cross without being noticed.

Suddenly, a shrill shriek filled the hangar. A Tevarin warrior charged a barricade, drawing fire from the Human behind it. Meanwhile, another Tevarin crept up from the other side. The Human suddenly realized his mistake and swung his weapon around but it was too late. The Tevarin warrior snapped up its own weapon and put a shot through him.

"Move. Now," Drahk said. He took off for the barricade closest to the ship. Shots rang out in his direction. As the barricade drew close, he slid across the floor until he was behind cover, heart pounding, exhilarated beyond belief.

He rolled over to see Hickory racing towards him, but the Human didn't even bother with the barricade, instead running straight for the ship. Hickory leapt inside and started the initiation sequence. The ship roared to life, drawing everyone's attention.

Drahk ran to the back, opened the cargo hold and climbed inside. He turned to see a Tevarin warrior charge up the ramp, weapon raised. When he saw Drahk was a Tevarin, he stopped and stared curiously. Suddenly, the ship lurched forward, causing the warrior to fall off. Drahk hit the button and watched the cargo door close.

"Let's get out of here," he called to Hickory.

"Now for the easy part." With that, Hickory accelerated the ship out of the hangar. They burst through the air shield into a maelstrom of combat. Thick fields of scattered debris from dead ships occupied the space between the massive capital ships.

Fighters, both Human and Tevarin, wove through space, chasing target locks and spraying weapon fire. It was a pure inferno.

Hickory evaded the best he could through the network of crisscrossing weapon fire. As he managed to break clear of the intense fighting, Drahk got his first good look at the battlefield. The *Crescent* looked like it was trying to ram the Tevarins. Based on the events of late, it seems ramming your ship instead of running was the strategy of choice.

* * *

Minutes later, Hickory still felt like his heart would beat out of his chest. Somehow he had piloted the ship through the chaos of all-out war and survived. Now the serenity of open space was a strange counterpoint to what they had just experienced.

"How much farther?" asked Drahk from the cargo hold.

"Almost there," Hickory replied while keeping his eyes on the scanner.

Drahk had grown increasingly nervous the more distance they put between them and the asteroid belt. He urged Hickory to fly faster. Though this ship was built for many things, speed was not one of them.

A subtle beep came from Hickory's suit. They were close. As he increased the range of the ship's scans, a blip hit the radar.

Moments later, his ship, Dolos, came into view. A part of him had believed he'd never see her again. Hickory stopped the ship then turned to Drahk. "So how's this going to work?"

"If the Instrument is authentic, it will include a series of codes that my people can use to verify."

"All right. I'll take care of it," Hickory smacked Drahk on the shoulder on his way towards the hatch. "Good luck and thanks for your help."

"I'm coming with you."

"Nothing personal, but I don't let anyone else on my ship."

"Forgive me if I don't take you at your word. My people, and yours, will continue to die until they know the truth. I am bound to make sure that message gets out."

Silence sat between them for a few seconds. Hickory couldn't remember the last time someone other than he had been aboard his ship.

"We can fight about it if you want."

"Fine, fine. Let's go then."

The two climbed out of the ship and EVAed to *Dolos*. Hopefully the broadcast wouldn't be too late.

* * *

Commander Wallace watched as *Crescent*'s bow passed through the phalanx shield. It was immediately met with a barrage of shots from the Tevarin. Once the initial waved passed, Coburn called, "Weapons! Fire."

Crescent responded with a volley of its own. The massive shots punched into the Tevarin ship's hull. Wallace watched the terminal before her.

"Phalanx is down ten — no twenty percent. It worked!" cried Daughtry from the scan station.

"Power back to shields," ordered Coburn. "Get us an angle on the next spot and fast, Ayers."

Coburn looked to Commander Wallace. The fire in his eyes said it all: this might just work.

A Tevarin counterattack caused the shields to flare up wildly. Some shots punched through and vented parts of the massive capital ship, but *Crescent* held.

"Guns ready in ten!"

"Waiting on you!" Wallace yelled.

Suddenly, the phalanx shield completely disappeared. A cheer went up around the bridge. Wallace studied her screen. Something was wrong here.

"Let's back out of range of those close-quarter cannon," ordered Coburn. "Then pound them until there's nothing left."

"We've got a message coming across the emergency channel," called Darsha from the comm station. Commander Wallace glanced down at her terminal to read the incoming message.

"We're in position, sir!"

"Ready the railgun and —"

"Hold your fire!"

"Commander!" Coburn called. "Now's our chance to end this."

"They just broadcast their surrender. They dropped the phalanx shield to show they're serious. Wait . . . they're also saying the war is over."

"What? They know and somehow we don't? It's a lie. You can't trust these Tevs."

"Watch your tone, XO."

"Check the scans. I bet more Prowlers are sneaking their way to that breach as we speak," Coburn yelled, becoming more manic by the second. "We have to finish them now while we have the chance. Villar, fire that bloody railgun!"

For once, Villar didn't snap to Coburn's order. She looked at Wallace.

"What's your order, sir?"

Wallace looked around the bridge. They were looking to her, not to Coburn, for the first time.

"Stand down. Open channels." Wallace turned to Coburn who was still quivering in rage. "Are we going to have a problem, XO?"

Coburn held Wallace's gaze. It looked like whatever seized him was fading. "No, sir."

"Good," Wallace stepped over to the hologlobe. "Now, let's see what they have to say."

*   *   *

Drahk listened to the UEE military broadcast from the utility vehicle while Hickory used it to fix his ship. The message had gotten through just in time. The Tevarin ship was saved. It had suffered heavy damage, but a good portion of its crew was still alive.

Crescent's crew didn't know what to do with all the survivors. The Tevarin ship was too crippled to make it out of the asteroid belt. Then they overheard the call go out for the transports to handle the survivors.

"Looks like I'm done," said Hickory from the pilot's seat. "Probably best I'm not around if *Crescent* comes in this direction. You may not be their enemy anymore, but I doubt I can say the same."

"Best of luck to you. Hope there's better days ahead for you," Drahk said then tipped his head in deference.

"What are you gonna do now?"

Drahk thought for a few moments.

"I don't know."

Hickory smiled and opened the hatch. Then paused and looked back, "I've got this thing in Banu Space I've got to take care of but, um, there's a lot of places to land between here and there. I can drop you somewhere if you want."

Drahk looked up to him and nodded. "Yes." Hickory smiled back at him. Silently, they exited the utility vehicle and EVAed to his ship. While Hickory prepped Dolos for takeoff, Drahk made his way into the back. He laid on the bed and instantly fell asleep, unsure where he was going or where he'd be when he awoke.

For the first time, he was okay with that.

The End