Proteus VR template

Simple. No plugins. No fuss.

Video is coming…

Features

- A heavily-modified version of Epic's VR Template plus:
    - 3 fully animated controllers meshes: Hands (like Oculus Avatar), Oculus Touch controllers and HTC Vive controllers
        - Can be controlled with Oculus Touch or HTC Vive controllers, and support for Oculus remote
        - Full input mapping
    - Control over controllers opacity, scale, HTC Vive controllers skins, Avatar color
        - For the hands, the scale is 1:1 with Epic VR template. Reduce scale to approx. 0.75 to come close to real-life
    - Function to spawn poles at the 4 corners of the Oculus Guardian or SteamVR chaperone limits
        - By default it is mapped to Oculus Touch B and Y buttons, and HTC Vive controllers menu button
    - Optimizations for Oculus Rift and HTC Vive HMDs
    - "Ghost Mode" with gamepad
        - By default it is turned on; can be turned off or mapped to another input
    - Avatar head
    - Rumble functions adapted to work with Touch & Vive
    - UI interactions
    - Vive Tracker compatible
    - Network and single player mode
        - Works single player, or multiplayer via local area network or Steam

Let's begin with some quick Q&A

So, what this is about?

This template consists of HTC Vive and Oculus Rift compatible pawn and settings, ready to drop in your game. So what you can do is choose the features you want, and build yourself/modify a pawn based on the functionalities you need.

Source material

- Epic VR template
- Epic Twitch on Steam blueprints
- All other meshes, animations and blueprints are from Proteus

Which HMD works with the template?

The template is optimized for the HTC Vive and Oculus Rift with Vive or Touch controllers w/wo gamepad.

You can also try one or several Vive Trackers (for now, they are tracked by a Vive HMD only).

Which Unreal Engine 4 version works with the template?

The template has been developed and tested with Unreal Engine 4.15.1

Which Steam / Oculus version is compatible with it?

UE4.15 is natively compatible with Steam SDK 1.32 and Oculus SDK 1.10

You can use latest Steam SDK by compiling from source and changing SDK.

You can use the latest Oculus SDK by compiling the latest UE4 from Oculus

Another VR Template? There's already a ton of it.

This template is very simple, no plugins, no fuss. It gives a good start to use Touch and Vive controllers, in single or multiplayer mode.

If you want to try different templates, here's three I recommend:

- Steam VR template (works with rift): adds the use of sockets when grabbing, different teleport functions, vehicle, platforms and a freakin' lightsaber. And hey, it's from me!
    - https://forums.unrealengine.com/showthread.php?106609-Steam-VR-Template
- mordentral's OpenVR expansion template: Adds a ton of features, but you'll need the plugin
    - https://forums.unrealengine.com/showthread.php?116782-VR-(OpenVR)-Expansion-Plugin
- Mitchemmc'VR Content Examples: Basic functionalities
    - https://forums.unrealengine.com/showthread.php?111074-VR-Content-Examples&highlight=mitch

How can I install it?

Files can be found at https://1drv.ms/f/s!Av77lIIxt2OY0XGGW8UDwykohjuT

GitHub version at https://github.com/ProteusVR/ProteusTemplate *(you need to be logged to Github to open the link)*

Main infos found in the forum at https://forums.unrealengine.com/showthread.php?133957-Single-Multiplayer-Touch-amp-Vive-Proteus-blueprint-only-Template

To install as a template, just unzip into the appropriate templates directory like C:\Program Files\Unreal Engine[Version]\Templates for launcher version or[ForkLocation]\UE4\Templates for source version. Launch a new project, and you'll find it in the blueprint section.

To install as a project file, unzip in your usual projects folder. Then, delete the file /Config/TemplateDefs.ini and you're ready to go.

IMPORTANT: If you open it like a regular project without deleting the TemplateDefs.ini file, you'll get errors messages.

What is the default input mapping for the Oculus Rift Touch Controllers?

- **Both controllers**
  - Thumbstick directions: Playground rotation before teleportation
  - Thumbstick button: Teleport
  - Index Trigger: Grab / Release
- **Right Controller**
  - A Button: Teleport
  - B Button: UI Interaction
- **Left Controller**
  - X Button: Teleport
  - Y Button: Guardian poles on/off

What is the default input mapping for the Vive controllers?

- **Both controllers**
  - Trackpad directions: Playground rotation before teleportation
  - Trackpad release: Teleport
  - Trigger: Grab / Release
- **Right Controller**
  - Menu Button: UI Interaction
- **Left Controller**
  - Menu Button: Chaperone poles on/off

For Touch or Vive controllers, you can also adjust teleport Rotation from Controller (in the VR Settings)

What is the input mapping for the Xbox One gamepad?

- Primary (left) thumbstick: Move in “ghost” mode
- Secondary (right) thumbstick: Rotate in “ghost” mode

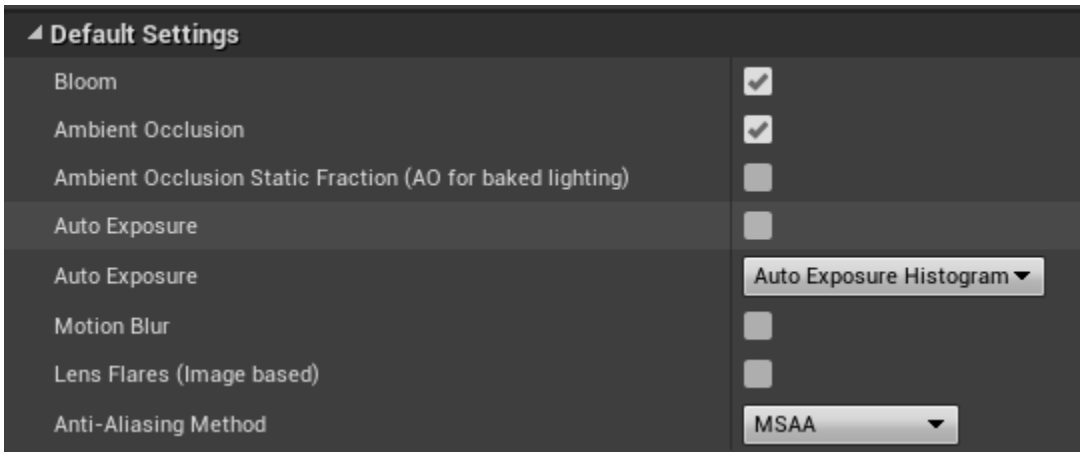
What is the input mapping for the Oculus Rift remote?

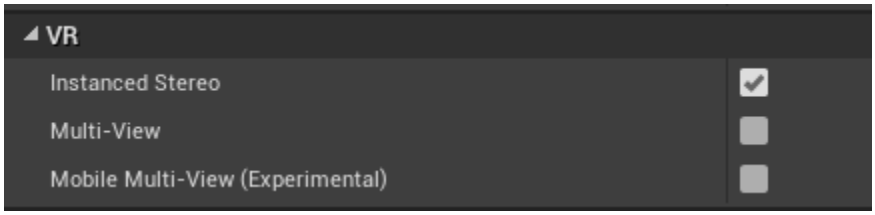
- By default it is not mapped to anything

What are the best Project Settings?

- In settings/General Settings/Framerate

- In settings/Rendering

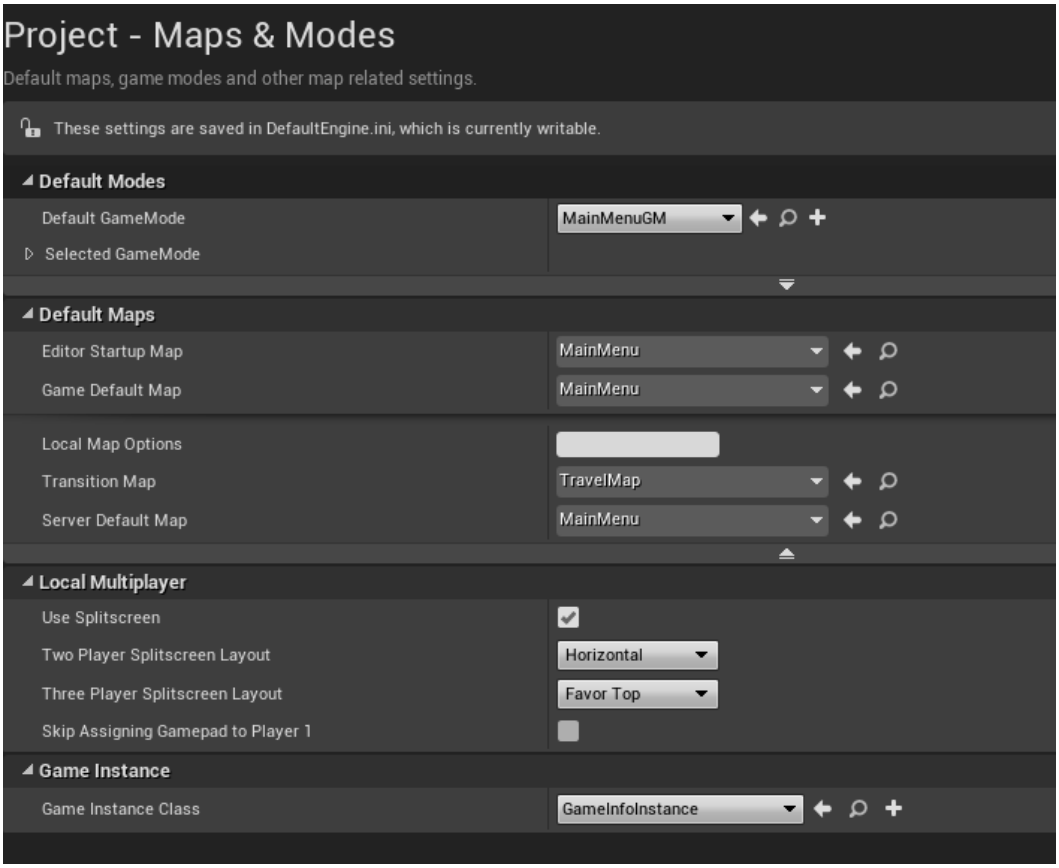




- Avoid using auto exposure, motion blur, lens flares and screen space reflections
- Pawn will spawn at playerstart (placed on the floor) and will teleport on navmesh

MULTIPLAYER MODE

IMPORTANT

- **Enable Plugins/Online Platform/OnlineSubsystem NULL and Online Subsystem Steam**
- **Start at MainMenu map**
- **Select MainMenuGM as GameMode**
- 

How does it work?

You can use any combination of Oculus Rifts and HTC Vive. Everyone must be in VR.

Each HMD must be connected to a different computer

IMPORTANT: You cannot connect to Steam or LAN in the editor or VR Preview. To connect to Steam, you must first package your game, then start from the compiled .exe

To use LAN: Close or logout from the Steam app; by default it will connect to LAN (you must also select LAN in the Host Menu)

To use Steam: Everyone must be logged in to Steam, under a different account. By default, you'll be playing the App ID #480, which is Space Wars. Your friends will see you're playing Space Wars.

The first to login becomes the listen-server. All other players are clients.

1) You first spawn as Avatar01 in the MainMenu map. If it's your first visit, you'll begin with the Options Menu. If not, you'll begin with the Main Menu. In the Options Menu, you can select your Avatar and Avatar Icon. Your Player name is randomly assigned.

2) Host: Choose the max # of players, map and Play Time. Choose between LAN or Internet (Steam). Be sure you logged out of Steam for LAN, and vice-versa. If you select LAN while connected to Steam and vice-versa, you'll not connect to anything. You are then sent to the chosen map.

3) Find a Match: You just have to choose your connection method. See warnings above. You'll join the match in whatever your fellow host chose as a map.

I can't type my name!

Typing in VR is not an easy task. It'll come soon. With the current template you doesn't need it, but if you need it there are other solutions you could implement: http://tomofnz.wixsite.com/tomofnz/single-post/2016/12/04/UE4-VR-KEYBOARD-WIDGET-SWITCHER

Quick remarks

MultiMap01 and 02 are the same thing. Only the landscape color is different. All Avatars are the same.

For now, there's no use for Avatar Icon, Avatar Name and Server Name. It will come with the lobby map.

What are the possible settings?

TAKE THE TIME TO REVIEW EACH SETTING BEFORE LAUNCHING / PACKAGING THE GAME

DefaultGameEngine.ini specific lines are mandatory (see below)

Project Settings should accommodate most, but there may be cases where you select otherwise. They are chosen in the Options and Host Menu during gameplay (see above)

- The VRSettings are chosen within the MainMenuPC (if multiplayer) or MultiPC (if singleplayer)
- Some other settings are set in specific blueprints

VR Settings VRSettings are chosen within the MainMenuPC (if multiplayer) or MultiPC (if singleplayer)are chosen within the MainMenuPC (if multiplayer) or MultiPC (if singleplayer)

Setting	
Controller Mesh	Hands / Oculus Touch / Vive controller
Controller Opacity	0 - 1
Controller Scale	For the hands, the scale is 1:1 with Epic VR template. Reduce scale to approx. 0.75 to come close to real-life
Vive Controller Skin (if Vive controller is selected in Controller Mesh)	Default / Apperture / Carbon / tron Aqua / Tron Clu
Enable Screen Messages	Yes / No
Monitor Output Resolution	by default, 1920x1080
GPU VRAM	GPU Video Memory, can be useful to tweak to stream large textures, by default 3000 (MB). You should put it around 1GB under your GPU VRAM
Show Pointer Controller	Yes / No
Avatar Color	Linear color of the Avatar
HMD Mirror Mode	Distorted / Undistorted / Single Eye / Single Eye Letterboxed / Single Eye Cropped (default); for the HTC Vive, there is only 2 modes: Distorted all Single Eye (all other will lead to Single Eye)

HMD Screen Percentage	Usually between 100-300
Teleport Rotation from Controller	Yes / No

Other settings:

Setting	You can change it in the following blueprint:
Max Number of Players available to host	/HostMenu/MaximumPlayers
Default Server Name	/HostMenu/DefaultServerName
Avatar Icon Images	/OptionsMenu/AvatarIcons
Avatar Images	/OptionsMenu/AvatarImages
Default Player Name	/OptionsMenu/MyPlayerName
List of Game Maps	/HostMenu/MapNames
Game Map Icons	/HostMenu/MapImages

Finally: Don't modify / rename Structure files (PlayerSettings and VRSettings) unless you want a festival of errors in your game cooking. If you modifiy something in it (you shouldn't), you'll have to reconnect and redo most of their related connections in many blueprints. If you do so, follow compiling error log to fix them.

DefaultGameEngine.ini files

In the template, the lines are already in the .ini file, but if you do a project from scratch, ensure the following lines are there:

```
[/Script/Engine.AudioSettings]
VoiPSoundClass=/Game/Proteus_Single/Blueprints/VOIPSoundClass.VOIPSoundClass
DefaultSoundClassName=/Game/Proteus_Single/Blueprints/VOIPSoundClass.VOIPSoundClass

[/Script/Engine.GameEngine]
!NetDriverDefinitions=ClearArray
; Uncomment the next line if you are using the Null Subsystem
;+NetDriverDefinitions=(DefName="GameNetDriver",DriverClassName="/Script/OnlineSubsystemUtils.IpNetDriver",DriverClassNameFallback="/Script/OnlineSubsystemUtils.IpNetDriver")
; Uncomment the next line if you are using the Steam Subsystem
+NetDriverDefinitions=(DefName="GameNetDriver",DriverClassName="OnlineSubsystemSteam.SteamNetDriver",DriverClassNameFallback="OnlineSubsystemUtils.IpNetDriver")
; Uncomment the next line if you are using the Oculus Subsystem
;+NetDriverDefinitions=(DefName="GameNetDriver",DriverClassName="OnlineSubsystemOculus.OculusNetDriver",DriverClassNameFallback="OnlineSubsystemUtils.IpNetDriver")

[/Script/Engine.Player]
;ConfiguredInternetSpeed=(Desired data rate cap)
;ConfiguredLanSpeed=(Desired data rate cap)
ConfiguredInternetSpeed=10000
ConfiguredLanSpeed=20000

[/Script/Engine.GameNetworkManager]
;TotalNetBandwidth=Total available bandwidth between all connections
;MaxDynamicBandwidth=Min and max per connection
;MinDynamicBandwidth=Min and max per connection
TotalNetBandwidth=50000
```


```
MaxDynamicBandwidth=20000
MinDynamicBandwidth=20000

[OnlineSubsystem]
DefaultPlatformService=Steam
bHasVoiceEnabled=true
PollingIntervalInMs=20
VoiceNotificationDelta=0.2

[OnlineSubsystemSteam]
bEnabledSteam=true
bEnabled=true
SteamDevAppId=480
SteamAppId=480
GameServerQueryPort=27015
bRelaunchInSteam=false
GameVersion=1.0.0.0
bVACEnabled=1
bAllowP2PPacketRelay=true
P2PConnectionTimeout=90
; This is to prevent subsystem from reading other achievements that may be defined in parent .ini
Achievement_0_Id=""

[Voice]
bEnabled=true
```

VOIP?

From my tests it doesn't work yet, but I'll be happy to take advices on modifications to enable it.

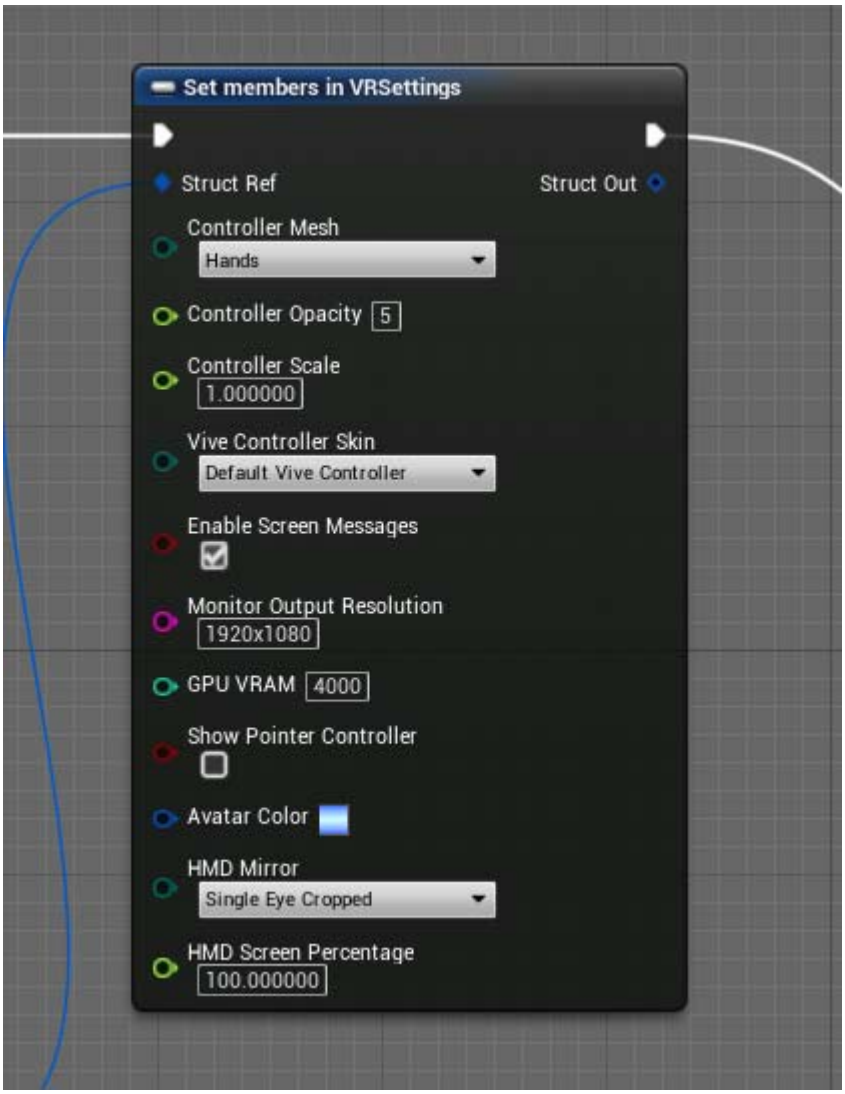
SINGLE PLAYER MODE

How does it work?

1. Start at MultiMap01 or 02. Set MultiGM as desired gamemode

Use it directly or import it to another project, by migrating the ProteusSingle folder into the project

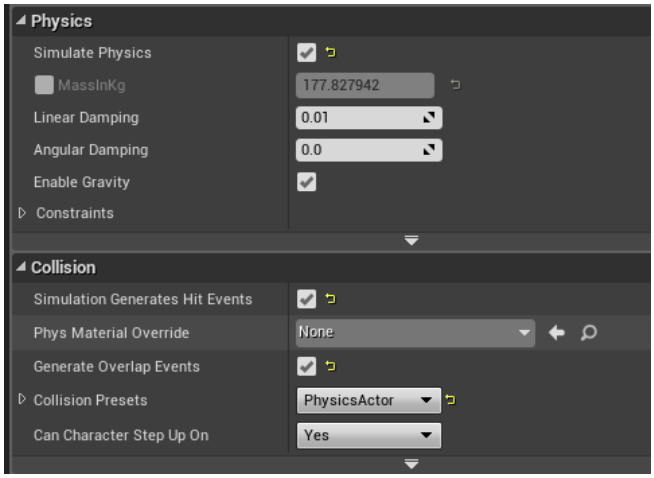
2. Set the desired settings in MultiPC; also check the Is SinglePlayer variable



How can I grab objects?

To enable object to be picked up, you have to:

- Make a blueprint of the mesh
- Be sure that the mesh inside the blueprint is set at Collision/BlockAllDynamic or PhysicsActor



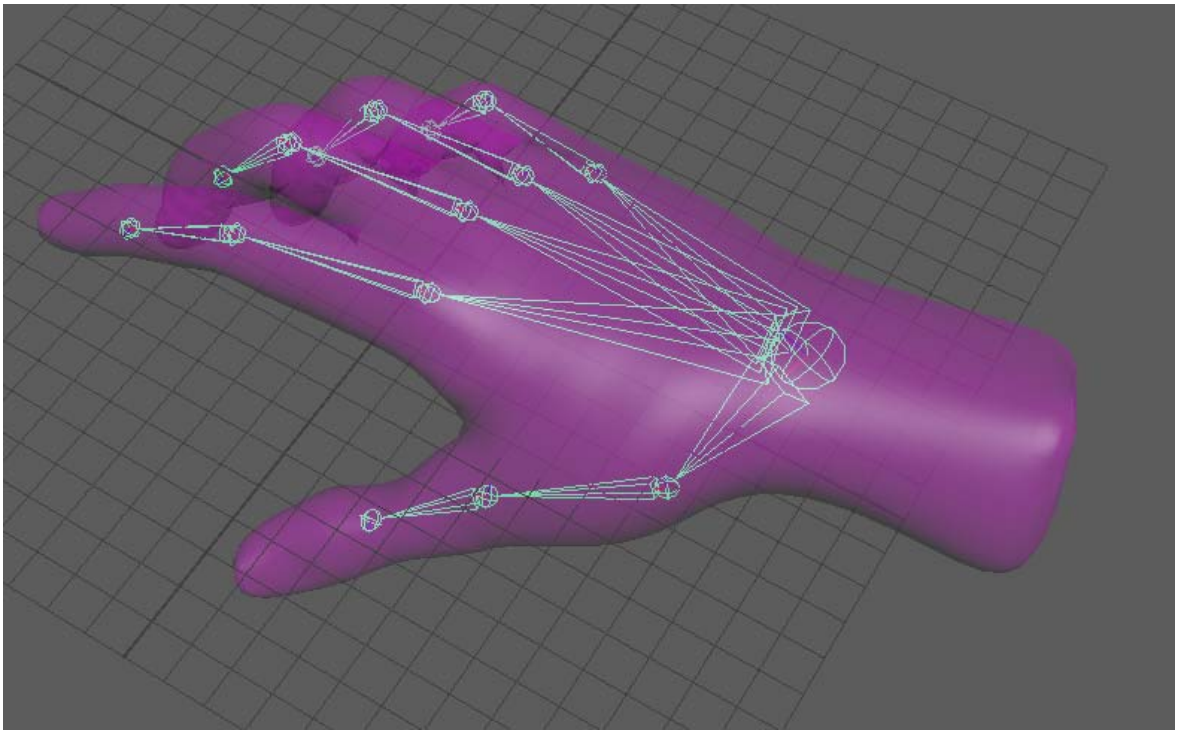
- Implement Pickup Actor Interface

- Put Event Pickup and Event Drop functions: look at the BP_PickupCube for an example

How can I add more fingers positions?

The hand model (.fbx and Maya) can be found on OneDrive at the same place as the template:

https://1drv.ms/f/s!Av77lIIxt2OY0XGGW8UDwykohjuT



You can then use your favorite 3D software to create fingers poses.

You'll also find the Oculus Touch and HTC Vive Controllers files (fbx and Maya on the drive)

Can I use more than 2 controllers with the HTC Vive?

You can use a Steam controller with a Steam dongle, or use a Vive Tracker effortlessly for more than 2 tracked objects.

If you have a Vive Tracker connected, it will automatically spawn in the MainMenu Map.

I want to access the camera in the Vive! What can I do?

For now, it works well with the Unreal4AR plugin found at http://www.unreal4ar.com/ (personal license for 99$), but the camera is in low-quality VGA.

I don't have 45/90 fps! Your template is crap!

The template and the functions inside the pawns are not computer-intensive. It has been rigorously tested and within the main MotionControllerMap, it stays at 90 fps.

99.99% of the time, the problem can be resolved by checking materials, lights and shadows. You have also to carefully assess and tweak the scalability and post-process settings.

Other settings

- Try to avoid any other materials than opaque and masked
- Avoid fancy collision boxes
- Eliminate / reduce to minimum dynamic lights and shadows
- Avoid meshes with high poly count
- Reduce the number of animated objects

I'm still having problems

For the ones having problem opening/packaging projects:

Errors on opening are due to:

1)Opening the downloaded template as a regular project without deleting the .ini file

2)Using the wrong UE4 version

99.9% packaging errors are due to

3)Overlooking settings in Project/Maps & Mode;

4)Overlooking options in Project/Packaging

What's coming for the future iterations?

- ✓ **Version 3**
  - Oculus support for Avatar/Rooms

What are the license terms?

Assets created by Epic can be freely reused in any Unreal Engine 4 project.

Assets created by Proteus are under the MIT license terms.

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