

The GDC logo is in white, bold, sans-serif font. The background of the slide is dark grey with several colorful, semi-transparent wireframe polyhedrons (a blue tetrahedron, a purple hexahedron, a yellow pentahedron, and a red cube) scattered across it.

GDC

Solving Titan Sized Problems

Evolving Titan Combat in Titanfall 2

Carlos Pineda

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GAME DEVELOPERS CONFERENCE | FEB 27-MAR 3, 2017 | EXPO: MAR 1-3, 2017 #GDC17



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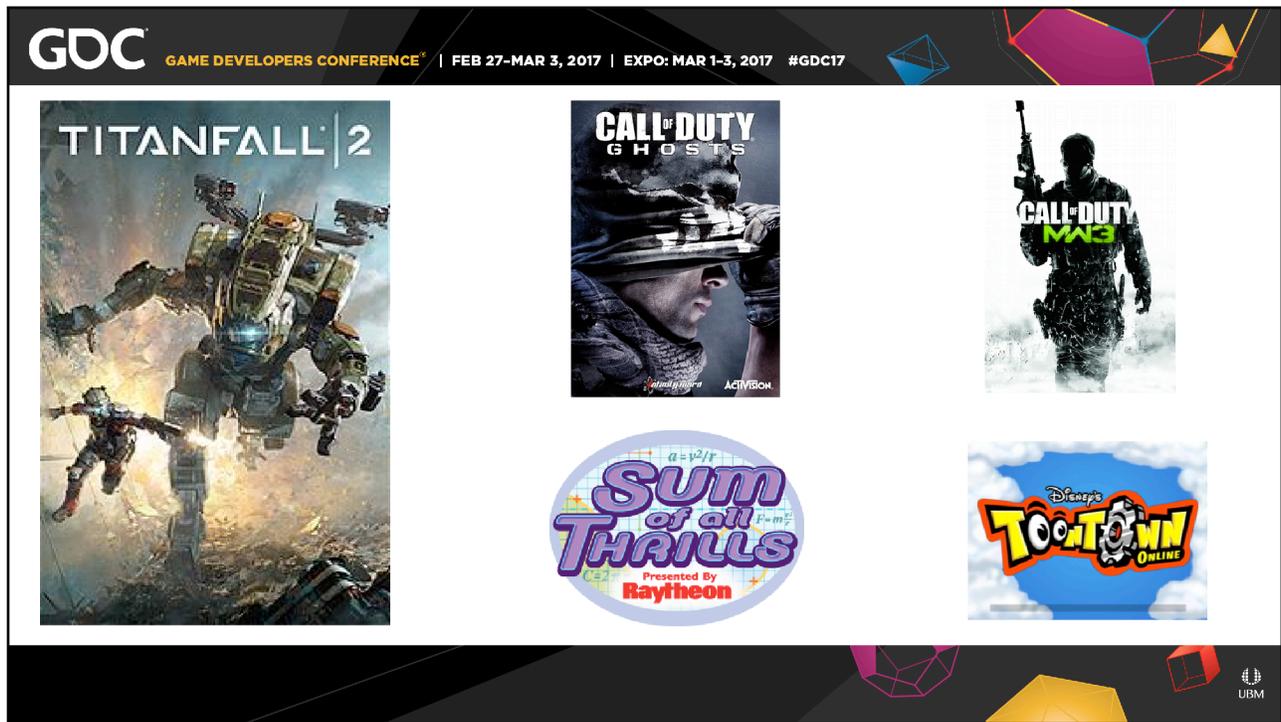
Who am I?

- Carlos Pineda
 - Game Designer @ Respawn Entertainment



My name is Carlos Pineda, and I am currently a designer at Respawn Entertainment

Before that, I was a designer at Infinity Ward and before that, I was at Schell Games



Here are some of the past projects I worked on... (image slide show)

Before we begin...

- Hindsight is 20/20
- Making games is a team effort



A couple more things before we get into it...

First: As you all know, video game development is a messy process, and while this talk may make it seem like we just figured everything out like that *snap*, the reality is that a lot of these lessons are a result of trial and error and we were only really able to organize them in this manner after the dust has settled.

Second: Making games is a team effort, and while I'm the guy standing in front of all of you, a lot of this talk represents a lot of the hard work that different teams put into it.

And with that, let's get started...

Talk Summary

- Introduction to the Problem
 - Low Time to Kill vs. High Time To Kill (TTK)
- Exploration of Solutions
 - MP
 - SP
- Pitfalls and Challenges

What is this talk going to be about? In this talk I will be discussing how we evolved Titan combat in Titanfall 2, and how we tackled the problem of combat in a High Time to Kill shooter. We're going to be breaking down the talk into 3 major sections:

The first part is the introduction of the problem. Here we will mostly be comparing High TTK and Low TTK and really try to break down what kinds of problems crop up when we simply try to apply Low TTK shooter sensibilities to a High TTK game.

The second part will go into the solutions that worked for us in Titanfall 2, and we'll start with how we attacked this problem in MP and then move on to how this affected SP.

Finally, we will discuss some pitfalls that we came across, or problems that we have not completely figure out



Real quick, let's talk about Titanfall 2: What is Titanfall 2?

For those who don't know:

Titanfall 2 is a First Person Shooter set in the future, in which players play as "Pilots" - agile soldiers that can wallrun and double jump around the battlefield.

During the course of a match, Pilots can call down their "Titans" - huge war machines designed for destruction - and manually control them on the battlefield.

So Titanfall is really a mix of both Low TTK gameplay (in form of the Pilots) and High TTK gameplay (in the form of the Titans)

"Time To Kill"



Just for the purposes of this talk, I'd like to define what I mean by "High Time To Kill"

When I say, High TTK, I am really talking about a time to kill that is in the range of 30-60 seconds. So I know traditionally we think of games like Halo and Overwatch as "High TTK", but for the purposes of this talk, we'll call them more "Medium Time to Kill"

Introduction to the Problem

So now that that's out of the way, let's begin by talking about what exactly is the Problem we are dealing with

Improving Titans

- Titans are key differentiator
 - FPS mobility no longer
- Problem: Titan Gameplay
 - Largely seen as boring
 - "Mushy"



At the beginning of Titanfall 2, Titans were identified as an area in which the game could greatly expand. With mobility no longer being unique to the franchise, Titans were seen as a greater key differentiator that could really set us apart.

The problem was that internally, Titan gameplay was largely seen as being boring or lacking depth. "Mushy" was a word often used to describe how titan combat felt.

Why?

Where does shooter depth come from?
Good games = interesting decisions

If we were to really push Titan gameplay, these would be the biggest problems to solve. So we started asking ourselves "why?"

Why does titan gameplay feel mushy? Why does it lack depth? It seemed to have all the pieces - guns, rockets, dashing. They even moved fast so it "felt" better than old school mech combat

So we got back to basics and really started asking ourselves some hard questions. Questions like:

Where does shooter depth come from?

We know that gameplay depth comes from having interesting decisions for players - so where would those come from in a shooter?

Layers of Decision Making



- <1s - "Atomic"
- ~10s - "Tactical"
- ~5-10m - "Strategic"

The model we came up with (and most of you would already be familiar with this in some shape or form), is that shooters tend to give players different layers of decisions that they are making, and these are broken down by the amount of time players have to make these decisions.

We've identified 3 key layers that most decisions can fall into: Atomic, Tactical and Strategic

Let's look at each one real quick...

"Atomic" Decisions

<1s 

- Acquire → Aim → Fire → Repeat



"Atomic" or "Twitch" decisions live in the sub-second decision space,

and they involve the player...

Identifying a target on screen, then

Deciding how to move their cursor over the target, then

Deciding when to pull the trigger, hopefully killing the target

These types of decisions are happening at split second intervals so you're not really always conscious of making these decisions. Nevertheless, they are there.

These types of decisions have to do with "twitch skill" or "hand eye coordination," so you get better by practicing and building muscle memory.

“Tactical” Decisions

~10s 

- Assess Map → Decide Approach → Execute → Repeat



“Tactical” decisions

Happen at around 10ish second intervals.

Usually these happen when the player has just spawned in, or has just cleared an area.

These decisions will involve the player...

Assessing the current map state: where am I on the map, where are the enemies (or where do I think they are)

Deciding on engagement approach: “Oh the enemies are in this building and my friendlies are over here, so this would be a good flank route”

These types of decisions often have to do with what people often refer to as “map knowledge.” The more you know the map, the better you can be at making these decisions.

“Strategic” Decisions

~5-10m 

- Assess loadout / Team composition



“Strategic” decisions

These will happen on a much longer timeline, sometimes only once per match

These decisions often involve loadout selection, or team composition

along with how to approach a map over multiple lives.

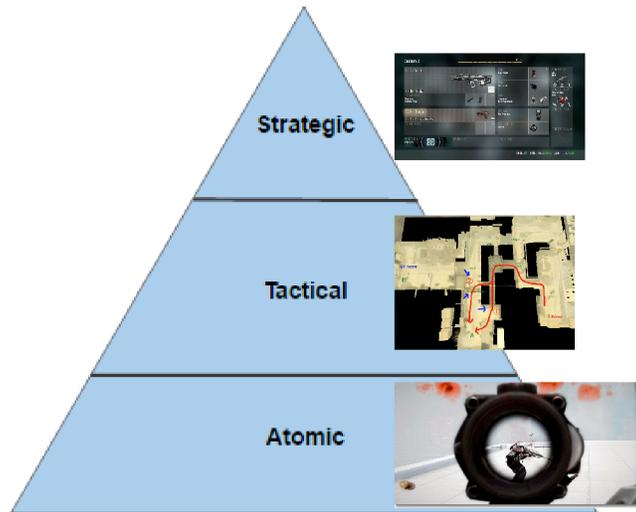
These can happen at the start of a match and also in the middle like when playing TDM and you have to reassess your loadout

Another good way to think about this is

Atomic decisions revolve around thinking about “the next bullet”

Tactical decisions are about thinking about “the next fight”

Strategic decisions are about thinking about “the next 3,4,5,6 fights”



So what we really have is this kind of food pyramid for interesting decisions. Note that the Atomic scale decisions are all the way at the bottom, since you are often making a lot of these in a row for shooters, and a lot of the immediately perceivable shooter depth will come from this layer.

Applying to Titan Combat



DON'T FORGET TO TALK ABOUT TITAN SIZE ON SCREEN

So we used these layers to examine how we could improve Titan combat. The most apparent problem is that High Time-To-Kill, or High TTK really works against the Atomic layer.

Imagine:

In a Low TTK shooter, I would acquire a target, move my cursor over the target, then pull the trigger. If I did it right, The target would be dead. If not, then most likely I would be dead. The loop would complete, and I can go on to make the next decision.

In a High TTK shooter, I would acquire the target, move my cursor over the target, then pull the trigger. But in this case, even if I did it right, the target would still be standing. So I keep my cursor on the target, and keep the trigger held - a non-decision at this point - and this would go on until the target is dead, which in our case could last up to a minute. So in the High TTK case, we're running up against the problem that the Atomic decisions players are trying to make are taking too long, thus making them uninteresting.

In Titanfall, this would be exacerbated even more by the fact that Titans take up a huge amount of screen space, so even putting your cursor over them is less interesting.

And this is really the problem that a lot of High TTK shooters will rub up against. More people will recognize this as the "bullet sponge" problem. So we really needed to solve this if we were to make Titans more important.

Other Titan Problems

- Tactical:
 - Lack of jump and/or climbing.
- Strategic:
 - Default to “dual purpose” weapons

These are some other, not-as-crucial problems that came up during our assessment:

Looking at the tactical layer, it seemed like titan combat maintained good depth due to the 3-lane routes that our MP designers generally build into our maps. This makes it such that titan combat generally carries over a lot of depth from traditional shooter models, with the exception that we lose a bit of verticality since Titans cannot jump or climb buildings. It loses a little, but overall is not the end of the world.

On the strategic front, we noticed that players would often default to what we called “dual purpose” weapons, like the XO-16 chaingun and the 40mm, Cluster missile, and Electric Smoke. This is really a Titanfall specific problem, since not a lot of games have the whole 2-games-in-1 thing going on.

We’ll be touching on these along the way, but the real problem to solve with regards to High TTK has to do with the Atomic later

Solving the High TTK Problem

Ok, so now that we have a greater understanding of the problem, we can start figuring out how we're going to solve it.

MP

First we'll talk about how we went about solving this in Multiplayer.

We decided it would be better so start solving this problem in MP first since it's much easier to apply MP depth to SP rather than the other way around. SP tends to use AI logic as a crutch and it's almost impossible to force players to do what the AI is doing whereas it's much simpler to make an AI pretend to be a "bad" player.

Taking the Good from Titanfall 1

- Weak Spots
 - Support "high skill" aiming



First I want to talk about specific things that we brought back from Titanfall 1.

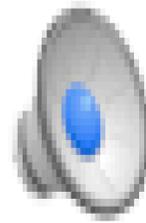
The first is the concept of "weak spots," which is basically our "headshot" equivalent. Similar to the headshot concept, this creates a high-risk-high-reward zone that a player can aim for, which helps with the Atomic layer.

It gives the player something more skillful to aim for.

The problem with weak spots was that they were only present when a titan's shield was lowered, so most of the time you encounter a titan in Titanfall 1, you wouldn't see his weak spots.

Taking the Good from Titanfall 1

- Block and Dash
 - Additional Atomic decisions



The second thing we carried over from Titanfall 1 was the concept of dashing and blocking as a form of damage mitigation. There are skills that we were able to add on to the Atomic layer, but they were not that viable due to the presence of hitscan weapons like the XO 16.

More on that later..

Who has solved High TTK?



Moving on to Titanfall 2, The first thing we did was to find out if any other MP shooters have solved the High TTK problem. We came up empty handed thinking about this, so if any of you know of some, I would love to hear about them!

Instead, we looked to other genres. What other genres might have solved this High TTK problem?

We came up with 2 answers: Fighting Games and MOBAs/MMOs

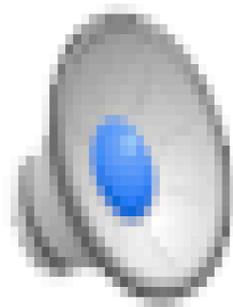
So we tried to find some commonality between the two, and it became pretty obvious that the commonality between those two genres was the idea of preset characters or classes.

Titan Classes



And once we unlocked that discovery, it became really clear that having Titans be preset characters was going to be a really good fit for High TTK since it really takes advantage of the increased face time between players.

Not only that, but the problem we were having of titans taking up a lot of screen space is now also a strength since you now have that much more screen space to visualize them.





So with titan classes, we were also able to create common "giant robot fantasies" that players can immediately identify with, like Scorch is the "Fire Titan" and Ronin is the "Titan with a Sword"

Titan Classes

- High TTK means more time to...
 - Assess enemies
 - Respond to strategies
 - Use ability combos

Having a High TTK means that players now actually have plenty of time to read an enemy and think about what tactics he might employ. A lot of games like Team Fortress 2 will talk about the necessity of the "snap read", which is that players need to be able to identify their enemies in a split second - thereby increasing the importance of distinct silhouettes. For us, fights lasted so long that the "snap read" isn't even that essential (I mean, we still strive for good silhouettes, but in the early days when we didn't have all the models, putting the titan's name above their health bar was good enough.

In addition, High TTK also means that players now actually have plenty of time to think about how they can combo their abilities. For example, Scorch has an incendiary trap that he can throw out and ignite. This on its own doesn't do anything - it requires Scorch to light it up with his main weapon. You would never ship this kind of ability in a Low TTK shooter because it's really inefficient: you're better off just pointing your gun at the enemy and shooting.

Preset loadouts

Allow for:

- More unique abilities
 - Not every ability needs to compete with each other
- Ability synergy
 - Create depth by allowing players to combo abilities

Having fixed loadouts also meant that abilities didn't have to directly compete with each other for players' loadout selection. This allowed us to create a variety of abilities that weren't necessarily balanced against each other. It also allowed us to create more niche abilities since not all abilities have to be useful in every circumstance.

Since we were going down the road of fixed loadouts, we wanted each titan's abilities to synergize with each other. This creates depth by allowing players to discover different ways they can use a titan's abilities. We also wanted to make sure that all the abilities thematically matched, to make the titan easier to understand both for the player and his opponent.

Weapon & Ability Design

- Avoid rapid fire weapons
- Low frequency, high damage attacks
 - Allow acquire → aim → fire loop to complete
 - Mimics Low-TTK dynamic
 - Create a more perceptible rhythm for attacks

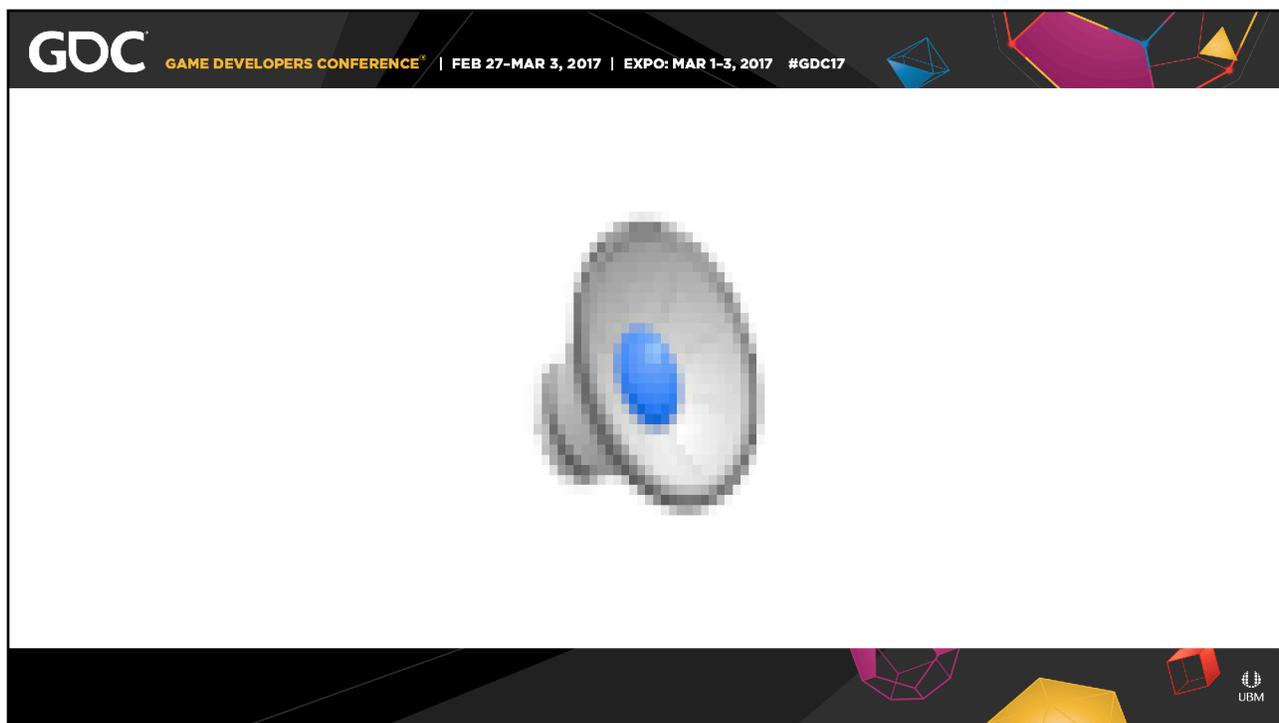
But, we still need to directly address the Atomic layer problem, and to do this, we found that staying away from rapid fire weapons actually benefitted that layer.

Low frequency, high damage attacks creates spikes in the flow of the fight, where players can have small moments of success/failure.

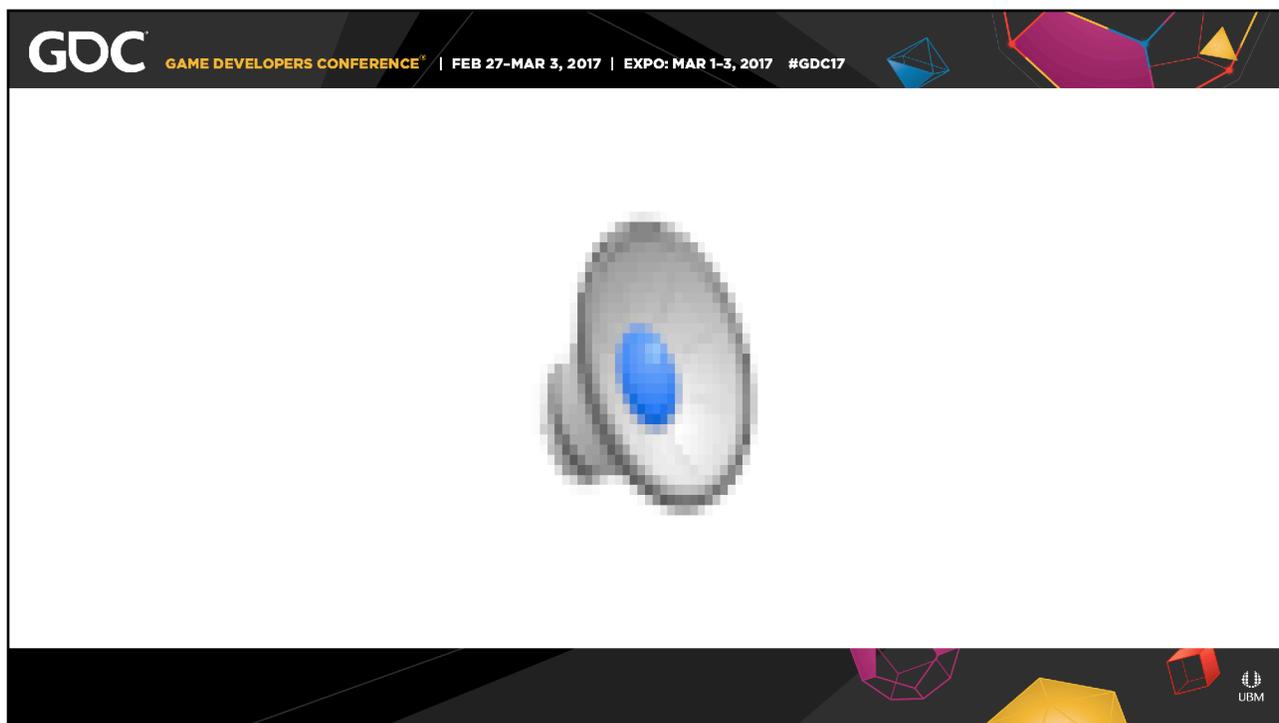
This also mimics the Low-TTK dynamic. The Acquire-Aim-Fire loop is completed after each shot since the lack of rapid fire capabilities means that the player needs to re-acquire his target after each shot.

This also allows for a better rhythm in the fight since it creates pauses between shots so players can have time to assess the situation between shots.

Let's take a look



This video would show titan combat in TF1, with the attacker using the XO-16 chaingun, which is a hitscan, rapid fire weapon. It will depict him shooting at a titan that is trying to escape at a distance, highlighting the lack of depth with precision, rapid fire, hitscan weapons. The first part would be from the attacker's perspective, and the second from the victim's perspective.



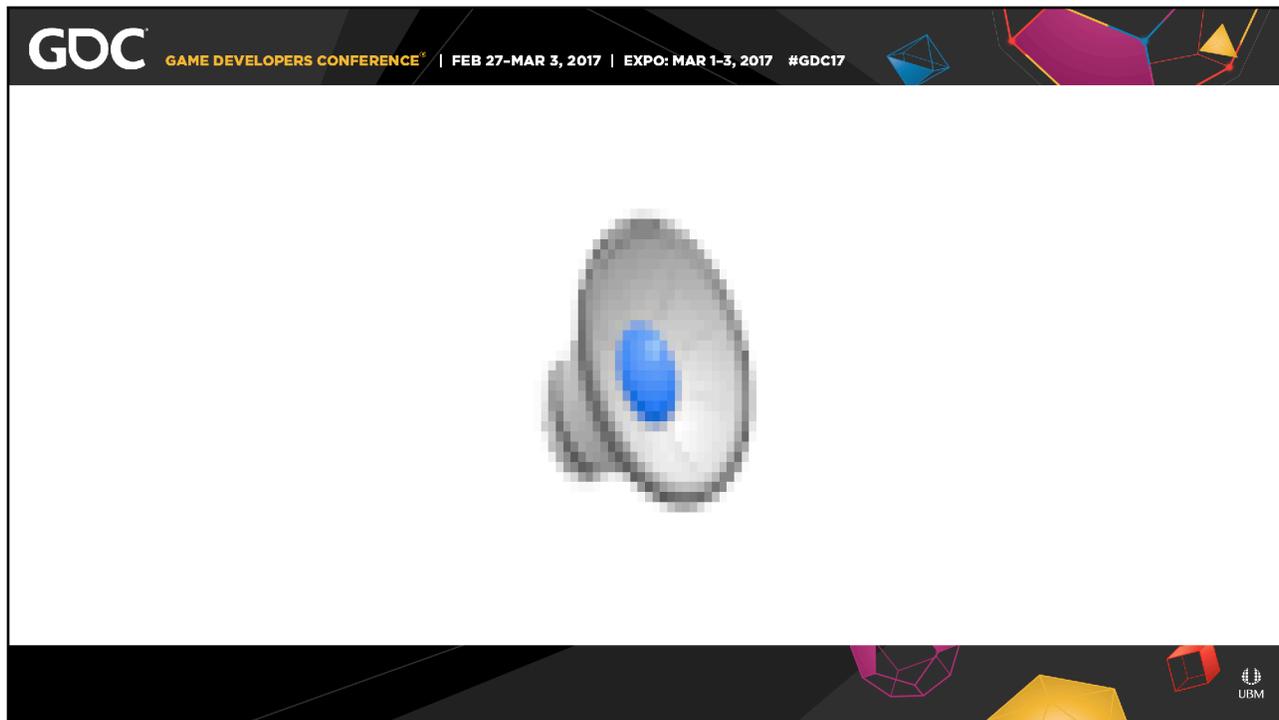
This second video would show a contrast, and show TF2 titans fighting, one using the Thermite Cannon, and the other using Ronin, trying to dodge the Thermite Cannon shots. Again we will show this from both perspectives.

Weapon & Ability Design

- Concessions made for accessibility
- Case Study: Ion
 - Rapid fire primary – “jab”
 - Single shot ordnance – “strong”

That doesn't mean we didn't have rapid fire weapons. The good thing about rapid fire weapons is that they are really good for new players, so we didn't want to completely give up that accessibility. But what we did is that we made sure that titans that had rapid fire weapons would have something else in their loadout that could create depth.

For example, Ion's Splitter Rifle is rapid fire but weak, and his laser shot is the high damage skill shot. So he has this dynamic where he uses the splitter rifle to do light jabs, but what he really wants to do is land hits with his laser shot.



Ion has splitter rifle as "jab" - use often but weak, shoulder laser as "strong" - hit hard, but need skill shot, low frequency.

This video will show some Ion gameplay, highlighting how he uses his Rapid Fire rifle to ping opponents, but occasionally using the Laser Shot to deal massive damage.

Weapon & Ability Design

- Heavy use of projectile weapons
 - Allow players to use dash & block skillfully



As mentioned previously, blocking and dashing was something we carried over from Titanfall 1, but we realized that this only really works when everyone's weapons are projectile based. Projectile weapons have travel time, and that time is essential for players to be able to respond to it. So combined with slow fire weapon designs, and damage mitigation as a concept is now viable.

Weapon & Ability Design

- “Fat Projectile” tech
 - Give projectiles larger collision boxes
 - Reduce annoyance with slow fire weapons
 - Works for Pilot weapons as well

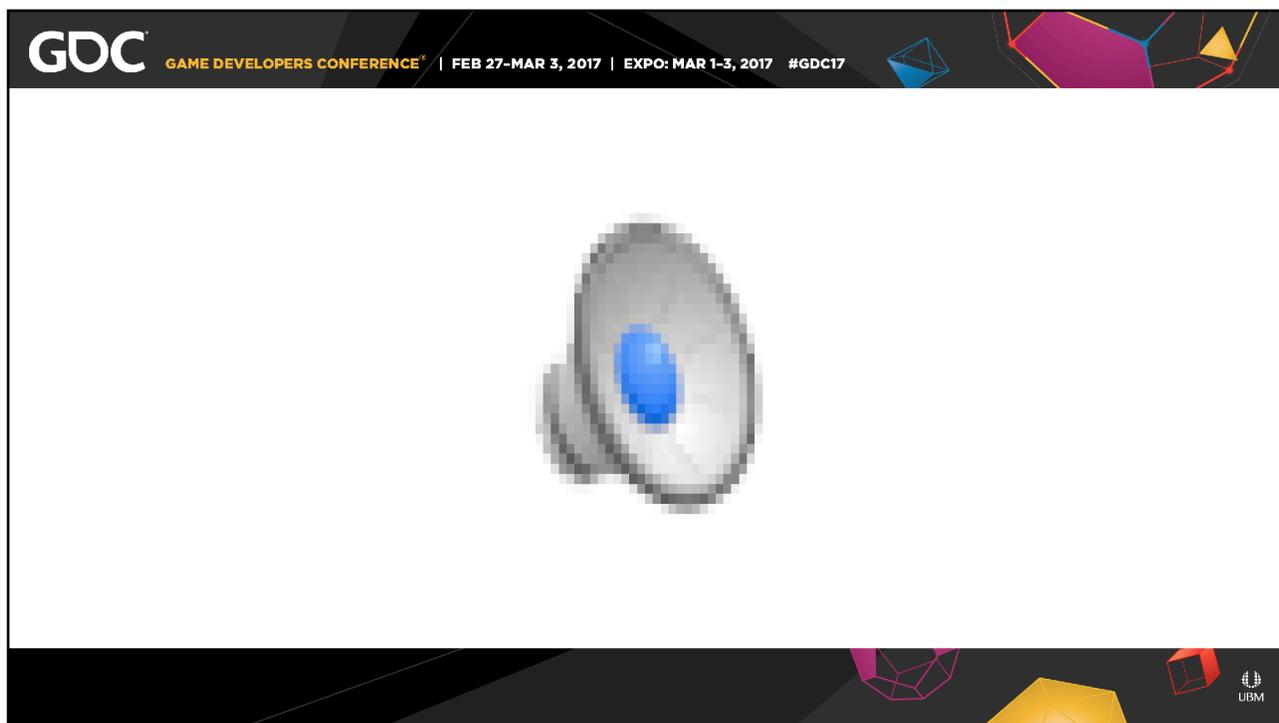
Projectile weapons tend to be difficult to use though, especially combined with the fact that many of our weapons were not rapid fire. To help with this, we have tech called “fat projectiles”, that we can apply - so we can give projectiles some width, making it easier to hit targets with them. This tech was also used for Pilot weapons, and that allowed us to create non-hitscan weapons for pilots that could go toe-to-toe with the Assault Rifle.

Weapon & Ability Design

- Hitscan can exist, but needs drawbacks
 - E.g. Predator cannon wind up time

Legion still has a hitscan weapon, though, but his minigun has a built in spin-up time so that compensates for the lack of travel time in his projectiles, and we do a lot of work to change his silhouette depending on the weapon state, so players can easily read whether or not he is ready to fire.

In addition, this also makes positioning way more important for a Legion player, so we accept that he will have less engaging Atomic decisions but that's ok since we've traded it for an increased dependence on Tactical decisions



Legion has minigun wind up gameplay so his decision making will lean more on position plays

This video will depict a Legion spinning up his minigun and having his opponent duck behind cover when he catches a glimpse of the Legion.

Weapon & Ability Design

- Abilities that create permanents



Another thing that we did a lot of was design abilities that created permanents in the battlefield. Scorch's loadout, in particular, features abilities that linger for some amount of time, so it forces his opponent out of position.

Weapon & Ability Design

- Abilities that create permanents
 - Players often play in the same space for minutes at a time
 - Dynamically change the battlefield
 - Slow moving permanents
 - Add a tangible timing axis

The thought behind that is that we realized that these Titan fights tend to last a while in the same space, so having something that can change the meaning of that space helped keep those fights feeling fresh.

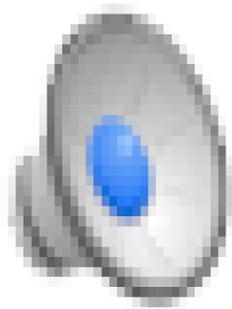
Some other examples of this would cluster missile, particle wall, Scorch's incendiary trap.

Static permanents are still good, but permanents that move in a slow, predictable path are even better. The "slow moving" part is important because you want these permanents to last a good amount on the battlefield (or enough time that players can react to them in a meaningful way). If they move too quickly, they end up hitting a wall or flying by your opponent, and they're basically gone at that point.



This really started when we made this ability called the arc ball (which oddly enough didn't ship as a Titan weapon). The arc ball (or the Thunderbolt, which is a pilot weapon) is an ability that launches a slow moving projectile that damages enemies within a certain radius of it. (as in the image)

When we play tested this, we found that it really added an extra thing that would change the dynamic of the fight for a certain amount of time.



Static permanents are still good, but permanents that move in a slow, predictable path are even better. The “slow moving” part is important because you want these permanents to last a good amount on the battlefield (or enough time that players can react to them in a meaningful way). If they move too quickly, they end up hitting a wall or flying by your opponent, and they’re basically gone at that point.



Weapon & Ability Design

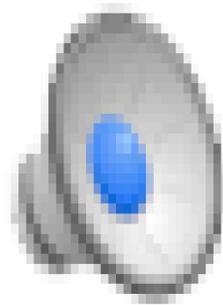
- Core Abilities
 - Breaks up stalemates
 - Allows for reversals
 - Counterplay
 - Wind up time / Movement penalty
 - Encourage commit/punish gameplay

Finally, the last element that we worked on was improving our Titan's core abilities.

In Titanfall, core abilities are essentially "supers" or "ults"--they are ultra low frequency moves that can have a high impact on a battle.

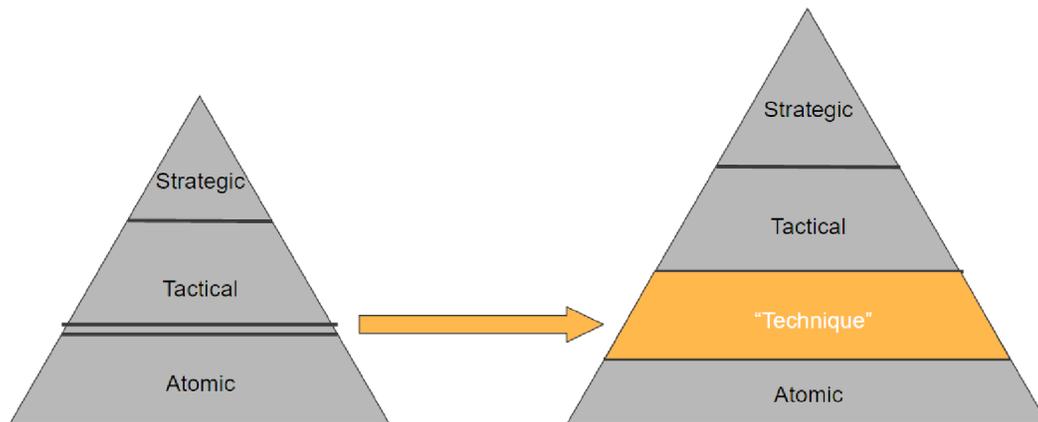
Titanfall 1 had core abilities, but they were mostly things like double damage or increased health, which were okay, but they didn't create the spikes in gameplay that you would want from an ultra low frequency attack. For Titanfall 2, we had to rethink our core abilities to be more attack-like with the goal of having them create opportunities to tip stalemates or create reversals.

One thing we wanted to make sure when designing these abilities was that they weren't "instant win" buttons. We still wanted the notion of allowing the players to express skill when using the core abilities. There's the idea of being able to use a core ability poorly and being able to use it well. Best example of this Ion's laser core, which has a wind up time to warn the opponent that it's going to happen, and when it activates, the attacker has slowed movement, disabled dash, and slowed turn speed. So a player has to make a judgment on whether or not it's a good time to use the ability. This also opens up a new type of gameplay, which is commit/punish, which is something that you find in fighting games a lot, where by doing a move, a character will commit to a certain maneuver and thereby exposing his blind spots that can be exploited by the enemy.



This video will depict Ion using his laser core in 3 ways:
Bad - enemy is near cover and aware so he easily ducks behind cover and flanks Ion
Good - enemy is out in the open and has nowhere to run
Great - multiple unaware enemies killed by laser core from behind.

Create decisions outside Atomic Layer



Really, what we are doing with all of these changes is we're trying to create new decisions for the player to make outside the atomic layer. We've kind of made this new layer, which for now, I'm calling the "technique" layer.

P.S. I just made that name up.

“Technique” Layer

- Assess Board State → Plan Attack → Execute
- Ability cooldown management
- Ability combo potential
- Present in Low TTK shooters → Grenades

The “technique” layer is this loop of decisions that occur in roughly 2-second windows. They have to do with assessing the current state of --not the whole map-- but this current engagement zone. Thinking about what abilities you have, what abilities the enemies have, and executing your next attack. Somewhere in there, you’re also thinking about the cool downs on your abilities and trying to figure out what your next available ability is and what you can combo it with.

This layer is actually sort of present in low TTK shooters, although it’s very underplayed. It’s present in the form of grenades, as a pre-engagement attack. In a low TTK shooter, if you know there’s going to be an engagement up ahead, you can use that time when you’re not being shot at yet to prep the room with grenades, trying to predict where your enemies might be. But in a high TTK shooter, because you’re not constantly worried about death, these moments will come up throughout the fight.

SP

Now that we've built our combat depth in multiplayer, we were able to apply this fairly easily to Single Player

SP Combat Design

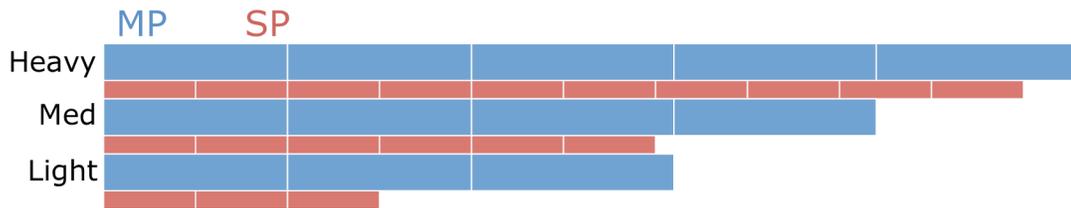
- First Try: Just spawn a bunch of Titans
- Second: "Weak Titans"
 - Felt good to fight
 - Made Titans not feel special

When we started working on Titan combat in SP, our first instinct was to just assume everything would work great! However, we ran into the problem of combat fatigue, where players would often get pretty tired after a titan fight. So to solve that, we experimented with "weak titans," which is a concept where presumably, we would say auto-titans would be easier to kill than "Piloted Titans." And when we implemented this, it felt great! People played through fights are reported that in general, they were having "fun"

But then after further inspection, we realized that being able to mow through a bunch of titans in a row really made Titans feel... weak... like they didn't feel special anymore - too disposable. In addition, we had all these cool behaviors from MP that weren't being showcased because the titans would die so quickly.

SP Combat Design

- Try #3: Back to High TTK
 - Pushed differences in Titan health



So we scrapped that idea, and instead split the difference. We increased the health back to their original values, and then we pushed the differences in health. So the light chassis has about half the health of its MP counterpart and the medium chassis has around 80% health. Now, 50% Light Chassis health is still a decent amount so they definitely still have time to use their abilities. At 50% health, I believe fighting a Ronin on average still takes a player around 15 seconds.

This allowed designers to tune fights a little better, so if you wanted an "easier" fight, you would drop in a Light Titans like Ronin or Northstar. We found that good fights usually were comprised of one Heavy Titans with one or two Light Titans backing him up.

But fights were still pretty tiring, so we still needed to break up titan fights with Reapers and Infantry sections. This proved to be good not just to break up fights, but to sell the scale of the titans as well.

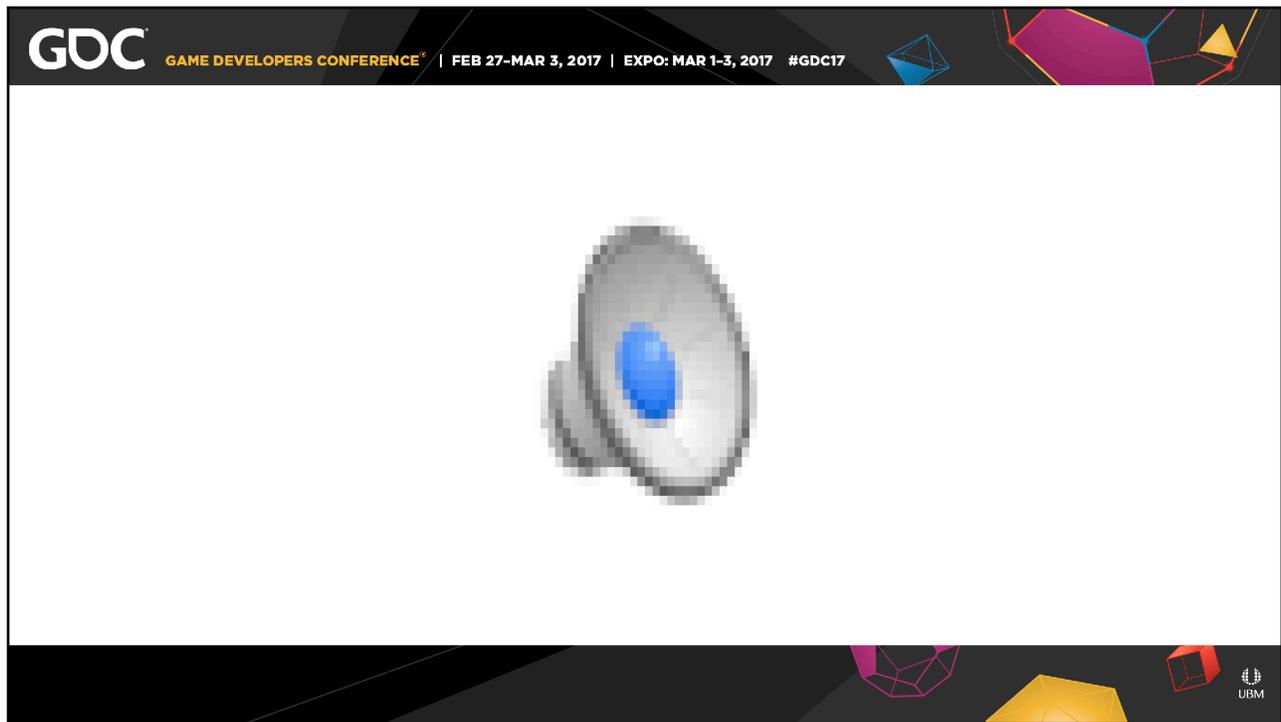
SP Combat Design

- Titan fights are usually 1v2 / 1v3
 - Allows the player to focus on what the AI is doing
- Give enemy titans personality
 - VDU system
 - Makes titans feel smarter

Since we still ended up with high-ish health titans, we generally tried to have titan fights be 1v2 or 1v3, and this allows players to focus on the enemy titans more, since we also found that players now had a lot more face time with enemies than in Low TTK games.

The increased face time between enemies means that we had all this time to play with, so we used it to give enemy titans more personality. It was a good opportunity to kind of, build a relationship between the player and the enemy he would be fighting.

To do that, we wrote a system, called the VDU system, that would detect player actions and make enemy titans respond accordingly. The idea was that when you fight an enemy Titan, that Titan's pilot would have an open communication channel with you and he would taunt you and stuff. So it would do things like, when the player damages the enemy, he would respond by saying something like "Ugh! How dare you!"... or if the player used his core ability, the enemy would say something about that too.



This video will show snippets of a Titan fight in SP, showing the different reactions they can have to players

Titan AI

- Good to invest in robust AI
 - High TTK = you spend a lot of time fighting
- Street Fighter bot fights
- Tries to act like players
- Make MP depth directly applicable to SP

So let's talk a little more about Titan AI.

Again, since players are now spending a lot more time with each enemy, they have a lot more time to notice AI behaviors, so it was worthwhile to invest in more robust AI.

In designing our AI titans, we decided to go the route of Street Fighter bot fights. We liked that when you fought against a bot in Street Fighter, all the thought processes that you go through when fighting a player would more or less apply to fighting the bot.

Our Titan AI generally tries to act as a player and they follow the same rules as a player. They'll only try to block or dash once you've fired. Again, having projectile weapons here helps because there's that travel time, which the AI also uses as a window to make decisions.

They also follow the same cool down rules for their abilities. It's also possible to bait certain abilities out of an enemy and then counter with your own attack.

These titans are used in both MP and SP. And again, SP simply adds a layer of characterization on top.

Titan Boss Battles

- Didn't have time to hand script
- Same as other AI, but more aggressive ability usage

The last thing I want to talk about is our AI Boss Battles. In Titanfall 2, (spoilers!) players will fight a number of Boss Characters, which are the different Mercs that Blisk has hired to help him.

Due to time constraints, we didn't have enough time to hand script each boss battle, like how we usually think of traditional boss battles. Instead, our Bosses just use the same system as our other Titans, but they are just more aggressive about using their abilities. And what I mean by that is that our "normal" titans will usually wait a bit after their ability is ready before they actually use it, but our "boss" Titans will often try to use their abilities as soon as they are ready.

Titan Boss Battles

- Need to make them feel special
 - Boss intros
 - Shields
 - Doomed State
 - Special VDU callouts

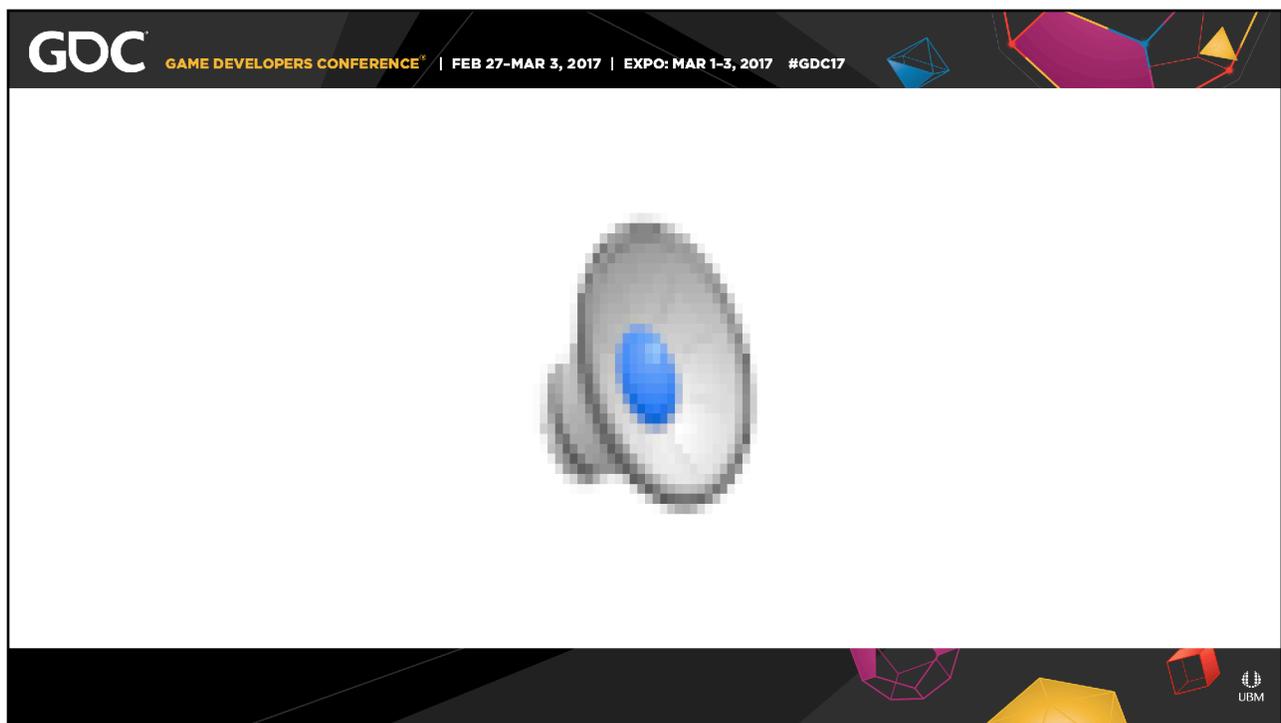
But! We still wanted to make our boss battles feel more special, and there are a few things we did for that

One, all our bosses have a cool intro that showcases their personality. With the exception of a few special cases, this is the only time we actually use "cutscenes" in Titanfall 2

Two, bosses have regenerating shields, just like the Player. Not only does this make them harder to fight, or deal damage to, but it also enables them to act just a little bit smarter than other Titans, since they will also try to preserve their shield. So a Boss Titan will retreat behind cover to try to get his shield back.

Bosses also have doomed state, which is an extra layer of health that puts a titan in an "executable" state. We removed this on regular titans because it extended their health too much, but it felt appropriate for bosses to have. This makes it so that bosses are the only titans that can get executed.

Finally, Boss Titans have extra VDU callouts that they can use. They have a few pools of just "taunt" dialogue that they can say if they haven't said anything in awhile. They will also call out if they are being aggressive or defensive so they seem a little bit smarter.



This video will show snippets of a Titan boss fights in SP, showing intros and some of the special dialogue they play

Titan Boss Battles

- Lots of room for improvement
 - Custom script on top of base AI
 - e.g. Viper boss fight

Overall, I think given the circumstances, it worked out really well. I think the fact that the bosses actually use AI makes our boss fights feel less scripted than traditional ones.

I do think there's lots of room for improvement, though, and I think there may be a middle ground where we can have our boss titans use their AI, but designers can script in special events to really sell the spectacle. And you get a little bit of a glimpse of that in the Viper fight in our game - so I think in the future I would try to push more in that direction.

Pitfalls

Finally, let's talk about the unexpected problems we ran into during development

Too Much Complexity

- Street Fighter & MOBAs are not that approachable!
 - Greater skill gap between players that know characters and those that don't
 - Partially solved by good matchmaking
 - Needs more work

The biggest pitfall in the direction we took was that all these different loadouts really increase the complexity of Titan combat. By introducing the skill of ability combos and enemy recognition, we created a potential for a greater skill gap between player that played a lot and know all the characters, and players that don't.

This can be partially solved by good matchmaking, so we don't ever put two players of different skill levels in a match together, but matchmaking can only go so far.

Too Much Complexity

- MOBAs work very hard to inform players of characters' abilities
 - Character tutorials
 - Training mode

Other games such as LoL and Street Fighter do a lot of work, both inside and outside the game, to give players access to information about their characters. We did a little bit with intro videos for the titans, but I think there's still a lot more we can do. Something like a training room, or a certification course would be ideal so players have a safe place to go to practice using a loadout.

Too Much Complexity

- Too much focus on 1v1
 - Led to overly complex abilities
 - Did not properly represent in game experience
 - Distracted from game mode objectives

Another thing that added to this was that when we started working on Titans, we primarily focused on making sure players were having good 1v1 fights. This was all well and good when playtesting 1v1 and even 2v2, but was disastrous when we actually played a real match of Attrition since players were having to deal with not just more titans, but the potential for pilots sneaking up on them as well.

This meant that we actually had to tone down some of the more obtrusive effects, that were again, working in a 1v1 context. For example, Northstar's plasma railgun used to apply a huuuge knockback effect whenever you would get hit – and this was great since it really helped him keep his opponent in his ideal range. But you can imagine when playing a 6v6 match, players didn't really appreciate being knocked back seemingly randomly from Northstar sniper shots.

The other problem this presented was that we had tuned health values to again be interesting in a 1v1 context – our intention was to make sure titan fights had enough time to “feel like a real fight”, again looking at Street Fighter fights as reference. In practice, however, we found that whenever two titans would get into a fight, they would effectively end up ignoring the game mode and disappear into their own world... (hardpoint story)

Too Much Complexity

- Titans are only ~30% of the game
 - On the fly loadout swap
 - Dynamic hint system

This problem is exacerbated by the fact that you are in a Titan for only about 30% of the time in Titanfall. This means that even if you wanted to practice using a certain titan, you would have to play the Pilot game for a while until the next one is available, which is not really ideal. Right now, if you wanted to practice using a Titan, the best place to do that is in Last Titan Standing, which is the game mode that always starts you in a titan.

In Single player, this is the main reason we switched to on-the-fly loadout switching for BT. Initially, players would pick up new loadouts from enemy titans, but we ran into the problem that they may pick up a loadout they don't like and be stuck with it - and it takes a long time to learn a loadout - so it really disincentivizes players to seek out new loadouts. With the Mega Man style, players can freely experiment with the different loadouts and not worry about being stuck with a loadout that doesn't suit their playstyle or is too hard for them to learn.

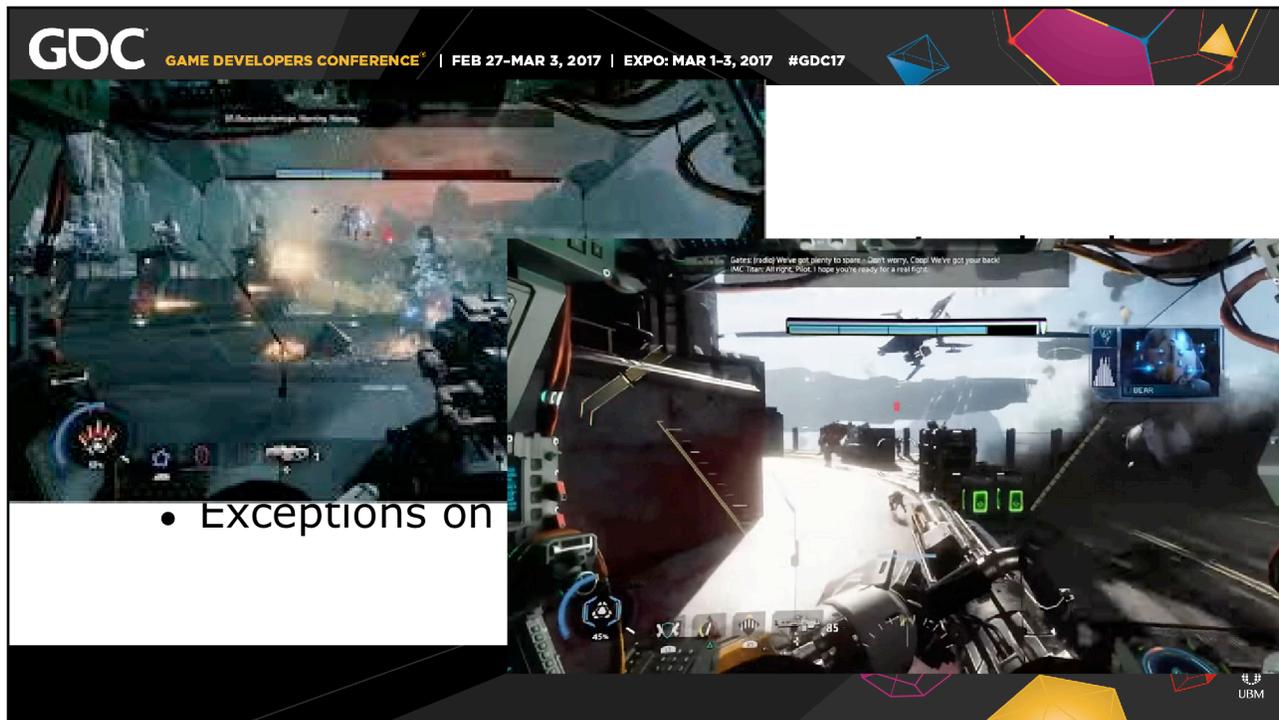
Too Much Complexity

- Hard to pinpoint where you made a mistake
 - Could have made a mistake early in the fight, but might not remember
 - No benefit from Kill Replay

Another thing specific to High TTK is the problem that it's difficult to communicate to players when they made a mistake. For Low TTK (Pilot) gameplay, we have a feature called Kill Replay, which will show players their final moments before they died. This 8-second window is usually enough to be able to show players exactly how they died so they can do better next time.

High TTK fights could last for minutes so showing the final 10 seconds of someone's life may not reveal anything valuable. In addition, players will often eject out of their titan instead of dying so they aren't even in a mindset to absorb that lesson (since they're still busy running around, trying to kill things as a Pilot)

We're still unsure of how to solve this, and some ideas have been brought up like showing a feed of major damage sources, but I think more research needs to happen with regards to how to present this information.



As I mentioned, in SP, when we started designing combat encounters with these titans, our first instinct was to lay out one fight after another similar to other shooters we've worked on, but we've found that even after just one fight, players got pretty tired since titan fights are a lot more involved than pilot fights.

We had a make a conscious effort to space out titan fights more and insert infantry combat in between, just as a palate cleanser. The only exception is in levels like "Trial by Fire" and "The Fold Weapon" where we had a lot of titan fights, but we purposely set up mechanics to make them go faster. In "Trial by Fire" the player has friendlies with him, so they help distract and damage enemies. In "The Fold Weapon" we have a bombardment mechanic that helps a player kill a bunch of titans.

This is generally less of a problem for our multiplayer since there are less titans on the field overall, due to the Pilot-Titan-Pilot thing. And in LTS, we have natural breaks that are the round transitions so those are good cooldown moments.

But I imagine if you were to make a multiplayer game that's high TTK all the time, you would run up against this problem as well.

Combat Fatigue

- High TTK fights are a lot more involved
- SP had to insert breaks between titan fights
 - Break up titan fights with infantry sections
 - Exceptions on a per-level basis
 - Less of a problem for MP

As I mentioned, in SP, when we started designing combat encounters with these titans, our first instinct was to lay out one fight after another similar to other shooters we've worked on, but we've found that even after just one fight, players got pretty tired since titan fights are a lot more involved than pilot fights.

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Regen Health

- Is good and thin
- But bad cycled o



rs stop
to get

Finally, this last problem is more of a Titanfall-specific problem. It has to do with regen health.

In Titanfall 1, titans had two layers of health. One layer was a regening shield and the other layer is health that didn't regenerate. In Titanfall 1, we were dealing with this problem we called Voltron. That's when a really good group of titans could get together and kill all the titans on the other team by 3v1ing or 4v1ing them. Basically, they would keep their advantage the whole match because the other team would only be able to bring titans in one at a time. Because they had regening health, it was hard for the other team to even bring their health down.

We tried different regening health models and they were either too weird or didn't solve the Voltron problem, so at the end of the day, we decided it was healthier for the game to not have regen health even if it meant having a little less depth for titan combat.

We still kept regening health in single player because Voltron wasn't a problem in single player. But, I imagine, if you were making a game that was all high TTK, we'd probably have regening health in there.

Regen Health

- Is good because it makes players stop and think...
- But bad because titans needed to get cycled out
- Kept it in SP since that was not a concern

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Conclusion

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- High TTK negates depth at atomic level
- Push designs that embrace High TTK
 - Fixed loadouts fit well with High TTK
 - Enemy recognition
 - Ability combos

Conclusion

- Think about how to add more interesting decisions within & outside that layer
- Be ready to handle increased complexity
- Watch out for combat fatigue

Final Words

- Embracing tough designs can lead to more interesting opportunities
- High TTK opens up a new design space for shooters
 - A space where ability design can flourish

Finally, I want to point out that when we started this project, High TTK was seen as kind of a problem child, and there was definitely a lot of temptation to lower their health values. But I for one, am glad that we embraced the High TTK nature of titans as it really made us push ourselves to make something that feels really unique.

And I'm glad we did – I think we found a pretty unique shooter space where designers have a lot more room to design really unique and interesting abilities and I'm excited to see how far we can take this.

Special Thanks

- Mackey McCandlish
 - Lead Designer
- Steven DeRose
 - Game Designer
- Jiesang Song
 - AI Programmer

Questions?



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P.S. Respawn is hiring!