Introduction to Final IK

Heyo!

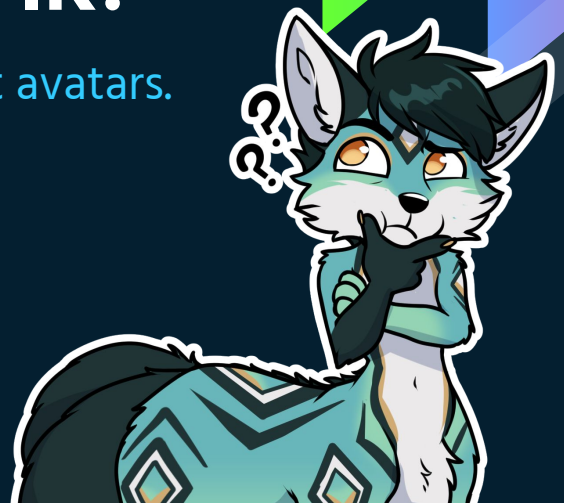
My name is Voxian

I created the Foxtaur, AvaTAUR, Betta Proot and AvianTAUR avatar bases for VRChat.

I am not affiliated with Root Motion, I just use their scripts.

What is Final IK?

In the context of VRChat avatars.



“A complete collection of inverse kinematics solutions for Unity”

(Image from Root Motion)

Inverse Kinematics

A process of calculating joint angles based on a start and end point.

What do games use this for?

- Determine where your elbows and knees are in VR.
- Keep your feet on the ground, especially on slopes or stairs.
- Hold a weapon while aiming at a target.
- Map animations between characters of different proportions.
- And so much more!

VRChat uses Final IK

And they allow us to use it as well!

Whitelisted Components

- Aim IK
- Biped IK
- CCDIK
- FABRIK
- Full Body Biped IK
- Grounder
- Limb IK
- Rotation Limits
- Shoulder Rotator
- Twist Relaxer
- VRIK
- IK Execution Order

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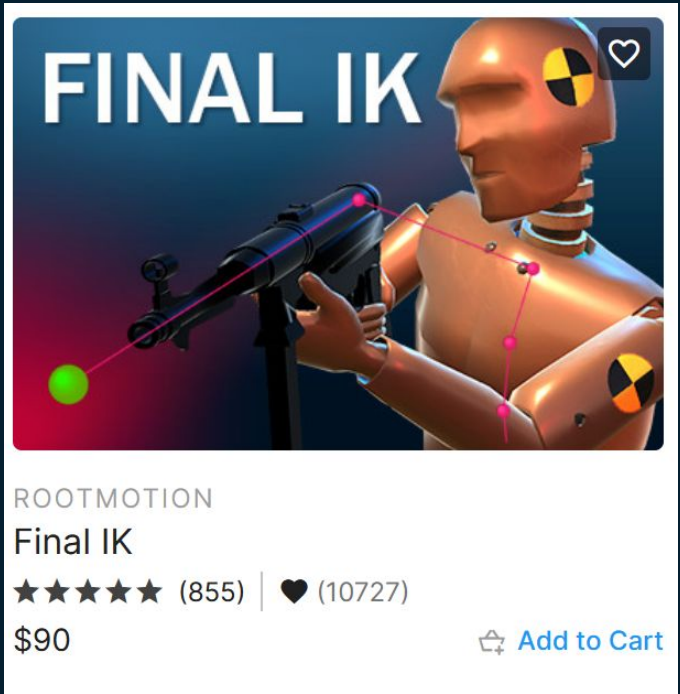


Final IK is a PAID asset

How does this impact us?

If you own Final IK

- The scripts will preview correctly in the editor. (But not behave exactly the same in game)
- You can upload an avatar with the whitelisted components.

There are some Final IK components that will not upload to VRChat.

If you do NOT own Final IK

- You will need to use what is called a “Stub” to setup the components.

  (VRLabs currently hosts a free stub on their Github)
- The scripts will not work in the editor at all, but they will work in VRChat!
- You can still create and upload avatars!

Distributing Content that Uses Final IK

Create content using Final IK Components

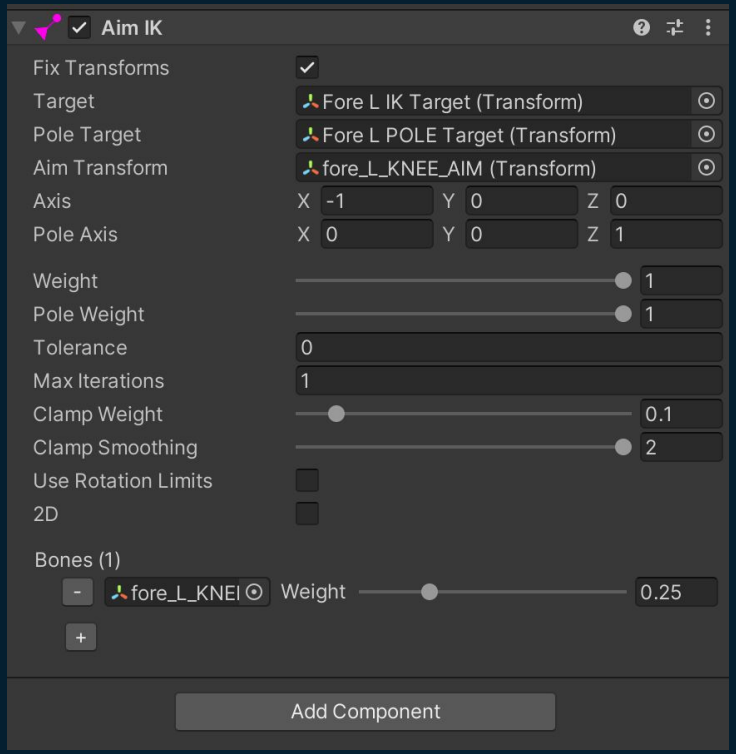
(You can use the free stub instead of the full version)

Share your files without the IK scripts

The end user combines your files with the FREE stub and uploads to VRChat

Final IK Examples

And generally how to apply them



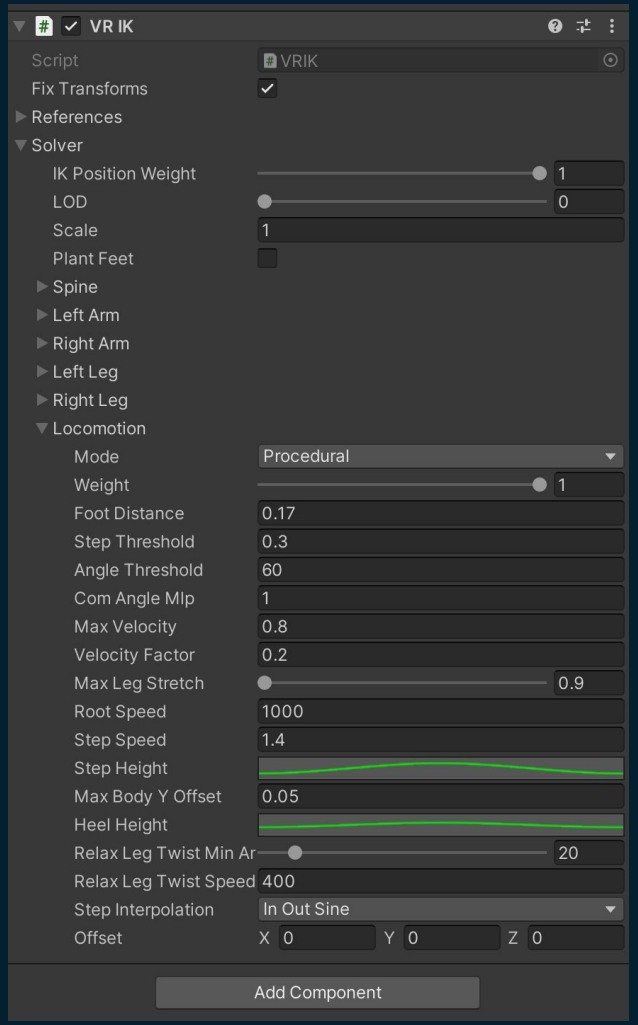
AIM IK

Similar to an Aim Constraint, but here we can have multiple bones in the chain and we can introduce limits.

Also, since it is an IK component, it is calculated at a different time than Aim Constraints.

Spines, Tentacles, and More!

Aim IK can be applied to any chain where you only know the start and end points. You can even tell the chain to twist evenly when the endpoint is twisted.



VRIK

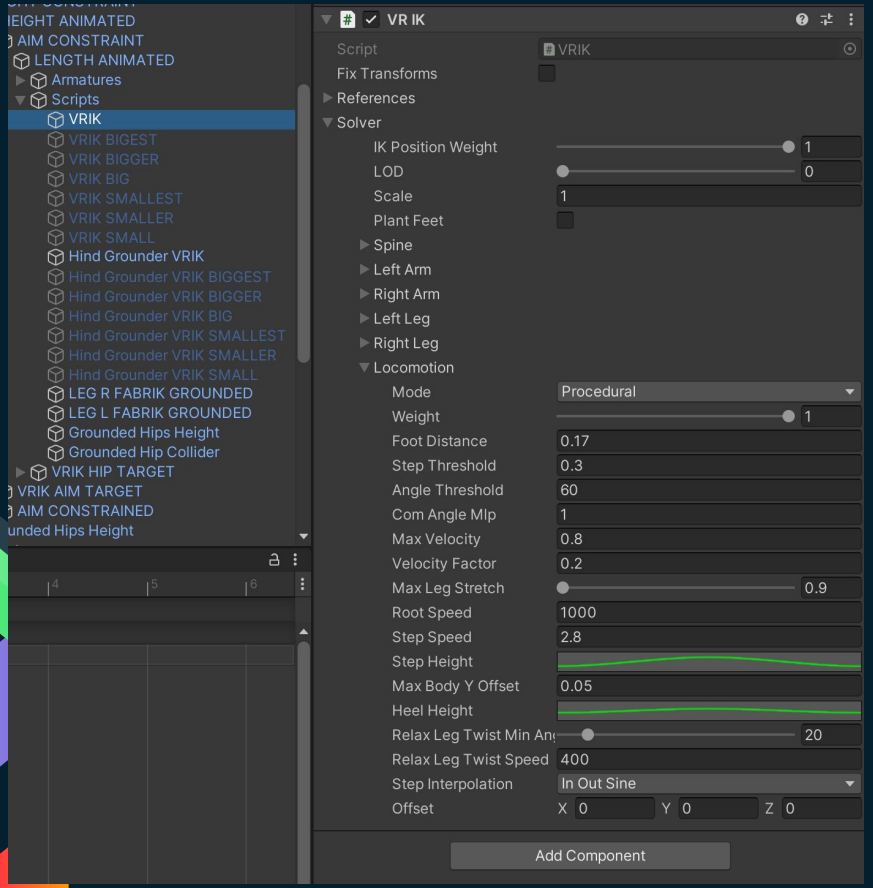
This script is a full system for mapping characters to VR Trackers.

One notable feature is the Procedural Locomotion. Which automatically makes steps whenever it detects the character is falling over.

More Legs!

Using a hidden armature, you can have VRIK calculate automatic steps for additional sets of legs!

You can also use this for followers.

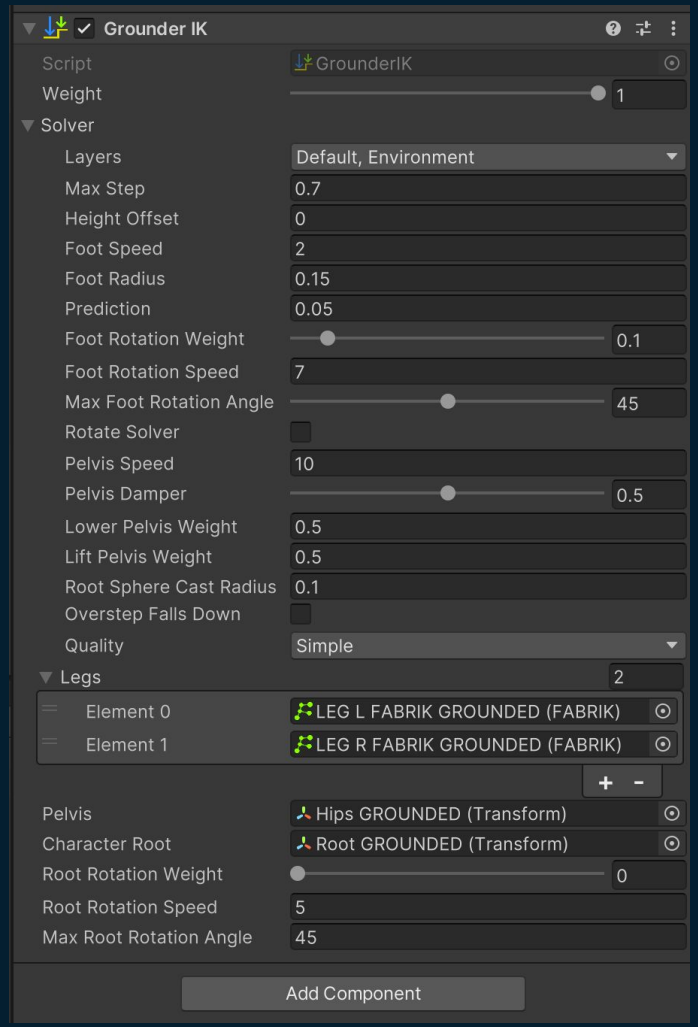


Limitations

VRIK does NOT scale with you.

You can NOT animate any settings.

Step Speed is faster in game than in the editor.



GROUNDER

This script searches for the nearest surface and keeps the “feet” touching and rotated to match.

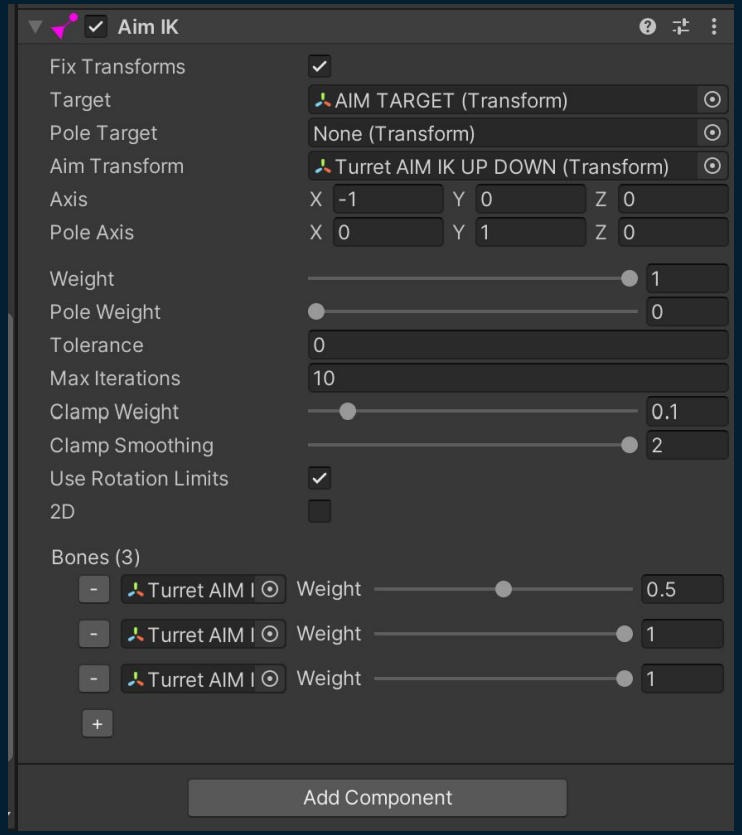
Deep Dive

Grappling Hook Robot

Grappling Hook Demo

How to Use

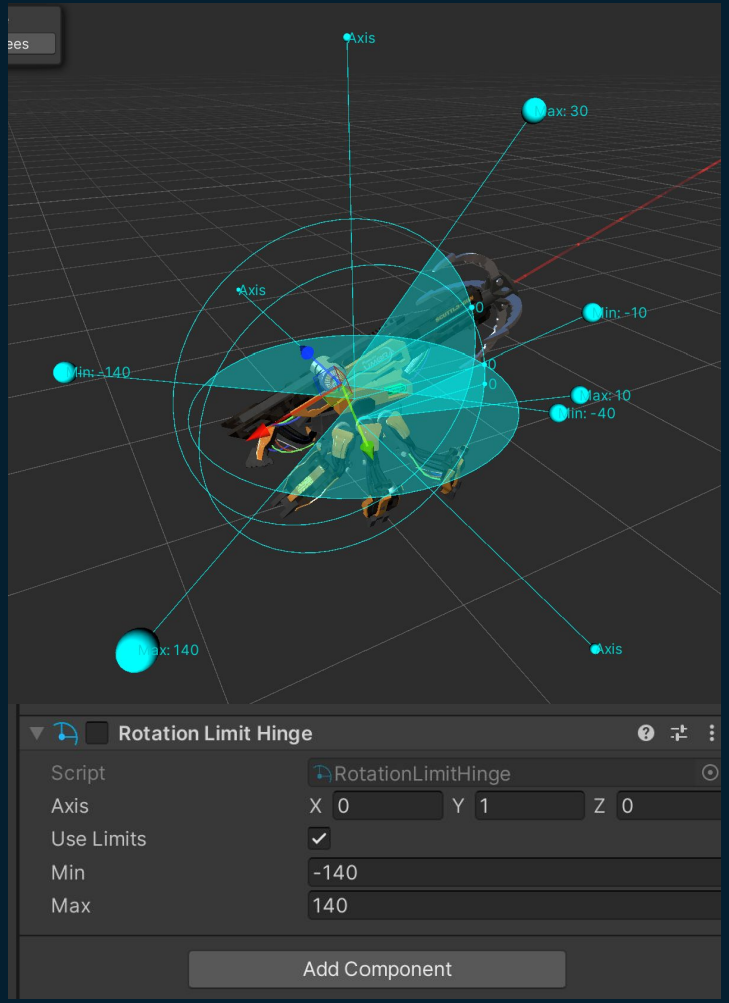
1. Tap your shoulder while pointing to activate.
2. Point at anything and the turret will aim at it.
3. Make a finger gun (lift your thumb) and the turret will fire.
4. Make a fist and the turret will retract.



Aim IK

We need the turret to aim at the location we are pointing at.

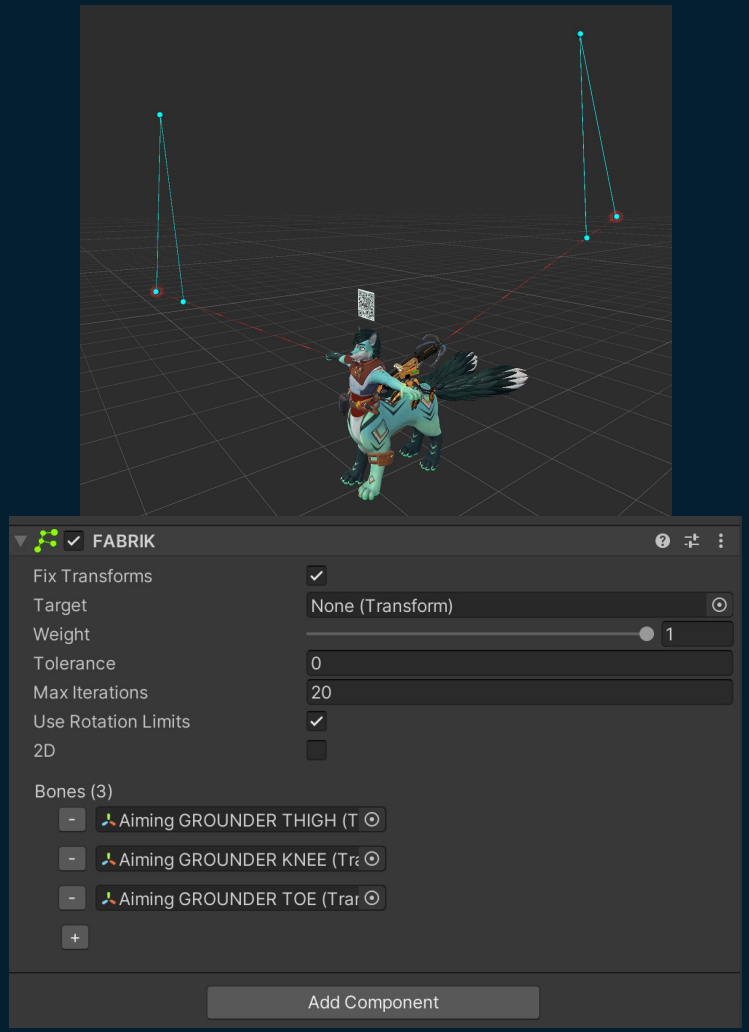
We cannot use an aim constraint, because we will be adding limits to how far it can rotate.



Rotation Limits

We don’t want the turret pointing inside our body or clipping through itself, so we will set rotation limits.

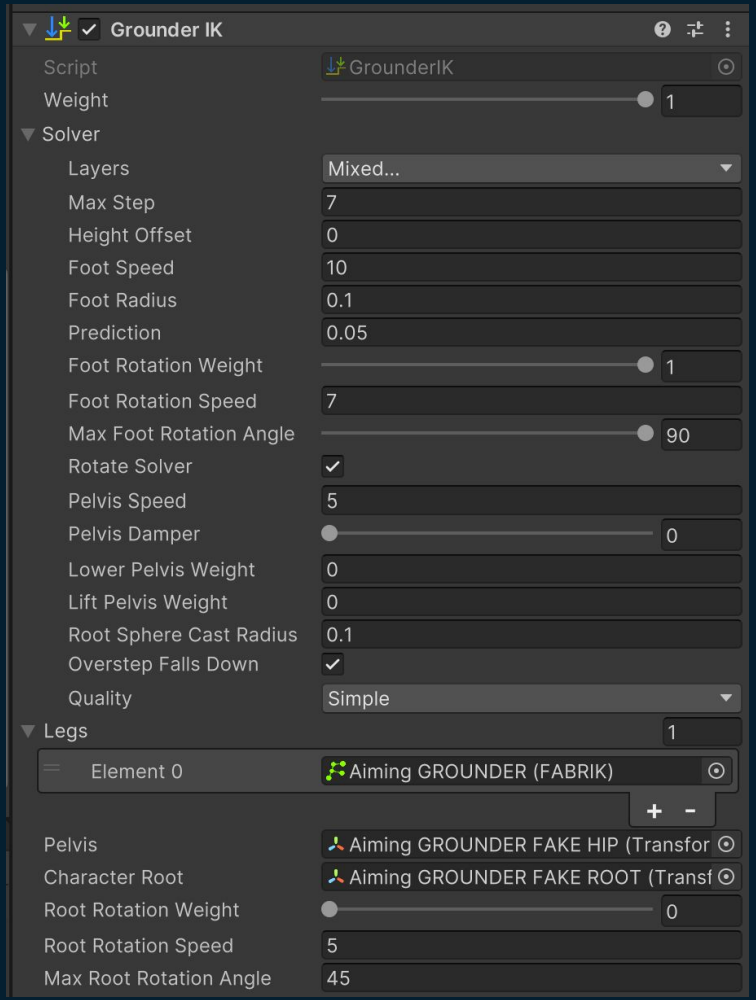
This will limit the AIM IK movement.



FABRIK

A large invisible leg attached to our finger and the turret.

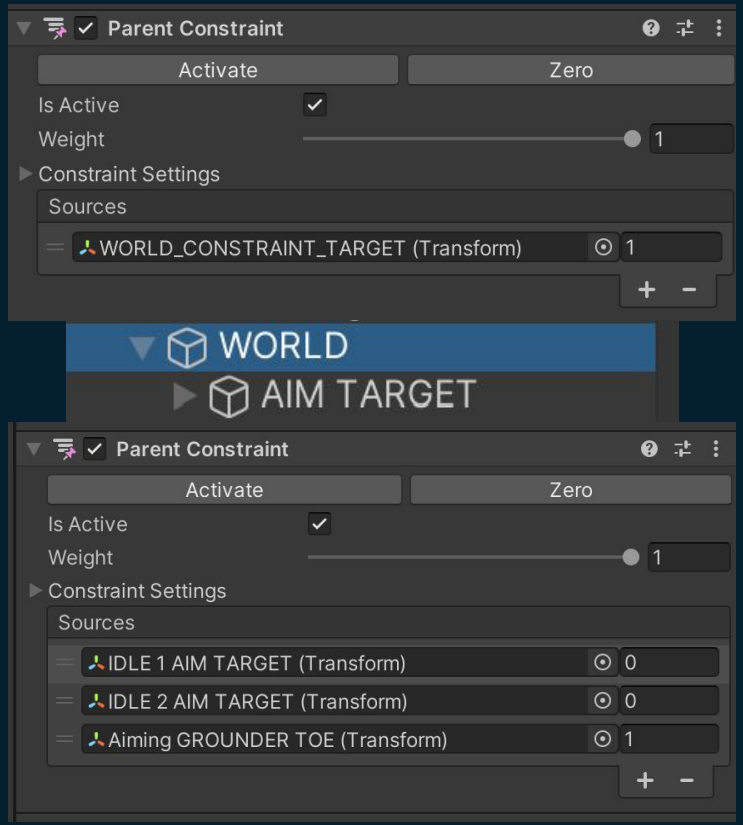
The length of this leg is the maximum firing distance.



Grounder

Next we create a grounder script and attach the FABRIK to it.

This will allow the arm to seek out the nearest “ground” in front of it.

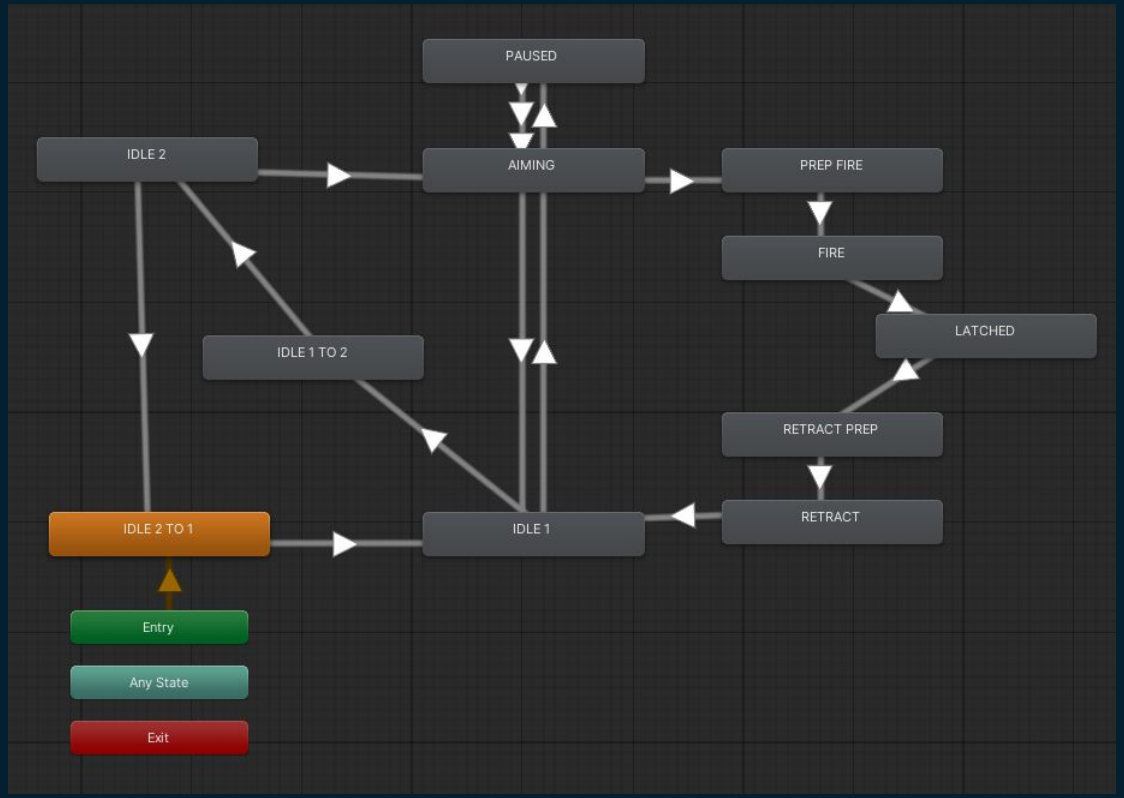


World Constraint

When the turret is ready to fire, we need to lock that location in world space.

The IK target is inside a world constraint and parented constrained to the end of the FABRIK “leg”. We will disable this constraint when we fire.

Animator Controller

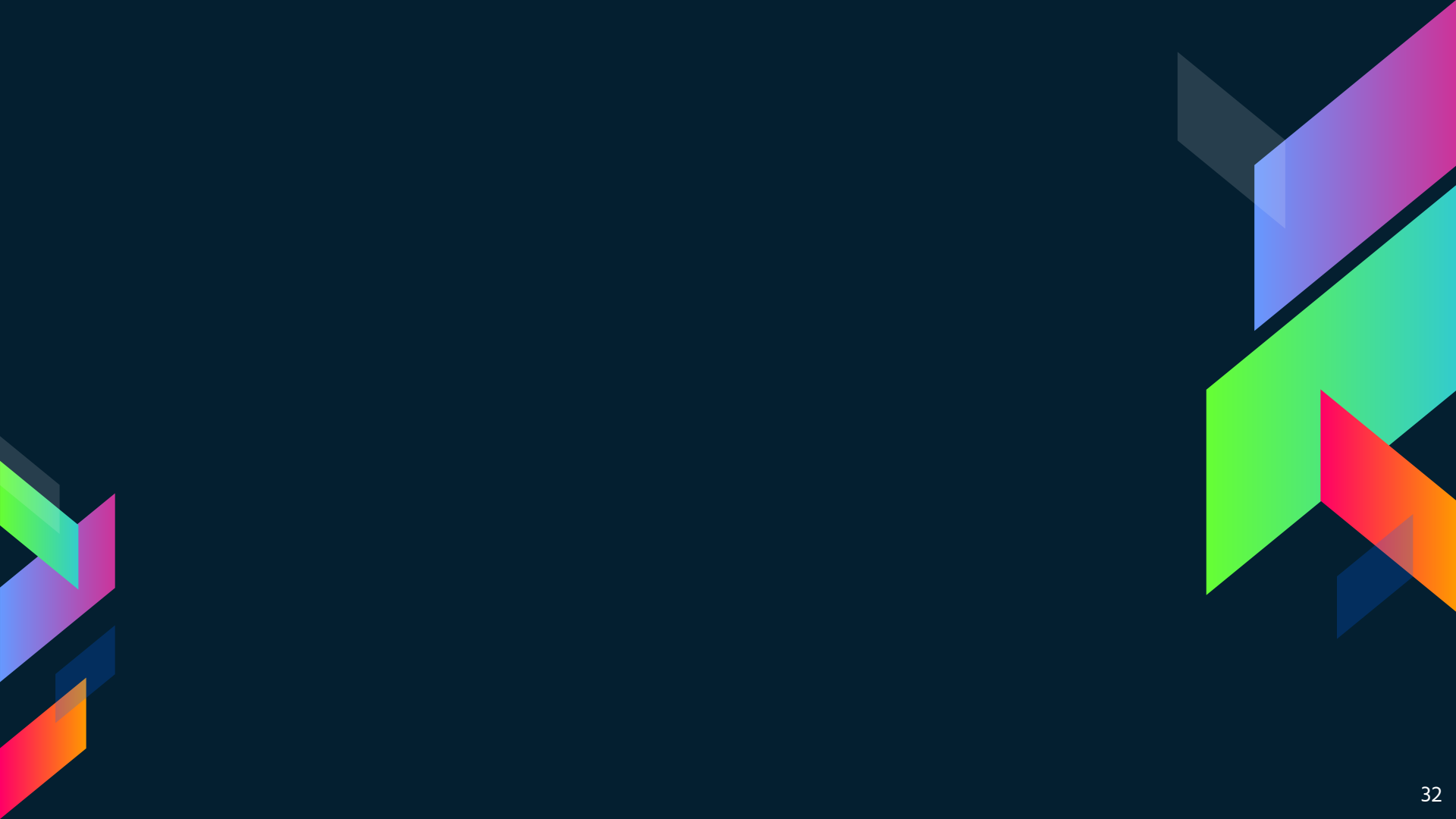


Credits

- Laser Raptor for developing and testing many of these techniques
- Ahzelion for creating the Scuttle Gun
- Presentation template by SlidesCarnival
- Photographs by Startupstockphotos
- Illustrations by TheCatnamedFish
- The Virtual Limbs community in general for supporting our work ❤

THANK YOU!

Any questions?

Join the Virtual Limbs community:

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