

Final IK Release Notes

[Version 1.0 - TBD](#)

[Interaction System](#)

[Demos](#)

[2D](#)

[Finger Rig](#)

[VR](#)

[FullBodyBipedIK](#)

[Common](#)

[Upgrade Guide](#)

[Version 0.5 - 24.02.2015](#)

[FullBodyBipedIK](#)

[Interaction System](#)

[OVR](#)

[Documentation](#)

[Common](#)

[Upgrade Guide](#)

[Version 0.41 - 22.09.2014](#)

[FullBodyBipedIK](#)

[AimIK](#)

[Version 0.4 - 07.08.2014](#)

[AimIK](#)

[FullBodyBipedIK](#)

[Interaction System](#)

[Common](#)

[LimbIK](#)

[Grounder](#)

[BipedIK](#)

[FABRIK](#)

[Third Party Support](#)

[Upgrade Guide](#)

[Version 0.3 - 07.04.2014](#)

[FullBodyBipedIK](#)

[FABRIK](#)

[LimbIK](#)

[Grounder](#)

[Common](#)

[Version 0.22 - 13.03.2014](#)

[FullBodyBipedIK](#)

[AimIK](#)

[FABRIKRoot](#)

[Upgrade Guide](#)

[Version 0.21 - 20.02.2014](#)

[Version 0.2 - 19.02.2014](#)

[FullBodyBipedIK](#)

[LookAtIK](#)

[AimIK](#)

[Rotation Limits](#)

[Common](#)

[Documentation](#)

[Upgrade Guide](#)

[BETA \(0.1\) - 15.01.2014](#)

Version 1.0 - TBD

Interaction System

1. Fixed a bug with picking up objects, where they were parented with a random offset.
2. When the InteractionObject is destroyed in the middle of interaction, will smoothly reset the interacting effectors to defaults.
3. Fixed a bug with the InteractionSystem.speed value, it can now be used without problems when pausing/picking up objects.

Demos

1. Restructured the 3rdPersonDummy demo. Made it use a simple upper-body aiming pose instead of 2 wasteful FBBIK passes.
2. Restructured CharacterThirdPerson, made the character controllers in the Grounder demo smoother and more responsive.
3. Removed CharacterControllerSimpleAim.cs (it is not needed anymore as IK solvers have "Target" properties).
4. Added the "Ragdoll Utility" demo scene.
5. Improved the "Mapping To Ragdoll" demo scripts to support smoothly blending in and out of the mapping
6. Converted the "Aim Weapon" demo to Mecanim.
7. Deleted CarryBoxDemo.cs, just assigned the hand IK targets to the effector target slots.
8. Added "CCD IK 2D" and "FABRIK 2D" demo scenes.
9. Added the "Finger Rig" demo scene.
10. Converted the "Hit Reaction" demo to Mecanim.
11. Converted the "Full Body FPS" demo to Mecanim.
12. Converted all Viking demos to Humanoid.
13. Removed Generic Dummy and his animations and Animator Controllers, all using Humanoid now.
14. Cleaned up many unused demo assets, reducing considerably the size of the package and import time.
15. Renamed most of the demo assets for better readability and consistency.
16. Removed the old and very confusing Legacy-based demo character controllers (CharacterControllerBase.cs, CharacterControllerDefault.cs, CharacterControllerLegacy.cs, CharacterAnimationSimpleLegacy.cs). Replaced them all with SimpleLocomotion.cs that works on Mecanim.

2D

1. Added a “2D” toggle to all Heuristic solvers (CCD, Aim, FABRIK). If toggled, the chains will be solved only on the XY plane, meaning bones will be rotated around the Z axis only.

Finger Rig

1. Created the FingerRig component. Add it to the hand GameObject, fill in the Fingers (or right-click on the component header and have them automatically detected). See the “Finger Rig” demo scene.

VR

1. Updated all FinalIK VR Demos and scripts to Unity5.1, merged the external VR package into the main project.

FullBodyBipedIK

1. Auto-detecting bone references for Humanoid characters is more reliable (using Animator.GetBoneTransform()).
2. Fixed a bug with FBBIKHeadEffector, that did not disable it's behaviour when the component was deactivated or disabled.
3. Fixed ShoulderRotator.cs to account for FBBIK solver weight.
4. Fixed a bug with limb mapping, where the right shoulder was dislocated under extreme solver stress.
5. FBBIKHeadEffector.cs can now be added in runtime without errors.

Common

1. Added RagdollUtility.cs that can be used to smoothly blend a character between animated and ragdoll modes. It also enables you to apply IK to make kinematic adjustments on a ragdoll pose (see the “Ragdoll Utility” demo scene).
2. Moved some demo assets (that will be also used in other packages in the future) to RootMotion/Shared Demo Assets.
3. Moved HandPoser.cs, GenericPoser.cs, IKExecutionOrder.cs to the RootMotion.FinalIK namespace.

Upgrade Guide

1. **Backup your project before upgrading!**
2. **Open a new empty scene, remove the existing RootMotion folder, reimport from the Asset Store.**
3. Namespace RootMotion.FinalIK.Demos was renamed to RootMotion.Demos to support sharing demo scripts with other RootMotion packages in the future. You will have to replace “using RootMotion.FinalIK.Demos;” with “using RootMotion.Demos” in your own scripts if you are referring to any of the demo scripts.

Version 0.5 - 24.02.2015

FullBodyBipedIK

4. Added the FBBIKHeadEffector script and the Head Effector demo scene
5. Added the "Soccer Kick" demo scene
6. Added the "Recoil" demo scene and scripts
7. Added the AnimationWarping script. This enables you to warp an effector from animation space to world space (see the "Soccer Kick" demo).

Interaction System

1. Restructured InteractionTrigger. Each trigger can now specify the ranges for both character position and camera position for triggering interactions. This is most useful for VR and first person rigs.

OVR

1. Made a separate package containing OVR demos and helpful scripts about full body mapping to the head controller, aiming and interactions.

Documentation

1. Added Search to the Script Reference.

Common

1. Moved all Editor scripts to RootMotion/FinalIK/Editor and RootMotion/Editor folders to make things easier for Javascript users
2. Added tooltips to the Interaction System and Grounder components and reusable demo scripts
3. Removed or made unique all conflicting assets from Unity's Sample Assets package
4. Restructured character controller scripts in the Grounder demo
5. Fixed a bug with MechSpiderLeg.cs

6. Removed skyboxes to reduce size of package

Upgrade Guide

4. **Backup your project before upgrading!**
5. **Open a new empty scene, remove the existing RootMotion folder, reimport from the Asset Store.**
6. All InteractionTriggers will be broken because of restructuring and have to be filled in again. Unfortunately this was unavoidable.

Version 0.41 - 22.09.2014

FullBodyBipedIK

8. Redesigned the Hit Reaction component and demo scene
9. Fixed a bug that did not allow for scaling characters after they had been initiated

AimIK

1. Fixed a bug with the solver that always used Vector3.forward as the Pole Axis
2. Added the AimIK Pole demo scene

Version 0.4 - 07.08.2014

AimIK

10. Fixed error when Clamp Weight was 1
11. Added polePosition, poleWeight and poleTarget to the solver. This enables us to keep another axis of the Aim Transform oriented at a position in world space

FullBodyBipedIK

1. About 20% performance improvement
2. Fixed initiation error when manually setting up the bone references in the Editor
3. Improved bend direction stabilization
4. Added FFIKChain.push and FFIKChain.pushParent
5. New custom editor
6. FFIK iterations can be now set to 0. In that case, full body effect is disabled and only trigonometric passes will be calculated.
7. Added effector target transforms. You can now assign them in the Editor or write `ik.leftHandEffector.target = transform`. FFIK will automatically set effector position and rotation to match the target transform's. It will overwrite `IKEffector.position = something`.
8. Added the Full Body FPS demo scene and scripts
9. Added the Pendulum demo scene to demonstrate how a character could be mapped to a ghost ragdoll with FFIK

Interaction System

1. InteractionObject now also works with Legacy
2. Icons for all Interaction System components
3. Added Push and PushParent to InteractionObject weight curve types
4. All InteractionSystem methods now return a bool value notifying if the operation was actually carried out or not. So if `StartInteraction()` returns false, the interaction did not start (maybe because the effector was already in interaction).
5. Integrated InteractionLookAt to IntegrationSystem to reduce the number of components. All used InteractionLookAt components need to be removed, Unity will give a warning if it finds any.
6. Added InteractionObject.WeightCurve.Type.PoserWeight. That will be used to determine weight of the hand posers.
7. Added picking up spherical objects to the Interaction Pickup2Handed demo
8. Restructured InteractionObject to add events that are easier to understand.

Common

1. Added IKExecutionOrder for easy editing of the order in which the IK components update their solvers.
2. All components of Final IK now have “User Manual” and “Script Reference” buttons in their context menu.
3. All component custom inspectors have a warning box now to inform you of invalid/incomplete setups without spamming the console.
4. Many bugfixes for custom inspectors
5. Revised component menu structure
6. Improved scene view handle and button scaling
7. Added range sliders to inspectors
8. Fixed the bug with IK components that found the wrong Animator/Animation component from the character hierarchy to get the Animate Physics value from
9. Improved the MechSpider demo, the spider is now capable of climbing vertical surfaces

LimbIK

1. Changed IKRotation to match the orientation of the last bone, like FBBIK effectorRotation
2. SetBendGoalPosition now takes a weight parameter.
3. Added the “Goal” bend modifier that allows you to assign a bend goal Transform.

Grounder

1. Small fixes, Grounder components can be added in runtime without errors
2. Added lowerPelvisWeight and liftPelvisWeight to the Grounding solver
3. Added horizontal wall running to the demo scene
4. Enabled strafing for the biped character controller in the demo scene (switch Move Mode to Strafe)
5. Added OnPreGrounder and OnPostGrounder delegates to the Grounder components

BipedIK

1. Simplified Pelvis constraints. Instead of bipedIK.solvers.pelvis.positionConstraint.position you can now use bipedIK.solvers.pelvis.position. Same with positionWeight, positionOffset, rotation, rotationWeight and rotationOffset.

FABRIK

1. 2-3 times faster constrained FABRIK chains.
2. Removed `IKSolverFABRIK.updateBoneLengths`. It will always update bone lengths and axes now, making it possible to skip animated bones in the hierarchy.

Third Party Support

1. Playmaker actions for all IK components and the Interaction System

Upgrade Guide

7. Backup your project before upgrading!

8. LimbIK `IKRotation` has been changed to match the orientation of the last bone like FBBIK `effectorRotation`. If you are using LimbIK or BipedIK somewhere, you will have to rotate the targets to match the exact desired rotations of the hand bones. This change will simplify setting up IK targets in the future (just copy the hand bone, pose it and use it as the target).
9. If you have used BipedIK pelvis constraints, you need to change `bipedIK.solvers.pelvis.positionConstraint.position` to `bipedIK.solvers.pelvis.position`. Same with `positionWeight`, `positionOffset`, `rotation`, `rotationWeight` and `rotationOffset`.
10. Integrated `InteractionLookAt` to `IntegrationSystem` to reduce the number of components. All used `InteractionLookAt` components need to be removed, Unity will give a warning if it finds any.
11. All `InteractionObjects` will need to specify `PoserWeight` curve or multiplier if you wish to use `HandPosers`.
12. Restructured `InteractionObject` to an event based system. Some properties like `triggerTime`, `releaseTime`, the animations and message recipients will have to be reassigned for the events.

Version 0.3 - 07.04.2014

FullBodyBipedIK

1. Added OffsetEffector.cs and demo scene
2. Added Interaction Walls demo scene and script
3. Fixed FixTransforms bug that was causing some twitching on some unanimated rigs
4. Improved spine mapping performance and accuracy. Not all spine bones need to be included in the spine references. It works the fastest if spine length is 2, first bone in the spine is the root node and the other is the last spine bone.
5. Improved solver weight blending. You can now weigh out the solver without dislocating the limbs even when the effectors are pinned
6. Improved the custom inspector and the validation of the biped references.

FABRIK

1. Improved solver stability under constraints.

LimBIK

1. Animated bones can be skipped in the hierarchy when assigning bones for LimBIK and TrigonometricIK. The last bone will still be solved to the correct position.

Grounder

1. Added the GrounderFBBIK, GrounderBipedIK, GrounderIK and GrounderQuadruped components and the Grounder demo scene.

Common

1. Added OnPreInitiate, OnPostInitiate, OnPreUpdate and OnPostUpdate delegates to all IK solvers.
2. IK Component inspectors draw the scene view handles for disabled IK components
3. All IK components not will look up the hierarchy to find the first Animation/Animator component to know if animatePhysics is on or off for the character.
4. Improved CameraController demo script

Upgrade Guide

1. **Backup your project before upgrading!**

Version 0.22 - 13.03.2014

FullBodyBipedIK

1. ShoulderRotator now works for characters that have animatePhysics enabled.
2. Added BipedLimbOrientations. It is now very easy to fix limb bending directions for UMA, 3ds Max and other skeleton types if necessary
(ik.solver.SetLimbOrientations(BipedLimbOrientations.UMA);). Removed IKConstraintBend.SetBendDirection() and IKMappingLimb.SetBendDirection().
3. Switched FBBIK limbs from 1DOF joints to 3DOF joints. This does not enforce the limbs to behave like hinge joints anymore and will allow for lossless solving and mapping of the limbs, meaning that if you have FBBIK on with 0 effector weights, the animation will remain the same.
4. Removed IKConstraintBend.BendBone because it is not necessary anymore after switching to 3DOF joints.
5. Restructured FBBIK chain structure to remove object composition cycle. This change is required for upgrading to Unity 4.6 (Beta).

AimIK

1. Added the Aim Swing demo scene.

FABRIKRoot

1. Restructured to remove object composition cycle. This change is required for upgrading to Unity 4.6 (Beta).

Upgrade Guide

1. Backup your project before upgrading!

1. IKConstraintBend.BendBone was removed, if you have any code using it, just delete it, will not be necessary anymore.
2. FullBodyBipedIK chain structure was restructured, so all used FBBIK components have to be reinitialized. Just right-click on the FBBIK component and select Reinitiate from the context menu. Pull and Reach values of the chains will reset to defaults.
3. FABRIKRoot was restructured and the chains have to be rebuilt in the inspector.

Version 0.21 - 20.02.2014

1. Removed Button.cs, a relic testing script that was unused and not namespaced.

Version 0.2 - 19.02.2014

FullBodyBipedIK

1. Better scaling of the effector handles (for extra large/small characters)
2. Fixed a bend constraint bug that occurred with very tiny characters
3. Added shortcuts to limb IK mappings (IKSolverFullBodyBiped.leftArmMapping, IKSolverFullBodyBiped.rightArmMapping, ...)
4. Added IKMappingLimb.weight for spherical interpolation of the limbs and for the possibility of disabling the effect of IK for a limb.
5. Added reach smoothing modes (FBIKChain.reachSmoothing).
6. Added IKSolverFullBodyBiped.GetLimbMapping(FullBodyBipedEffector).
7. Added IKConstraintBend.SetBendDirection() and IKMappingLimb.SetBendDirection() to enable you to change the bending direction of the limb.
8. Added Amplifier and a demo scene for it.
9. Added OffsetPose.Apply(IKSolverFullBodyBiped solver, [float](#) weight, [Quaternion](#) rotation)
10. Fixes to Inertia deltaTime issues.
11. Removed IKEffector.Mode, you can use IKEffector.maintainRelativePositionWeight now for smooth blending between the former MaintainAnimatedPosition and MaintainRelativePosition
12. Added OffsetModifier that will be the base abstract class for Inertia, BodyTilt, Amplifier, EffectorOffset and all other FBBIK effector positionOffset modifiers in the future. OffsetModifier works with animatePhysics, uses delegates safely and makes it easy to apply limits to the offset. It will also make it easier for you to create your custom offset modifiers, check out EffectorOffset.cs.
13. Added the TerrainOffset demo that was used to make the AimIK - Redirecting Animation tutorial.
14. Fixed IKSolverLookAt.SetChain. The LookAt solver now works with no head and nulls can be passed to SetChain.
15. Added GenericPoser, which is similar to HandPoser, but enables you to pose hierarchies that have a different number of bones.
16. Added the Interaction System and with it 3 demo scenes: Interaction, Interaction Character2Character and Interaction Pickup2Handed.

LookAtIK

1. Improved IKSolverLookAt. It now looks better with animations that have strong amplitude on the spine such as running and sprinting.

AimIK

1. RotationLimits can be used on the Aim Transform of AimIK now.

Rotation Limits

1. Fixed RotationLimitAngle twist limit when swing limit is 0.

Common

1. Added V3Tools to help dealing with vector algebra.
2. Added Fix Transforms option to all the IK components. Its now possible to use FBBIK and BipedIK with no Animation/Animator component. With Fix Transforms set to true, there will be more issues with unanimated bones.
3. Clamped all solver weights to 0-1.

Documentation

1. Updated User Manual and Script Reference to 0.2
2. Added diagrams to the Script Reference

Upgrade Guide

1. **Backup your project before upgrading!**
2. The new Fix Transforms option for IK components will be defaulted to true. You can turn it off for a small performance gain on solvers you don't need it for. It will also make any unanimated IK chain reset to it's initial pose in each Update before solving, so if you need additive solving of your CCD/FABRIK/FABRIKRoot chains, turn it off.
3. IKEffector.Mode was changed to IKEffector.maintainRelativePositionWeight, so if you used MaintainRelativePosition anywhere, you will have to change it to effector.maintainRelativePositionWeight = 1.
4. Changes to BodyTilt behaviour, you may need to adjust the OffsetPoses for tilting.

BETA (0.1) - 15.01.2014

Initial Release