Preventing Wallhacks

With information theory and geometry

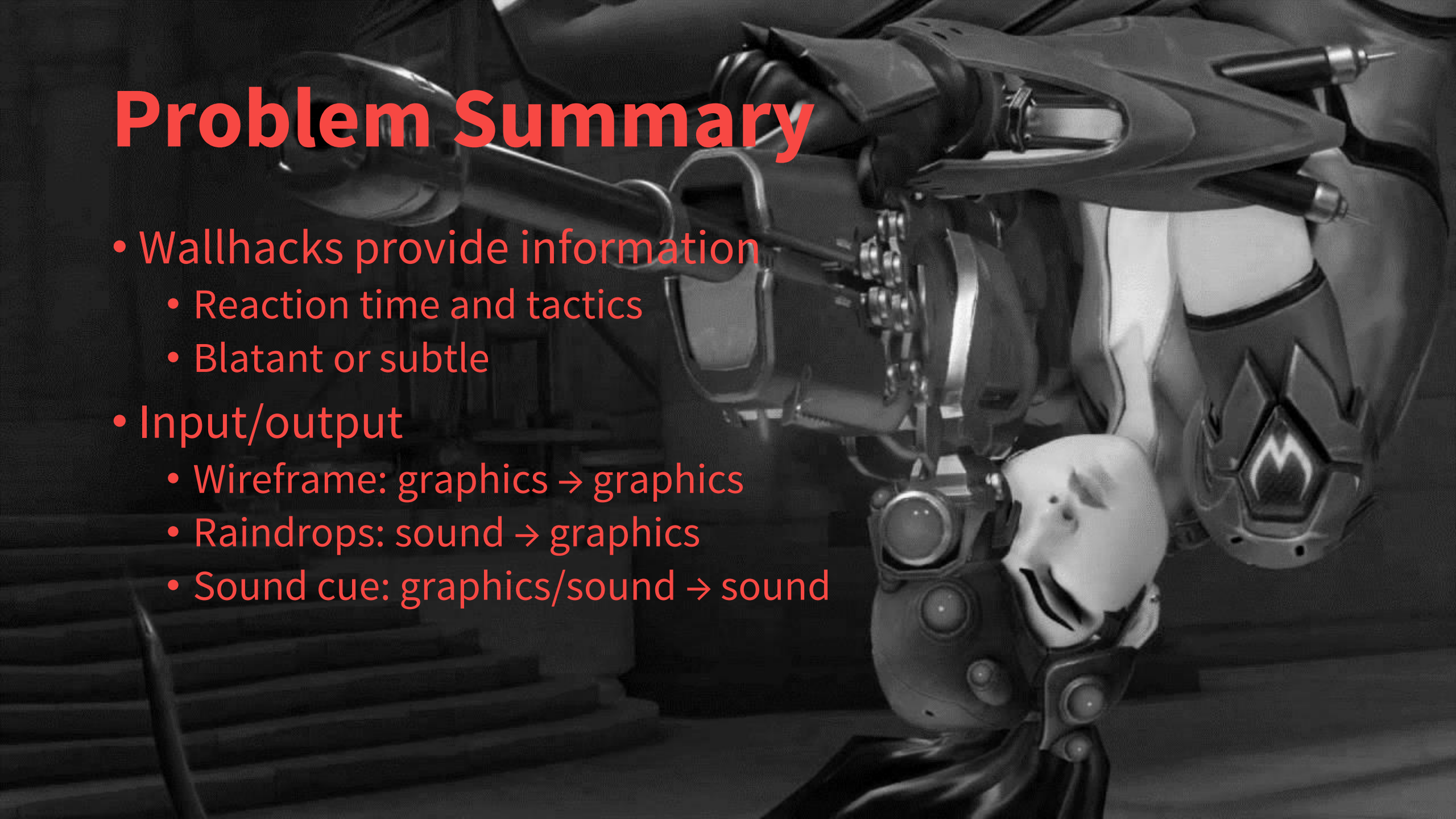
Topics

The Problem

Current Solutions

Our Solution

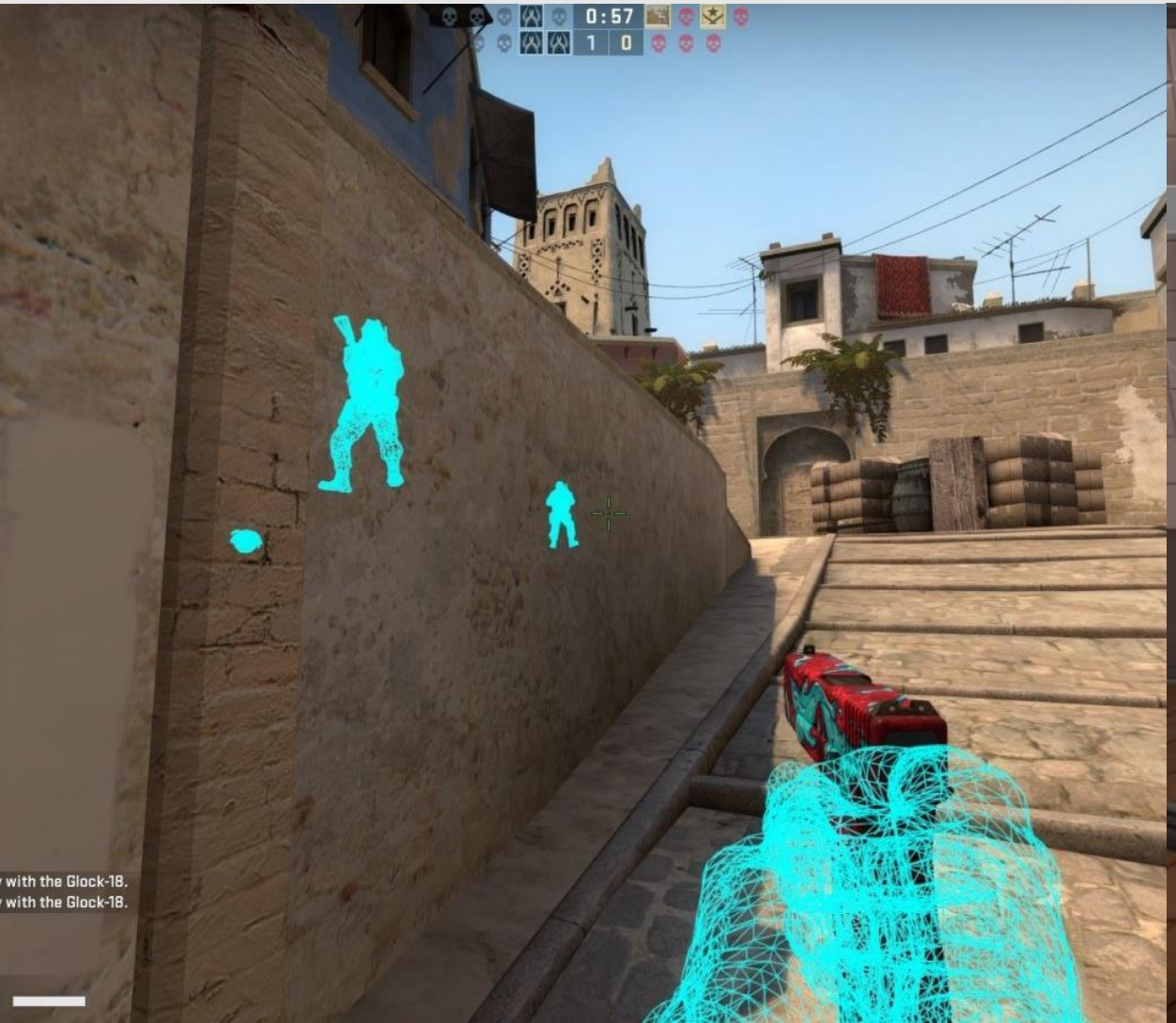
Future Work



Problem Summary

- Wallhacks provide information
  - Reaction time and tactics
  - Blatant or subtle
- Input/output
  - Wireframe: graphics → graphics
  - Raindrops: sound → graphics
  - Sound cue: graphics/sound → sound

Example 1


0:57
1 0
with the Glock-18.
with the Glock-18.


6
1:23
6
B
A
B Tower
100
12 / 45

Example 2

Example C

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Detection


132 fps on maps\de_dust2.bsp
COUNTER-TERRORISTS 1
1:34
Round 6/30
4 TERRORISTS
$1900
$24100
Diamond Sparrow
$5350
100 Hurricane
Toucan
100 Iceberg
23 Diamond
100 Eclipse
The Suspect 100
Sparrow
Vortex 100
Iguana 100
Cyclone 100
The Suspect
Overwatch Case Review
AWP
K A D ADR 3K 4K 5K HS% OBJ
1st 8 1 2 131 1 - - 50% 2
2nd
[X] X-Ray [F] Overview [Q] Graphs
100
100
10 / 30

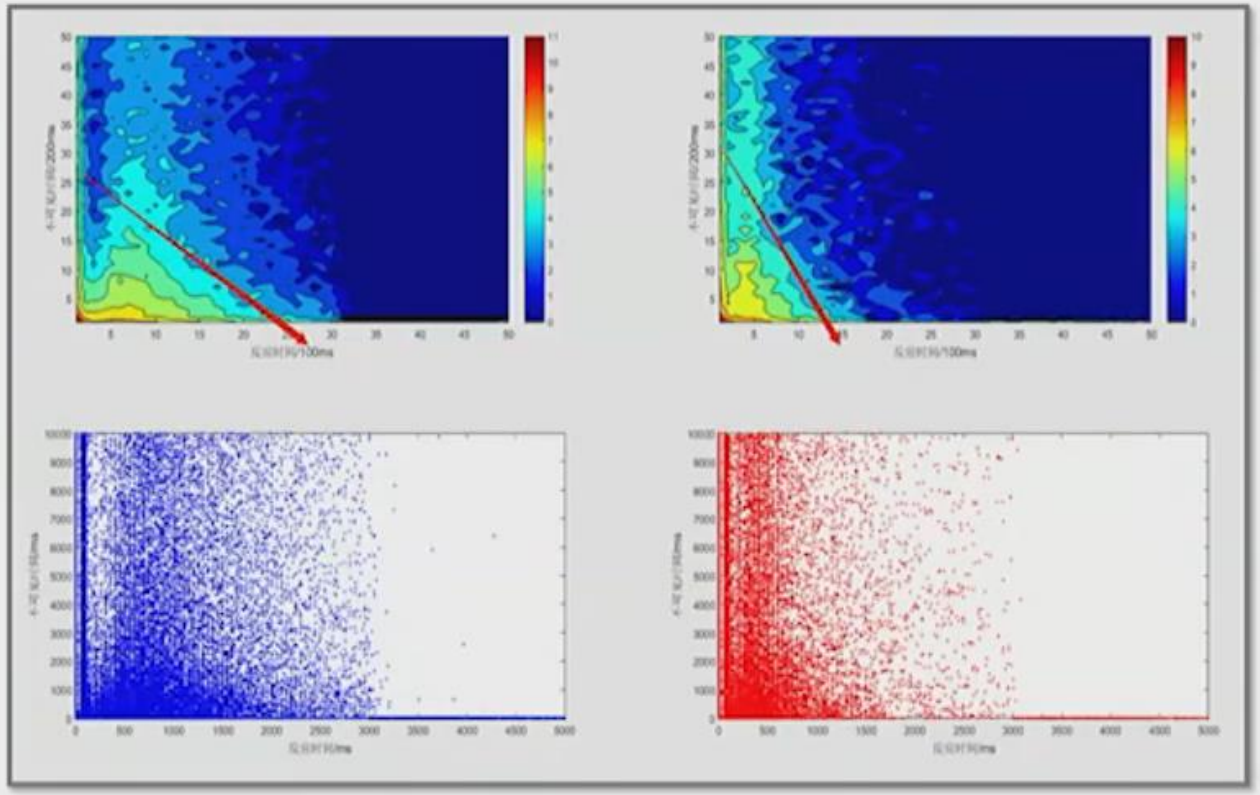
Detection

AI Training

Restore raw data through analyzing replay file

Create feature engineering

Machine learning



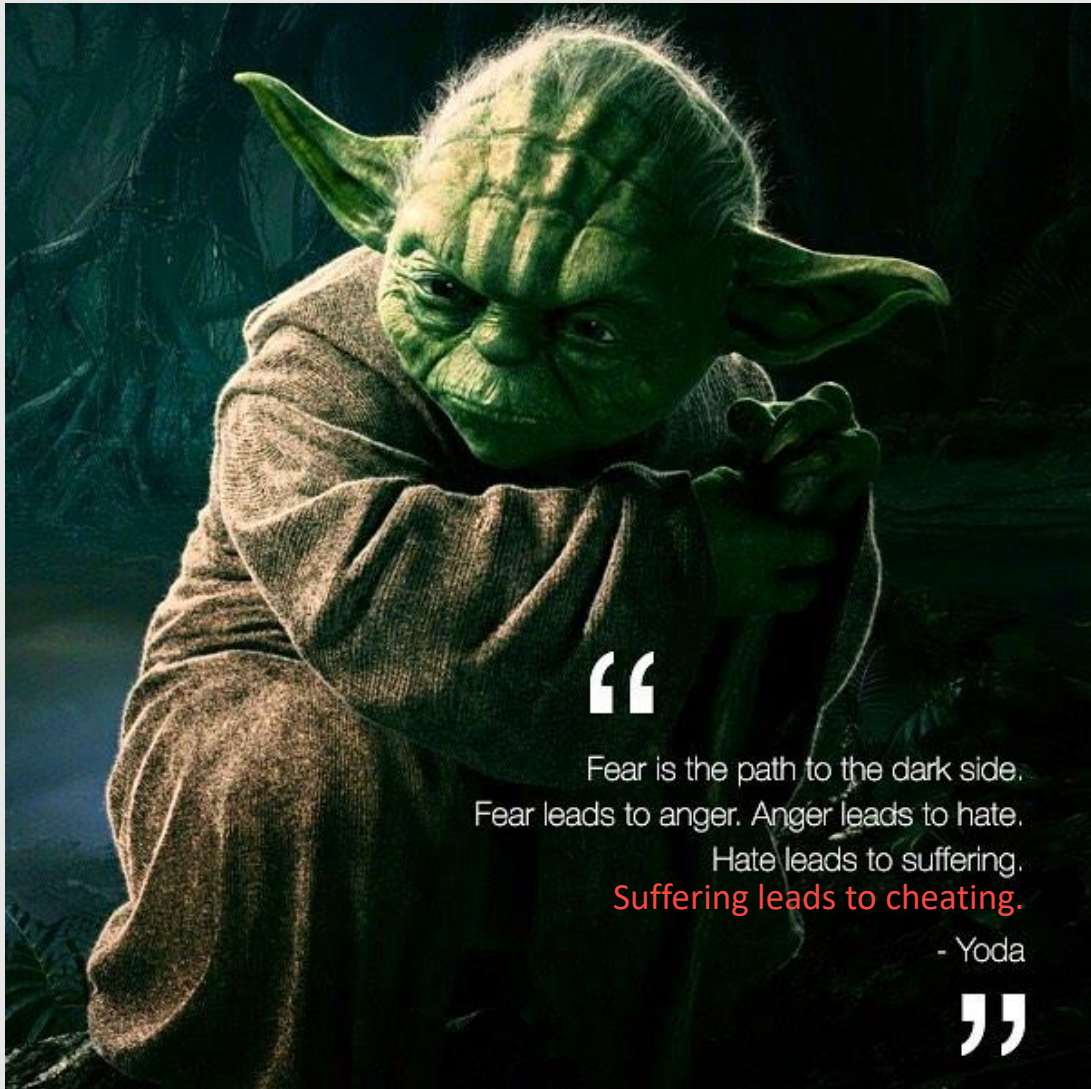
Normal Players

Cheating Players

Jiayin Wang GDC 2019

Flaws of Detection

- Hard to be certain
- Psychological stress:
  - Uncertainty: “Hacks! Yes! No! Yes?”
  - Fear: Maybe everyone is hacking.
  - Darkness: I should too.

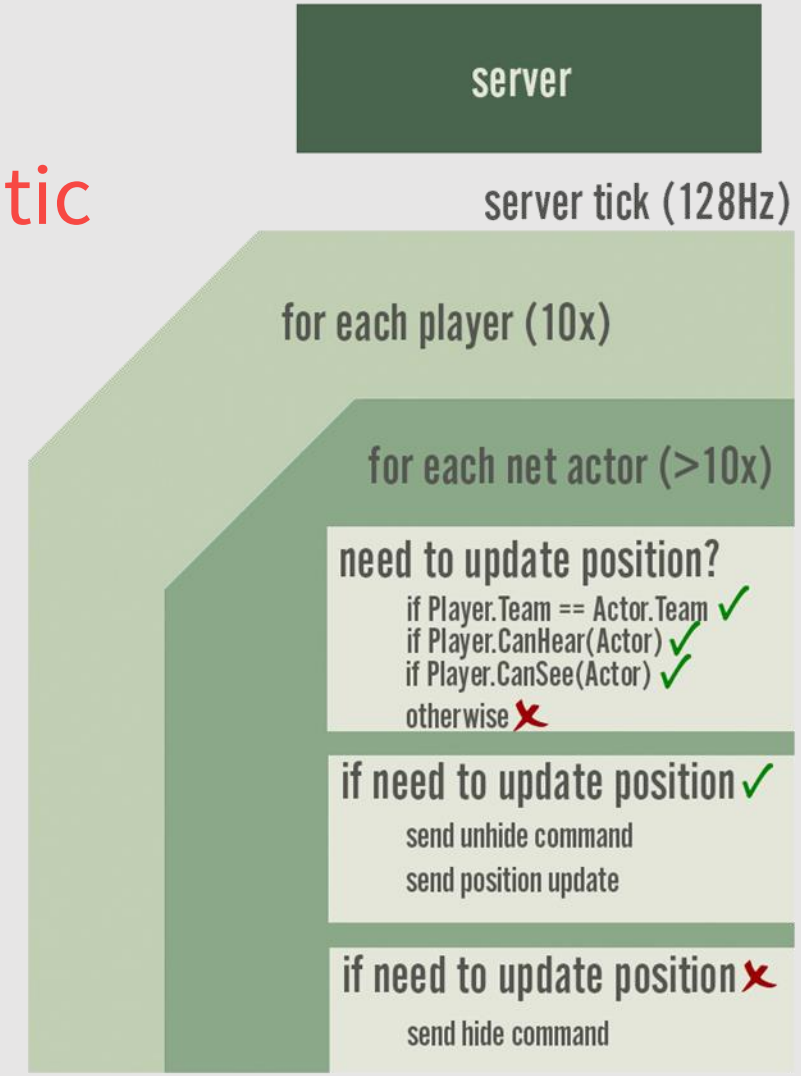


Prevention: Client

easy™
ANTI-CHEAT

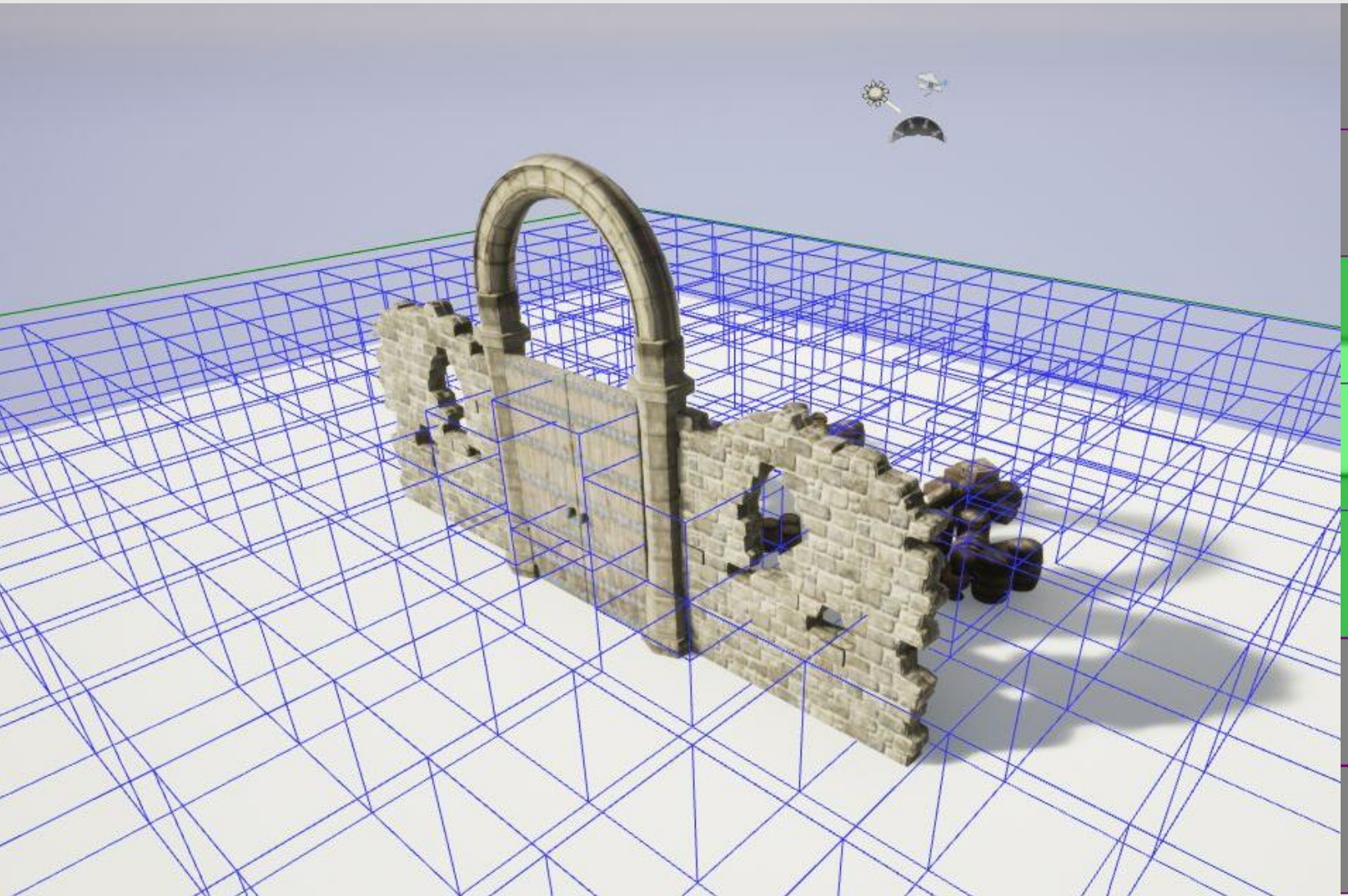
Prevention: Server

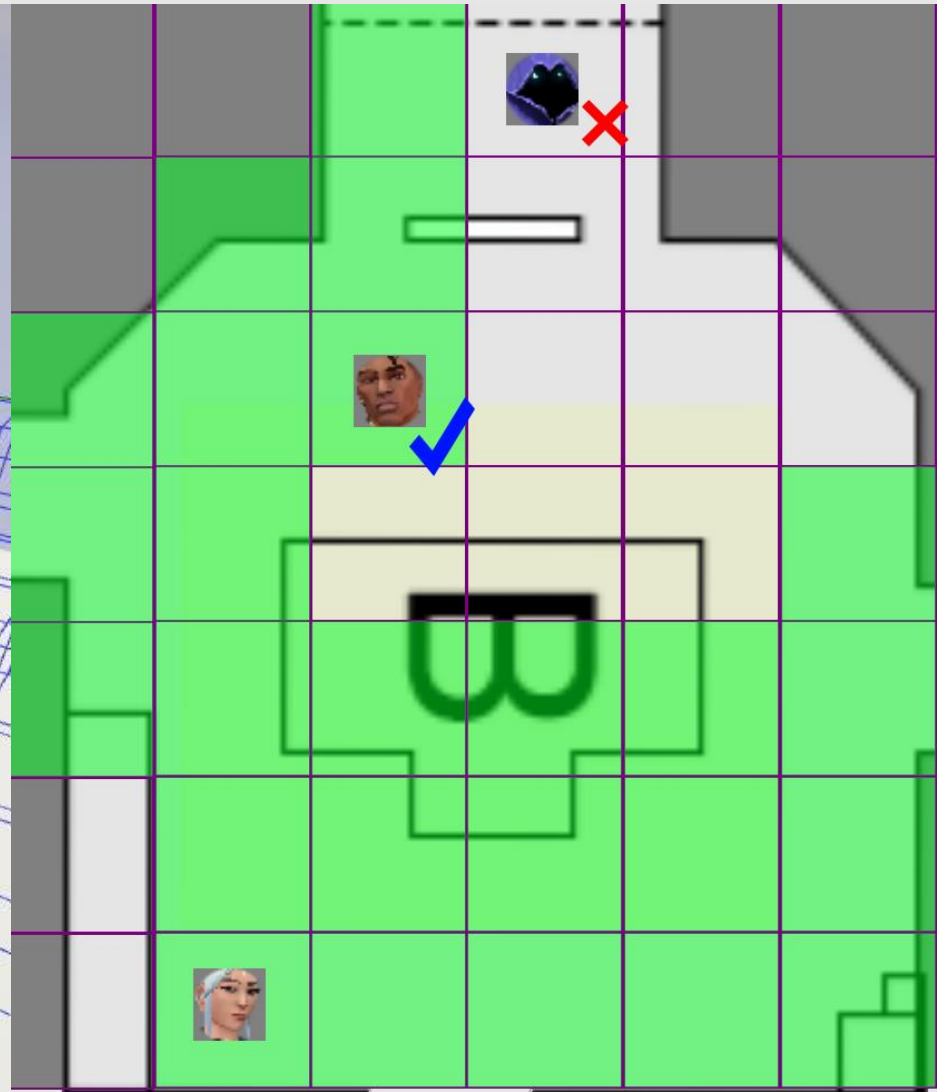
- Occlusion Culling
- Information-theoretic
- Our framework



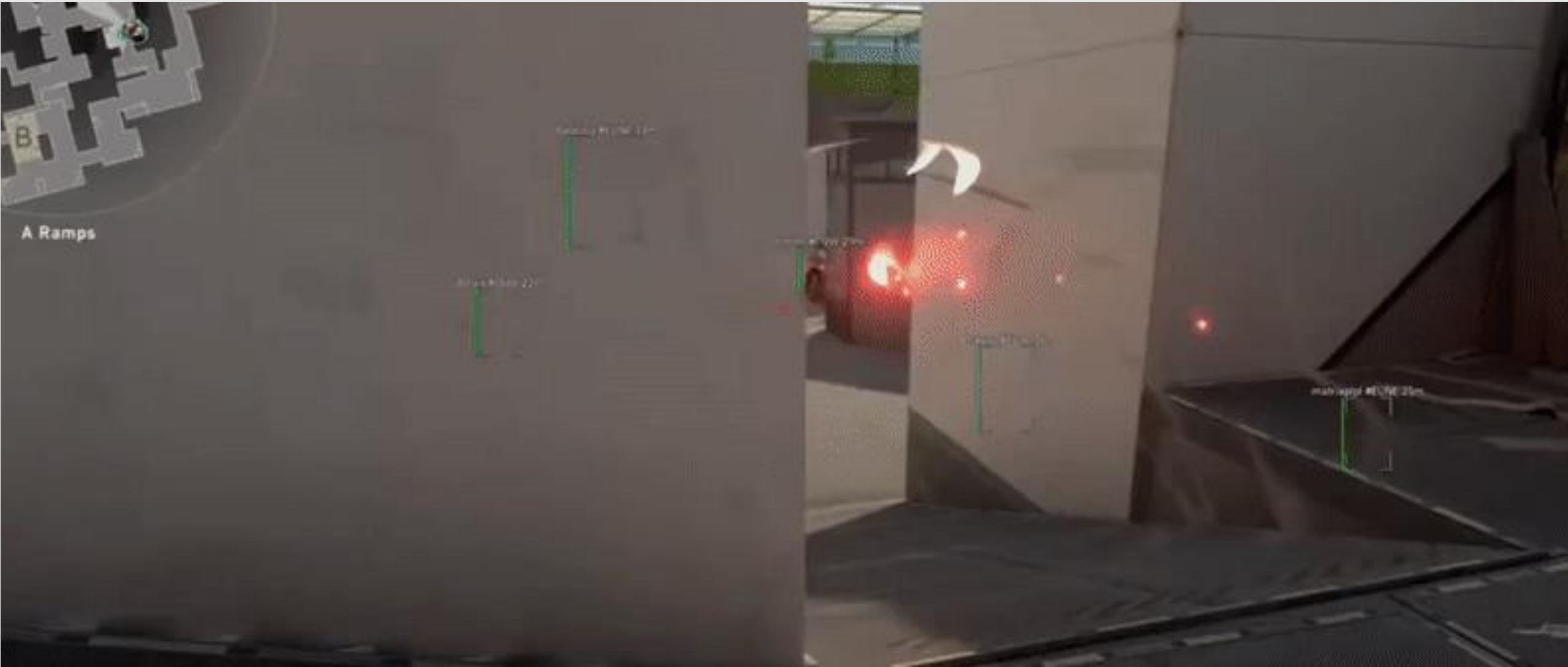
Source:
Paul Chamberlain
Riot Games Tech Blog

Potentially Visible Sets





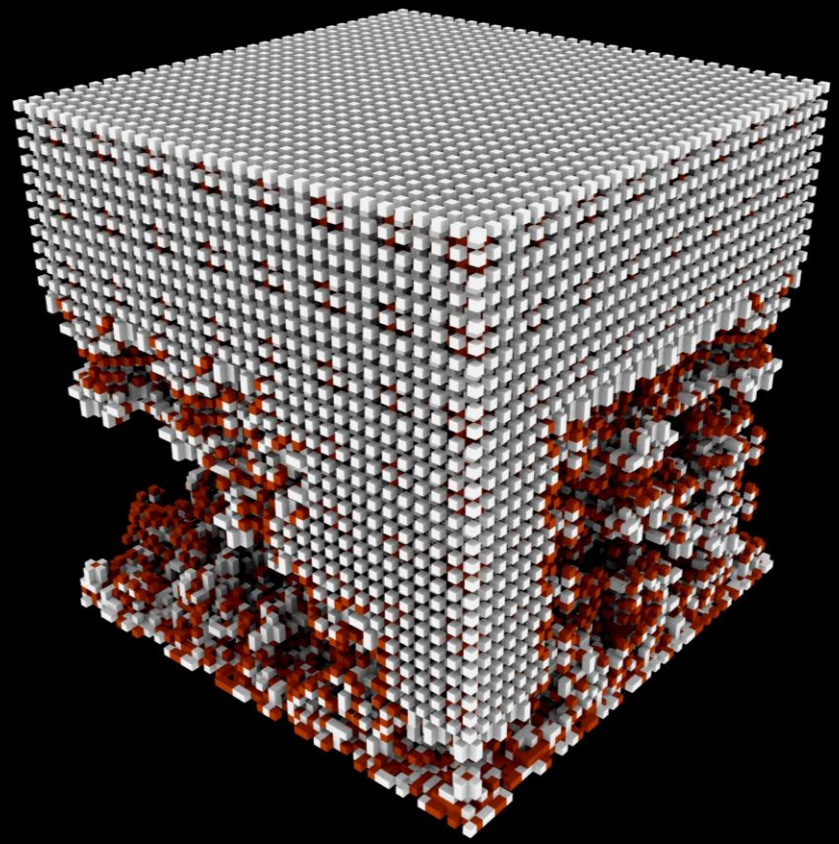
Inaccuracy



No Dynamic Occluders

PVS Analysis

- Accuracy: Sometimes
  - (2000 x 2000 x 10) grid
  - ~2 TB disk
  - ~10^14 ray casts naively
  - Be smart about cache
- No dynamic occluders
  - Recalculation too slow
- Useful for acceleration



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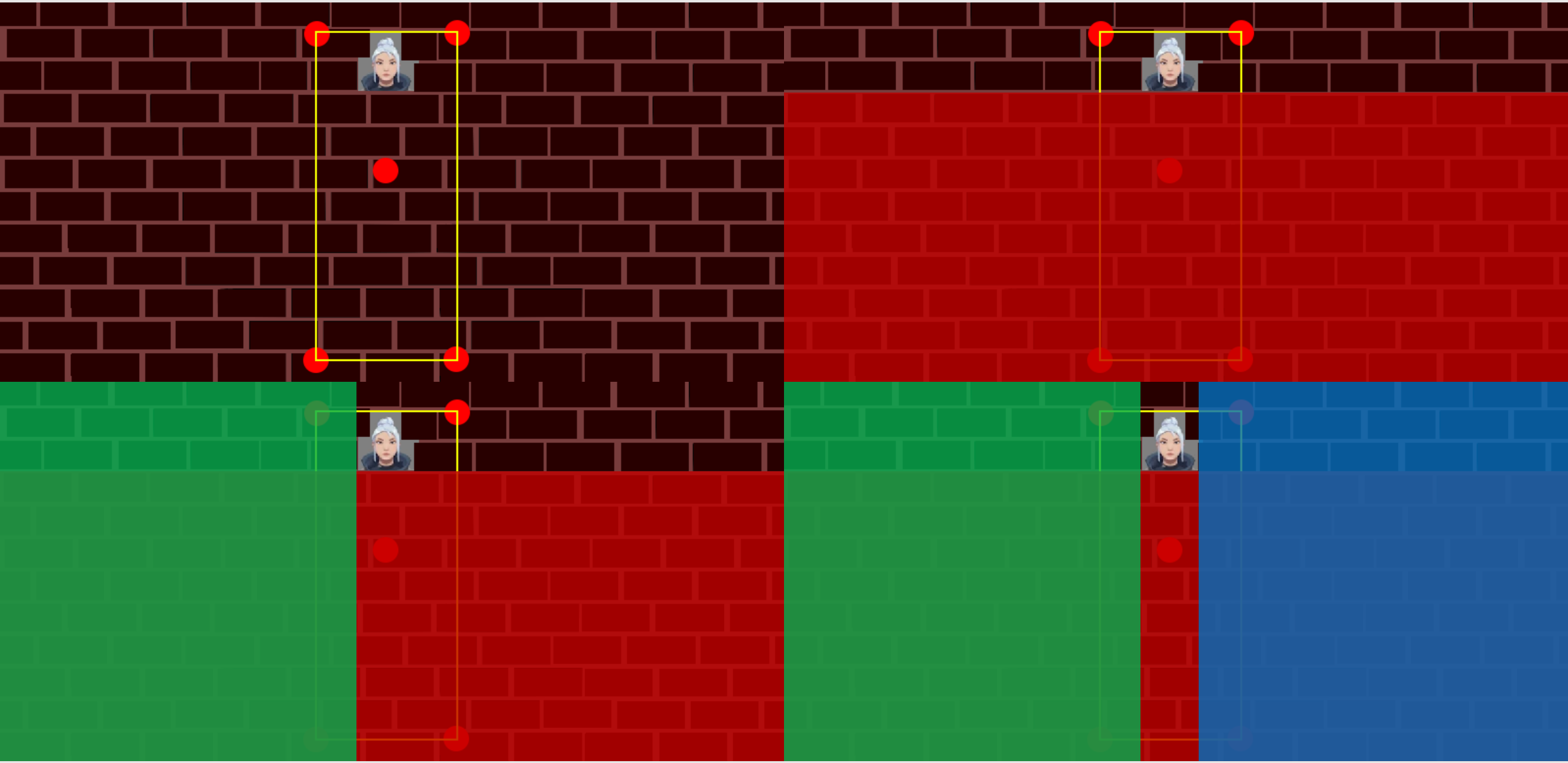
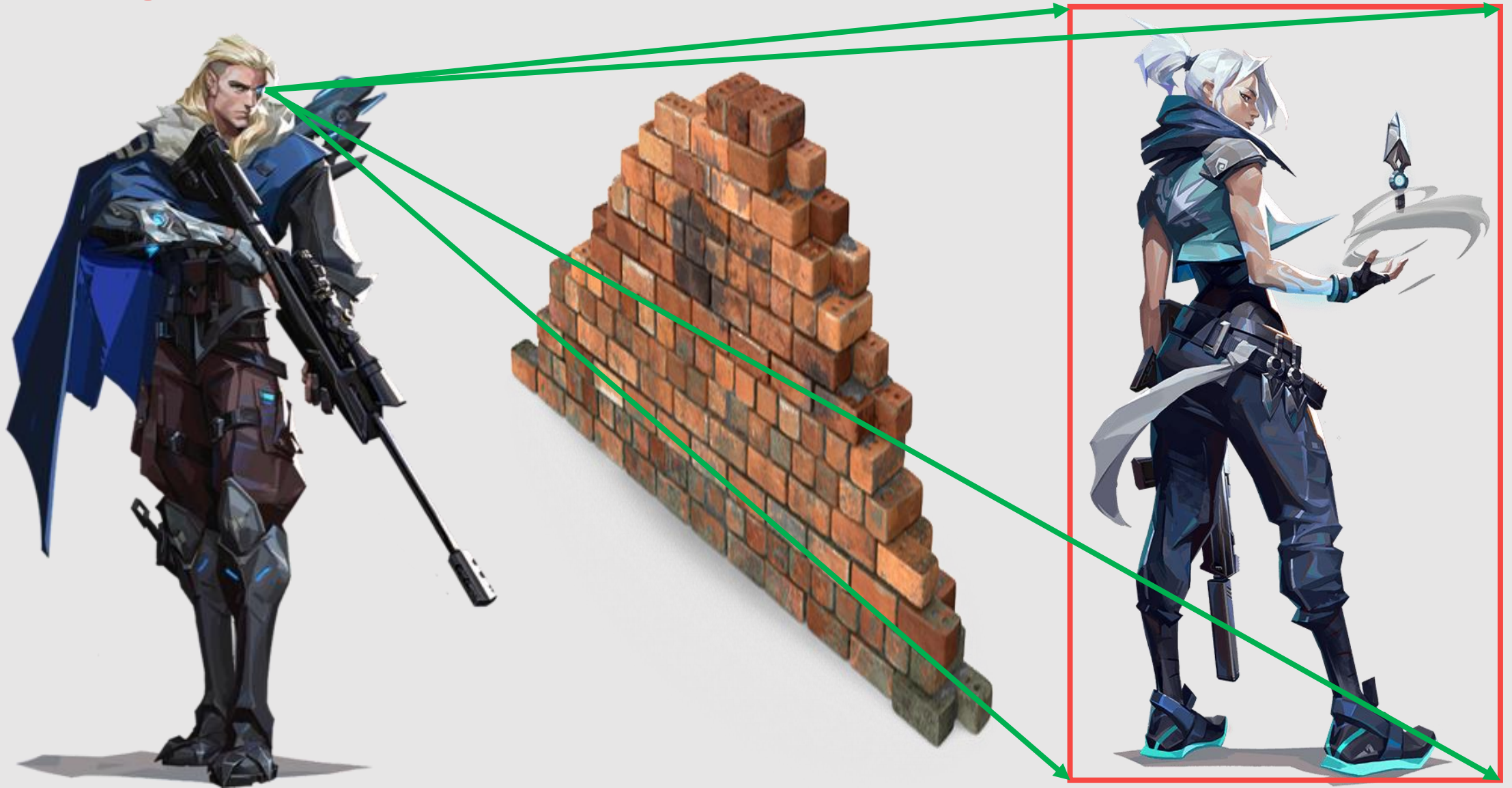
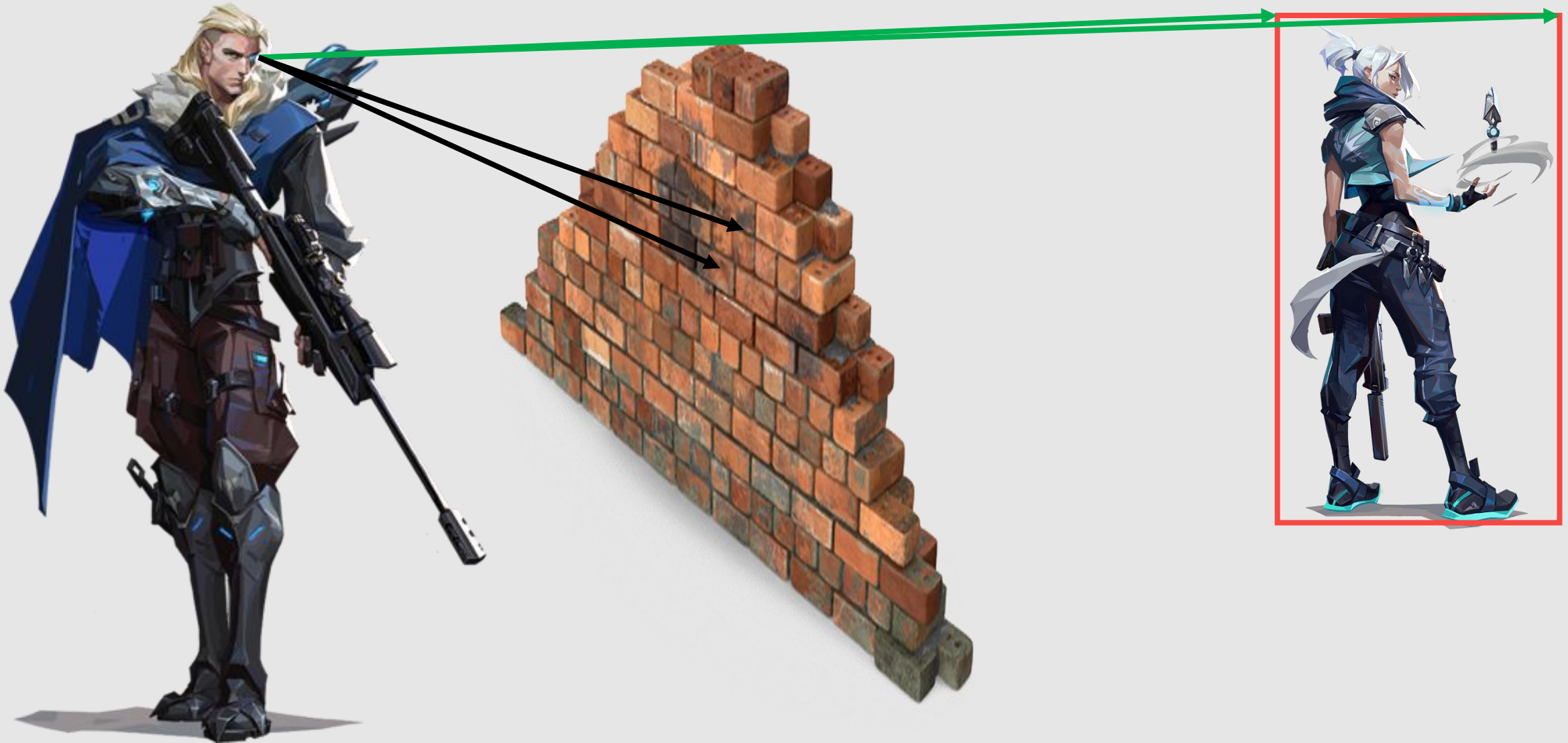


Paul Chamberlain, Riot Games Tech Blog

Ray Casts

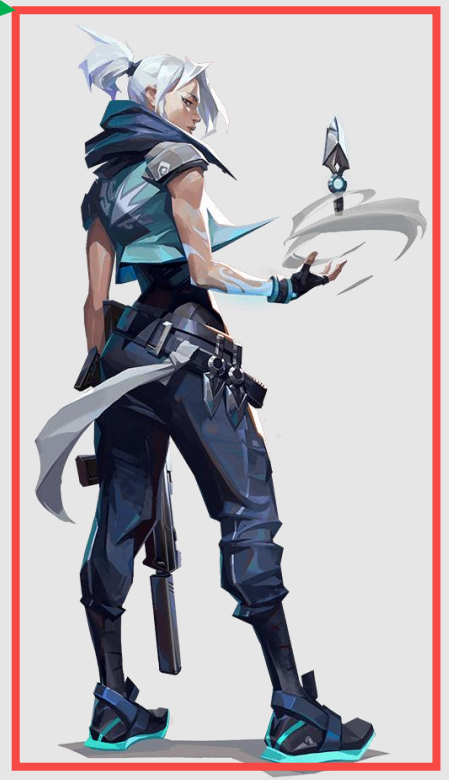


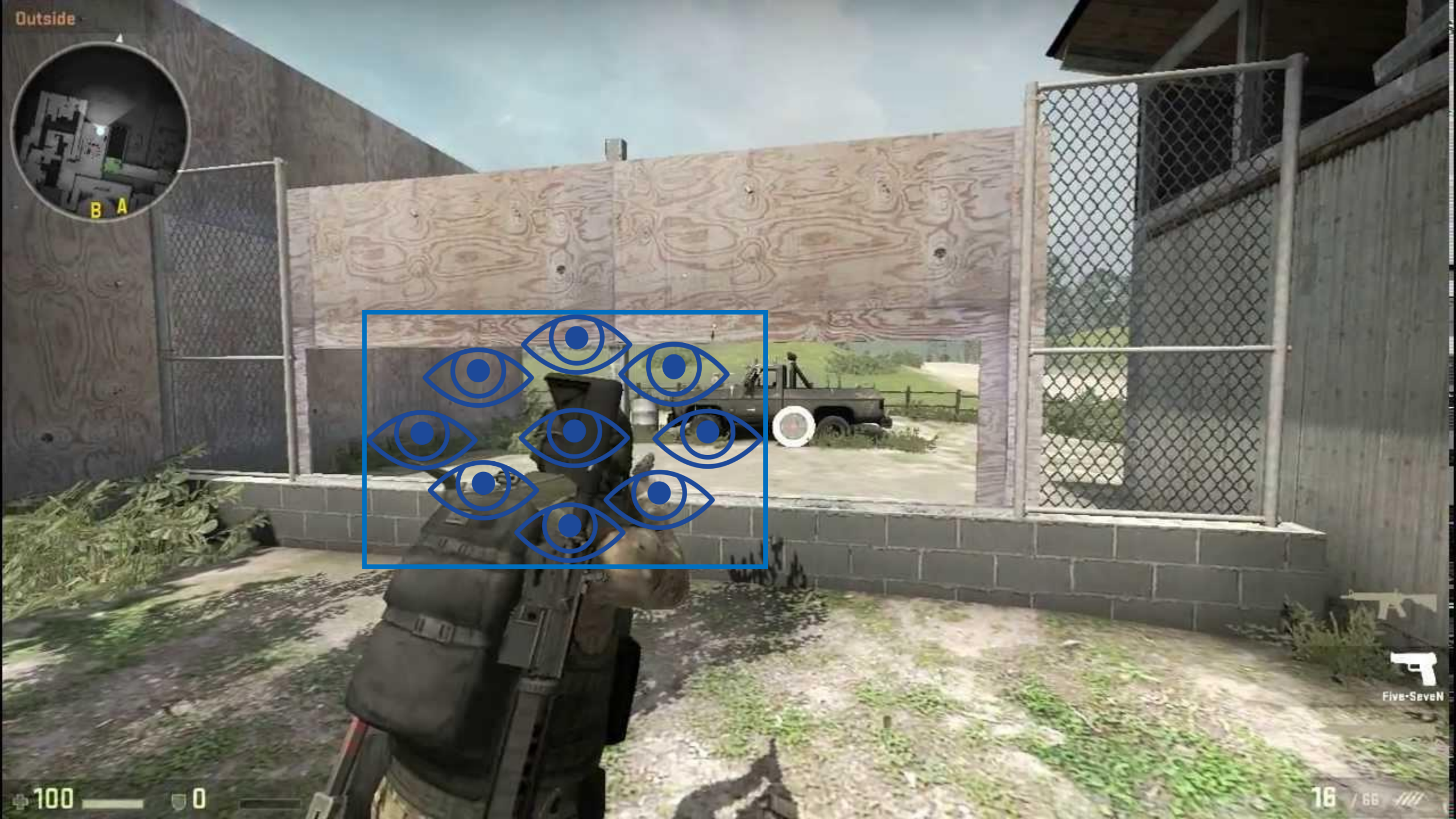
Ray Casts



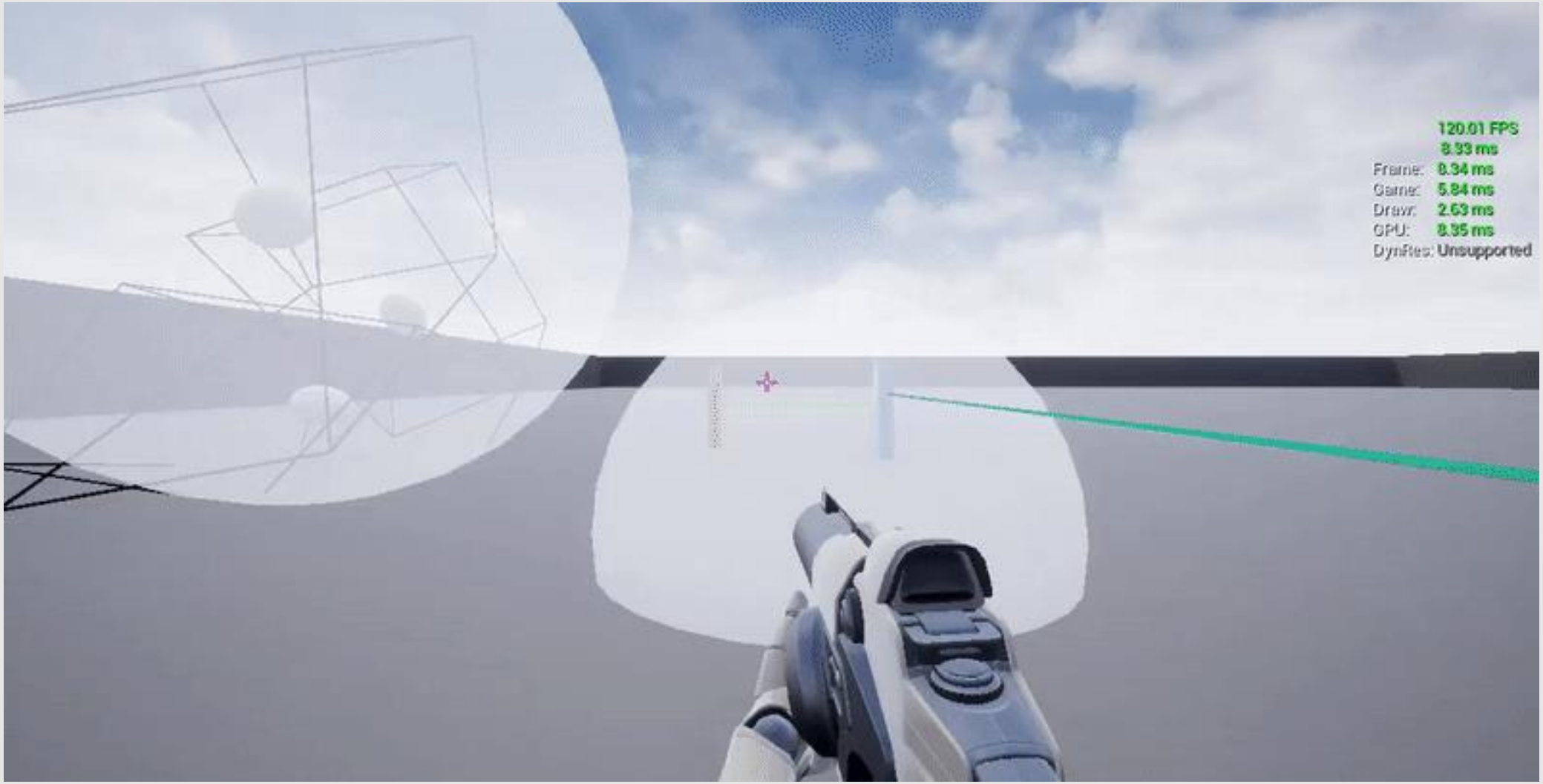
Ray Casts

Ray Casts with Latency

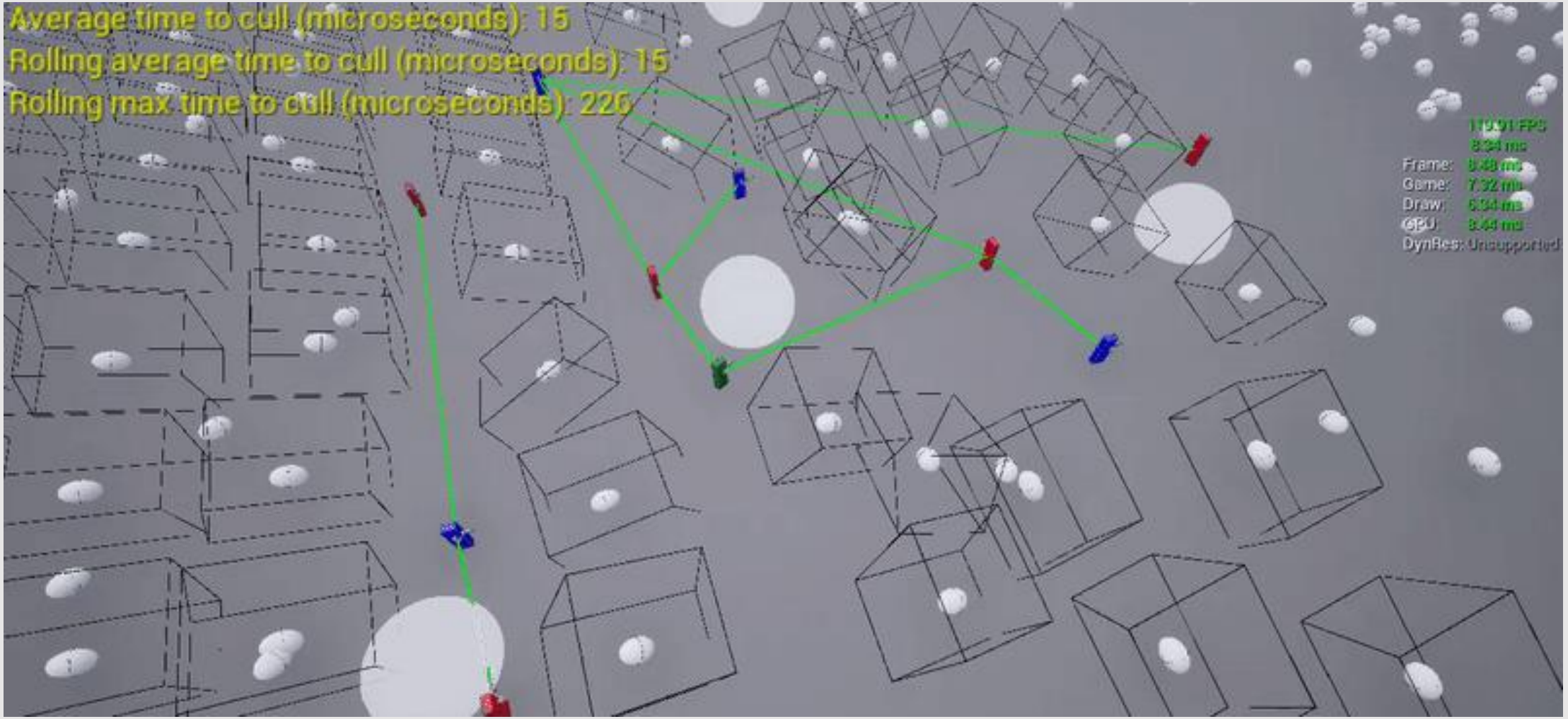



Outside
B A
Five-SeveN
100
0
16 / 66

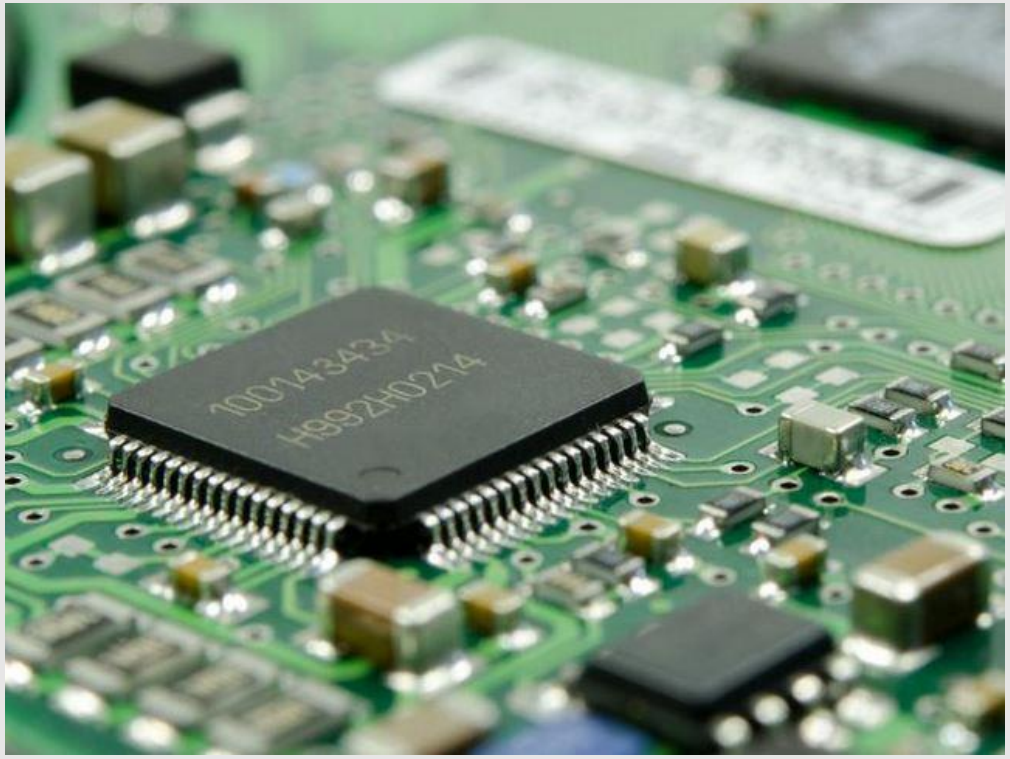
Accuracy

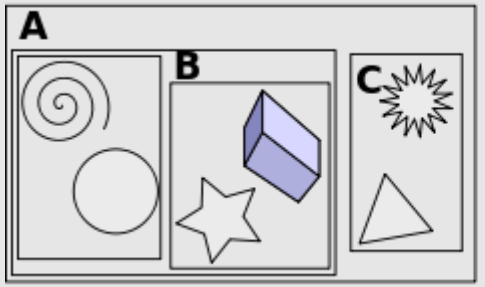

120.01 FPS
8.33 ms
Frame: 8.34 ms
Game: 5.84 ms
Drawr: 2.63 ms
GPU: 8.35 ms
DynRes: Unsupported

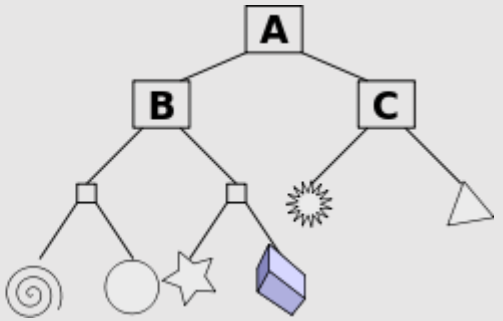
Performance

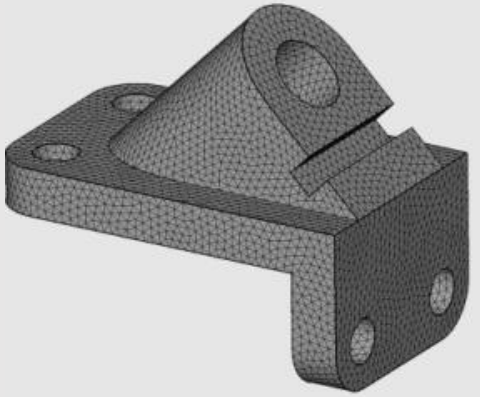


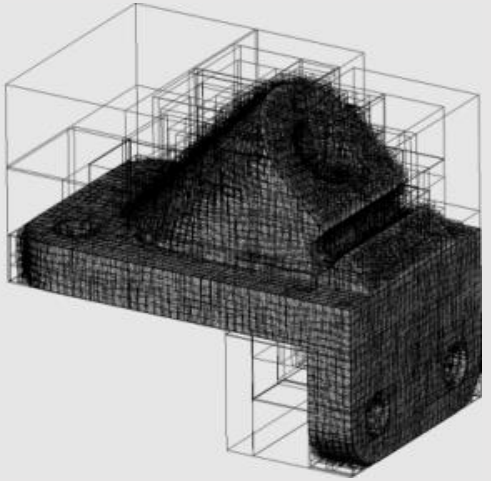
Performance Optimizations











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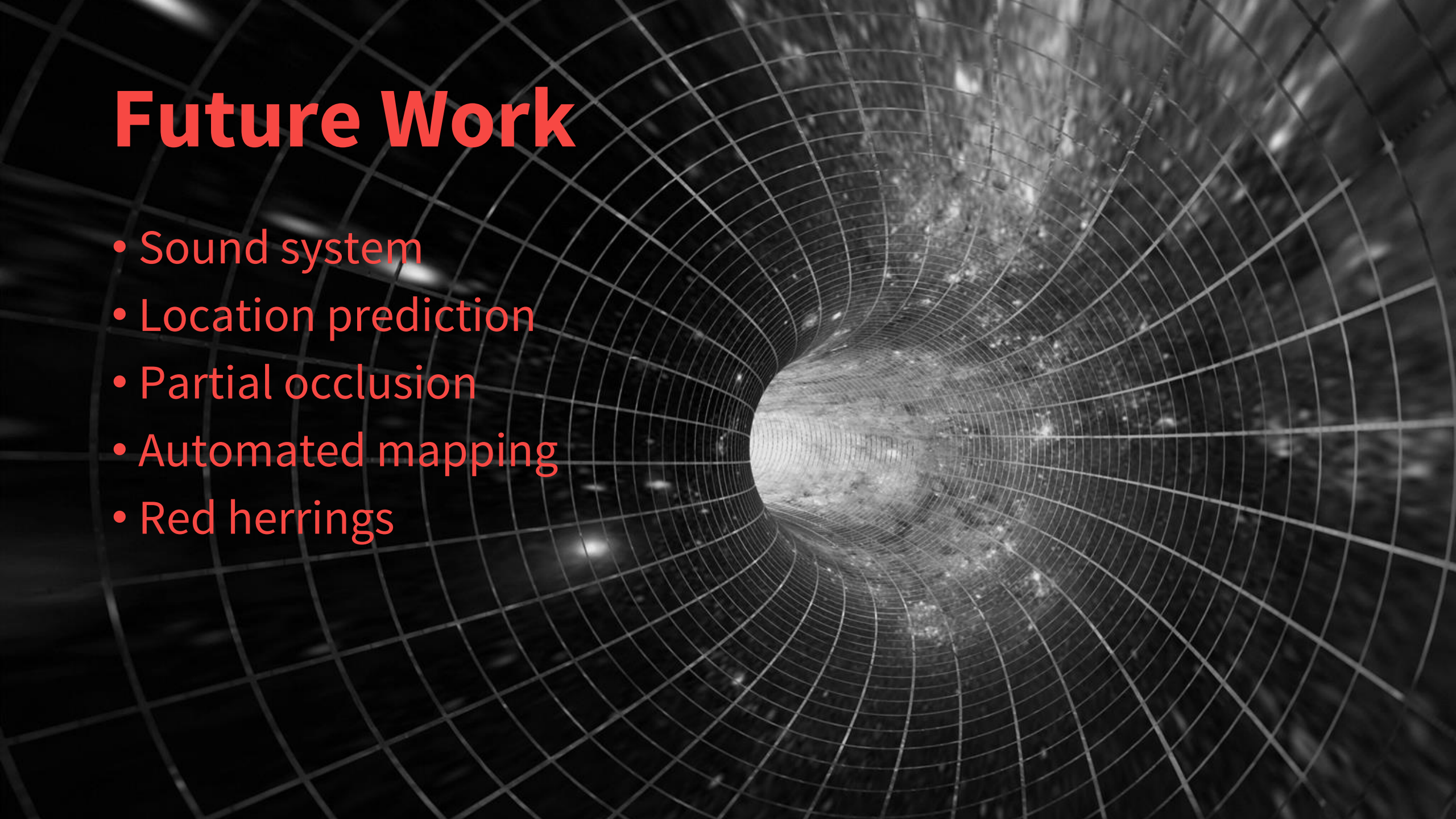
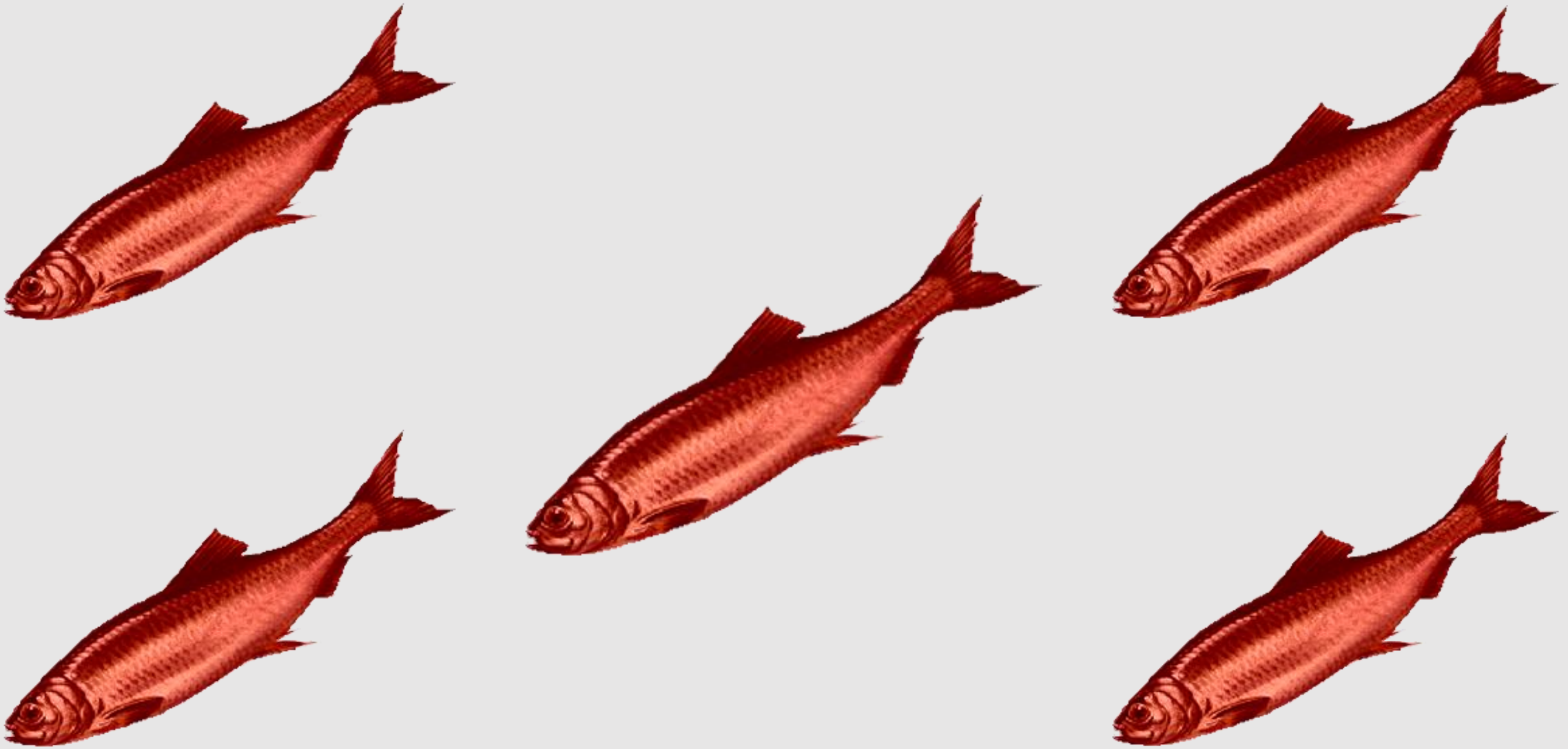


Future Work

- Sound system
- Location prediction
- Partial occlusion
- Automated mapping
- Red herrings




Bombsite B
B
A
$1000
0:00
0 0
B
Smoke Grenade
PLAY | DazzyJ @ Mid Doors (RADIO): Smoke Out!
100
100

Thank you!