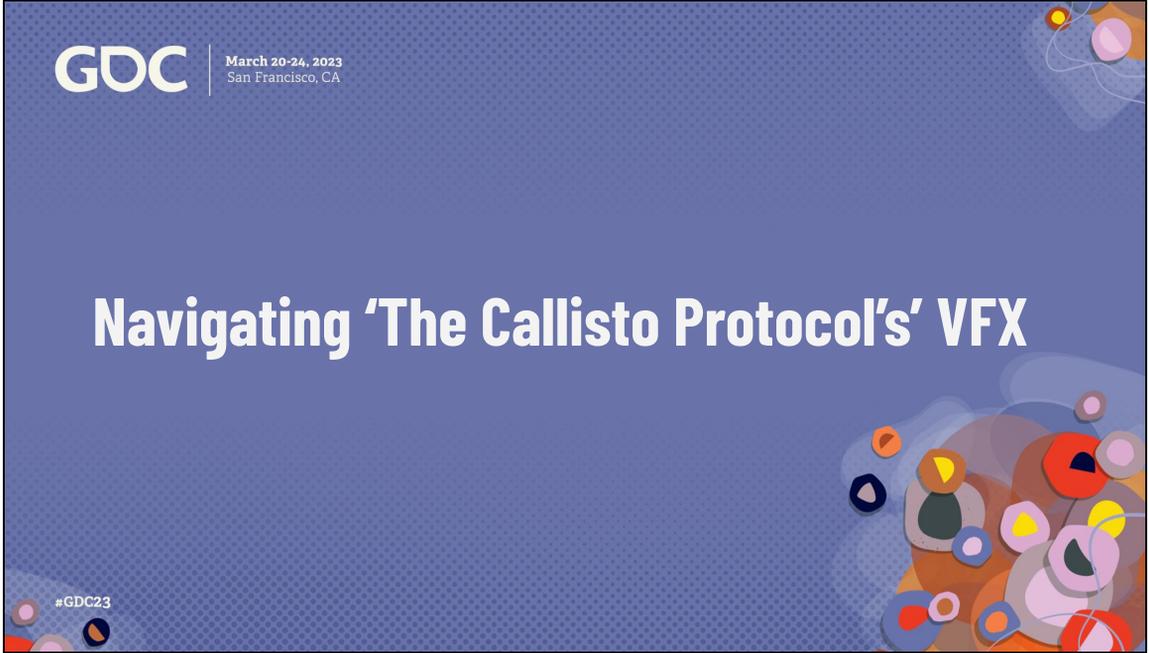


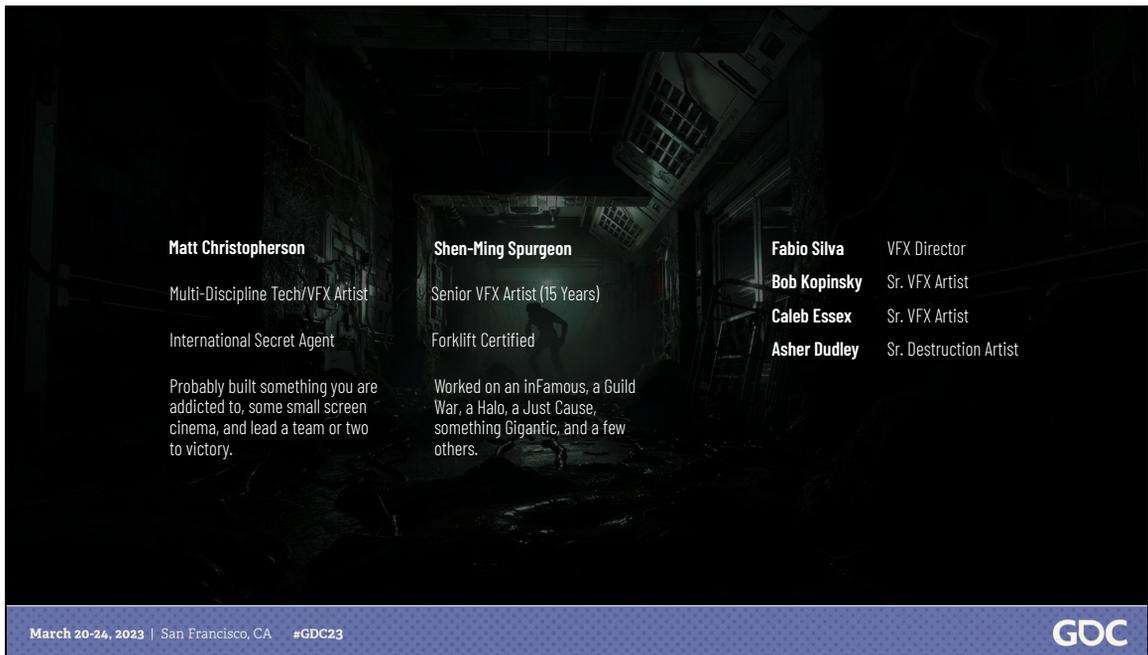
GDC

March 20-24, 2023
San Francisco, CA

Navigating 'The Callisto Protocol's' VFX

#GDC23





Matt Christopherson

Multi-Discipline Tech/VFX Artist

International Secret Agent

Probably built something you are addicted to, some small screen cinema, and lead a team or two to victory.

Shen-Ming Spurgeon

Senior VFX Artist (15 Years)

Forklift Certified

Worked on an inFamous, a Guild War, a Halo, a Just Cause, something Gigantic, and a few others.

Fabio Silva

VFX Director

Bob Kopinsky

Sr. VFX Artist

Caleb Essex

Sr. VFX Artist

Asher Dudley

Sr. Destruction Artist

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We make up a third of the Striking Distance Studios' VFX department. We are a mix of pre-rendered and real-time experience and all have 10+ years of experience doing what we do.

We are a remote department and have been that way since the inception of the studio.

SECTION 01

Strange Routine

SECTION 02

Weapons

SECTION 02A - Developing with Design

SECTION 02B - Developing for Fun

SECTION 02C - Developing for Sci-Fi

SECTION 04

Q&A

SECTION 03

Environment

SECTION 03A - Building up Atmosphere

SECTION 03B - Building in Flexibility

SECTION 03C - Building it Together

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What we'll be sharing in this talk is the development of key VFX pieces from The Callisto Protocol. While we'll be discussing techniques we utilized throughout the talk, the main throughline to follow and reflect on is how we partnered with our designers to solve these challenges.

For weapons, I'll be sharing how the path to designing weapons is not always straightforward

For environments, Matt will be sharing how we accommodated the design needs for creating atmosphere and mood, finding ways to be flexible when creating assets, and finally putting it all together with design for moments that transition between cinematics and gameplay.

PILLAR 01

Hostile Environments

PILLAR 02

Brutal & Strategic Combat

PILLAR 03

Sci-Fi Horror

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The Callisto Protocol is a single -player, third person, narrative driven game with a focus on...

These pillars make up the mirror we used to hold up to the VFX we created

Our setting is a prison on the isolated moon of Callisto. It doesn't get more hostile than that.

Prison + uninhabitable environment = place I don't want to wander around in

For combat, we force players to get personal with the creatures they meet throughout Black Iron Prison, blasting off legs and chopping off limbs, doing whatever it takes to survive. It's messy, it's bloody.

And finally, the horror of it all. We're blending atmosphere and tension with the combination of our environments and combat, but also with a healthy dose of dread in all the dark corners of the prison.

So, with that, let's look at one of our trailers to understand what that all means.

Trigger Warning: *Blood*
Gore
Graphic Violence

STRIKING
DISTANCE

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As a warning, there is blood, gore, and graphic violence, so if you would like to step out briefly, this is the time.



SHOW LAUNCH TRAILER

https://youtu.be/gghRJv_tdb0

SECTION 01

Strange Routine

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Now that we've watched that scary thing, close your eyes for a second. I'm going to describe another horror moment for you all.

Back in March of 2020

That was a time where many of us relocated to the different corners and various soft surfaces of our homes. We didn't know how to sit in chairs because we were working on our beds or on top of a chest freezer in the basement. The dinner table was too sacred for our work.



But now it's 2023. We sit in chairs that are mostly comfortable, we take breaks for stretching. Or at least think about them.

As for Striking Distance, we have been remote since then and have continued to support remote teams ever since. We make it work.

And that's the last you'll hear about the pandemic from this talk.



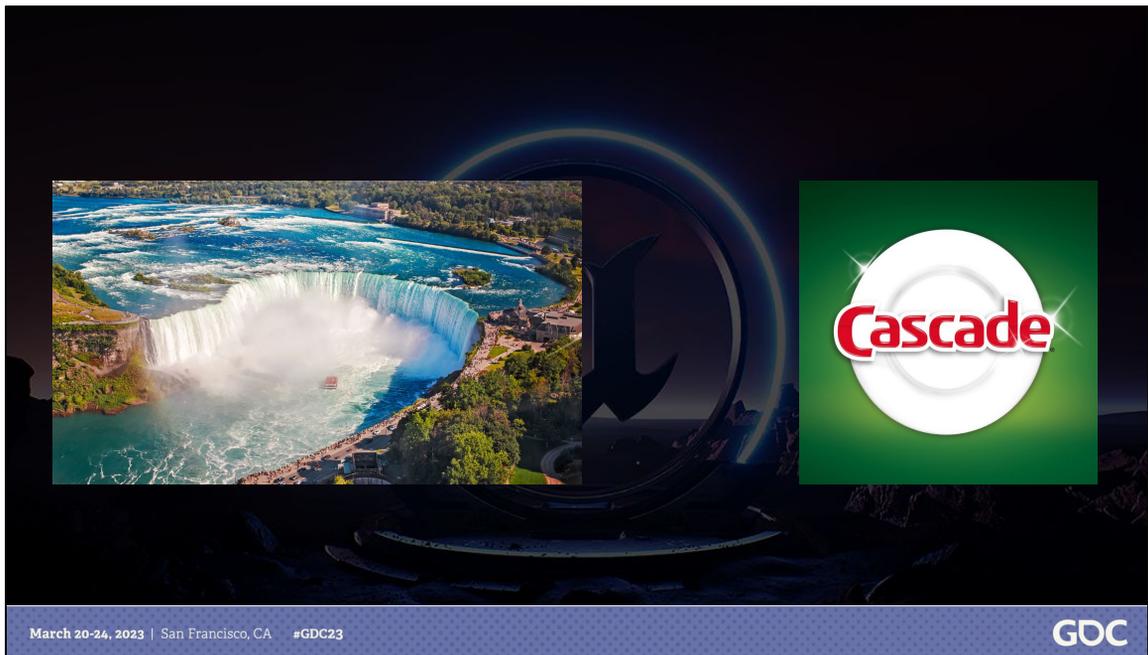
Moving on.

We developed TCP using Unreal Engine 4 with a strong commitment to pursue realistic quality with visceral moments.

We didn't choose Unreal because it's better than other engines. Obviously the engine has shipped many wonderful games, but the choice to use Unreal is far more pragmatic:

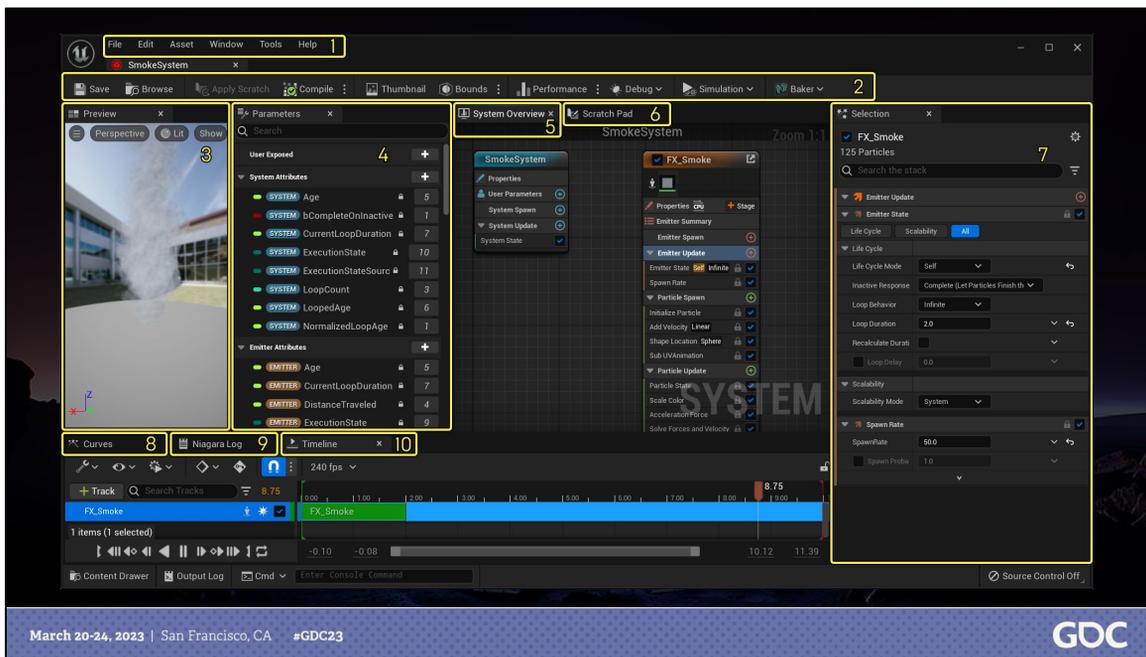
We chose the engine because the pipeline and tools are understood by many developers and using Unreal makes it significantly easier to hire experienced developers.

The less time we spend developing something proprietary means more time developing the gameplay and visuals.



In the case of The Callisto Protocol, we leaned into using Niagara and had a moment of silence for Cascade.

As much as I would have liked to keep Cascade in the project, there's literally no performance benefit between the two tools.



For those not familiar with Niagara, it's Unreal Engine's "next generation VFX system." For those with more technical leaning in VFX, it gives one the power to create additional function without the need of a programmer. This image is taken from Epic's Unreal Engine documentation.

Visually it's very different from Cascade and may even be overwhelming. Just remember to take it slow and ask your peers for help.

For our non-VFX friends in the room, the documentation is very approachable and worth perusing if you have any interest in VFX or what you might need for your project.

Cascade

Pros

- Cascade is fast when adding behaviors, and the Cascade modules layer, stack and interact very well with each other
- Non-technical artists have lots of control, and can use a suite of typical behaviors.
- The stack paradigm works well to give a lot of information at a glance.

Cons

- Features in Cascade are fixed. To change, add or remove features, you need to be a programmer.
- Adding things to a system bloats the particle payload
- Data sharing between particle systems and the rest of the engine is nearly impossible
- CPU and GPU simulations are very different

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Here's a bit more information about why one should go with Niagara over Cascade.

All this information is taken directly from Epic's Niagara documentation as well. Cascade was a great tool and though I miss it, the future is exciting for VFX artists working in Unreal Engine.

The slide features a dark, atmospheric background with a glowing blue circular frame in the center. Inside the frame is a stylized, dark blue 'N' logo. The background shows a rocky, mountainous landscape under a dark sky with a faint horizon line. The word 'Niagara' is written in a white, sans-serif font at the top center. Below it, the words 'Pros' and 'Cons' are written in a smaller white font, each followed by a list of bullet points in a light red color. At the bottom of the slide, there is a blue footer bar with white text on the left and the 'GDC' logo on the right.

Niagara

Pros

- Puts full control in the hands of the artist
- Programmable and customizable on every axis
- Provides users with better debugging, visualization, and performance tools
- Supports data from other parts of UE4 (also from external sources)
- Gets out of the way of the user

Cons

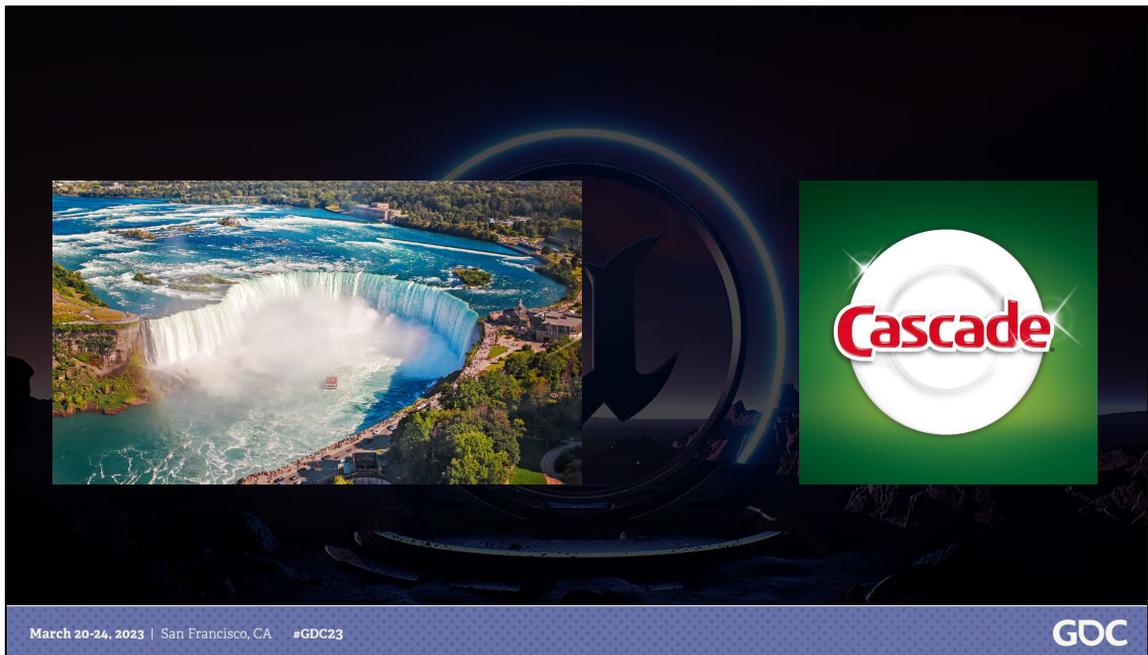
- Learning curve
- It's constantly developing

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And for Niagara, same thing - many reasons to switch to Niagara all coming straight from Epic's documentation

One of my favorite things is the customization that artists and designers get from utilizing Niagara's Override Parameters. Doing so allows you to expose parameters in the details panel of Unreal, giving instances of your effect access to data that would otherwise be baked in. Change the color and size of smoke on the fly and forget about those times you had to make five duplicates of the same effect!



Moving forward with Niagara was good for us in the sense that because we are a mixed team of pre-rendered and real-time, those without the foundation of Cascade got to learn Niagara at a fairly similar pace as those of us with real-time experience. While Niagara has been out for some time, Epic had not used it in production up until the last few years.

If anyone is waffling about whether to learn Cascade or Niagara, just jump into Niagara. This is a great time to be and want to be a VFX artist.

SECTION 02 Weapons

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While developing this talk, I saw a bigger theme at play and couldn't let this be a bunch of slides of Niagara systems, textures, and material nodes. You'll get some of that, but in each example, our goal is to talk about the importance of having a strong relationship with design and VFX.

That might seem like a no-brainer

SECTION 02A

Developing with Design

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However, it's real easy to lose sight when production is in full swing. You only have time to focus on execution and how it hits and that can easily take precedence over design and gameplay.

At the end of the day, we're making games for people to experience.

So what does that relationship between design and VFX look like within weapons? Weapons are the tools players use to interact with our world and players need feedback!

For this first section, we're going to look at how the Stun Baton developed!

Developing with Design

Stun Baton



the stun baton is your most reliable weapon; wield it with authority.

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TCP employed a variety of melee weapons, but the one you spend the most time with is our professional grade, prisoner-tested Stun Baton. Essentially a cattle prod on steroids. As you can see, this is where it ended up, but the road to this took some time.



Since the prison was not going to be equipping guards with lightsabers, it was important to me that I find an identity for this device -

you know, really drive home the fact that when you brandish it, you're going to have a fun time swinging it and hopefully want to keep doing it.

It was important for us to make this feel fun and look good.

Developing with Design

Stun Baton



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This device was one of the first weapons I worked on when I joined

Something I observed was that it was missing the components that I really wanted to see. I was only scheduled to improve the impacts, but felt we needed a few more things to make it extra juicy.

The first roadblock I ran into was that the map to finalizing this weapon was incomplete. The stun baton did a couple of things that were problematic for any FX artist.

- 1.) No impact VFX for environments
- 2.) The stun baton was swinging through the environment

Up until that point, we had only focused the stun baton interactions with enemies.

Developing with Design

Stun Baton



- *talk to a designer*

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So, first step: Talk to a Designer

Why? They're going to have all the answers.

Which leads us to...



ASK ALL THE QUESTIONS

When talking to a designer, it's important to discover

what they're doing

why their doing it

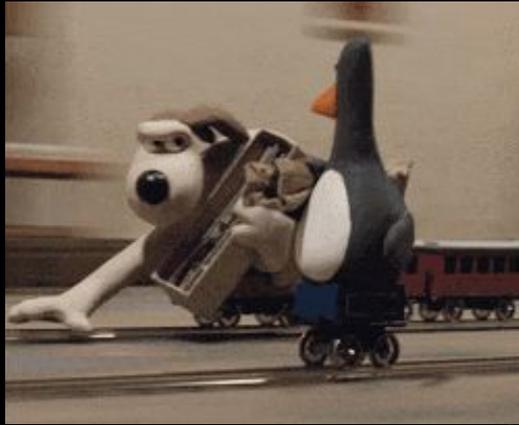
how they're implementing it (or how they want it to work)

There are definitely more questions to ask and you'll want to get as much knowledge as possible, prepare for many scenarios, and even brainstorm with them. As a VFX artist, you're bridging a gap for design to explore possibilities with art, available technology, and functionality.

So the more info you have about what the designer is doing, the better you can prepare with solutions.

Developing with Design

Stun Baton



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So I get my answers and the designer and I chat about the visual goals.

It looked a bit like this <point to screen>

It's important to be aligned because not every engineer or designer is going to share the same vision as you and sometimes you've got to build the path while you're driving on it.

So what better way to get alignment than by building a prototype

Developing with Design

Stun Baton



**BUILD
A PROTOTYPE**

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I made I something quick to demonstrate how I wanted it to look.



For my first concept, I used one of our stun baton animations, parented the baton to the hand, and played an effect off of a socket at the end of the baton.

Super simple

Developing with Design

Stun Baton



- *talk to a designer*
- *ask all the questions*
- *build a prototype*

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But enough to help the designer to see where I wanted to go.

My goals for the stun baton needed to...

- react with collision
- react with different surfaces (i.e. flesh, metal, non-metallic)

But get this...!

We had this weird problem. In order to prevent players from swinging through environments, Design had to rebuild the way our stun baton's collision behaved with environments.

Once that got sorted out,



Collision worked but there was a ways to go,

In this video

I'm using a debug tool to show the hit location and the direction it's pointing.

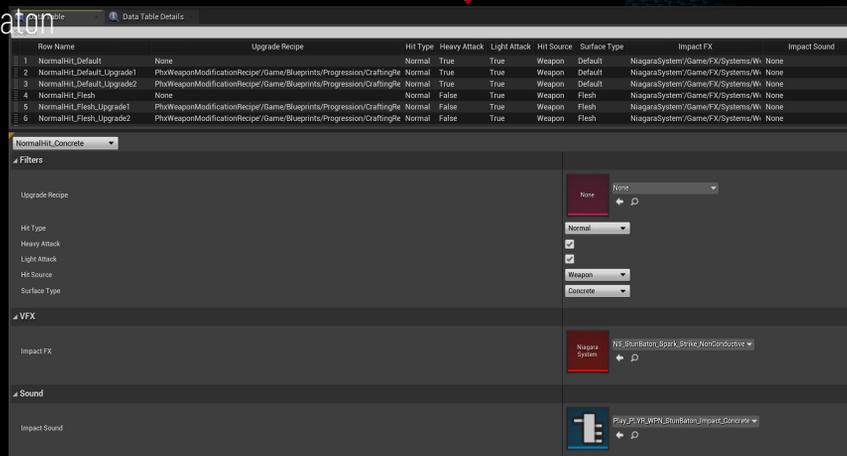
This showed me that the effect is playing correctly, shooting sparks in the X-positive direction.

Later in the video we have a faked velocity to show how I want the impact to behave, shooting sparks in the direction of the swing. Because this isn't the true behavior, we only see the effect looking correct half the time because of the swing animations.

The best part of this is that I could start moving forward on these very exciting effects.

Developing with Design

Stun Baton



Row Name	Upgrade Recipe	Hit Type	Heavy Attack	Light Attack	Hit Source	Surface Type	Impact FX	Impact Sound
1 NormalHit_Default	None	Normal	True	True	Weapon	Default	NiagaraSystem/Game/FX/Systems/W_	None
2 NormalHit_Default_Upgrade1	PhxWeaponModificationRecipe/Game/Blueprints/Progression/CraftingRe	Normal	True	True	Weapon	Default	NiagaraSystem/Game/FX/Systems/W_	None
3 NormalHit_Default_Upgrade2	PhxWeaponModificationRecipe/Game/Blueprints/Progression/CraftingRe	Normal	True	True	Weapon	Default	NiagaraSystem/Game/FX/Systems/W_	None
4 NormalHit_Flesh	None	Normal	False	True	Weapon	Flesh	NiagaraSystem/Game/FX/Systems/W_	None
5 NormalHit_Flesh_Upgrade1	PhxWeaponModificationRecipe/Game/Blueprints/Progression/CraftingRe	Normal	False	True	Weapon	Flesh	NiagaraSystem/Game/FX/Systems/W_	None
6 NormalHit_Flesh_Upgrade2	PhxWeaponModificationRecipe/Game/Blueprints/Progression/CraftingRe	Normal	False	True	Weapon	Flesh	NiagaraSystem/Game/FX/Systems/W_	None

The screenshot shows a 'Data Table Details' window for 'NormalHit_Concrete'. It features a 'Filters' section with dropdowns for 'Upgrade Recipe' (None), 'Hit Type' (Normal), 'Heavy Attack' (checked), 'Light Attack' (checked), 'Hit Source' (Weapon), and 'Surface Type' (Concrete). Below the filters, there are sections for 'VFX' and 'Sound'. The 'VFX' section has a dropdown for 'Impact FX' set to 'NIS_StunBaton_Spall_Sprite_ApocConductive'. The 'Sound' section has a dropdown for 'Impact Sound' set to 'Phx_PVP_WPKL_SpallBatonImpact_Concrete'.

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In fact, here's an image of what the fun looked like.

This is our data table that gives us a place to hook up VFX and Audio for specific impact types.

Up at the top we have a default with two upgrade types. Next we have flesh, and the list goes on for many other material types like concrete, rubber, plastic, dirt.

Can I get a show of hands for anyone who has experienced the breakneck excitement of working on weapon impacts or foot steps?

I'll be honest: making VFX isn't always super flashy, but that's because someone didn't set up the impact table yet.



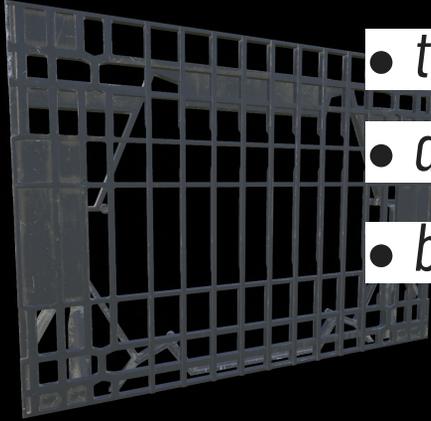
Once the impact table was filled, the Stun Baton was ready for prime time. Here in this video, I was looking to make sure that the stun baton was interacting with collision and that the different surfaces were firing off the different impacts.

Developing with Design

Stun Baton



- *talk to a designer*
- *ask all the questions*
- *build a prototype*



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One interesting thing about testing the baton is it looked great when I stuck objects with detailed collision.

Take this prop right here

Each vertical and horizontal bar had collision and every collision with the stun baton meant a flurry of sparks. More on this in a few moments.



At the beginning of this video, I'm testing it out on the rocky environment of one of our maps. Lots of places to strike at different angles - it was a great location to test on.

So back to the barred door. It looks great when I'm swinging against it. I'm getting that ignition of sparks, but when we hit a flat surface like a panel or concrete slab, we get one impact

One collision = one impact.

This meant our designer would need to account for many collisions on a flat surface or I would need to fake it with an emitter that would spit out sparks based on the distance it was travelling or frame.

Developing with Design

Stun Baton



- *talk to a designer*
- *ask all the questions*
- *build a prototype*
- *iterate, iterate, iterate*

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Overall, that mine shaft environment was really great for iteration because there were so many complex surfaces to test the stun baton out with. It also meant dialing in how I wanted the sparks to behave. When you've got basic functionality down, it's just a matter of iterating quickly.

In that time, highly recommend capturing as much footage as possible, show it to your lead, the designers you're working with, other teammates, anyone really. This is prime time to get feedback since this is when you're trying to get the biggest emotional reads from the changes you're making.



OKAY FINAL POINT

Here's a question:

With a show of hands

WHO ENJOYS GOING TO MEETINGS AND SHARING THEIR IDEAS?

Let the record show that _____ people raised their hands

It's not easy. It's a moment of vulnerability that can easily unravel the strength of an idea. We've all been there and we also know folks who have great ideas but also don't share them.

Suggesting that the baton and environment play with each other is not a golden ticket idea, but had I not said anything, who knows if it would have been included.



Unspoken ideas never get made, so please don't be afraid to speak up.

Ultimately, my hope is that the designer I worked with walked away with an understanding that having VFX adds context to the development process and allows us to think through challenges sooner than later.

SECTION 02B

Developing for Fun

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To round out our player's arsenal, TCP equips the player with a variety of ranged guns. In this next section, we're going to take a look at the rollercoaster development of the Handcannon's muzzle flash

Developing for Fun



"The Handcannon"

"This is the standard BI-55 Pistol."

● muzzle flash



"Use it wisely, ammo is in short supply."

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What do all weapons need?

Muzzle flashes

Developing for Fun



"The Handcannon"

"This is the standard BI-55 Pistol."

- muzzle flash

- projectile



"Use it wisely, ammo is in short supply."

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Projectiles

Developing for Fun



"The Handcannon"

"This is the standard Bl-55 Pistol."

- muzzle flash

- projectile

- impacts



"Use it wisely, ammo is in short supply."

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Impacts

And everything in between - like audio, animation, recoil, reload -

For simplicity, i'll reduce it to the **business of fun**

Developing for Fun



"The Handcannon"

"This is the standard Bl-55 Pistol."

● muzzle flash

● projectile

● impacts

● fun



"Use it wisely, ammo is in short supply."

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So I began working on the ranged weapons about eight months out from ship, they still looked very much like their real-world counterparts and one central piece of feedback was that they needed some sci-fi polish.



Somewhere between what I know about guns and all the science-fiction I've consumed, there was something in the design that would tell me how the weapons should visually behave.

And that's what got the ball rolling: Behavior

The gun needed to be more than just a bunch of shapes and color.

The verb for what the weapon was represented needed to be present.



Following the process we discussed earlier with the stun baton, I needed more information from our weapon designer who described the handcannon as a powerful sidearm with high recoil and a low rate of fire.

Basically a high-powered future revolver.

And with a brief in hand, it was time to do some prototyping and research to improve its current design.

[SHOW VIDEO]

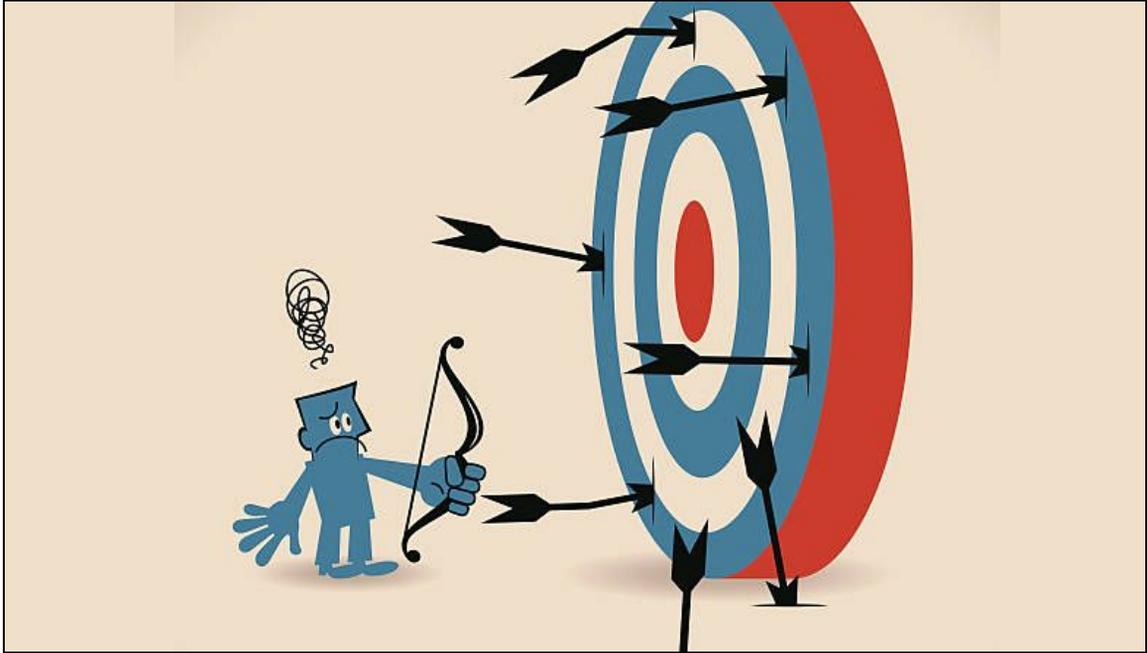
Let's review the Handcannon, my take on an "improved" muzzle flash.

March is a huge departure from where we started. It's a bit more stylized, a bit more fiery than before.

April review is another deviation from where we were in March, going for a more light-based look. Traditionally big because I wanted to capture it's high-poweredness

But no gas emission or residual smoke. I kept a bit of the flamey look I had from March, but it's quite subtle.

So why show those reviews?



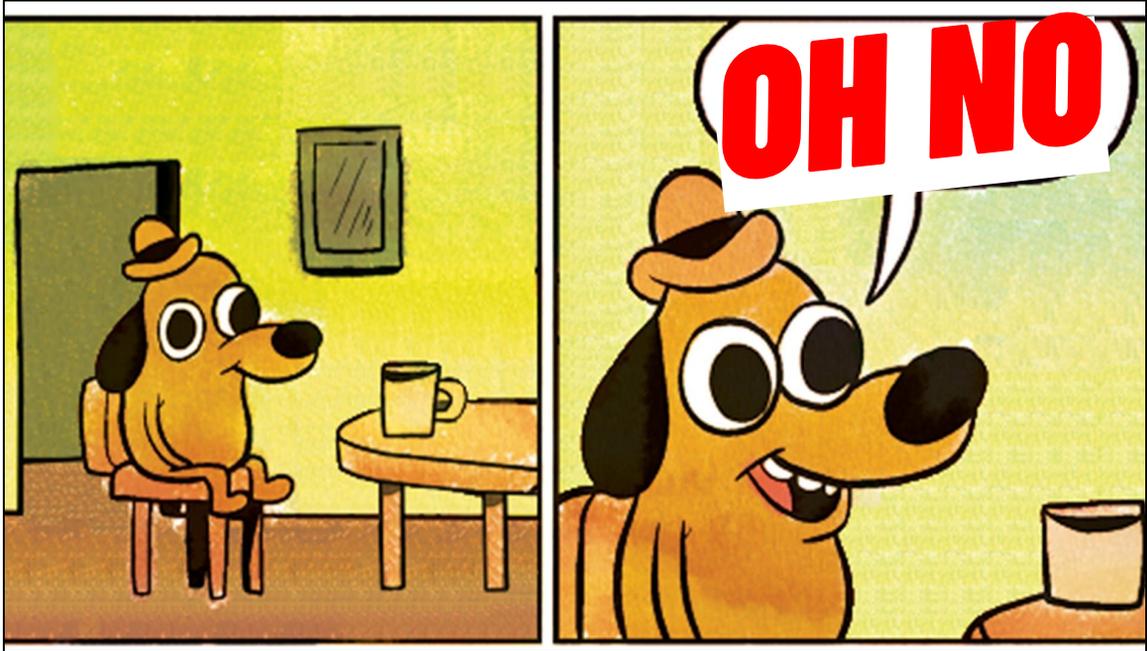
Progress is cool, but you know what's cooler? Finding out that I missed.

It was disappointing because of how much time I worked on it, following art direction,

I made different colored muzzle flashes to help communicate which weapon players were firing, different shape language to help them stand out, but at the end of it all, the feedback still echoing in my head was...

"You know, it looks fine, but I wouldn't know the difference between any of these weapons without the recoil.

They're just missing the fun."



That feedback was 100% correct. I was too busy chasing art direction and not thinking about fun.

Obviously that isn't the end of the story.

It resulted in a productive discussion with actionable feedback. Luckily, I had plenty of material to use and rework into the assets we eventually shipped.

This gave me the runway to pursue my original idea.



Throughout the next video you might see three bars extending from the weapon. That is placeholder art for the projectiles.

Versions 4-6

At the beginning, i was exploring a variety of ways to show off shockwaves and distortions

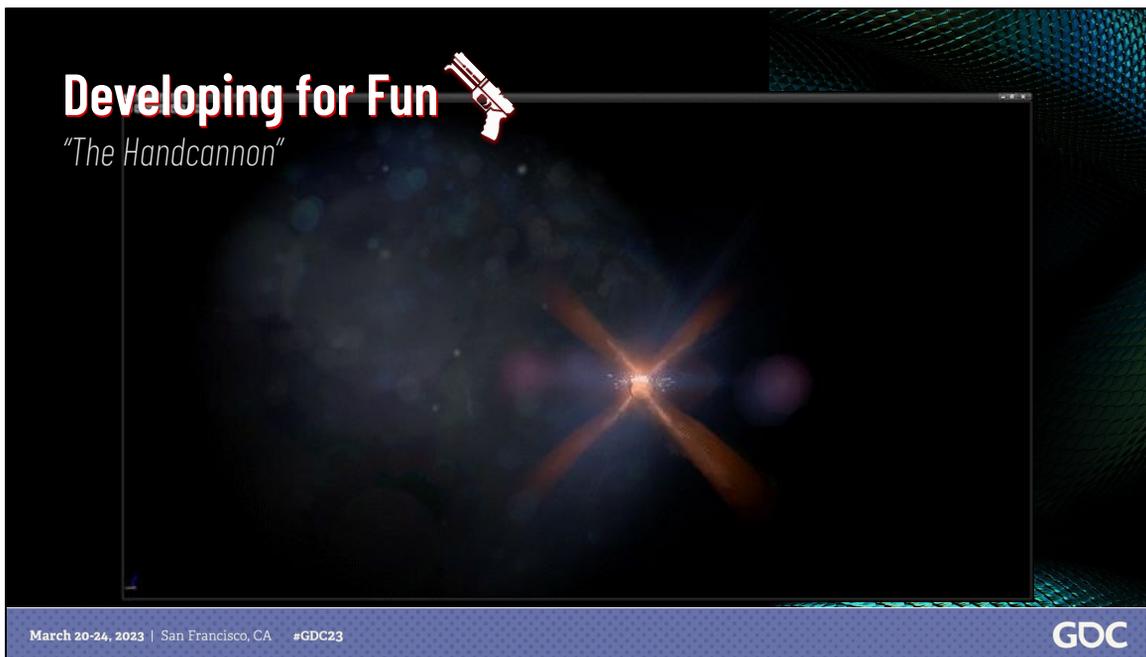
[SHOW VIDEO]

Version 7 is where I included a ring with some chromatic aberration in it which became central to all the weapons

Version 8 is where I added a ring of colored vapor and began testing out the projectile tracer. From version 0 a few slides back until now, we had only been using one projectile. Somewhere along the way, we decided we wanted to cut off limbs and so we added a spread of projectiles.

Version 9 is testing the handcannon in a dark test map with some enemies. Here we see the projectile start to take on a little more art.

Version 10 is the proper in-game test. Checking value, making sure things aren't blown out in the live environment.



So here is a moment of the Handcannon's muzzle flash we ended up shipping with

We have elements of faked light

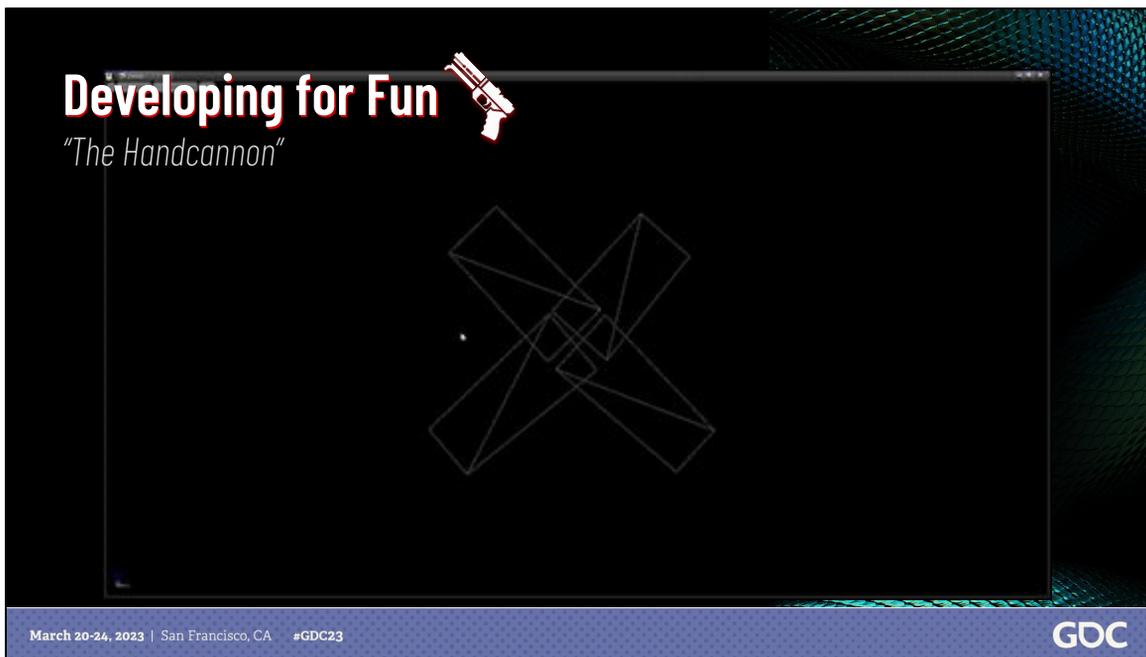
bokeh

lens dirt

A chroma ring.

I also added some gaseous elements. In game, there is distortion and an effect light as well.

It isn't a complicated effect, just quickly timed out elements with a handful of emitters animating the textures over time.



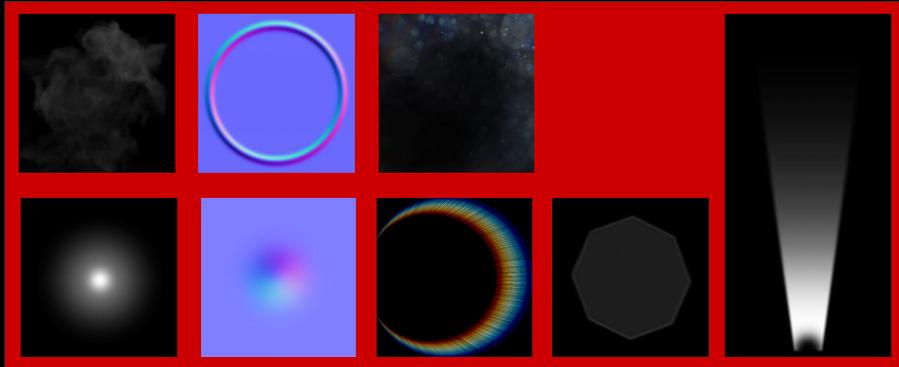
The most complicated aspect of it is probably the Starburst which uses an in-house scratch module that allows one to rotate a sprite inward and outward, offset its the entire group around an axis, and change the spread distribution between the arms of the starburst. If I want this to have more or less arms, I increase or decrease the spawn burst. It came in real handy for this situation.

SHOW VIDEO

Developing for Fun



"The Handcannon"



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These are the textures I used to make up this muzzle flash. It's quite simplistic.

A couple of the textures I reuse in materials and systems for this effect.

Muzzle flashes are a good exercise in how optimized you can make an effect.

Recognizable elements are important for something like a muzzle flash otherwise it just becomes a mish-mash of shapes that players can't connect with.

Developing for Fun



"The Handcannon"

"This is the standard Bl-55 Pistol."

● *gameplay first*



"Use it wisely, ammo is in short supply."

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Some things to consider when making weapon VFX

- Gameplay comes first -
- players need to see what's going on.
 - I had to scale back plenty of things on weapons because as impressive as it might have looked with all the distortion and sparks, players were losing track of enemies. That's not fun!

Developing for Fun

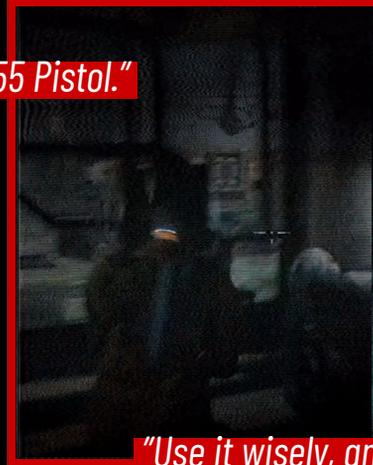


"The Handcannon"

"This is the standard Bl-55 Pistol."

● *gameplay first*

● *visual spectacle*



"Use it wisely, ammo is in short supply."

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- Visual spectacle
- there are two wolves inside you: One is fighting for gameplay and the other for visual spectacle.
-

Developing for Fun

"The Handcannon"



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Does the visual match the gameplay object
and if it does, is it overdone or just right?

Developing for Fun



"The Handcannon"

"This is the standard Bl-55 Pistol."

- *gameplay first*
- *visual spectacle*
- *the sum of its parts*



"Use it wisely, ammo is in short supply."

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The SUM OF IT'S PARTS

- Ask yourself, "Does it need to be seen?"
- There is a point where some things don't need to be seen or be as complex. The muzzle flash is in no way a complex effect. It's on for less than a quarter of a second and yet if I were to remove it, the gun experience is not very satisfying
- Add it back in and the place it occupies is felt in those few frames.

Developing for Fun



"The Handcannon"

"This is the standard Bl-55 Pistol."

- *gameplay first*
- *visual spectacle*
- *the sum of its parts*
- *gameplay again*



"Use it wisely, ammo is in short supply."

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- Gameplay again??
- Remember that gameplay is a big deal?
- I said it earlier - we're making a game.
-
- Silhouette, color, impacts - it's all part of the experience and this is going to affect players. Invite players to pull the trigger, to swing the baton again because you made sure that the experience was exciting, reactive, rewarding, and something they need to do and see again.
- VFX isn't just art for art sake - it's communication and emotion

SECTION 02C

Developing for **Sci-Fi**

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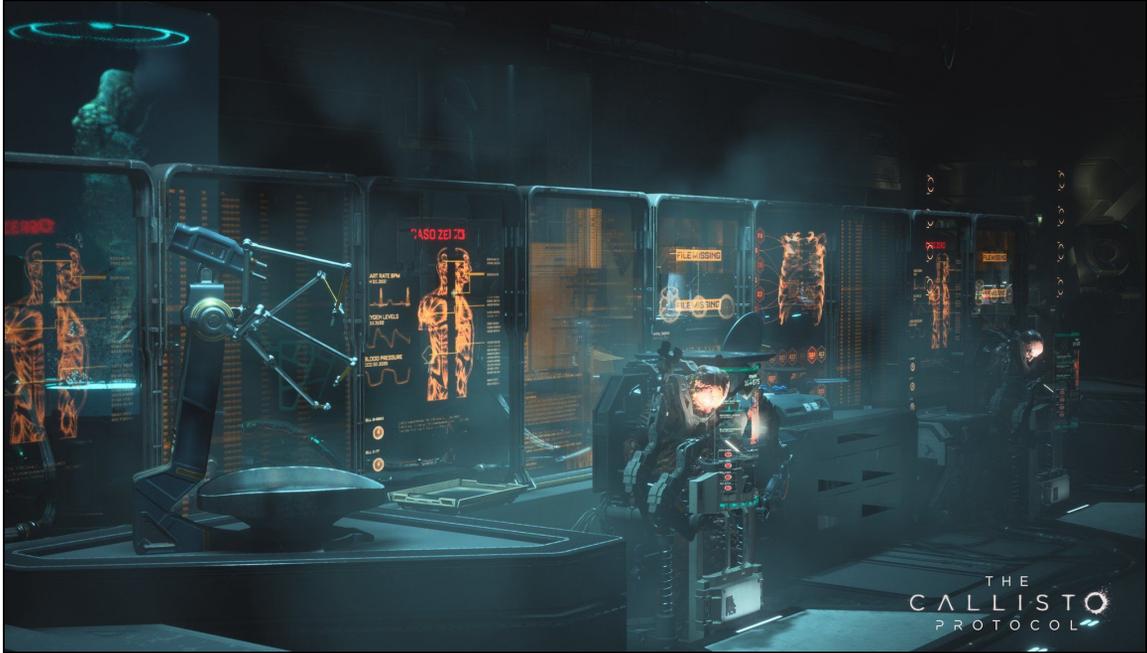
Okay let's talk about developing the science fiction for one of our weapon's upgrades.



It all started with TCP's UI

Look at this.

We got stuff on screens,
on panels
on glass
It's even floating in the air



All these screens, beautifully decorated with thoughtful interfaces and signage, objects with augmented reality populating the Black Iron Prison.



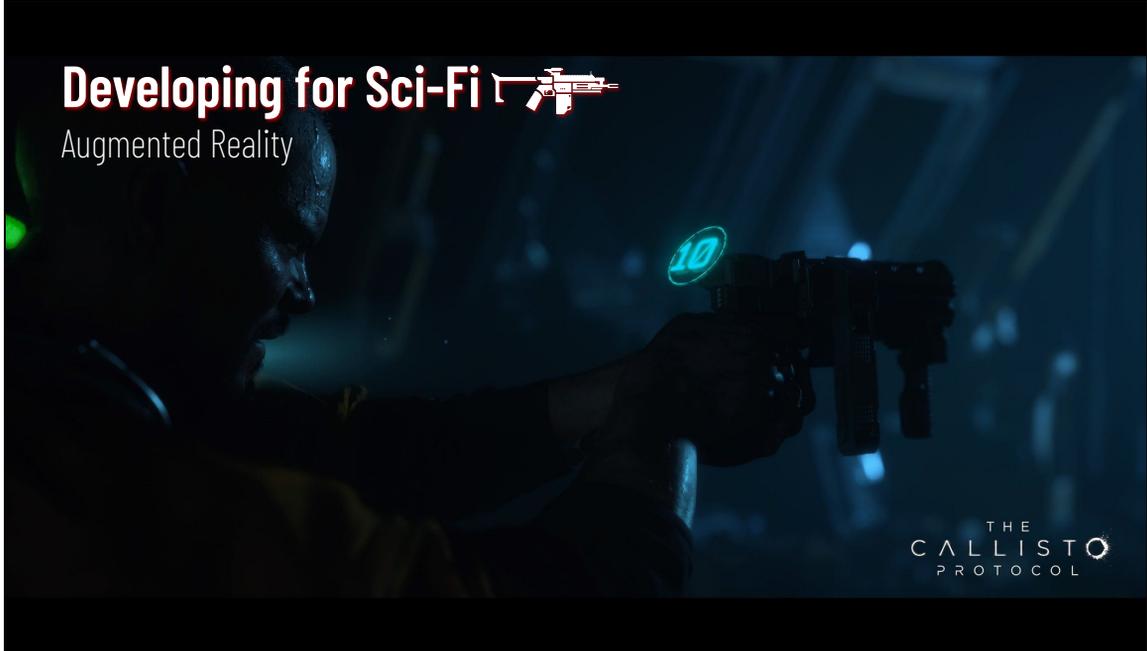
There's a slick diegetic interface



You even find it on our main character.

Developing for Sci-Fi

Augmented Reality



So given what we've established for the game's environmental and diegetic UI, I wanted to bring the same sort of feel to our weapons,

giving some texture to the weapon experience.

The weapons had already seen a visual upgrade in terms of muzzle flash, but was there anywhere else I could push the sci-fi look beyond the ammo counter?

I had a lot of conversations with our UI/UX Director because what I was about to embark on could potentially confuse players.

So I set some guides for myself:

Developing for Sci-Fi

Augmented Reality

- *push the sci-fi*

THE
CALLISTO
PROTOCOL

- Give a weapon a sci-fi element beyond what currently existed.
 - We were already very limited on what we could do for weapons since we were close to content lock

Developing for Sci-Fi

Augmented Reality

- *push the sci-fi*

- *do not interfere with UI or design*

THE
CALLISTO
PROTOCOL

And the other goal is to create a cosmetic element that wouldn't interfere with UI or design

- Doing so could confuse players because of the additional visual language

So push sci-fi and don't mess with the UI or Design

Super vague, right? No one was asking for this

no one was demanding our weapons get more sci-fi than they currently were.

There were no directions for what this should be, but sometimes you gotta scratch the itch.

Developing for Sci-Fi

Augmented Reality

- *research your target*



Step One: pack my brain full of content. The more you know, the more you can work with

or not work with.

Majority of my research lead me to ammo counters and other supporting UI that shows up on weapon. Cool stuff, but also not exactly what I was looking for.

Here are some of the pieces that inspired me

Ghost Recon Future Soldier

Developing for Sci-Fi

Augmented Reality

● *research*



THE
CALLISTO
PROTOCOL

Kin

Really cool weapon VFX and UI work



SEMIOTIC STANDARD FOR ALL COMMERCIAL TRANS-STELLAR & HEAVY ELEMENT TRANSPORT CRAFT
APRIL 26, 2078

PRESSURIZED AREA	PRESSURIZED BY ARTIFICIAL GRAVITY	ARTIFICIAL GRAVITY ABSENT	CRYOGENIC VAULT	AIRLOCK	BULKHEAD DOOR	NON-PRESSURIZED AREA BEYOND
PRESSURE SUIT LOCKER	POSITIONING SYSTEMS (FINE OPTICS)	LASER	ASTRONOMIC SYSTEMS (ELECTRONICS)	HAZARD WARNING	ARTIFICIAL GRAVITY AREA, NON-PRESSURIZED, SUIT REQUIRED	NON-PRESSURIZED AREA, NO GRAVITY, SUIT REQUIRED
EXHAUST	AREA SHIELDED FROM RADIATION	RADIATION HAZARD	HIGH RADIOACTIVITY	REFRIGERATOR	DIRECTION (UP/DOWN/LEFT/RIGHT)	LIFE SUPPORT SYSTEM
GALLEY	COFFEE	BRIDGE	AUTODOC	COMPUTER TERMINAL	MEDICAL	MEDICAL LIFE SUPPORT
MAINTENANCE	LADDERWAY	INTERCOM	STORAGE	ORGANIC STORAGE (FOODSTUFFS)	REFRIGERATED STORAGE ORGANIC FOODSTUFFS	ORIGINAL DESIGNS BY RON COBB - ICONS BY SCOTT AND RICK

Car dashboards, lights, really anything promoting a retro future, much like Ron Cobb's semiotics from Alien.

Developing for Sci-Fi

Augmented Reality

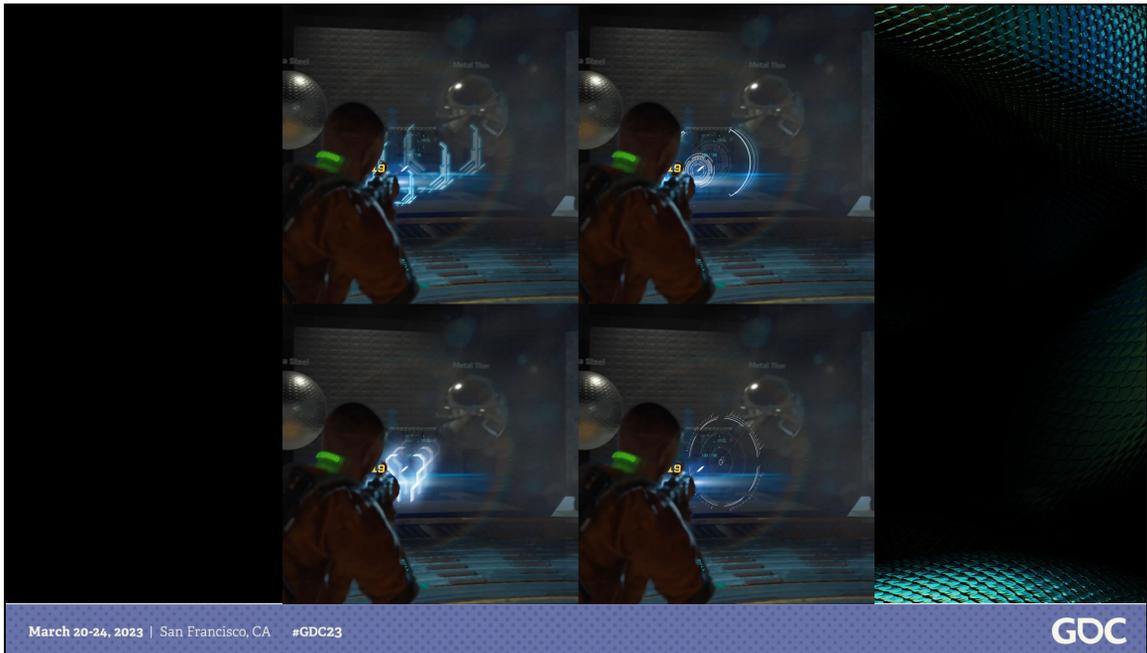
- *research your target*
- *concept your ideas*

THE
CALLISTO
PROTOCOL

One of my biggest faults as a creator is getting stuck at what it needs to look at. We can research all day, but when it comes time to creating, fear of making a mistake, fear of making the wrong choice and so on...It's all part of the process and real easy to get stuck in your head.

As my son once said when he was five, "start small or not at all". At the time I thought it was adorable, this little kid digging in the ground to make a river - but taking that advice and applying it to art - the "not at all" part scares me.

You've heard it your entire creative life that if you don't start, you won't get anywhere.



So with the research done, it was on to the concept phase.

Let me be the first to tell you that I am not a concept artist.

However I needed to get these ideas out of my head. Once I started seeing them in front of me, i was able to build a checklist of things I needed and wanted to see. It also gave me material to show directors and leads where I wanted to take the weapon.

The concepts were a good north star for me, but I knew simplicity had to drive this.



Working at the visual scale our game was at meant that I couldn't get super detailed otherwise it gets crunchy, real noisy looking.

Again, these sketches provided an idea, but they were going to be moving with the weapon once they're made.

The really awesome part of the VFX job is that you aren't dealing with hypotheticals about what something can look like. You're crafting that content in real time, you're finding the boundaries of what you should and shouldn't be doing in the moment.

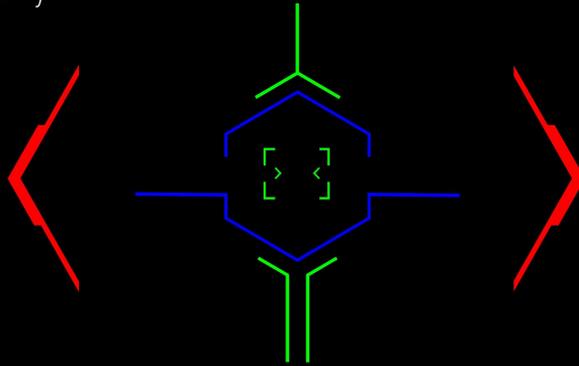
It didn't take much to find out which designs were going to work.

In fact, I found my napkin drawings to be far more productive since we needed it to look focus on it readable.

I shared these with our UI/UX director as well as my lead and got the thumbs up from both.

Developing for Sci-Fi

Augmented Reality



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Over an evening, I designed what I thought should be the weapon's GUI. There wasn't going to be a lot of time to ruminate on what going to hold this back. Success and failure had to be determined simultaneously, probably within the concept phase. The real-time part of it would sort itself out.

On this slide, I'm sharing what the final texture of this looked like.

Actually, it started off completely white and then I split sections of it into different channels so I could animate the elements when they arrive on screen. Doing that kept my material cost down

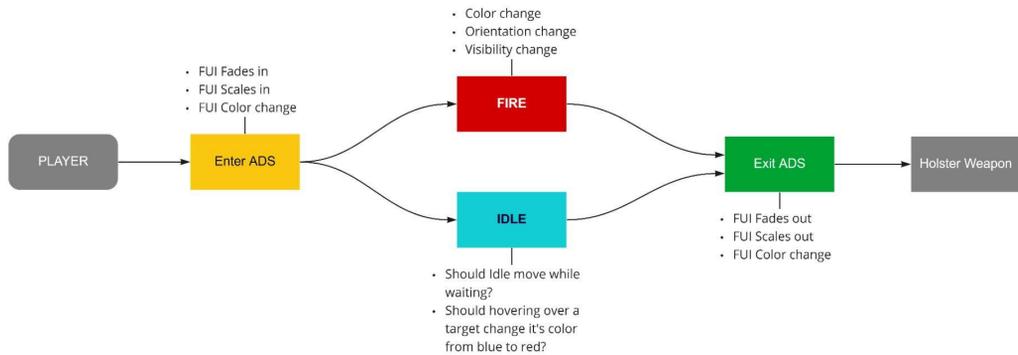
So I had only made one for the Assault Rifle. It's a weapon you get much later in the game and I thought, "might as well be the only one that has this."

Makes it feel real special, you know. Also being more powerful than the pistols and looks cooler. Players will just equip this and boom, one weapon to rule them all.

Developing for Sci-Fi



Augmented Reality



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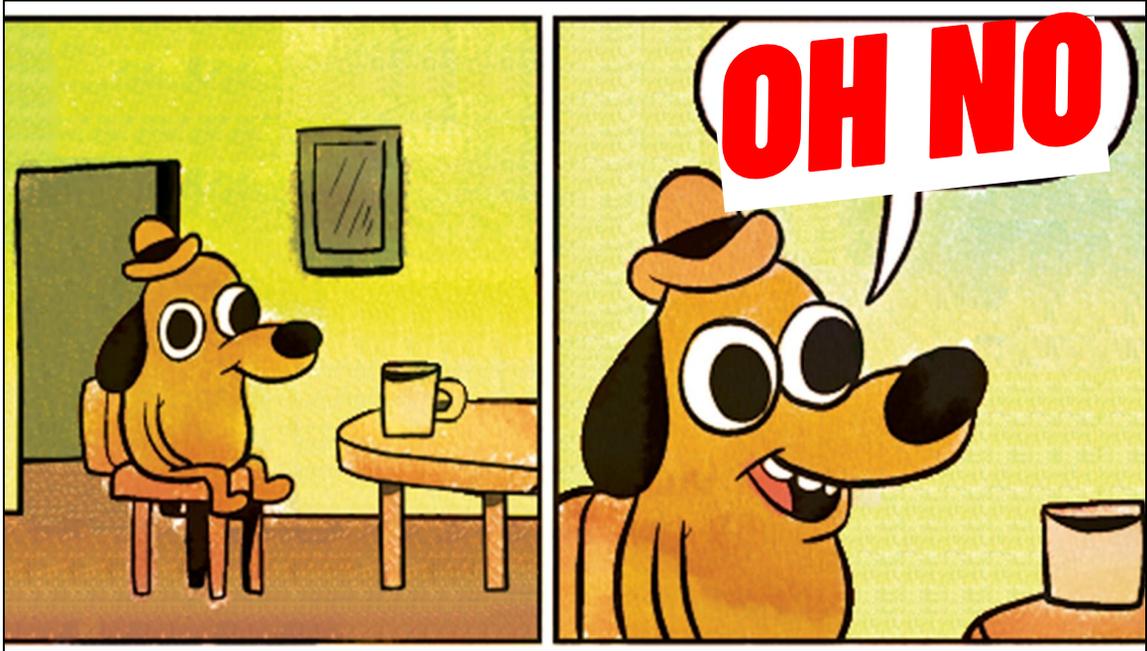
GDC

Here's the plan I had for how the player would use the augmented reality. Nothing super wild, but just a glimpse at where I wanted it to go and where we could take it further if there was time.



So I put together a wedge of the Assault Rifle's GUI to show directors, demonstrating different scale, distance, and opacity.

And get this: they asked how quickly I could make them for all the weapons.



“Oh no. What have I done?”, I thought

All this time I was thinking of just the one-and-done to make the Assault Rifle feel special and now I have more work??

Developing for Sci-Fi

Augmented Reality

- *research your target*
- *concept your ideas*
- *be the change you want to see*

THE
CALLISTO
PROTOCOL

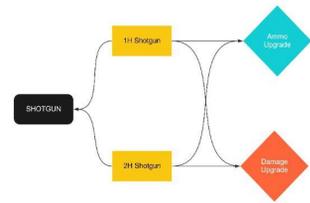
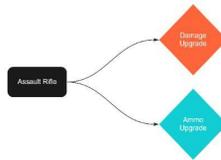
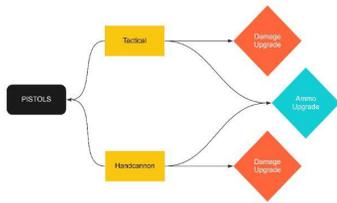
Truthfully, I really enjoyed doing it. I was just shocked I was getting to make more of something no one asked for.

Once you're in production, there's very little time to deviate from that path until you run into a challenge and have to pivot or overhaul a thing. I said it earlier in regards to developing the stun baton. In order to see change you need to speak up, you need to show ideas, demonstrate that it can work.

And sure enough...

Developing for Sci-Fi

Augmented Reality

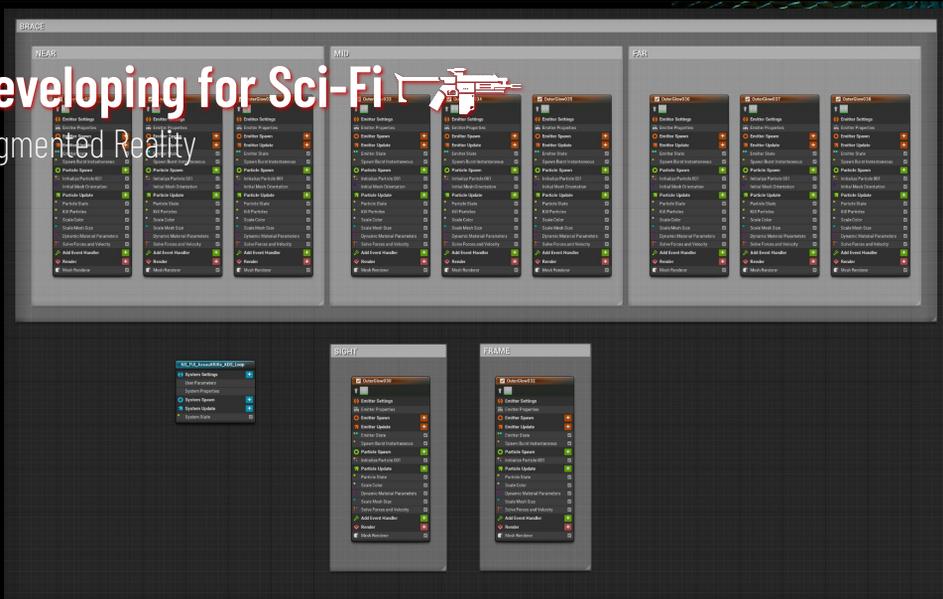


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I took the rest of the week to create the language that these weapons would share, making sure that the shared qualities made sense and that reuse could be utilized. We paired them with a damage upgrades.

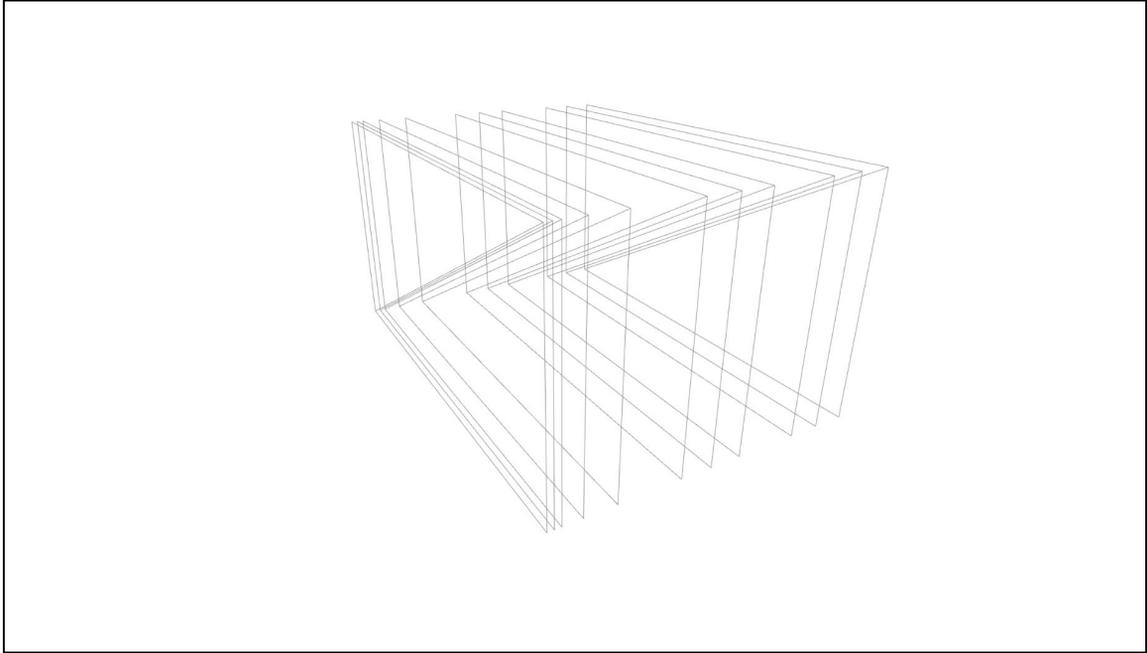
Developing for Sci-Fi Augmented Reality



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Setup wise, the GUI is pretty basic. Just layers of images offset from one another to give it more dimension



I had tested out using a mesh that had multiple planes on it, but that just restricted me on animating it quickly. While possible, I moved on without it since I knew I could brute force my way through it get it done quicker.



What I ended up with was an asset that achieved the goals needed to bring more sci-fi elements to the weapon, not interfering with UI and gameplay, and managed to create a place for more color in an already oppressive environment.

Speaking of oppressive environments, here's Matt.

I'm going to turn it over to Matt so he can walk you through the rigors of bringing a dead moon to life by making it feel spooky and dead.

SECTION 03 Environment

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*[Transition] (Give space for the claps and things.) Thanks Shen.

Shen took us through a journey of collaboration and discovery, to create unique and well thought out design to achieve fun and engaging effects for our weapons, thinking about the way the player interacts with the world, and how we could accomplish

Next, I am going to guide us through a journey of how we approached a few aspects of filling the “dead moon” of The Callisto Protocol, and made it feel...alive???

SECTION 03

Environment (& Gameplay)

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...and Gameplay. These two things, especially for TCP, are inseparable.



Bringing Sci-Fi Horror to Life (or Death?)

What are our goals and inspiration?

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First we are setting parameters: “What is it we want to achieve?”

We were tasked with creating an unforgiving atmosphere, inspired by sci-fi and horror media, especially those with practical approaches to things like fog, steam and smoke.

Not only taking from “realistic” reference, but looking to achieve a surreal and suspenseful taste in light and shape that gives space for your imagination to get the best of you.

Countless hours of work was put in by the team to conceptualize and culminate ideas to bring this world to life, but how do we distill this into what we want to, and more importantly, CAN deliver?



Bringing Sci-Fi Horror to Life (or Death?)

What are our goals and inspiration?

How to give atmosphere to the world we are exploring?

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Bringing Sci-Fi Horror to Life (or Death?)

What are our goals and inspiration?

How to give atmosphere to the world we are exploring?

What are the challenges in these environments?

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What kind of places are we going to journey through?



Bringing Sci-Fi Horror to Life (or Death?)

What do we want to achieve?

How to give atmosphere to the world we are exploring?

What are the challenges in these environments?

Finding allies on our journey.

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The Inspiration

Finding the Look and Feel



Sci-fi and Horror that inspires

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Movie Sci-Fi/Horror Inspirations (think Alien, The Thing, Blade Runner, Terminator, etc.)

-Studying great reference, but also finding inspiration!

Art Direction,

For me, growing up with sci-fi especially, I am a wimp when it comes to horror, but movies like Aliens are ingrained in my memory.

Both bringing a feeling of nostalgia and excitement to not just recreate these feeling of suspense and exploration, but find ways to bring something slightly unique to what we were building.

SECTION 03A

Building up **Atmosphere**

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For The Callisto Protocol, the environment itself IS a character in the story. We are traversing through rough terrain and learning as we go.

By listening and observing the world around us, it tells us the story of not only the current tricky situation our characters face, but also the history of our universe and the story we are discovering.

One aspect of giving the world (maybe moon is more accurate?) of TCP a signature look and feel that meets the vision we set out to achieve is a sense of depth of immersion.

Building Atmosphere

THE CHALLENGE OF DEPTH AND IMMERSION

What tools do we have to fill the environment?

- Niagara is great, but what else can we explore?
- Flipbooks and billboards can be limited in perception of depth.

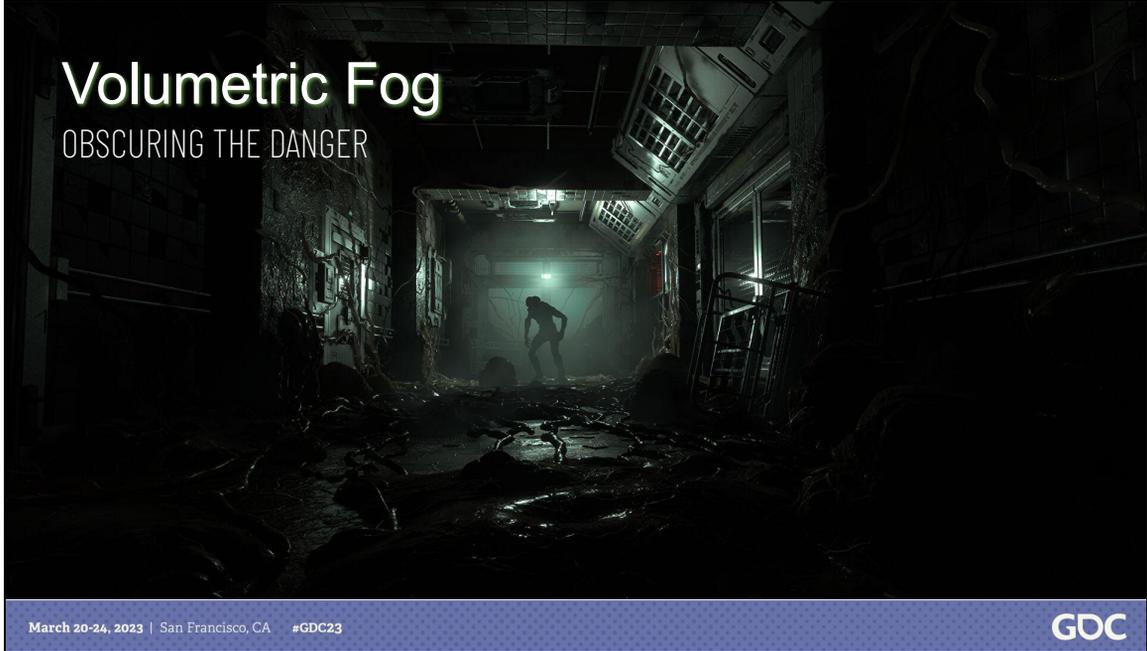
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We explored and created systems with mertext animation and deformationscountless varieties of smokes, steams, fogs, and even with fancy depth fades and other tricks, billboards can break down at certain angles, and only obscure as long as geometry remains behind the mesh bounds of the particle.

Volumetric Fog

OBSCURING THE DANGER



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Building Suspense

1. Trying to build the suspense for a player in different scenarios allowed us to play heavily with visibility. There were early interests in pushing the use of volumetrics especially to play up the sci-fi influences that fed the design of The Callisto Protocol.
 - a. We decided to pursue custom fog volumes that we could utilize to create effects similar to dry ice, fog machines, and much of the feel that traditional effects might have been used on sets for classic sci-fi and horror movies.
 - b. Our goal was to create local fog volumes that played nicely with lighting, had fidelity to fit with our hyper-real environments, and didn't blow our tech budgets up.
 - c. As mentioned earlier, our decision to use Niagara fairly heavily, for particles was great for tight, high-fidelity effects, but for those areas where we wanted to player to feel a little more lost, the local fog volumes allowed for control and animation of their density, turbulence, and variation in texture.

Volumetric Fog

OBSCURING THE DANGER



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1. Volumetric Fog allowed us to obscure areas and work with lighting and environment to create areas of confusion and danger.
2. Many areas where puzzles or enemies might be encountered required more visible obstruction and sense of depth to allow danger to hide, but also FEEL like it had depth.

Building the Fog

CONSIDERING THE DETAILS

What makes up the fog...so, foggy?

- Shaping Volume
- Noise, Movement, and Turbulence
- Playing Nice with Lighting (Collaboration!)
- Customizing and Variation

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The VFX team had a lot of close collaboration with our lighting department and began to explore more use of the volumetric fog materials for not only lighting needs, but gain a deeper understanding of how we could use this as a solution for some of the fill and atmosphere in localized areas. There are some great resources out there on various approaches to local volumetric fog materials and setups. I will be focusing on a few key details that made this a great tool for meeting art direction and collaborating on this very specific look we aimed to achieve.

Getting Thick In Here

Getting Results

- Volumetric controlability allowed for maximum art direction and variation.



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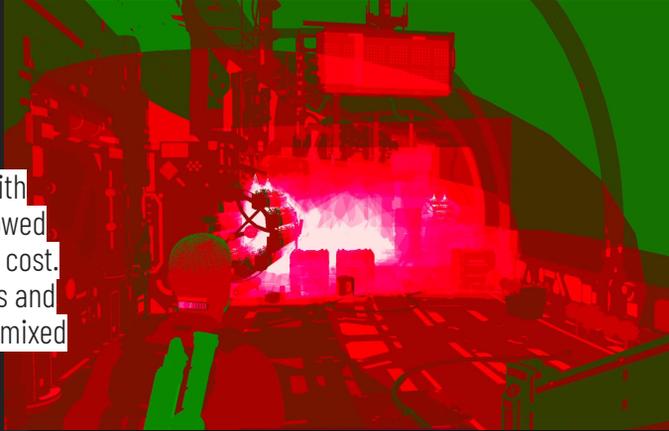
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(Video) Volumetric Variation and Control

Hallway Breakdown

Simplify Complexity

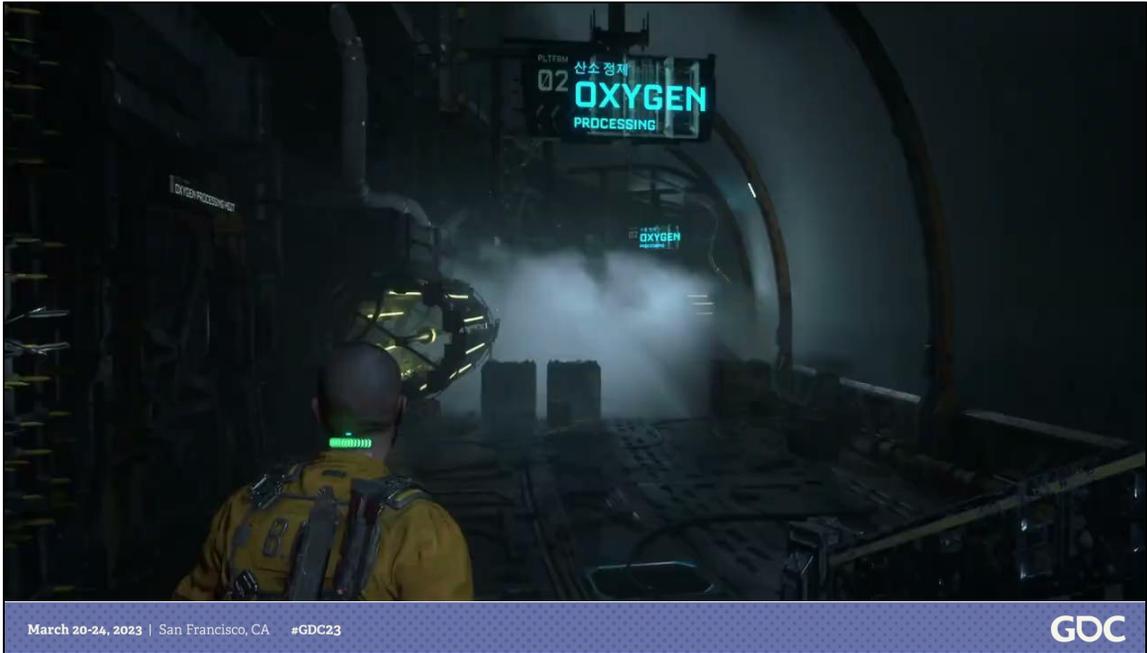
- Simplified Volumes with variation controls allowed contained and known cost.
- Various other systems and effects could be intermixed for detail work.



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(Video) Volumetric Variation and Control



(Video) Volumetric Variation and Control

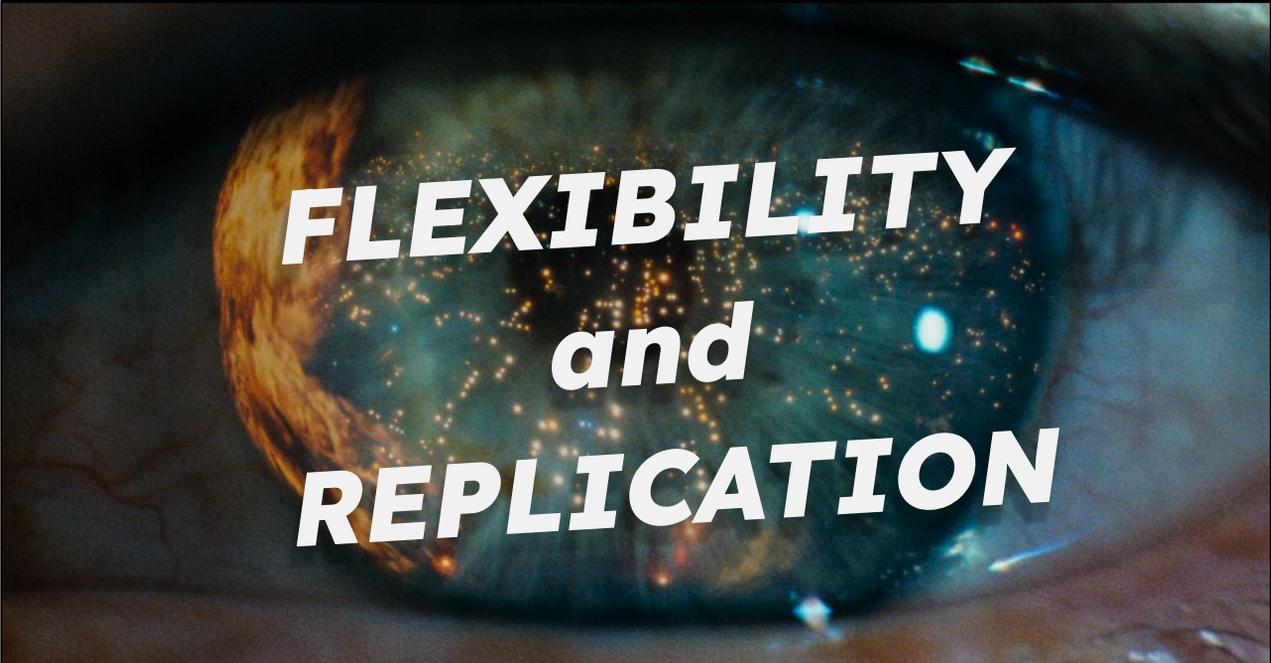
SECTION 03B

Building in **Flexibly**

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As with any collaborative development, the need and desire to be flexible allows for more focus on art direction, building story and gameplay. Iteration and Refinement.



FLEXIBILITY and REPLICATION

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Flexibility for collaboration and parallel work is key to moving fast and creating a lot of effects that can be customized and art directed easily. Saving time for us artists to get feedback as well as turn around on direction.

Needing to cover ground and having a small team required us to think in a way that built for flexibility whenever possible.

Time spent figuring out constraints and consulting your local experts in lighting, tech and performance can help you move quickly to a more robust solution. But don't get lost in the details.

The Challenge

Of Flexibility



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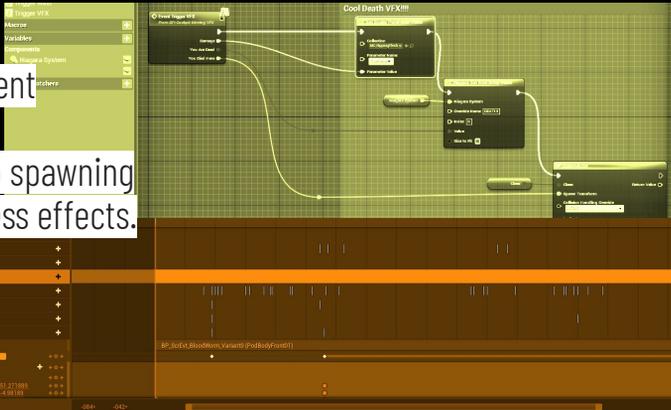
Palette Cleanser Slide

Suspense is all about pacing, so here are some cute flexible animals I found on the internet.

Blending the Parts

IMPORTANCE OF COORDINATION

- Coordination through event systems, interfaces and notifications were key to spawning in and managing countless effects.



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By using a variety of methods to script events and control VFX at multiple levels, we created a way to be both flexible and give finite control to the artists, allowing us to layer in multitudes of suspense, horror and death.

Coordinated Blueprints using interfaces, messaging and notification systems.

Spawning, Animating, and Managing and passing data in BPs

Triggers and Events

Coordinated Deaths

ENSURING CONTINUITY

- Coordinating an **EXPLOSIVE** amount of effects for unique enemy kill and player death scenarios!



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We're Not Gonna Make It (This is where it gets a bit gory...)

1. Player Deaths by enemies and environments, seamlessly engage during most unfortunate circumstances...
 - a. Bigmouth Kill Breakdown
 - b. Sequence Coordination
 - i. Subtracks
 - ii. Spawnable and Possessables!

Gore Warning!



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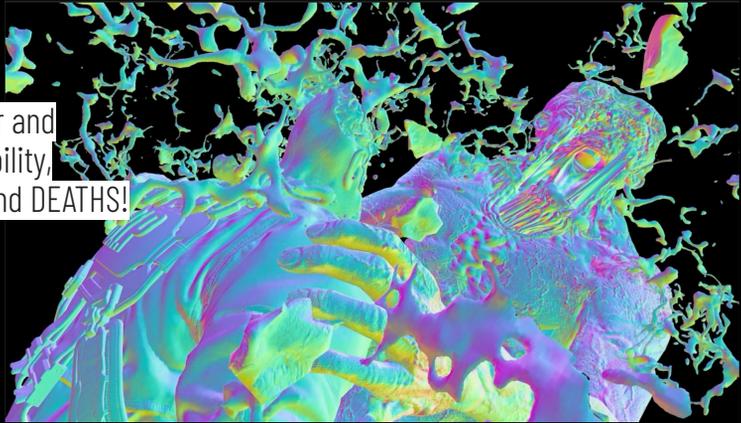
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Coordinated Deaths

ENSURING CONTINUITY

- Apply to both character and environment controllability, seamless cutscenes, and DEATHS!



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SECTION 03C

Building it **Together**

Scripted Events

BUILDING VFX FOR FLEXIBILITY

- Event coordination is key for parallel work.
- Allowed flexibility for VFX to iterate, multiple artists and developers per section.
- Collaboration and freedom!



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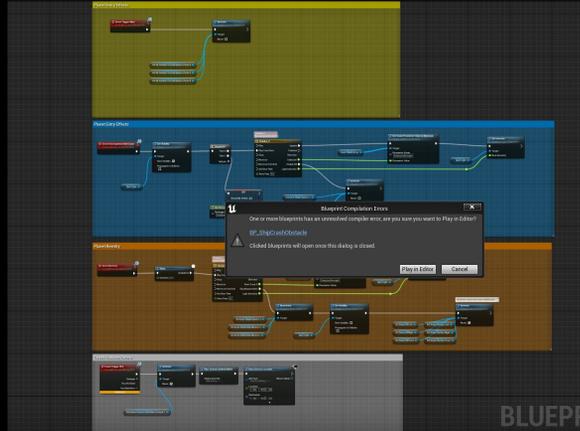
Coordinating Events

1. Being a game with a lot of narrative, dialog and action drive the story and gameplay, there were many cases where the player engages in action and would be pulled into a scripted shot or event with little to no cuts. Some being fully cinematic, others requiring continuity with the current environment and seamless blending with gameplay..
2. Pipeline:
 - a. Subtracks allowed for parallel work to be done.
 - b. Notifies and events to drive both poseable and spawnable Actors.
 - c. Retaining continuity between tracks and environment.

(VIDEO)

Flexible Blueprints

PRE-FABRICATING AND GROUPING



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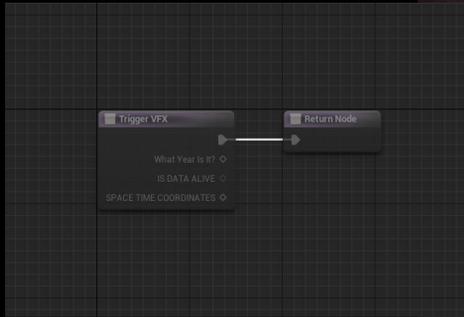
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(VIDEO)

Breaking Down the Data

STATE YOUR NEEDS



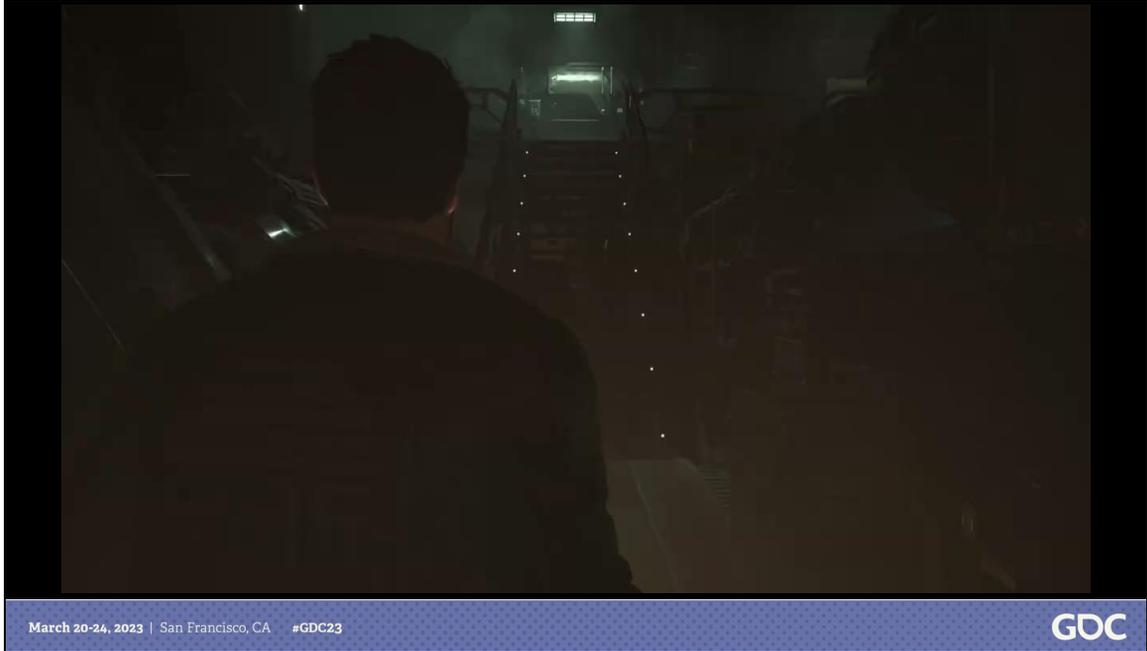
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(VIDEO)

Making It Together

Communication is Key

- Collaborate with your team AD's, LD's, TA's, Lighting, Modelers and invite feedback!
- Coordinate your assets and data needs!
- Find inspiration!



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 - c. Retaining continuity between tracks and environment.

(VIDEO)

THANKS!



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Thank you for listening. We want to leave some time for your questions and in the event that we have to stop here.

The graphic features a dark background with a green, textured, wavy pattern. On the left, the text "Q&A" is written in a large, white, handwritten-style font. To the right of this text is a QR code. Further right, there are three yellow rectangular boxes containing text: the top one has the URL "shorturl.at/apDL", the middle one has a Twitter bird icon followed by "@ayyyshen", and the bottom one has a Twitter bird icon followed by "@hapamaki". In the bottom right corner, there is a logo for "STRIKING DISTANCE STUDIOS" and the "GDC" logo. At the bottom left, a blue bar contains the text "March 20-24, 2023 | San Francisco, CA #GDC23".

Q&A



shorturl.at/apDL

 @ayyyshen

 @hapamaki

STRIKING DISTANCE STUDIOS

GDC

March 20-24, 2023 | San Francisco, CA #GDC23

For those wanting to check out the videos we shared today, you can scan the QR code or go to the URL and it will take you to the YouTube playlist

OR if you don't have a trust strange links, we'll share the youtube link on Twitter.

For any questions post-conference, please feel free to contact us on Twitter or find us on LinkedIn.



Please enjoy the rest of your time at the conference!