Vacumm BP

Another concept we wish to apply on the game was a simulation of hull breach causing a decompression in the environment and a vacuum to the space and being one hazard to consider seriously by the Decompression Sickness as documented by NASA in the next link:

https://humanresearchroadmap.nasa.gov/evidence/reports/DCS.pdf

An example would by in the video regarding the gameplay of Dead Space 2 produced by EA in 2011 in the link down below (note: Game rated M for mature +17 due to strong language and violence on horror gender, viewer discretion is advised)

https://www.youtube.com/watch?v=UyfLg5aN09o

https://www.youtube.com/watch?v=5QbRDVGat7HQ

As for the logic in programming should be an area that drags based on the distance of the vacuum and location of elements another video example that was considered was the gameplay of smite

https://youtu.be/RBiWUS3_6Kk?t=236

https://www.bentglassdesign.com/glass-used-in-space/

https://ntrs.nasa.gov/citations/20070013741

In the build for the Unreal Engine 4 was used one the built walls Blueprint then was placed a collision box to evaluate how close the player is from the range of the decompression vacuum area

Vacuum BP

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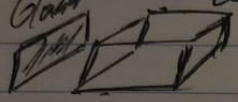
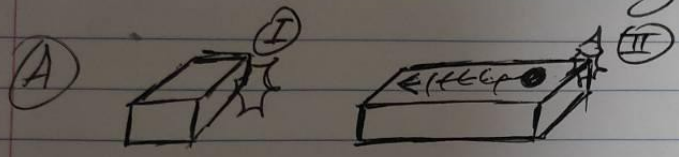
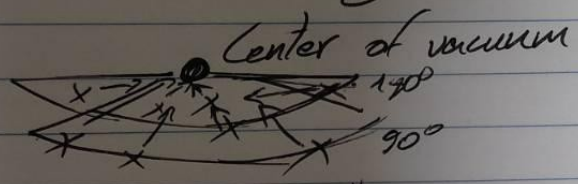
Glass Mesh Collision Box

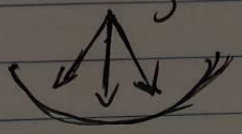


Note: Any contact on surface will apply impulse dragging the objects including players



Note: check for dynamic vacuum





Detection and pull from pointing

Test for simple objects with simulated physics and ragdoll

VFX works

A) Small circle particles (dot material)
B) Trail of dust particles
C) Smoke particles

https://www.reddit.com/r/unrealengine/comments/dn02v2/how_do_i_attract_an_object_with_physics/

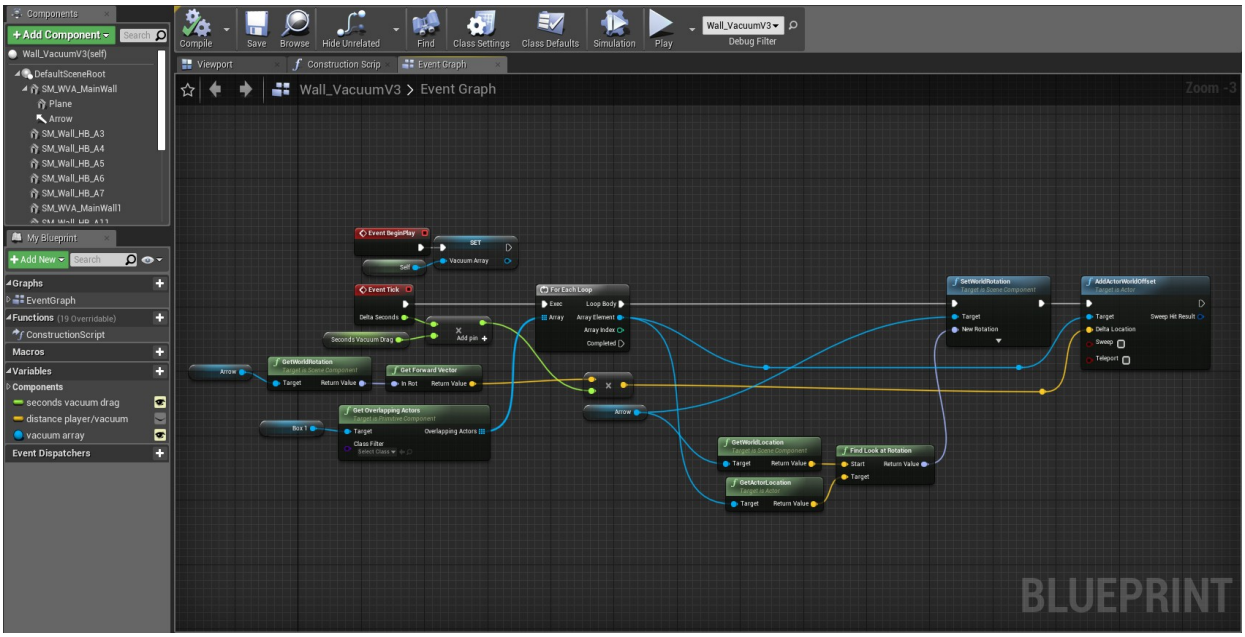
By checking another tutorial we managed to get an initial concept to drag the player

https://www.youtube.com/watch?v=yq7Obrk-tbA

And by another tutorial was managed to get it dynamic with the idea of being dragged at the center of the breach using the collision to change the arrow that points then drag the object

https://www.youtube.com/watch?v=Q7pngazR75E&t=162s

Variables	
Name	Type
Seconds vacuum drag	Float (1.175494351 E - 38 to 3.402823466 E + 38)
Distance player/vacuum	Vector (X,Y,Z)
Vacuum array	Actor (any interactive object in the game project)
broken_window?	Bool (True/False)
Location_VFX	Transform (Location (X,Y,Z) & Rotation (X,Y,Z) and Scale (X,Y,Z))



The variable of seconds vacuum drag can be adjusted for the force it will drag the player and can move far based on the character movement to be enough to escape but need to make an effort as for jumping won't be efective

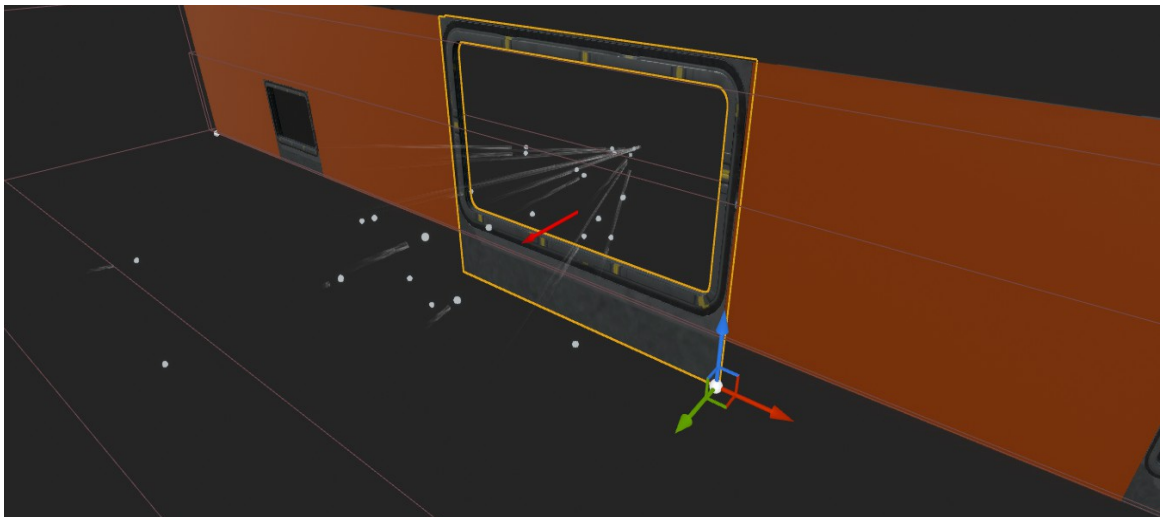
The variable of distance player/vacuum will be adjusted to change the address the arrow is pointing and causing to be pull to the center of the blueprint any material no matter the relative location or rotation in the axis X, Y, Z

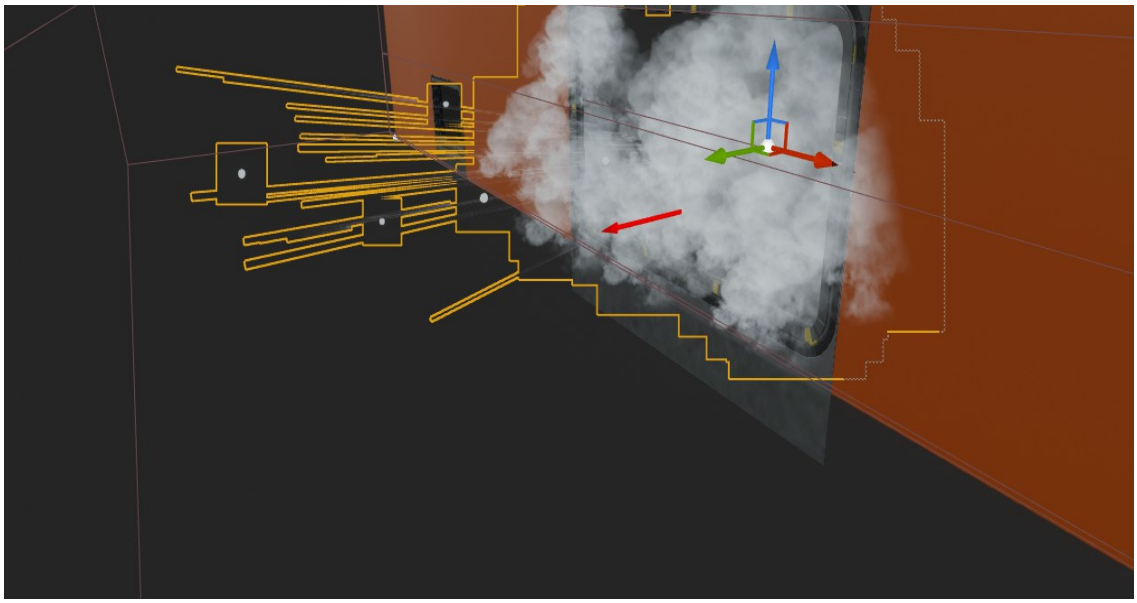
Vacuum Visual Effect

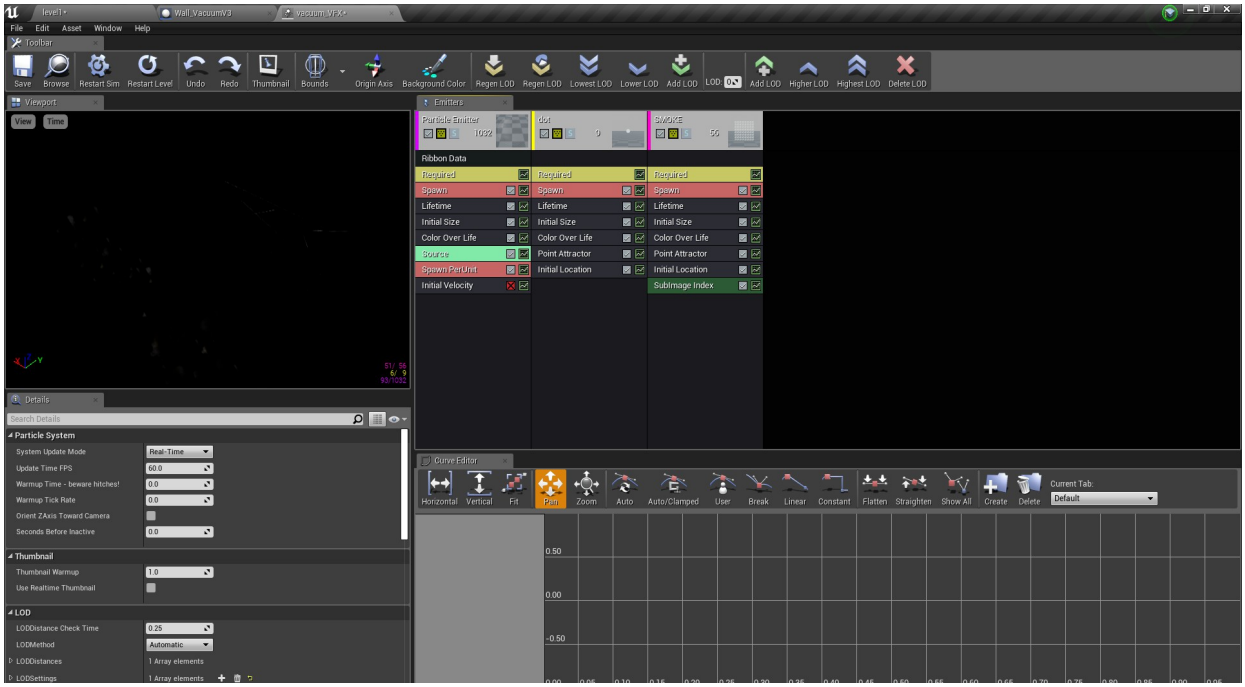
With the blueprint for the vacuum working we need not only to work on the mechanics and logic but also the visual for the player to understand what is happening in the game level, usually from the other examples the decompression cause the air to be visible due to the high pressure when is being sucked out to space as well in custom displays a few particles going fast with trail ribbons for the high speed of those, by using tutorials it was made the visual effects of the vacuum

https://www.youtube.com/watch?v=jBUF6at1s1o&t=459s

https://www.youtube.com/watch?v=aJe1ysBGbXs&t=358s






File Edit Asset Window Help
Toolbar
Save Browse Restart Sim Restart Level Undo Redo Thumbnail Bounds Origin Axis Background Color Regen LOD Regen LOD Lowest LOD Lower LOD Add LOD Add LOD Higher LOD Highest LOD Delete LOD
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Emitters
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Details
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System Update Mode Real-Time
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Warmup Time - beware hitches! 0.0
Warmup Tick Rate 0.0
Orient ZAxis Toward Camera
Seconds Before Inactive 0.0
Thumbnail
Thumbnail Warmup 1.0
Use Realtime Thumbnail
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Current Tab:
Default
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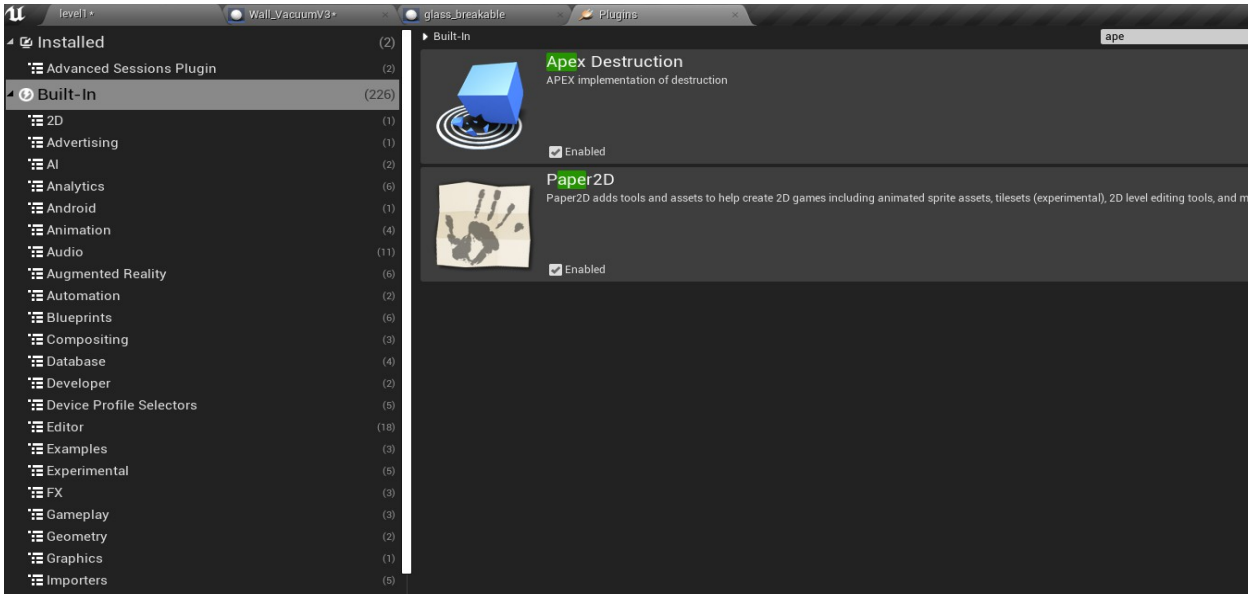
With the Vacuum mechanics and display working was missing to also make the effect of the glass breaking to start the decompression

Using the plugin on the engine of apex destruction was placed a destructible mesh that will react when something collides and cause the window glass to break in pieces.

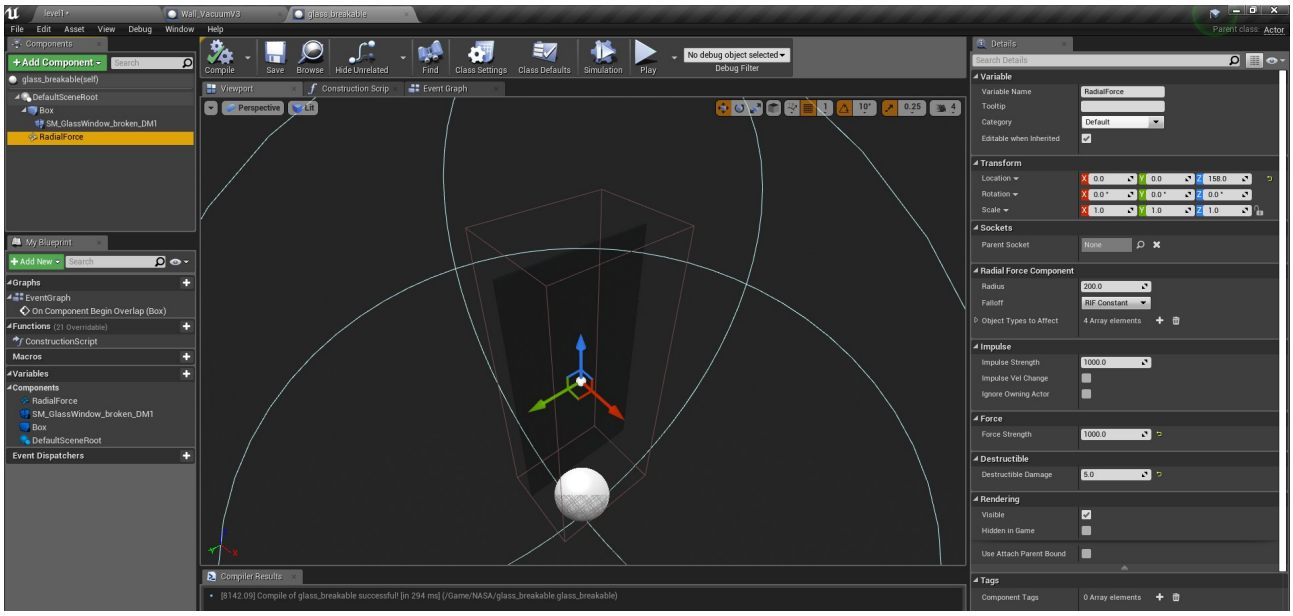


After testing the collision settings needed to be customized inside a blueprint with the next elements:

1. Collision Box: Designed to detect when in the area gets in contact with the projectile(s) to trigger an action of the sequence.

2. Destructible Mesh: 3D model already designed to simulate breaking for visual effect.

3. Radial Force: Physic impulse to input damage in the destructible mesh and “break” it at the same time is expanding the broken parts.



The concept is when the projectile or items meant to cause damage gets in the collision box will trigger the radial force to apply the damage on the destructible item and cause the break then the collisions for the drag and the vacuum visual effect will be enable to simulate the decompression, will work also within a certain range.

https://youtu.be/JLkpovKoS3A