The Sunset Overdrive Navigation Mesh Data Pipeline

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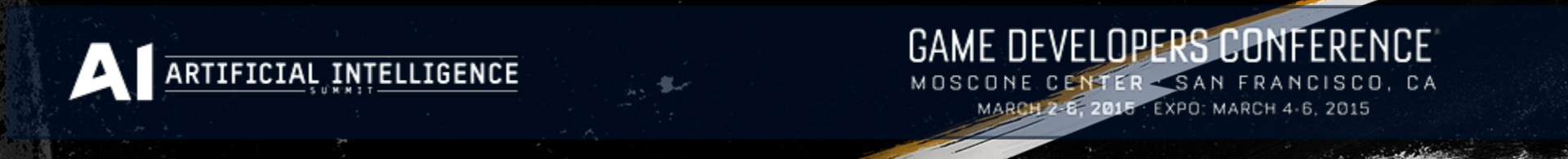
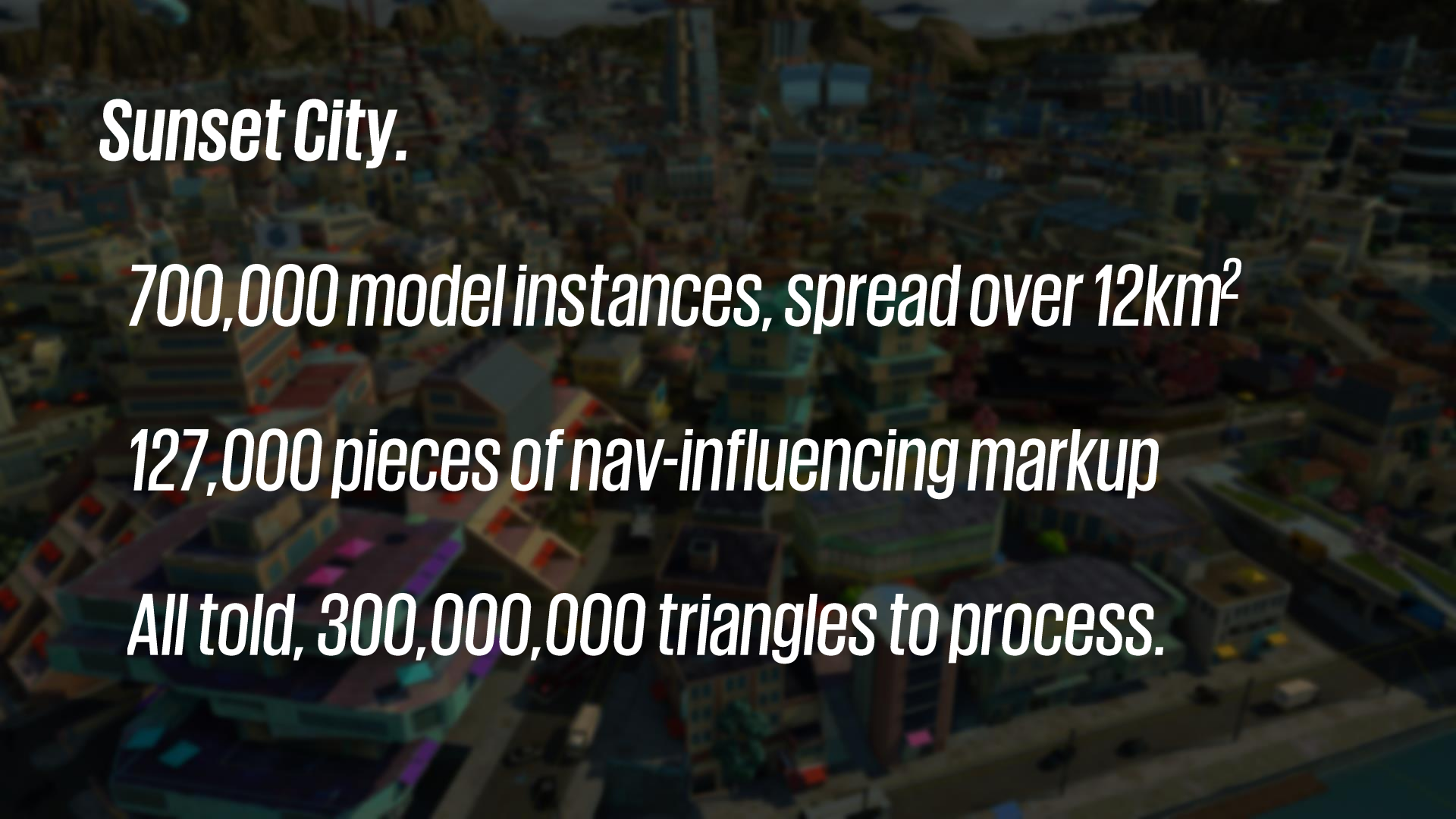
Core Programmer, Insomniac Games



FARMER FONG'S


Sunset City.
700,000 model instances, spread over 12km²
127,000 pieces of nav-influencing markup
All told, 300,000,000 triangles to process.

Increased user efficiency & data quality...

Increased user efficiency & data quality...

through Improved User Experience!

User Experience

User Experience

Before:

Part of level-editor

Error-prone setup process

Unreliable

Dark Magic

User Experience

Before:

Part of level-editor

Error-prone setup process

Unreliable

Dark Magic

After:

User Experience

Before:	After:
Part of level-editor	Standalone application
Error-prone setup process	One-click
Unreliable	Reliable*
Dark Magic	Universally accessible

Increased user efficiency & data quality...

Increased user efficiency & data quality...

through Decreased Running Time!

Running time: Loading the input data

Running time: Loading the input data

Before:

Running time: Loading the input data

Before:

Source data (JSON)

Everything

Running time: Loading the input data

Before:

Source data (JSON)

Everything

10 -15 minutes

Running time: Loading the input data

<u>Before:</u>

Source data (JSON)

Everything

10 -15 minutes

<u>After:</u>

Running time: Loading the input data

Before:	After:
Source data (JSON)	Binary game data
Everything	Geo, instance data & markup

10 -15 minutes

Running time: Loading the input data

Before:	After:
Source data (JSON)	Binary game data
Everything	Geo, instance data & markup
10 -15 minutes	5 seconds

Running time: Building the navmesh

Running time: Building the navmesh

Before:

For each tile:

- Setup
- Generate navmesh

Running time: Building the navmesh

Before:

For each tile:

- Setup
- Generate navmesh

Running time: Building the navmesh

Before:

For each tile:

- Setup
- Generate navmesh

50 minutes

Running time: Building the navmesh

Before:

For each tile:

- Setup
- Generate navmesh

50 minutes

Running time: Building the navmesh

Before:

For each tile:

- Setup
- Generate navmesh

50 minutes

After:

Running time: Building the navmesh

Before:

For each tile:

Setup

Generate navmesh

50 minutes

After:

Setup

For each tile (parallel):

Generate navmesh

Running time: Building the navmesh

Before:

For each tile:

Setup

Generate navmesh

50 minutes

After:

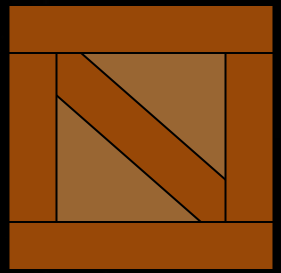
Setup

For each tile (parallel):

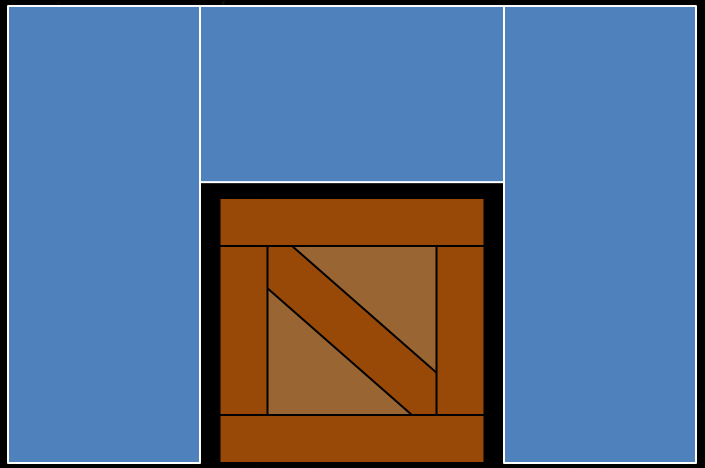
Generate navmesh

44 seconds

Running time: Spatial queries



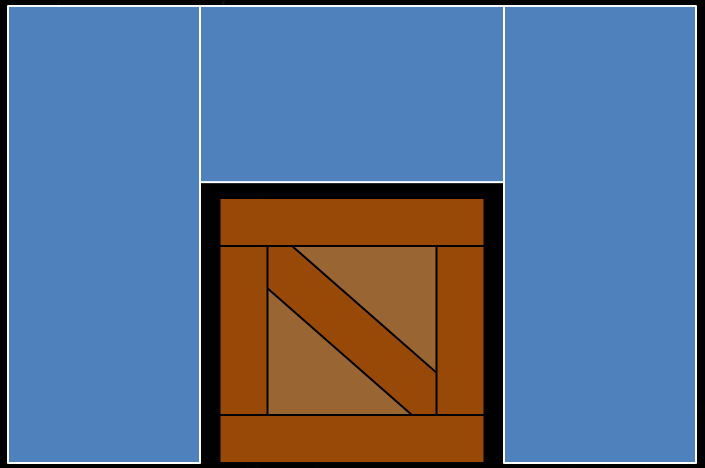
Running time: Spatial queries



Running time: Spatial queries

Before:

30 minutes

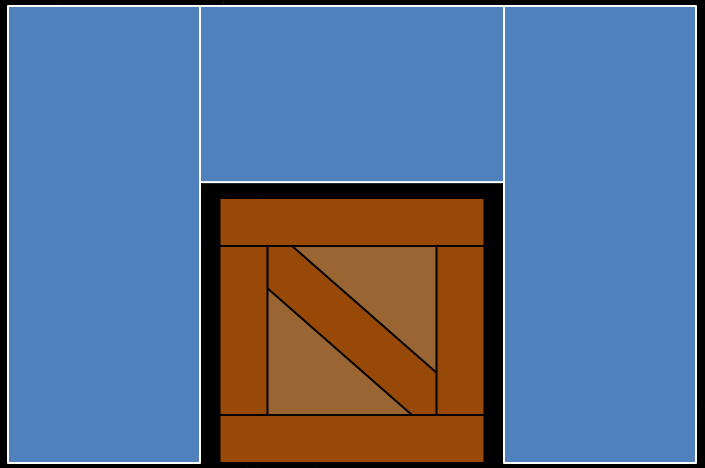


Running time: Spatial queries

Before:

After:

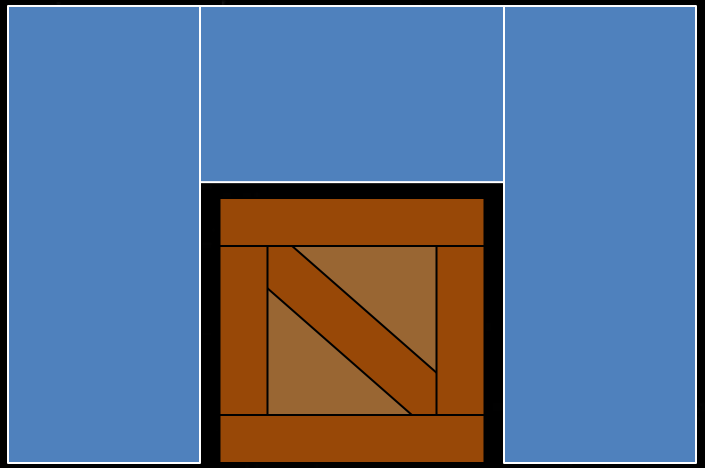
30 minutes



Running time: Spatial queries

Before:

30 minutes



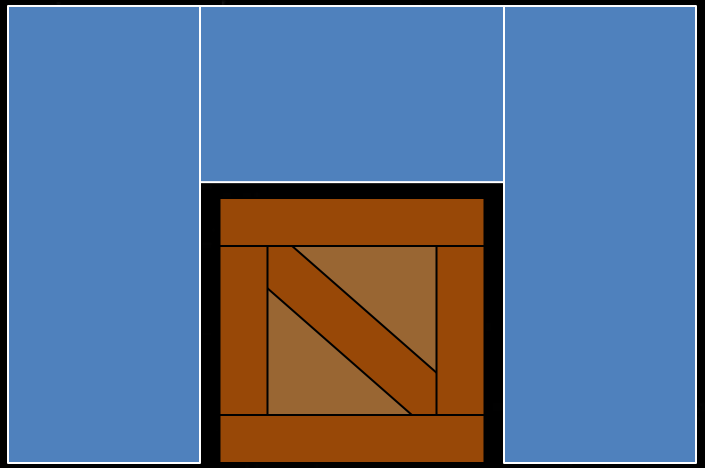
After:

Use recast's voxels

Running time: Spatial queries

Before:

30 minutes



After:

Use recast's voxels

0 seconds

Running Time Summary

Running Time Summary

Before: 10 + 50 + 30 minutes

Running Time Summary

Before: 10 + 50 + 30 minutes

After: 5 + 44 + 0 seconds

Running Time Summary

Before: 10 + 50 + 30 minutes

After: 5 + 44 + 0 seconds

Assessment:

Running Time Summary

Before: 10 + 50 + 30 minutes

After: 5 + 44 + 0 seconds

Assessment: **Adequate.**

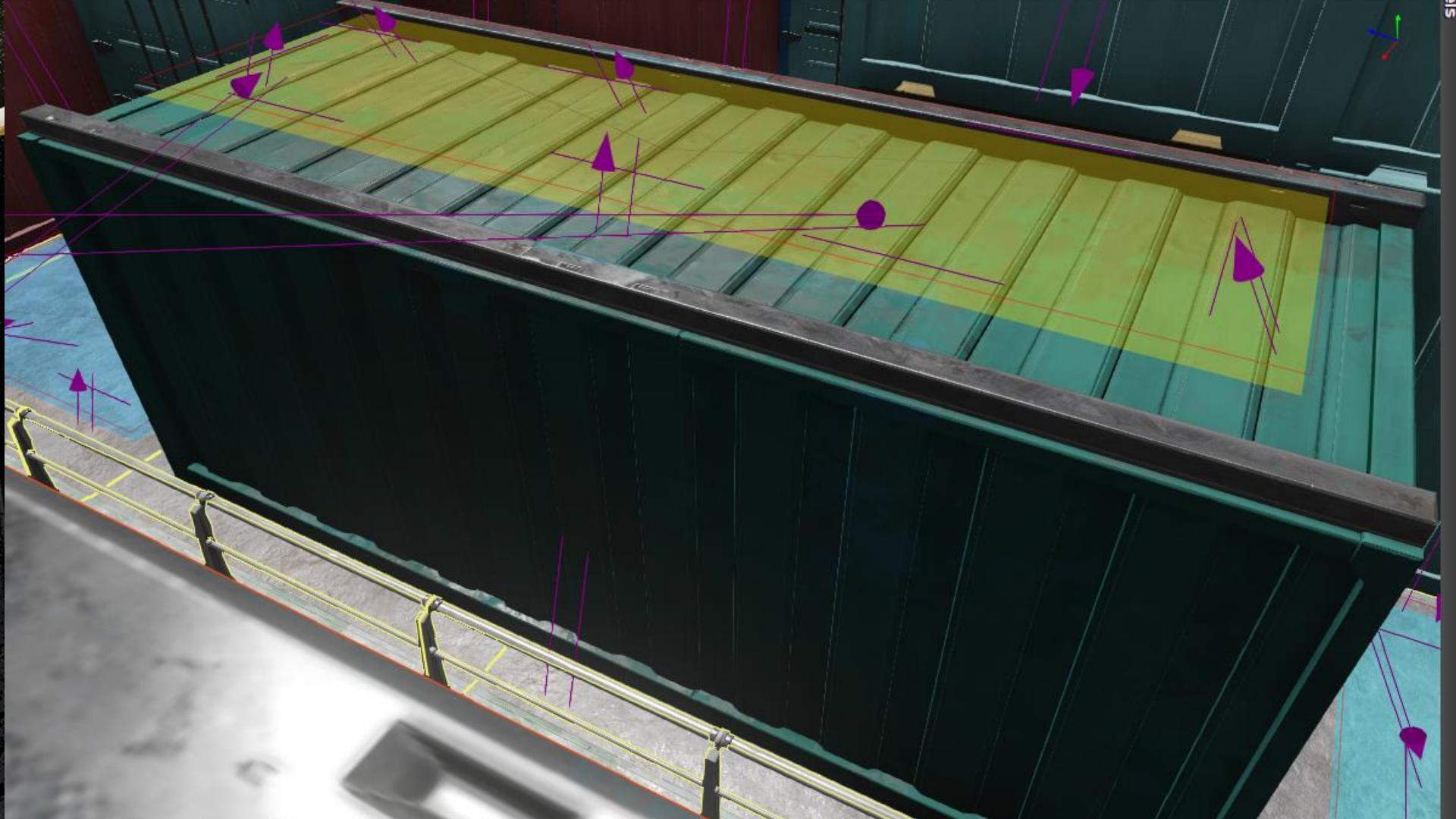
Increased user efficiency & data quality...

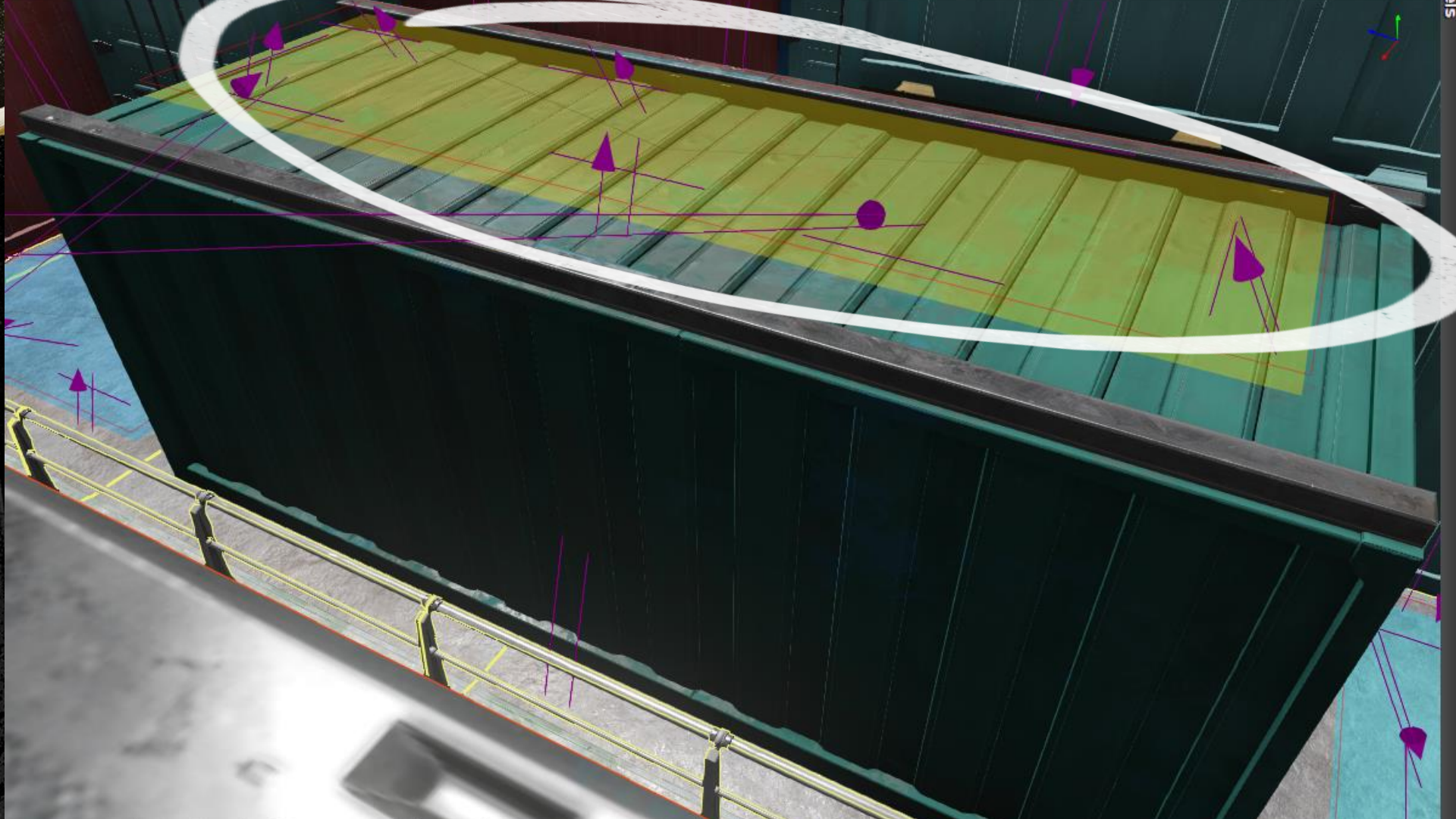
Increased user efficiency & data quality...

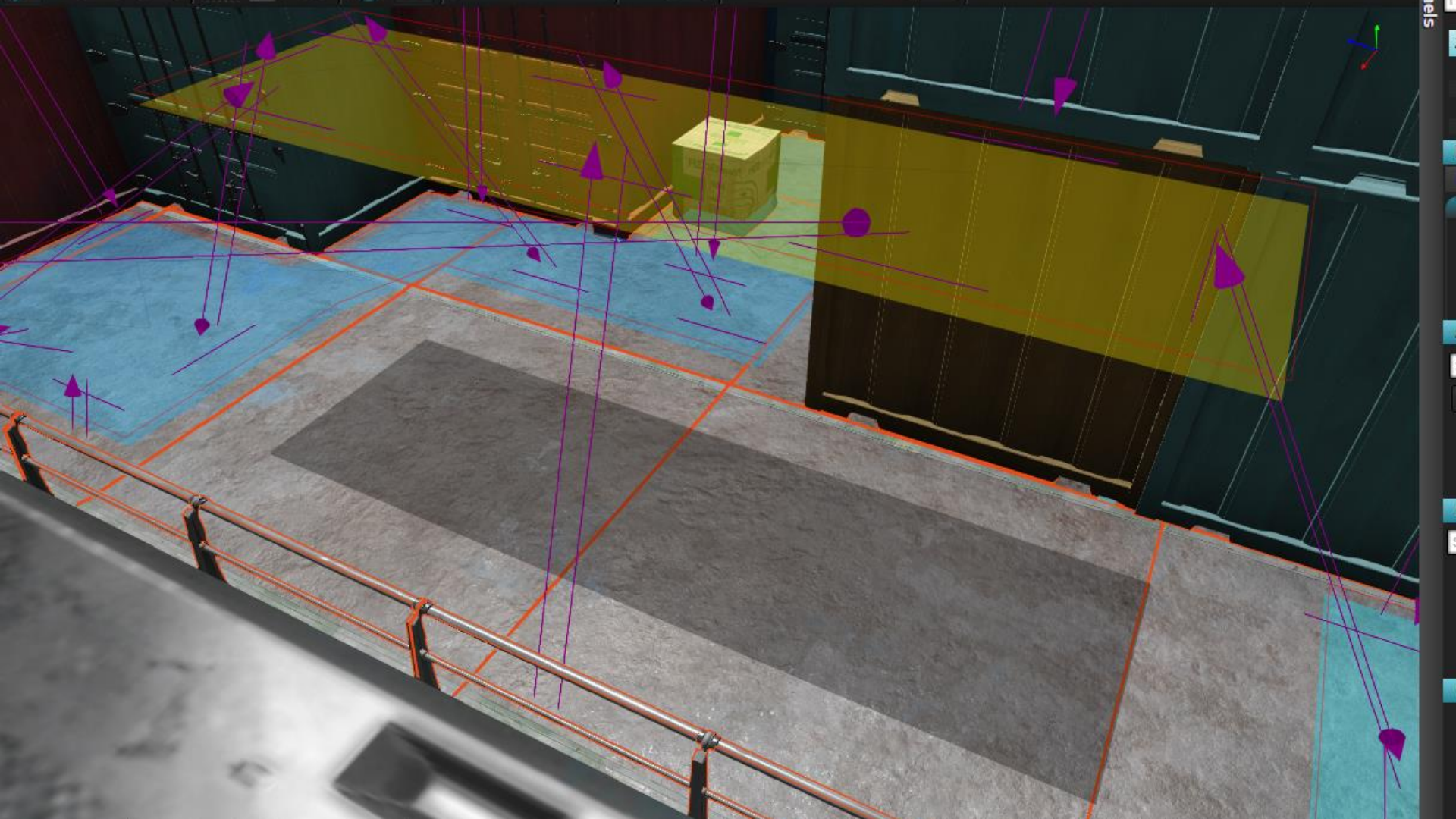
through Post Processing!

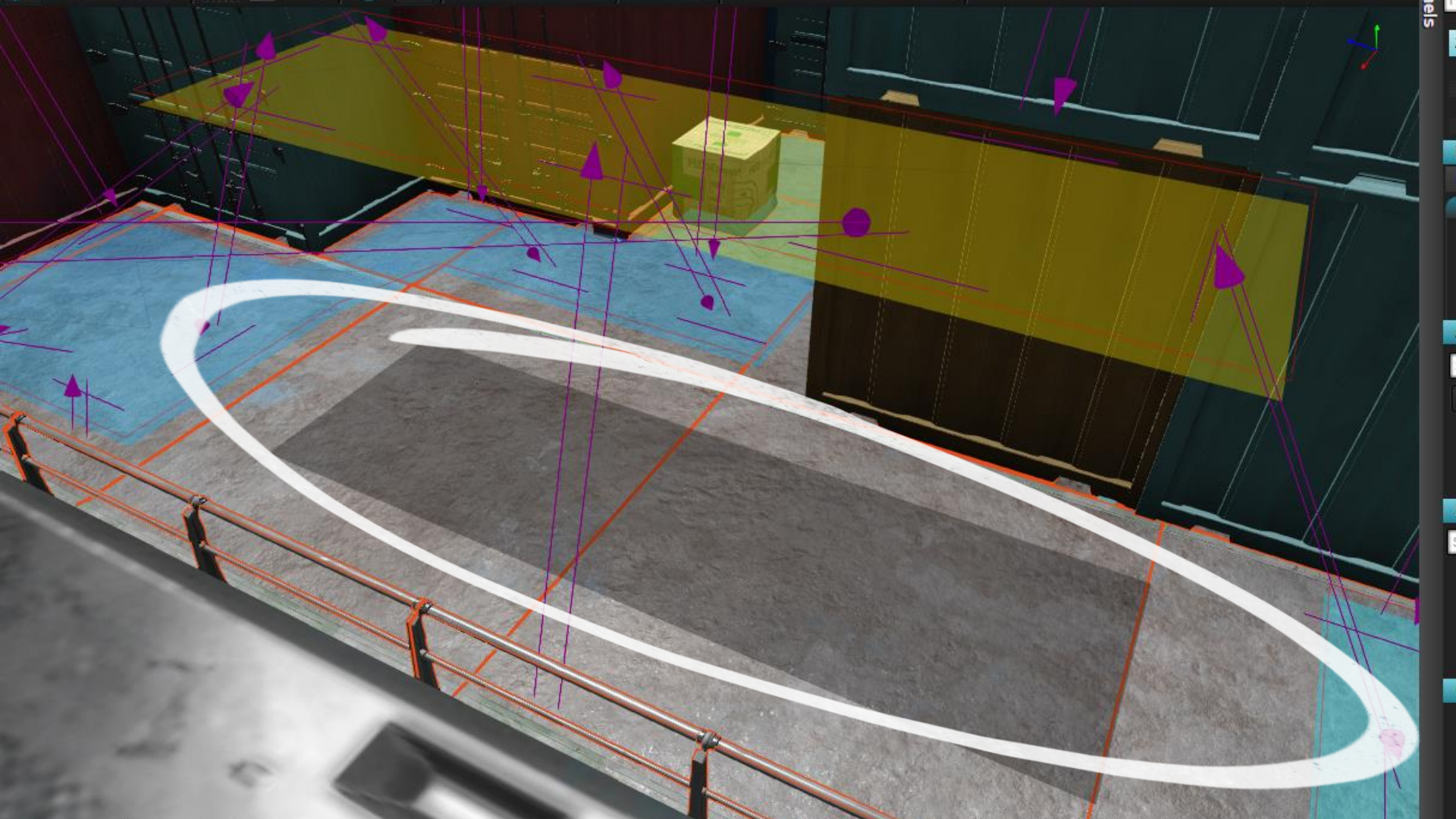
Postprocessing

Detect and discard unreachable mesh islands









Postprocessing

Build data for use in editor and in game

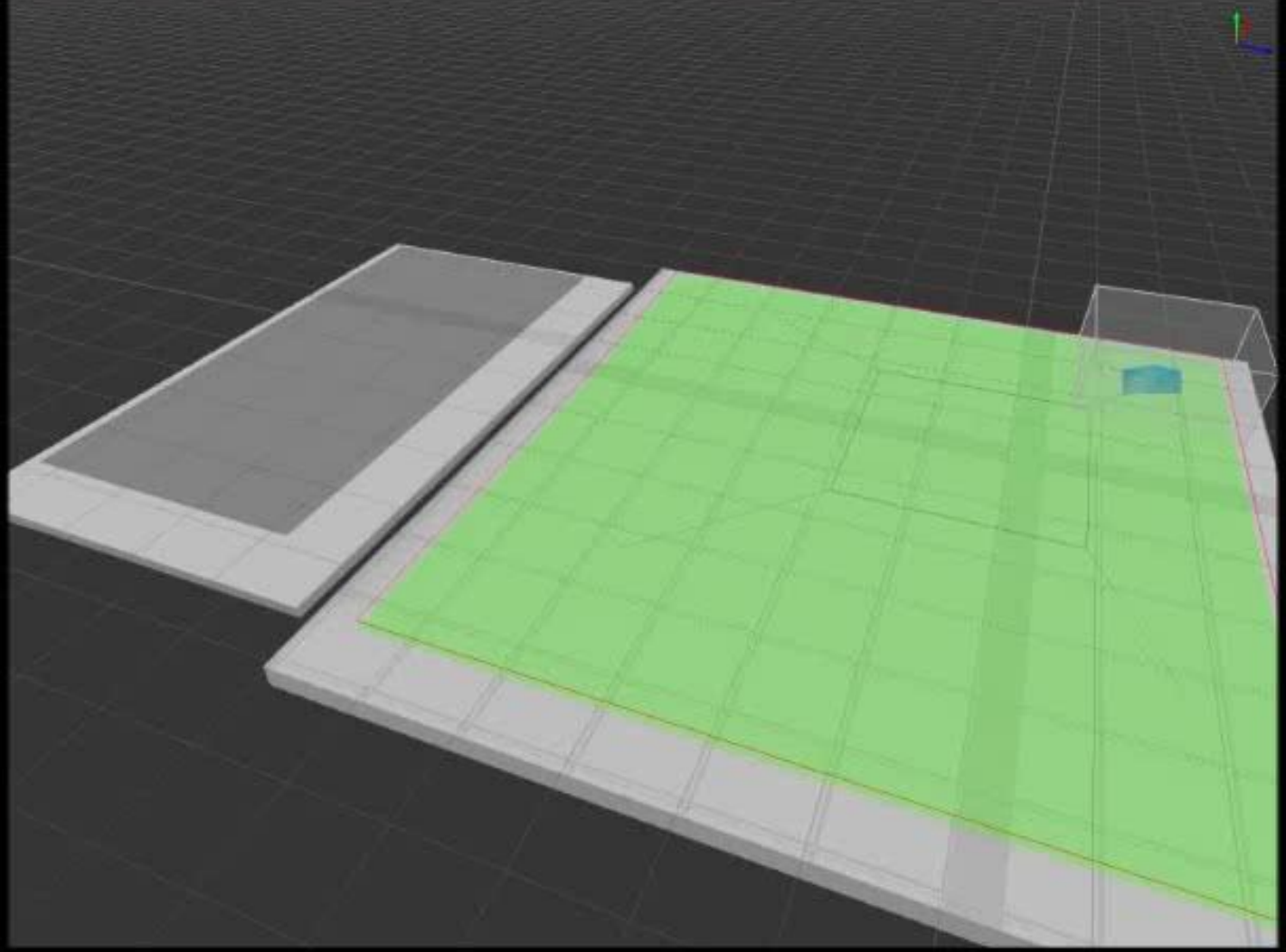
Minimize subsequent transformations

Increased user efficiency & data quality.

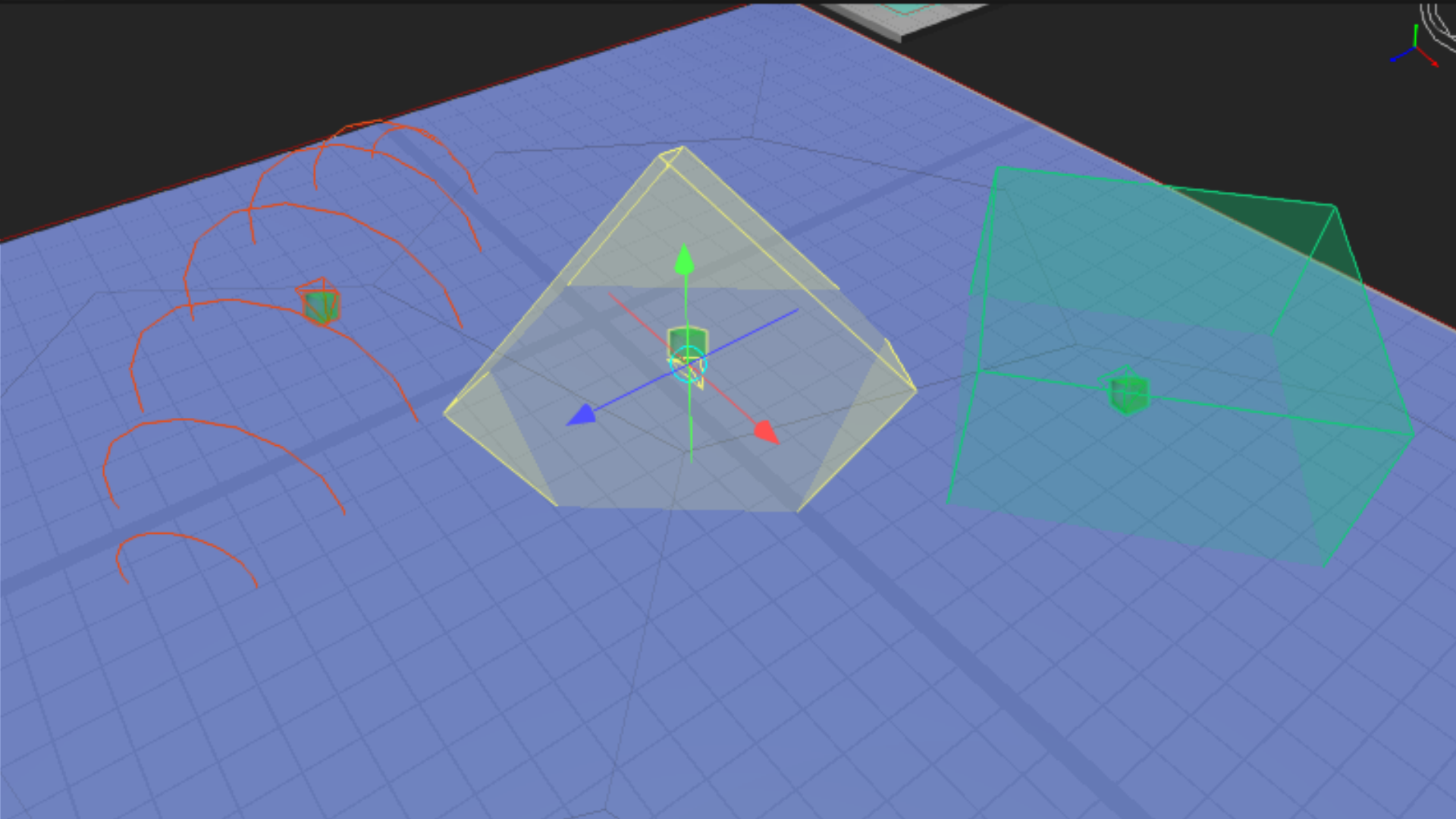
Navigation tools

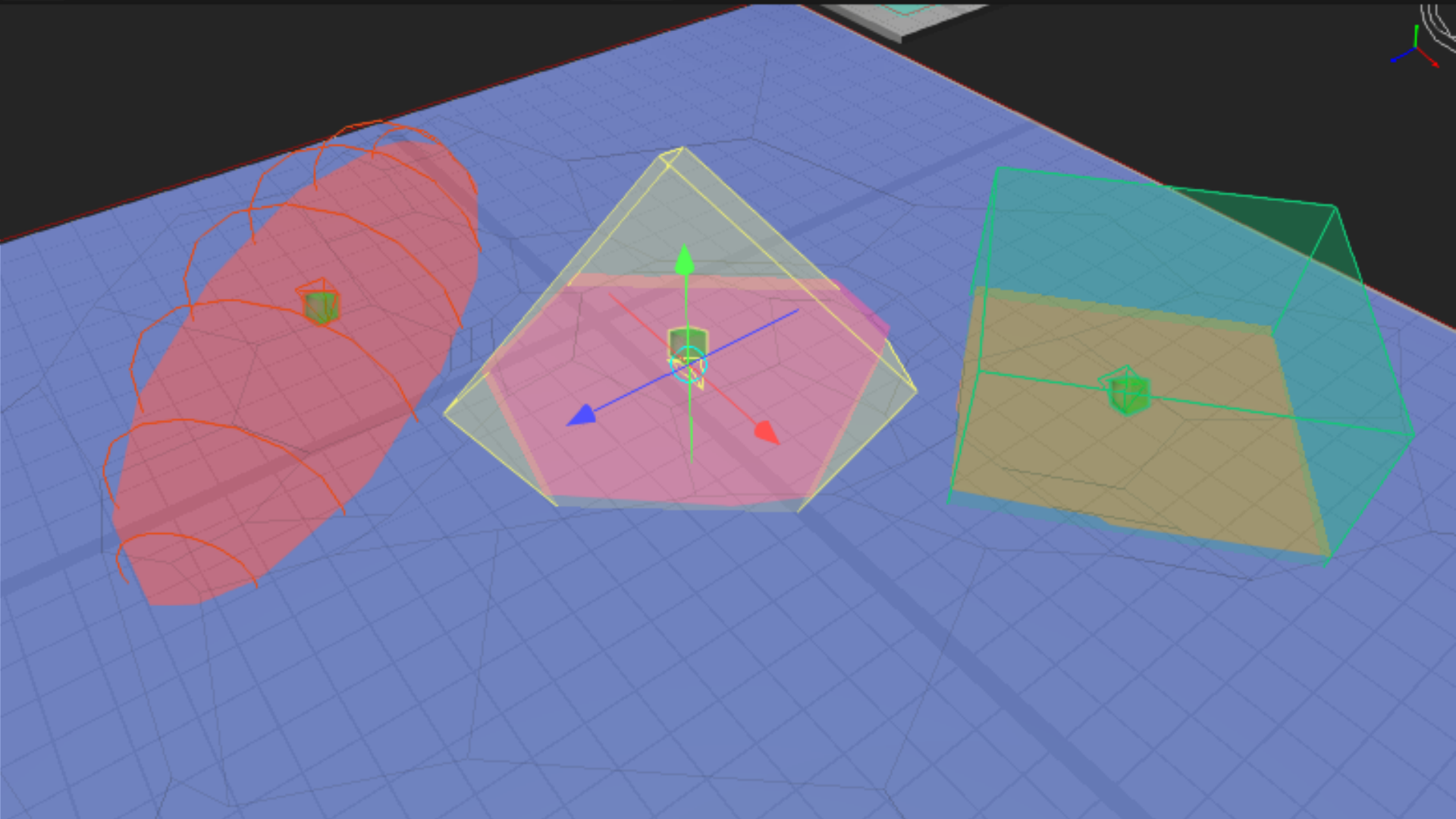
Navigation tools: Overrides

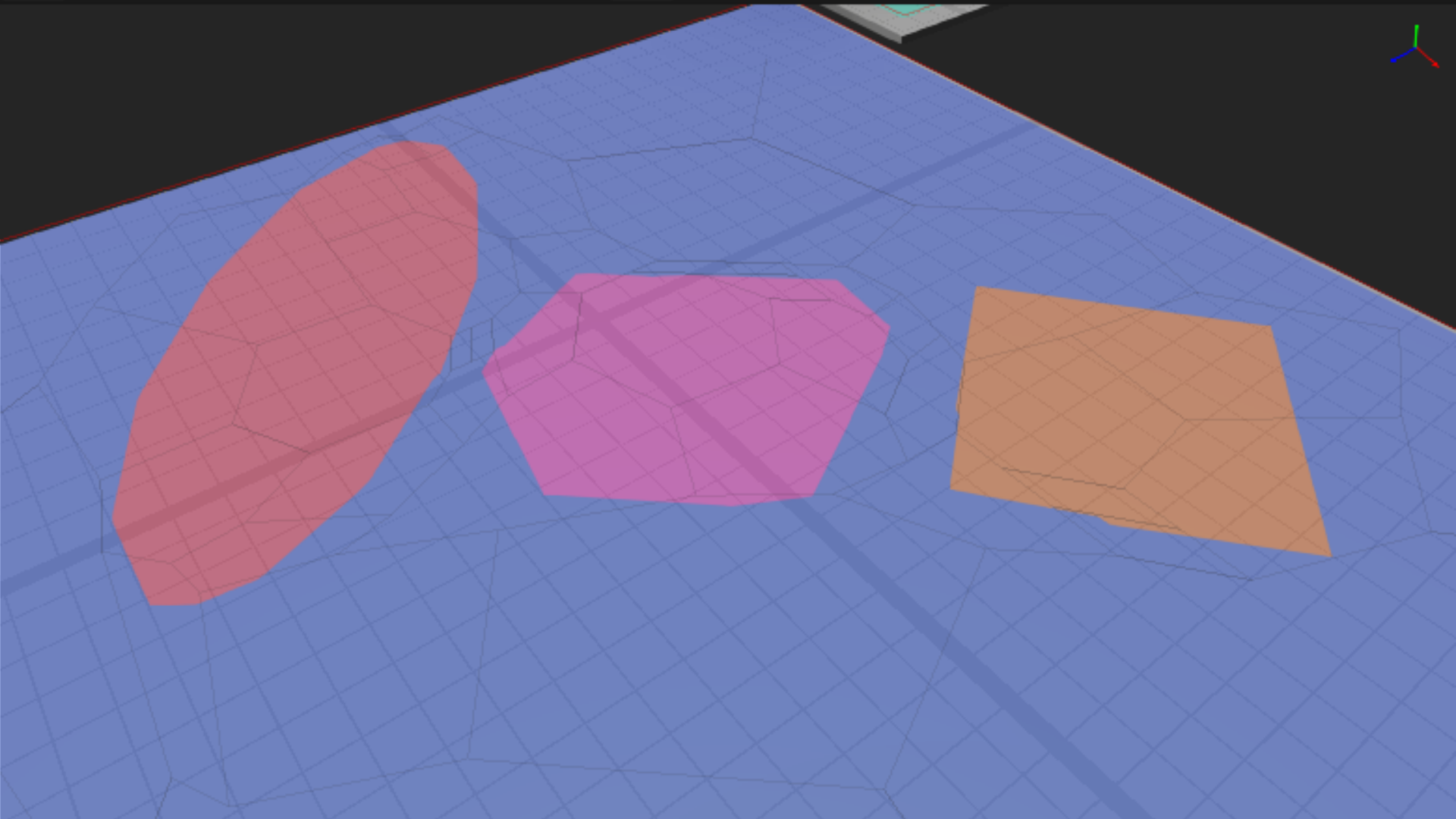
(Additive and subtractive)



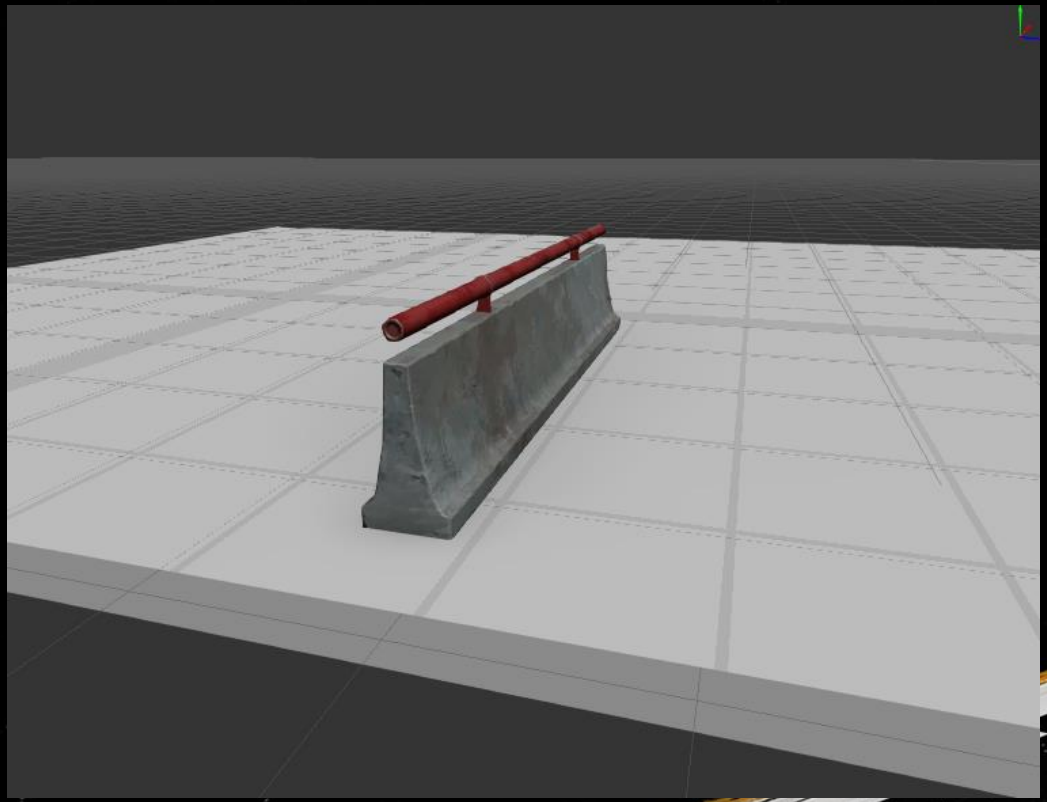
Navigation tools: Poly Flagging

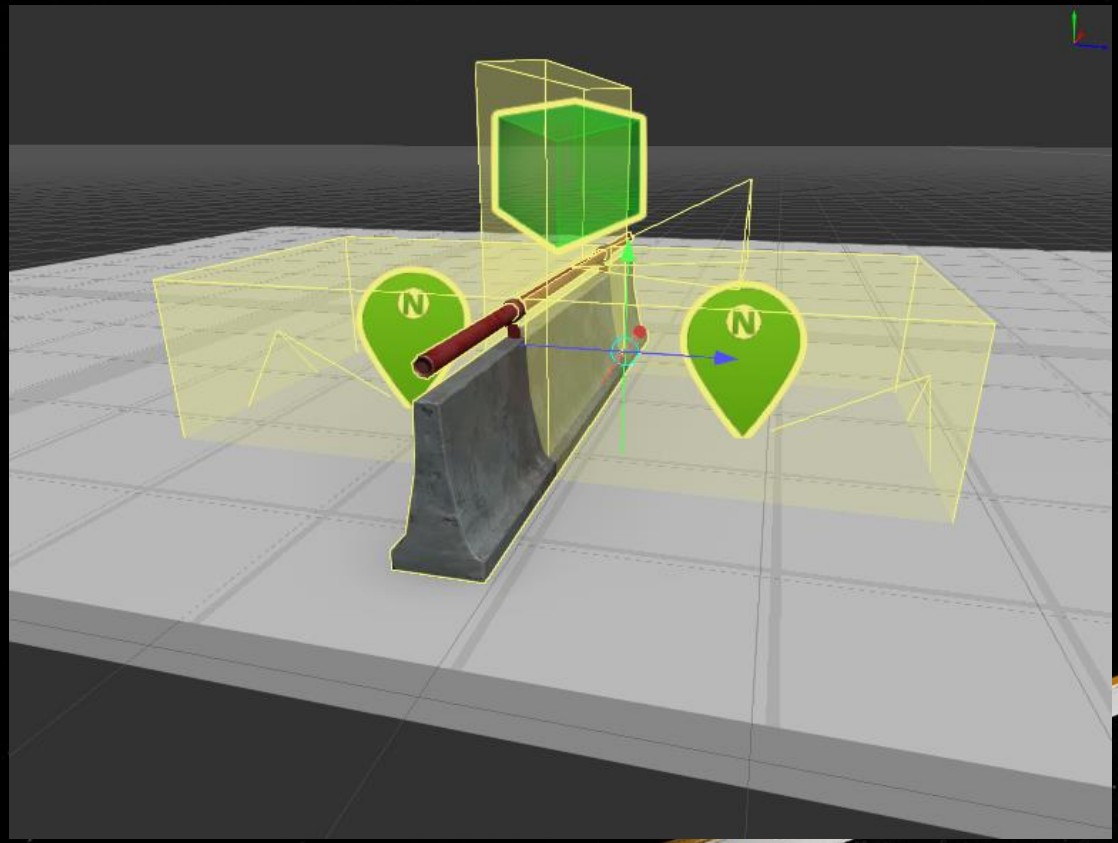


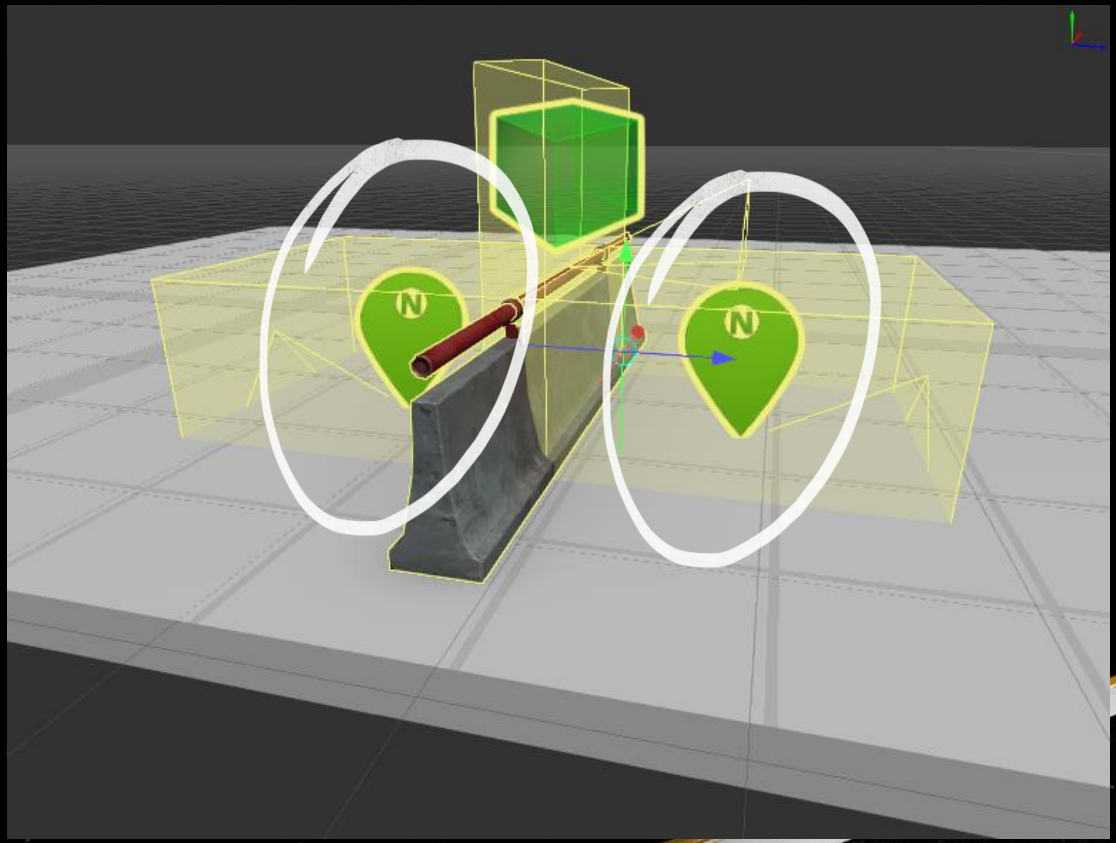




Navigation tools: Off-mesh connections



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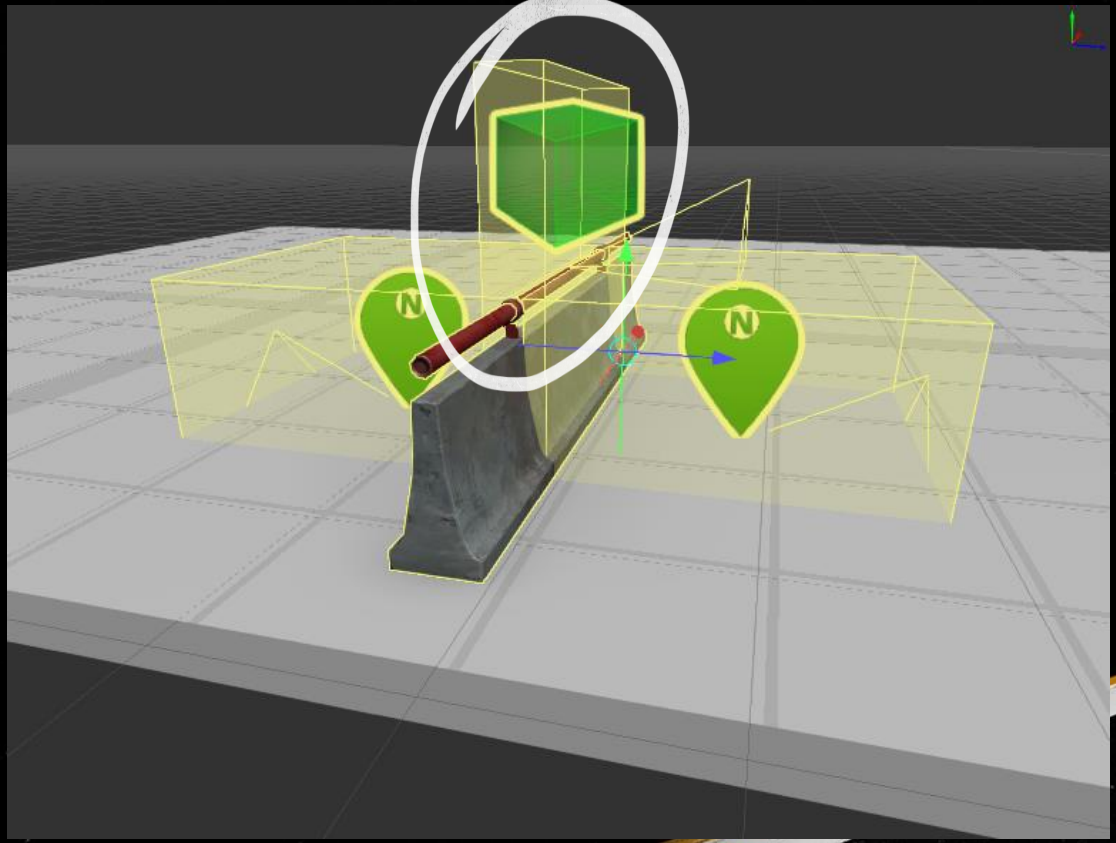
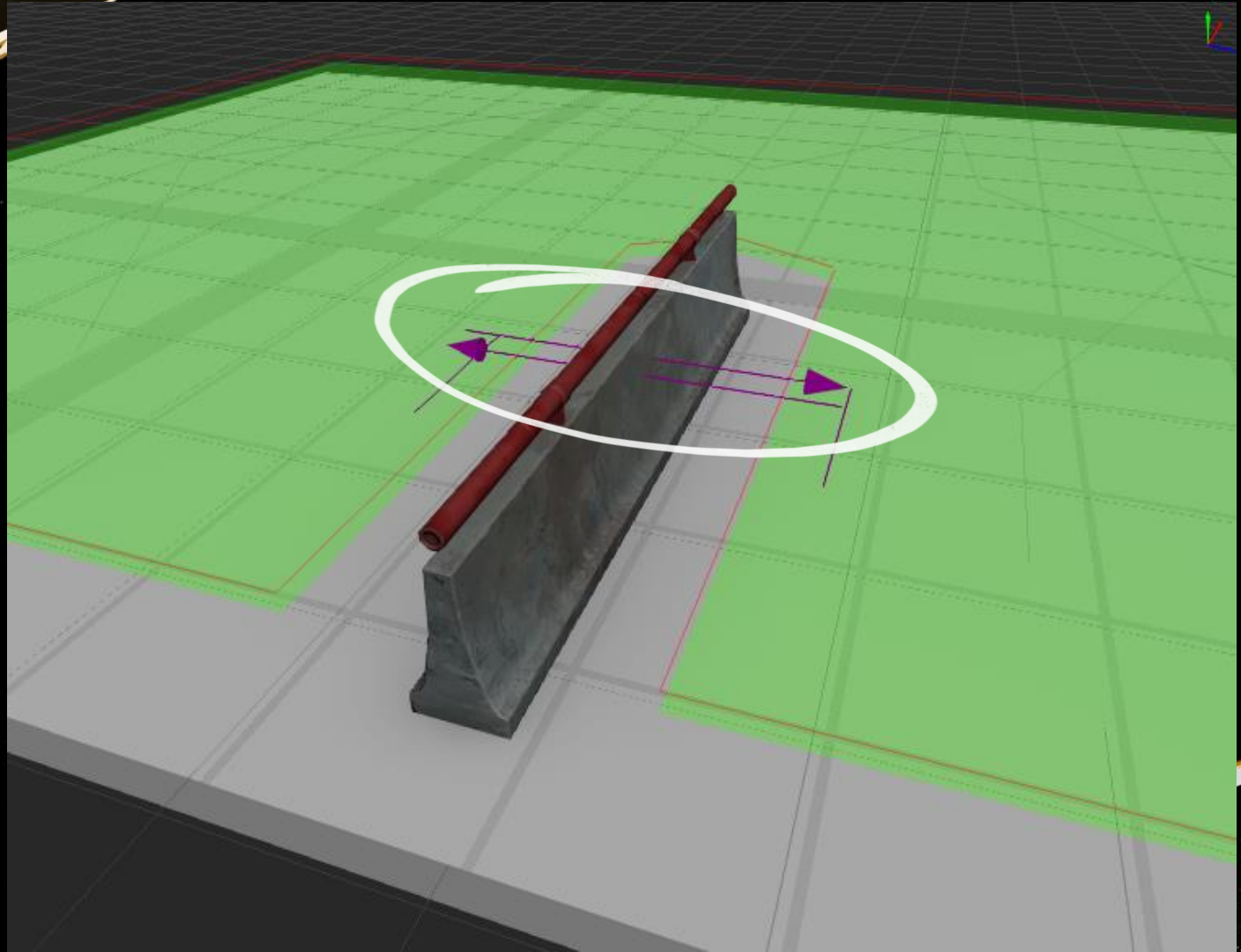
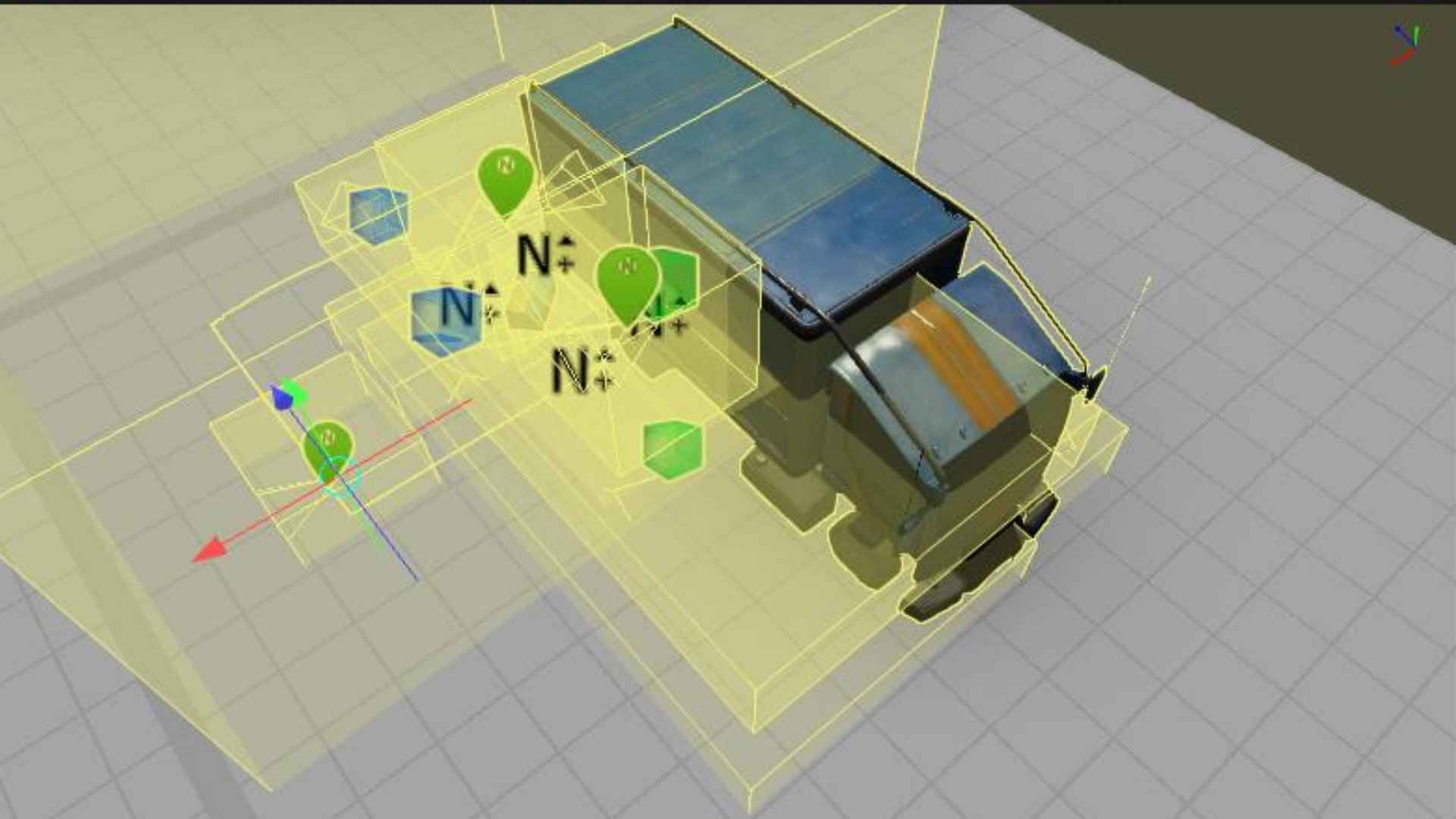
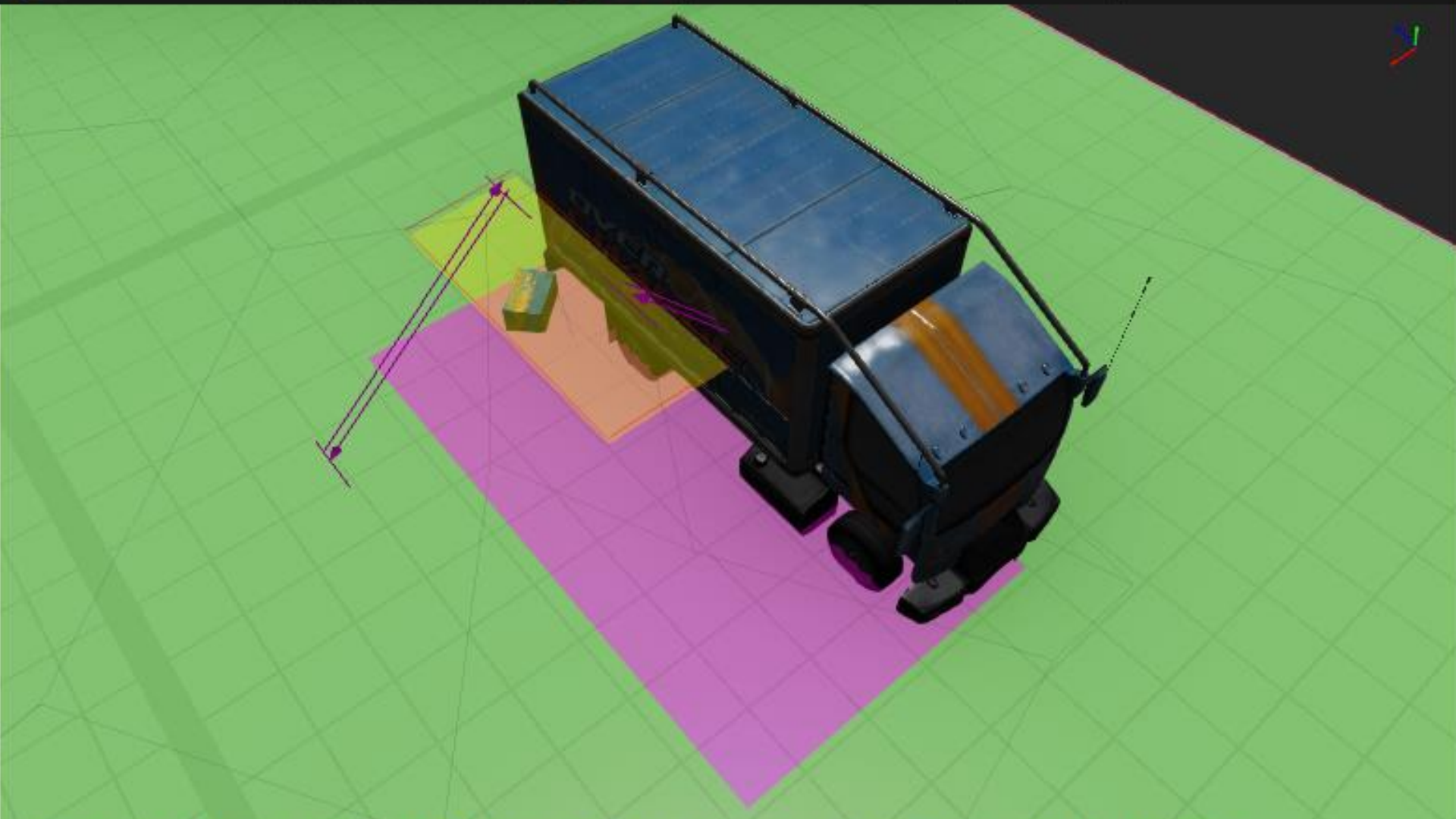
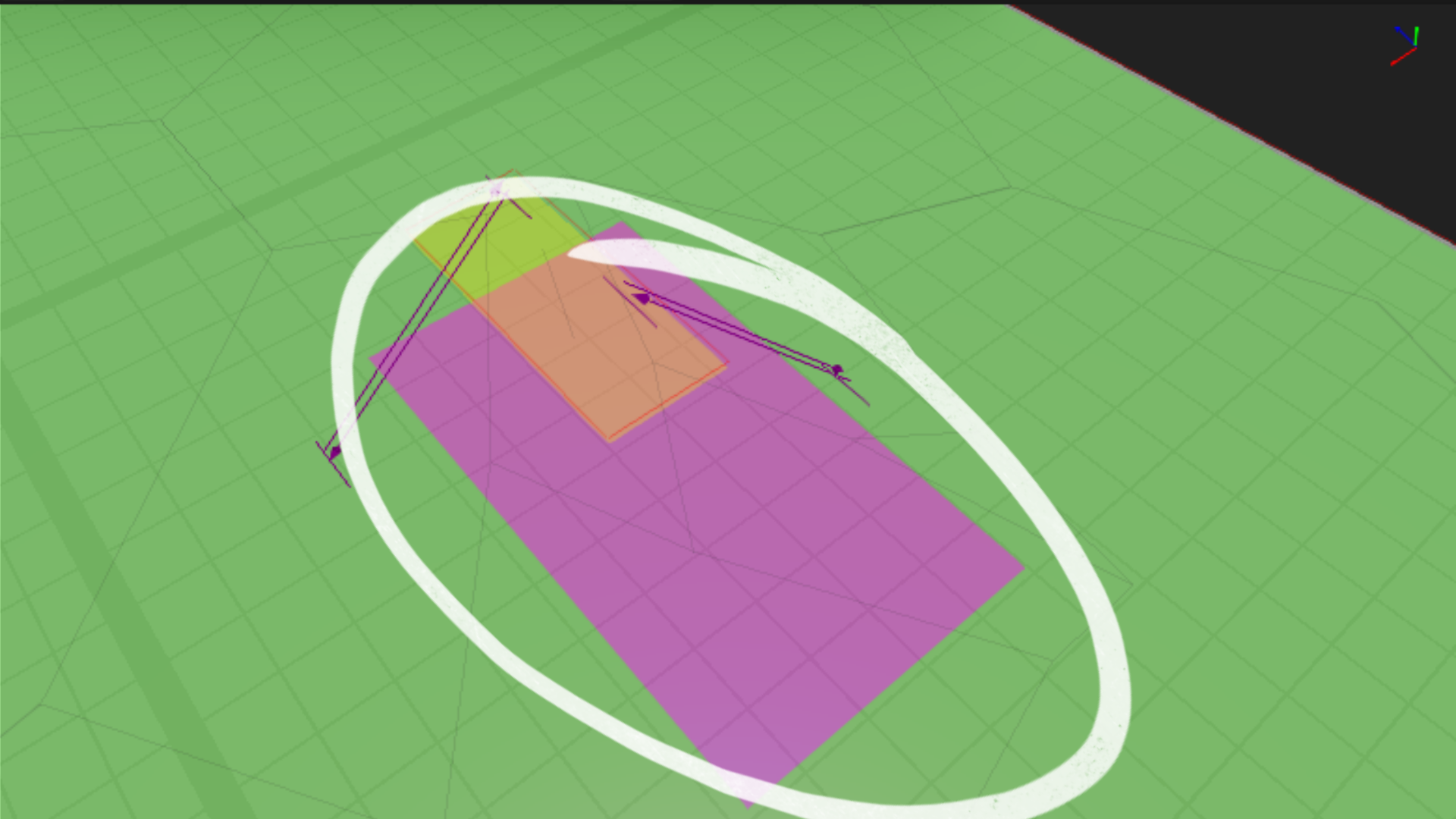


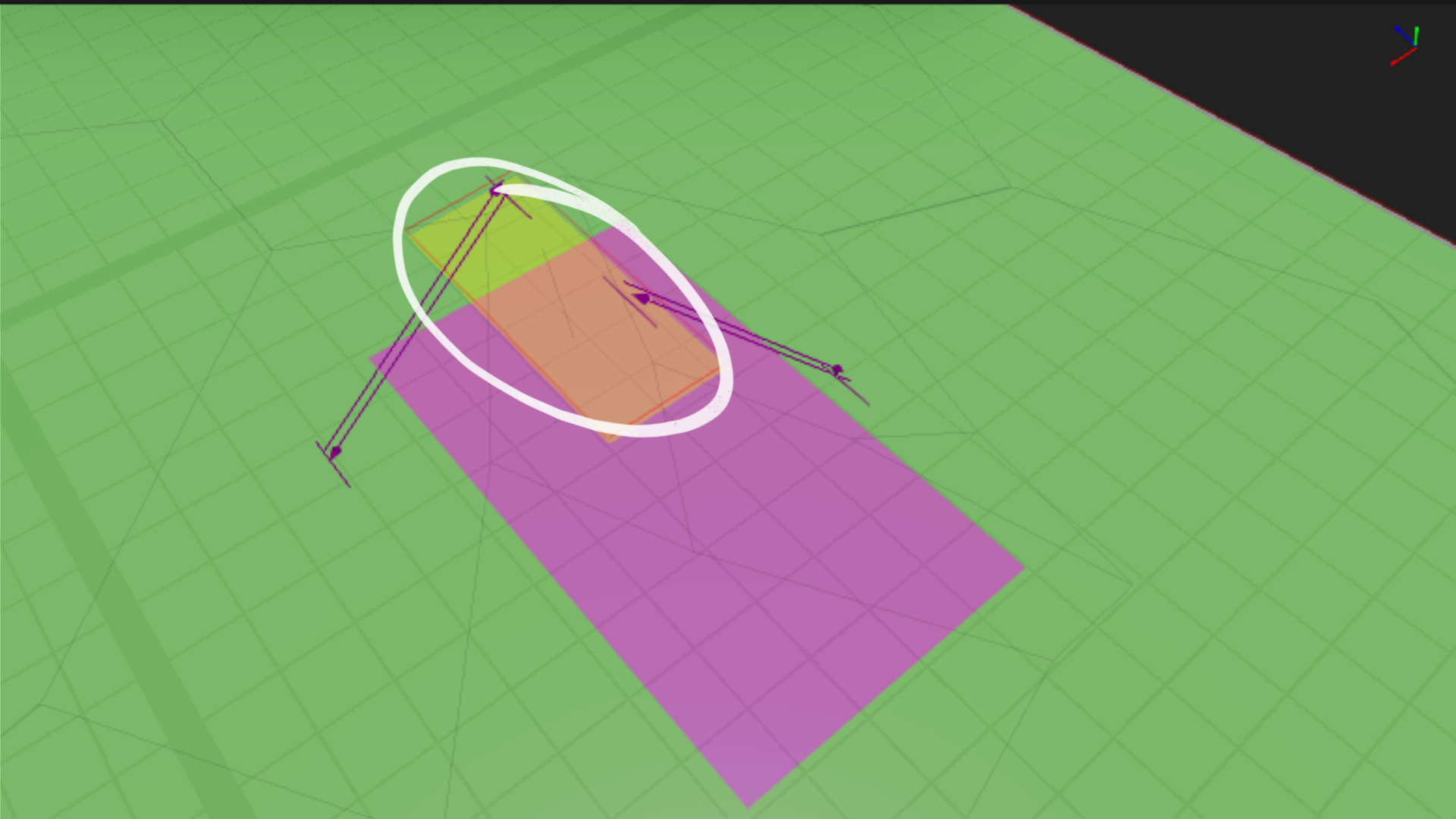


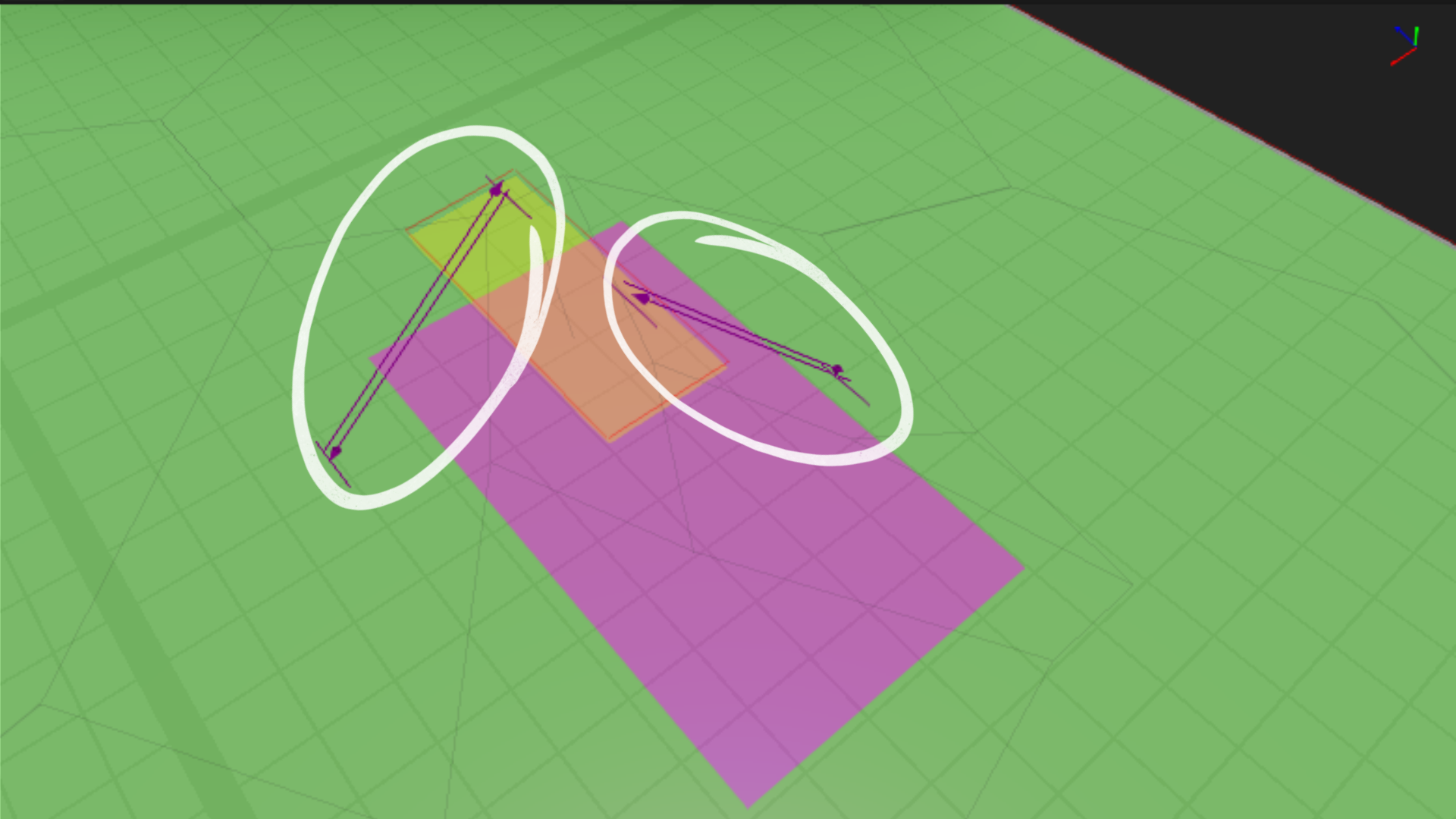
Putting it all together...











Questions, Comments, other Feedback...

@twoscomplement

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