## PicoVRAndroidSDK\_UE4

# Development Document

Version: v\_1.1.6

Beijing Pico Technology Co., Ltd

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## 1 SDK introduction

This document describes the use of PicoVRAndroid SDK\_UE4 (hereinafter referred to as SDK) to make VR/AR applications running on Pico integrated machine equipment under the environment of Unreal game development engine. SDK mainly provides: binocular stereo rendering, optical distortion correction, sensor fusion, asynchronous time distortion, single buffer rendering, multi-interactive support (head-hand 3D OF/6DOF), multiple peripheral support, power and heat management, account number and display. Payment management and other functions.

The SDK is provided in the form of an engine plug-in that implements UE4's VR abstraction layer bridge engine and Pico virtual reality hardware device.

This causes the position/orientation of the Camera component in the engine to follow the Pico virtual reality helmet movement, so that the engine's MotionController component will follow the Pico motion controller motion.

Certainly, the engine API can be used to control the Pico VR hardware device. For example, the Input/Head Mounted Display/Reset Orientation and Position can be used to implement the gesture/position reset function of the HMD. For some Pico VR-specific features, we also provide blueprint interfaces, with call methods attached.

## 2 Supported Devices

## 2.1 VR all-in-one Devices

Manufacturer	Product
Pico VR	Pico Goblin、Pico G2、Pico Neo

The SDK does not support normal Android phones, but only the VR all-in-one devices listed above.

## 3 Developing Environment

Software	Version Requirement		
Unreal Engine	4.18.3、4.19.2、4.20.3、4.21.2		
Visual Studio	2015 or later (for UE4.20+, Please ensure that the latest version of VS2017 has been installed)		
JDK	jdk1.7.0_01 and later		
Android Works	The latest version is recommended		

Installation steps of Android Works please reference:

https://docs.unrealengine.com/en-US/Platforms/Mobile/Android/InstallingAndroidCodeWorksAndr

#### oid.

When installing Visual Studio 2015, the box "Common Tools for Visual C++ 2015" must be checked,

otherwise the project cannot be compiled.



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#### Figure 3.1 Visual Studio 2015 install features

## In addition, when installing Visual Studio 2017, please check "Game development with C++" :

stalling – <b>/orkloa</b>	– Visual Studio Community 2017 — 15.1 (26403.7) ds Individual components Language packs			
	Mobile development with .NET  Build cross-platform applications for iOS, Android or Windows using Xamarin.	Ø	Game development with Unity Create 2D and 3D games with Unity, a powerful cross-platform development environment.	Summary • visual studio core editor • Game development with C++ Included
	Mobile development with JavaScript Build Android, iOS and UWP apps using Tools for Apache Cordova.	<b>*</b> .	Mobile development with C++ Build cross-platform applications for iOS, Android or Windows using C++.	<ul> <li>✓ Visual Studio C++ core features</li> <li>✓ Windows Universal C Runtime</li> <li>✓ VC++ 2017 v141 toolset (x86,x64)</li> <li>Optional</li> </ul>
ner Tool:	Game development with C++ Use the full power of C++ to build professional games powered by DirectX, Unreal, or Cocos2d. sets (3)			<ul> <li>C++ profiling tools</li> <li>Windows 10 SDK (10.0.15063.0) for</li> <li>Windows 10 SDK (10.0.14993.0)</li> <li>Windows 10 SDK (10.0.10586.0)</li> <li>Windows 10 SDK (10.0.10240.0)</li> <li>Windows 11 SDK and UCRT SDK</li> </ul>
¢	Visual Studio extension development Create add-ons and extensions for Visual Studio, including new commands, code analyzers and tool windows.	Δ	Linux development with C++ Create and debug applications running in a Linux environment.	Cocos Unreal Engine installer By continuing, you agree to the license for the
	NET Core cross-platform development Build cross-platform applications using .NET Core, ASP.NET Core, HTML, JavaScript, and CSS			vision a such e control you servicely, we also there ability to download other software with Visual Studio. This software is licensed separately, as as out in the 3rd Party Notices or in its accompany license. By continuing, you also agree to those licenses.
ation				Install sizes 5.17
:\Progran	n Files (x86)\Microsoft Visual Studio\2017\Community			 Install size: 5.

Figure 3.2 Visual Studio 2017 option of install

## 4 Quick Start

## 4.1 Project Creation

Our SDK supports both blueprint projects and C + + projects. Here we take blueprint project of blank

as an example.



Figure 4.1 Project Creation

The target hardware should be Mobile / Tablet and the target graphic level should be Scalable 3D or

2D.

## 4.2 Project Settings

You need to set the project to compatible with our SDK. The steps are as follows:

1、Save the current map and open Edit-> Project Setting-> Project-> Maps and Modes to set it as the

project Editor Start Map and Game Default Map.

Project – Maps & Modes Default maps, game modes and other map related settings.					
n These settings are saved in DefaultEngine.ini, which is currently writable.					
⊿ Default Maps					
Editor Startup Map	NewMap	Q 🔶 🗝			
Game Default Map	NewMap	a 🕈 🗝			

Figure 4.2 Set default maps

2、Open Engine ->Input->Mobile to clear Default Touch Interface:



Figure 4.3 Clear Default Touch Interface

Then Open Platforms->Android->APKPackaging to check Enable FullScreen Immersive on KitKat and

#### above devices:

Disable verify OBB on first start/update.	
Orientation	Landscape 🔻
Ant Verbosity	Quiet 👻
Enable FullScreen Immersive on KitKat and above devices.	
Preferred Depth Buffer format	Default 🔻

Figure 4.4 check Enable FullScreen Immersive on KitKat and above devices

3、Enter Platforms->Android to set both Minimum SDK Version and Target SDK Version to 19:



Figure 4.5 Select SDK Version

Then Enter Platforms->Android SDK to set SDK API Level as matchndk and ensure NDK API Level as

android-19:

Platforms - Android SDK	
Settings for Android SDK (for all projects)	Set as Default
✓ SDKConfig	
Location of Android SDK (the directory usually contains 'android-sdk-')	D:/NVPACK/android-sdk-windows
Location of Android NDK (the directory usually contains 'android-ndk-')	D:/NVPACK/android-ndk-r12b
Location of ANT (the directory usually contains 'apache-ant-')	D:/NVPACK/apache-ant-1.8.2
Location of JAVA (the directory usually contains 'jdk')	D:/NVPACK/jdk1.8.0_77
SDK API Level (specific version, 'latest', or 'matchndk' - see tooltip)	matchndk
NDK API Level (specific version or 'latest' - see tooltip)	android-19



4、Enter Platforms->Android->Build to ensure the items of Support armv7 has checked:

⊿ Build					
	Support armv7 [aka armeabi-v7a]	<b>~</b>			
	Support arm64 [aka arm64-v8a]				
	Support x86_64 [aka x64]				

Figure 4.7 CPU

5. Open the project and enter UE editor, go to Menu/Edit/Plugins, uncheck all the options under

Built-in/Virtual Reality label. At this point the editor will prompt to restart. You should close the editor

#### Instead of restart it.

## 4.3 Import SDK

#### Be sure to keep the editor closed, and then copy the Plugins directory to the project's root

#### directory:

名称	修改日期	类型	大小
Config	2018/3/28 16:10	文件夹	
Content	2018/3/28 16:10	文件夹	
Intermediate	2018/3/28 16:12	文件夹	
📙 Plugins	2018/3/28 16:16	文件夹	
Saved	2018/3/28 16:10	文件夹	
🕕 MyProject.uproject	2018/3/28 16:10	Unreal Engine Project File	1 KB



Then double-click on the project name to reopen it.

If you use UE4.20+, it will prompt the SDK module is not compiled, click "Yes (Y)" to continue:

Missing Demo_420 Modules	$\times$
The following modules are missing or built with a different engine version:	
PicoMobile PicoMobileController PicoNeoController	
Would you like to rebuild them now?	
是① 香(N)	

figure4.9 Prompt not compiled

Under the Plugins page, you can see our plugin:

۲ 🖉 Plugins	×				
🔺 🖳 Installed	(3)	▶ Installed		搜索	ρ
🔚 Input Devices	(2)		PicoMobile NEW!		Version 1.1.4.0
🖬 Virtual Reality	(1)		PicoMobile is a sample of a Pico stereo	HMD implementation	
🛾 🕑 Built-In	(136)				
' <b>==</b> 2D	(1)		Z Enabled	Edit Package	💿 Pico Technology Co. I td
Advertising	(1)				
TE AI	(1)		A plugin for PicoVB Controller	EW!	Version 1.1.4.0
Analytics	(6)		A plugin for Ploover controller		
🔁 Android	(1)				
🔚 Animation	(2)				
🖬 Audio	(7)		🖌 Enabled	Edit Package	🕤 Pico Technology Co., Ltd
🚍 Augmented Reality	(2)		PicoNeoController NEW!		Version 1.1.4.0
Blueprints	(7)		A plugin for PicoNeo Controller		
Compositing					
Device Profile Selectors					
Editor			🖌 Enabled	Edit Package	n Pico Technology Co., Ltd
Examples					
File Formats					
T FX					
🚍 Gameplay					
🖬 Importers					
🖬 Input Devices					
					New Plugin



## 4.4 Project Completion

1、Create a Pawn blueprint class and add a Scene component to it. Then add a Camera component to

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#### Scene component.



Figure 4.11 Hierarchy of pawn

After being packaged and mounted to the helmet, the relative position/pose of the Camera will be

refreshed in real time according to the helmet, completing head tracking and stereo rendering.

2、Drag the Pawn into the scene and set its Auto Possess Player to Player0:



Figure 4.12 Drag Pawn to level

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## 4.5 Package Project

The texture compression format Pico Neo Pico Goblin support is ASTC, so please select Android(ASTC) when packaging project. The specific packaging process is: in editor, File->Package Project->Android-> Android(ASTC) (It is recommended to enter the "Project Settings" first, check the "Package game data inside .apk?" in the Platforms sub items Android, in order to package the data into

apk).



Figure 4.13 Package Project

In addition, please uncheck before "Enable Gradle instead of Ant" before packing.



Figure 4.14 Uncheck "Enable Gradle instead of Ant"

After packaging, double-click the "Install\_project name\_compiler configuration -armv7-es2.bat for

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#### installation":



Figure 4.15 Install apk

## 5 Guide to use Pico controllers

## 5.1 Pico Goblin Controller

#### 5.1.1 Instruction



Figure 5.1 Pico Goblin Controller

To use Pico Goblin controller, please follow the steps below:

1、Add MotionController component to the default Pawn in your project, in the same level as the

Camera.



Figure 5.2 Add MotionController component

This component is not affected by the Hand property. For example, if you change the left and right hands, please go to the system settings to modify it. And please make sure to enable "Disable Low Latency Update" option, so that the controller model won't twinkle as the result of dual update per

#### frame.

Motion Controller		
Player Index	0	2
Hand	Left	•
Disable Low Latency Update	2 5	

Figure 5.3 Check Disable Low Latency Update

After packaging and installation, the component will follow the position/orientation movement of

the Pico Goblin handle.

2、Add model for MotionController:

For UE4.18, please add StaticMesh component under MotionController.



Figure 5.4 Add StaticMesh component

In StaticMesh property panel, please select "Show Plugin Content" and then choose ppcontroller.



Figure 5.5 Add Pico Goblin controller model

For UE 4.19 and higher, add the model under the Visualization sub-menu of the MotionController

details panel (also check "Show Plugin Content" to display):

✓ Visualization	
Display Device Model	✓ = 1
Display Model Source	Custom 💌 🔁 🙎
Custom Display Mesh	ppcontroller 3
Display Mesh Material Overrides	0 Array elements 🗕 🖶 💼

Figure 5.6 UE4.19+ adds Pico Goblin controller model

It should be noted that in our plugin directory, we package the handle with button animation into an

Actor. If you want to reuse it, attach it to the Pawn or Character in your level.

#### 5.1.2 Input instruction

#### 5.1.2.1 Buttons

The buttons used by the Goblin controller are not predefined by the engine. When developing,

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please set the input binding according to the following table, or drive the event through the

T

#### corresponding blueprint node:

Goblin Conti	roller buttons	Input Binds	Blueprint Node
	<mark>App</mark> Touchpad Home	Pico Handle Back 👻	Pico Handle Back Pressed  Released  Key
	App Touchpad Home	Pico Handle Touchpad 🔻	Pico Handle Touchpad Pressed  Released  Key
	App Touchpad Home	Pico Handle Home	Pico Handle Home Pressed  Released  Key
	Volume Up Volume Down	Pico Handle VolumeUp 🔻	Pico Handle VolumeUp Pressed  Released  Key

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Goblin Controller buttons	Input Binds	Blueprint Node
Volume Up Volume Down	Pico Handle VolumeDown	Pico Handle VolumeDown Pressed  Released  Key

#### 5.1.2.2 Touchpad Axis

Please see the picture below:



Figure 5.7 Goblin Controller touchpad axis

Please notice that the value of X and Y axis are range from 0 to 1, different from the touchpad of Steam, Oculus and Google. If there are functions related to touchpad axis in your project, please remember to map the value [0,1] to [-1,1].

Use the nodes below to get the axis value:



Figure 5.8 How to get the touchpad axis value

## 5.1.3 Blueprint nodes

There are some other blueprint interfaces of the Goblin controller:

	Description	Set the operation when connection of motion controller disconnect and reconnect the operation you want do	
f Pico Set Controller Connected Status Changed Delegate     On Pico Controller Connected     On Pico Controller Disconnected	Input	OnPicoControllerConnected : The delege executed when the handle is reconnected OnPicoControllerDisconnected : Commissio when the handle connection is accident disconnected	
	Output	None	
	Return	None	



Input	Left——left hand, Right——right hand
Output	None
Return	None

	Description	Switch the suitable hand for motion controller
f Pico Switch Controller Hand	Input	None
	Output	None
	Return	None

	Description	Select the current tracking joint for motion
<b>f</b> Pico Choose Arm Model Joint	Description	controller
D D D	Input	Wrist, Elbow, Shoulder
Wrist	Output	None
	Return	None



Input	None
Output	None
Return	None

## 5.2 Pico G2 Controller





The Pico G2 controller buttons' corresponding relationship is as follows.:



Figure 5.10 Pico G2 Controller Button Correspondence Diagram 1



Figure 5.11 Pico G2 Controller Button Correspondence Diagram 2

G2 Controller buttons	Input Binds	Blueprint Node
1、APP	Pico Handle Back	Pico Handle Back Pressed  Released  Key
2, Touchpad	Pico Handle Touchpad 🔹	Pico Handle Touchpad Pressed  Released  Key

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G2 Controller buttons	Input Binds	Blueprint Node
3、Home	Pico Handle Home 🔻	Pico Handle Home Pressed  Released  Key
4、Volume Up	Android Volume Up 👻	Android Volume Up Pressed  Released  Key
5、Volume Down	Android Volume Down	Android Volume Down Pressed Released Key
6、Trigger	Pico Handle Trigger 👻	Pico Handle Trigger Pressed  Released  Key

## 5.3 Pico Neo Controller

## 5.3.1 Instruction



Figure 5.12 Pico Neo controller

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Regarding Pico Neo controller, there is a very important concept: main controller and sub controller.

The main controller is one with the ray and can interact with UI, and the sub controller is the other one. When there is only one controller connect to the HMD, it must be the main controller.

It is suggested to add WidgetInteraction component on the main controller, to make sure using the same controller to interact with UI in the system and in your own application.

#### 5.3.2 Instruction

To use Pico Neo controller, please refer to the following steps:

Add two MotionController components, which should be in the same level as Camera, to the default Pawn in your project and rename them to MotionController\_Main and MotionController\_Sub.



Figure 5.13 Add MotionController components

Select MotionController\_Main, set the value of Hand to "Special 1" in its property panel. So the component will follow the main handle movement. With regard to MotionController\_Sub, the value of Hand should be "Special 2".



Figure 5.14 Set Hand property

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#### 4、Add StaticMesh component to MotionController:

For UE 4.18, first add the StaticMesh component to the MotionController component:



Figure 5.15 Add Static Mesh component

In StaticMeshcomponent panel, enable "Show Plugin Content" option, and then select

Mesh_cvcontroller:
--------------------

▲ Static Mesh		
	None	1
Static Mesh	Current Asset Copy	 View Type ● Tiles
Physics	Paste	<ul> <li>List</li> </ul>
Simulate Physics	Clear	Columns
MassInKg	Browse	View
Linear Damping 🗧 🤰	Search Assets	🗌 Show Folders 🔹 🕨
Angular Damping	Static Mesh	Show Collections
Enable Gravity		Content
D Constraints		🗹 Show C++ Classes
Ignore Radial Impulse		Show Developers Content
Ignore Radial Force	2	Show Engine Content
Apply Impulse on Damage	<b>4</b>	🗹 Show Plugin Content
		Show Localized Content

Figure 5.16 Add Pico Goblin Controller model

For UE 4.19 and higher, please add the model under the Visualization sub-menu of the MotionController details panel (also check "Show Plugin Content" to display):



Figure 5.17 UE4.19+ Add Controller Model

It should be noted that in our plugin directory, we package the handle with button animation into an Actor. If you want to reuse it, attach it to the Pawn or Character in your level.

#### 5.3.3 Input instruction

#### 5.3.3.1 Buttons

The buttons used by the Goblin controller are not predefined by the engine. When developing, please set the input binding according to the following table, or drive the event through the corresponding blueprint node:

buttons	Input interfaces		
	Main	PicoNeoController (Main) App 👻	PicoNeoController (Main) App Pressed  Released  Key
	Sub	PicoNeoController (Sub) App 🔻	PicoNeoController (Sub) App Pressed  Released  Key

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buttons	Input interfaces				
	Main	PicoNeoController (Main) Touchpad	PicoNeoController (Main) Touchpad  Pressed  Released  Key		
	Sub	PicoNeoController (Sub) Touchpad	PicoNeoController (Sub) Touchpad  Pressed  Released  Key		
	Main	PicoNeoController (Main) Home 🔻	PicoNeoController (Main) Home Pressed  Released  Key		
	Sub	PicoNeoController (Sub) Home 🔻	PicoNeoController (Sub) Home Pressed Released Key		
	Main	🚞 PicoNeoController (Main) Volume <del>च</del> ्र	PicoNeoController (Main) Volume Up Pressed  Released  Key		
	Sub	PicoNeoController (Sub) Volume Up	PicoNeoController (Sub) Volume Up Pressed  Released  Key		

buttons	Input interfaces		
	Main	🚘 PicoNeoController (Main) Volume 🕏	PicoNeoController (Main) Volume Down Pressed  Released  Key
	Sub	PicoNeoController (Sub) Volume Dev	PicoNeoController (Sub) Volume Down Pressed Released Key

## 5.3.3.2 Touchpad Axis



Figure 5.18 Pico Neo controller touchpad axis

Using the below blueprint nodes to achieve the value of the touchpad of the main and sub controllers:

🎮 PicoNeoController (Main) TouchX 🔳 🛤 PicoNeoController (Sub) TouchX 🔳 D D Axis Value 🔿 Axis Value 🔿 PicoNeoController (Main) TouchY PicoNeoController (Sub) TouchY D D Axis Value 🔿 Axis Value 🔿 🞮 获得PicoNeoController (Main) TouchX 🛤 获得PicoNeoController (Sub) TouchX Return Value 🔿 Return Value 🔿 🞮 获得PicoNeoController (Main) TouchY 🛤 获得PicoNeoController (Sub) TouchY Return Value 🔿 Return Value 🔿

Figure 5.19 Touchpad blueprint nodes

The value of the trigger range from 0 to 1, you can get the value with the following interfaces:



Figure 5.20 Trigger blueprint nodes

#### 5.3.4 Blueprint nodes

Right click on the Pico Neo/Controller in the menu, you can see the APIs of the Pico Neo controller:

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Figure 5.21 Pico Neo controller API

Please see the table below for more detail:



0	
$\sim$	100
S	

Output	None
Return	None

	Description	Get main controller battery level
<b>f</b> Get Main Controller Battery Level	Input	None
D D Return Value 🔿	Output	None
	Return	main controller battery level,1~10

	Description	Get sub controller battery level
f Get Sub Controller Battery Level	Input	None
D D Return Value O	Output	None
	Return	sub controller battery level, 1~10



	Description	Get the sub controller connect state
f Is Sub Controller Connect	Input	None
Return Value O	Output	None
	Return	true-connected, false-disconnected

	Description	Judge whether the main controller support 6DoF
<b>f</b> Is Main Controller Support 6Dof	Input	None
	Output	None
Neturi Value O		true-Support , false-Not support ( with only
	Keturn	3DoFtracking)

	Description	Judge whether the sub controller support 6DoF
f Is Sub Controller Support 6Dof         □         □         □         □         □         □         □         □         □         □         □         □         □         □         □         □         □	Input	None
	Output	None
		true-Support, false-Not support (With only 3DoF
	Keturn	tracking)

	Description	Get the HMD type
f Pico Get Device Model            Model	Input	None
	Output	HMD type
	Return	None

## 6 API Reference

## 6.1 General API

The SDK supports VR generic functions in the following red dot-marked:



Figure 6.1 General API

For their detailed usage, please refer to the official UE4 document:

https://docs.unrealengine.com/en-us/。

The Reset Orientation and Position node only supports the function of resetting the positive

direction, ignore Yaw parameter, which is invalid.

## 6.2 Pico API

For system functions such as volume and brightness, the SDK also provides the corresponding API in the form of a blueprint node. Right-click in the event graph to enter the Pico Mobile sub-item, and you can see these APIs:



Figure 6.2 System interfaces

#### The details of these APIs is as follows:

	Description	to get the current orientation of HMD
<b>f</b> Pico Get Current Orientation	Input	None
Return Value 🔿	Output	None
	Return	the current orientation of HMD

	Description	to get the current position of HMD
<b>f</b> Pico Get Current Position	Input	None
D D Return Value O	Output	None
	Return	the current position of HMD

	Description	to get the count of sensor in using
<b>f</b> Pico Get Sensor Count         □       □	Input	None
Count 🔿 Return Value 🔿	Output	the count of sensor in using
	Return	whether succeed in getting the value

	Description	to get FOV
	Input	None
	Output	None
	Return	FOV

f Pico Get Current Brightness	Description	to get the current system brightness
D D		
Return Value 🔿	Input	None

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Output	None
Return	the current system brightness (integer, 0~255)

	Description	to set system brightness
f Pico Set Brightness	Input	the desired brightness (integer, 0~255)
O Brightness O Return Value O	Output	None
	Return	whether succeed in setting the brightness

<b>f</b> Pico Volume Up ▷ ▷	Description	to increase the system volume (from 0~15, the value increases by 1 after calling)
	Input	None
	Output	None
	Return	None

<b>f</b> Pico Volume Down □ □ □	Description	to decrease the system volume (from 0~15, the value decreases by 1 after calling)
	Input	None
	Output	None

Return None

	Description	to get the current system volume
<b>f</b> Pico Get Current Volume	Input	None
Return Value 🔿	Output	None
	Return	the current system volume

	Description	to set the system volume
f Pico Set Volume       >       >       >       >       Volume	Input	the desired system value (integer, 0~15)
	Output	None
	Return	None

	Description	to get the max volume number
f Pico Get Max Volume Number	Input	None
D D Return Value O	Output	None
	Return	the max volume number

	Description	Get Device Serious Number
f Pico Get Device SN	Input	None
	Output	Serious Number
	Return	None



## 7 Payment System

Pico payment SDK is based on the Pico account system for game currency payment system, the settlement is under the current Pico company game currency unit (P-coin).

## 7.1 Preparation

7.1.1 Apply and fill in APPKEY, APPID, SCOPE, DEVELOPERID, APP SECRET

When accessing the payment SDK, developers need to create applications and obtain corresponding

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strings on the developer platform. Below are the application steps:

- > 1.Log on to the developer platform and register as Pico member (<u>http://dev.picovr.com/</u>)
- > 2.Apply to become a developer

Developers are divided into individual developers and enterprise developers, please apply according to the actual situation. Upon review, we will provide feedback within 3 working days. Please review the developer platform status in a timely manner.

#### > 3. View developer ID

After becoming a developer, click on the upper right corner nickname, you can see the developer ID:

<b>⊙</b> Pico开	[发者平台	首页	SDK下载	文档中心	管理中心	常见问题	<b>。众秦思明</b> 退出
应用管理	硬件申	请	结算中心	数据中心	消息中心	用户反馈	
				一日本の目前の目前の目前の目前の目前の目前の目前の目前の目前の目前の目前の目前の目前の	用户名: ID:81 称:产品-Joey	秦思明	
					SIXXIV DUAT		
				僧	战开发者资料		

Figure 7.1 Developer ID

> 4. Obtain corresponding strings

Developers can enter the creating the application phase from the management center.

OPico开发者	平台	首页 SD	K下载  SDK DEMO	文档中心	管理中心	常见问题	〕秦小明 退出
应用管理	硬件申请	结算中心	数据中心	消息中心	用户反馈		
	创建应	用					
	应用	名称	应用平台	版本名称	状态	操作	
	测试游网	戈1016	PicoStore	2.0	等待上传应	用 上传应用 管理	
	Dem	101	PicoStore	1.0	已下线	预约上架管理	
	正式-青岛SD (P币3	DK支付测试 支付)	PicoStore	1.0	审核不通过	重新提交 查看详	青

Figure 7.1 Create application

After you click create the application, you can choose which platform to publish:



Figure 7.3 Choose platform

After entering the appropriate platform, you can improve the application of relevant information,

Including whether the app is free or paid, how much P currency to pay when paying:

		01100
基础信息	编辑资料	
英文	应用名称:	应用各称
HX	应用简介:	简单描述应用
	应用介绍:	不超过400字
	应用截图:	文件格式为jpg或png: 尺寸为800°450條赛 PicoStore应用列表将使用您上传的首张截圆用作展示
	应用类型:	● 应用 ○ 游戏 提示:应用类型一经选择无法修改

@ Duco

Figure 7.4 Improve information

Please pay attention to the red box of the figure above. Please fill in the application type carefully.

Once filled, it cannot be modified!

After the application is successfully created, the developer platform assigns the strings. 包括 APPKEY, APPID、APP SECRET:

APP名称:aila
APPID : 2bd5d117f53b491d64d3b9cf21fd07c8
APP KEY : 4ef7d5a7aba7bf5e8c57e3c2394ba88f
APP Secret : 0f6e554c6b3c8903351f2b2911894a50
状态:等待上传应用
提交时间:2017-04-14 13:46:31
操作:查看信息
上传应用 游戏内支付配置
提示:游戏内支付配置仅针对"游戏类型"生效!请在上传应用前
先进行道具配置,无内付游戏请忽略。

Figure 7.5 APP ID、 APP KEY、 APP Secret

For games, if there are items in the case of payment, we require developers to use the developer backend to use commodity code for unified management. Choose in-game payment configuration, configure the in-game purchase information:

前最名称(中)     价格     商品名称(笑)     价格     类型     代码     操作       周末礼包1     50.00P市     Gift1     1.00美元     不可消耗     weekendgift001     修改 URL: 提供订单支付通知地址 提示:商品名称会展示在用户中心消费明细中,计费代码配置完成后,无法进行修改及删除。	<sup>应用管理</sup> 游戏内支付	硬件申请	结算中心	数据中心	) 消息	中心  用	户反馈			添加
周末礼包1       50.00P币       Gift1       1.00美元       不可消耗       weekendgift001       修改         回调地址	计费代	的配置	商品名	称(中)	价格	商品名称(英)	价格	类型	代码	操作
回调地址 URL: 提供订单支付通知地址 提示:商品名称会展示在用户中心消费明细中。计费代码配置完成后,无法进行修改及删除。			周末礼	包1	50.00P币	Gift1	1.00美元	不可消耗	weekendgift001	修改
URL: 提供订单支付通知地址 提示:商品名称会展示在用户中心消费明细中。计费代码配置完成后,无法进行修改及删除。			回调地	址						
提示:商品名称会展示在用户中心消费明细中。计费代码配置完成后,无法进行修改及删除。			URL :	提供订单	支付通知地址					
			1	是示:商品	名称会展示在用	月户中心消费明细中。	。计费代码配置领	完成后,无法进行!	<b>廖改及删除。</b>	

Figure 7.6 in-game purchase information

Note that the rules for commodity codes are defined as' first is the alphabet, and only letters and numbers are allowed, no more than 20 characters. The commodity code between different items cannot be repeated.

Items are divided into expendable items and non-expendable items. Expendable items are those which can be purchased repeatable, such as coins and other items; non-expendable items are one-time purchases of products, such as weapons and unlock game levels.

> 5. Fill in the string

Open Edit->Project Settings... and go to PicoMobile to check "Enable Payment Module", Then check "Is Foreign" according to the actual situation. Fill in ID、APPID、APP KEY、APP secret:

<b>Pl</b>	ugins - PicoMobile		
ĥ	These settings are saved in DefaultEngine	ini, which is currently.	writable.
4	Pico Neo		
	Enable HMD 6 Dof Module?		
	Enable Controller 6 Dof Module?		
4	Payment		
	Enable Payment Module	<b>~</b>	
	Is Foreign		
	Merchant ID		
	App ID		
	App Key		
	Pay Key		

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Figure 7.7 fill in string

#### 7.1.2 Setting callback proxy event

Before you use the payment, you should first set up the callback proxy event so that you can obtain the parameters of the callback function output and set the subsequent execution process. Please use the

PicoPaymentSetCallbackDelegates node we provide here:



Among them, On Pico Payment Exception Callback is a callback for various exceptions. The exact meaning of the other callback function parameters will be introduced in the next section to introduce its related key functions. Beijing Pico Technology Co., Ltd.

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### 7.1.3 User login

Pico provides Oauth2.0 based authentication authorization for developers, therefore, users need to

log in before they pay. Please use the PicoPaymentLogin nodes we provide



Callback function: OnPicoLogInOutCallback, parameters are as following:



- > IsSuccess: whether succeed in logging in or logging out (Boolean)
- > Reason: The reason of success or failure for login and logout.

Users only need to login once, then the payment can be used directly. Two weeks after login the

function will return a code (login expired code). After login is expired, users need to log in again

## 7.2 Other related APIs

#### 7.2.1 PicoPaymentLogout



- > Description: to log out
- > Callback function: OnPicoLogInOutCallback as introduced above

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## 7.2.2 PicoPaymentGetUserInfo



- > Description: to get user info
- > Callback function: OnPicoGetUserInfoCallback,



Info: An unprocessed Json string (string), query succeeded example is as following:

```
{"ret code":"0000",
"data" : {
    "aboutme":"",
        "birthday" : 1460476800000,
         "phone" : "1310000000",
         "username" : "Admin",
         "email" : "",
         "gender" : "male",
         "lastname" : "",
         "openid" : "4f3148bdc34d9bca104927729a173b64",
         "firstname" : "",
         "avatar" : "http://172.31.83.11/upload/6dd6ee103714e967846c3d38ae48d511",
         "signature" : "14a25d7219d8dfc91e55f63286ae5c0a",
         "country" : "China",
         "city" : ""
},
"ret_msg":"调用成功"
```

Query failed example is as following:

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"ret\_code":"00003000", "ret\_msg" : "签名验证失败"

Other ret\_code codes and ret\_msg are as listed:

ret_code	ret_msg	meaning	
0000	请求成功	Request success	
00020000	数据库操作失败	Database operation failed	
9999	系统错误	System error	
00001000	参数错误	Parameter error	
00002000	数据解析失败	Data parsing failed	
00003000	签名验证失败	Signature verification failed	
00003001	时间验证失败	Time validation failed	
00060000	用户未找到	User not found	
00060001	用户密码错误	User password error	
00060002	用户登录未知错误	User logon unknown error	
00061000	用户 token 未找到失败	Cannot find user token	
00061001	用户 token 验证失败	User token validation failed	
00061002	用户 token 未知错误	User token unknown error	
00070001	应用验证失败	Application validation failed	
00071001	应用密钥验证失败	Application key authentication failed	
00080001	OAUTH_CODE 验证失败	OAUTH_CODE validation failed	
00090001	REFRESH_TOKEN 验证失败	REFRESH_TOKEN validation failed	
00100001	ACCESS_TOKEN 验证失败	ACCESS_TOKEN validation failed	
00110001	SCOPE 验证失败	SCOPE validation failed	

List 7.1 OnPicoGetUserInfoCallback output code ret\_code and ret\_msg

## 7.2.3 PicoPaymentPaywithCoin



- Description: pay with P-coin
- > Input Value: Order



OrderNumber: The order number generated by the merchant itself, within 32 characters, can contain

letters and numbers;

OrderTitle: order title

ProductDetail: the description of the product

Notify Url: the notify URL (not obligated), it must be URL for direct access, and cannot contain

#### parameters;

PicoCoinCount: coin count.

Callback function: OnPicoPayOrderCallback



Code and Msg are as listed:

Code	Message	Meaning
-		

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Code	Message	Meaning
00000	网络异常	Network anomaly
10000	登录成功	Login successful
10001	用户未登陆	User not logged in
10002	请输入正确金额	Please enter the correct amount
10003	登陆过期,请重新登陆	Login expired, please re-login
11000	商户验证成功	Merchant verification successful
11001	商户验证失败	Merchant authentication failed
11002	用户验证参数错误或请求过期	User authentication parameter error or request expired
11003	商户未验证	Merchant not validated
12000	支付成功	Successful payment
12001	支付失败	Payment failure
12003	P 币不足	P coins are insufficient
12004	余额可用	Balance available
13000	生成订单	Generate order
13001	获取数据失败	Failed to obtain data
13002	生成订单失败	Failed to generate order
14000	查询订单成功	Query for order success
14001	订单不存在/有误	The order does not exist / is incorrect
14002	用户取消支付操作	User cancelled payment operation
15000	未输入商品信息	No input commodity information
15001	未输入预付 ID	No prepaid ID entered
15002	请输入 Pico 支付订单号或商户订单号	Eenter Pico order number or merchant order number
NOAU	商户无此接口权限	Merchants do not have this interface authority
SYST	系统错误	System error
APP_I	APP_ID 不存在	APP_IDdoes not exist
MCHI	MCHID 不存在	MCHIDdoes not exist
APP_I	app_id 和 mch_id 不匹配	app_id&mch_id not match
LACK	缺少参数	Parameter missing
SIGNE	签名错误	Signature error
NO_D	没有查询到数据/用户未充值	No query to data / user not prepaid
ORDE	订单已存在	The order already exists
PAY_C	消费代码不存在	The consumer code does not exist
PAY_C	用户已对商品代码消费	The consumer has consumed the commodity code

## 7.2.4 PicoPaymentPayWithPayCode<sup>1</sup>



- > Description: pay with pay code
- > Input value: Order

		f Pico Payment Pa	ay with Pay Code
📜 Make PicoPayCode	OrderInfo	D	D
🗿 Order Number 🗌	Pico Pay Code Order Info 🔶 🗕	🔷 Order	
🔥 Order Title 🗌			
🔿 Product Detail 🗌			
🔥 Notify Url 🗌			
🔥 Pico Pay Code 🗌			

OrderNumber: The order number generated by the merchant itself, within 32 characters, can contain

letters and numbers;

OrderTitile: order title ;

Product Detail: description of product;

Notify Url: he notify URL (not obligated) , it must be URL for direct access, and cannot contain

#### parameters;

PicoPayCode: item code, user can obtain from 7.1.1 configuration.

> Callback function : OnPicoPayOrderCallback, same as P-coin payment.

<sup>&</sup>lt;sup>1</sup> Note: commodity code payment is a new payment system designed by developers' platform, and developers need to create different products under the game of developer platform, and fill in the commodity code. In the development of the game, you do not have to fill in the amount of the goods, directly fill in the corresponding commodity code, you can call the corresponding payment interface for payment.

> Callback function: OnPicoPaymentExceptionCallback, same as P-coin payment.

#### 7.2.5 PicoPaymentQueryOrder



- > Description: to query the order
- Input value : OrderNumber,order number (String)
- > Callback function: OnPicoQueryOrderCallback:



Parameter is the same as OnPicoPayOrderCallback

## 7.3 Developer server interaction

After payment is completed, the payment system will send the relevant payment results and user information to the game developer, and the developer needs to receive, process, and response.

When interacting with backend, if the response that the payment system received is not either successful or overtime, it will be regarded as failed. The payment system will periodically resend

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notifications with certain strategies to increase the success rate of the notification, but it does not guarantee that the notification will eventually succeed.

The same notification may be sent to the developer 's system several times, so the developer' s system must be able to process duplicate notifications correctly. We suggest to check the status of corresponding business data and determine whether the notification has been dealt with or not after receiving the notification of processing. If not, the system will start processing, otherwise, it will return succeeded directly. Before check and process the business data status, concurrency control using data locks should be performed to avoid data confusion caused by reentrance functions.

The developer server needs to implement the following interface for receiving requests from the Pico server to obtain payment results and user information from the Pico payment system:

Name	Payment results callback interface			
Request type	POST			
Request URL	payment, PayOrder input value notify_url			
Request format	JSON	JSON		
Return format	JSON			
Require Login	Yes			
Parameters	Check details in "List 7.3 Notification parameters in the			
	payment results notification" .			
Return value	name	type	description	
	ret_code	string	Error code.	

List 7.2 The interface that the merchant server needs to implement

	ret_msg	string	Error information string.
	Check details	s in "List 7.4 I	Return result"
Example	{ "ret_code": " "ret_msg" : "0 }	SUCCESS", K″	
Update			
description			

## List 7.3 Notification parameters in the payment results notification

Field name	Variable name	Required	Туре	Description
Return status code	ret_code	Yes	String	SUCCESS/FAIL This is communication identi fication, not transaction iden tification, please use result_c ode to judge if the deal is fi nished
Return message	ret_msg	No	String	Return message, if not null, it contains error message Signature failed, parameter f ormat check error

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Field name	Variable name	Required	Туре	Description
error code	sub_code	No	String	Error code
Error code message	sub_msg	No	String	Message description of erro r
Pico trade number	trade_no	Yes	String	Pico trade number
Merchant trade nu mber	out_trade_no	Yes	String	Merchant trade number
App ID	app_id	Yes	String	App ID
Merchant ID	mch_id	Yes	String	Merchant ID
User ID	open_id	Yes	String	User ID under each app id
Device ID	device_id	No	String	Device ID
Random string	nonce_str	Yes	String	Random strings, not longer than 32 bits. A random nu mber generation algorithm i s recommended
signature	signature	Yes	String	signature, see the signatur e generation algorithm

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Field name	Variable name	Required	Туре	Description
Result code	result_code	Yes	String	SUCCESS/FAIL
Trade type	trade_type	Yes	String	The type user paid by.
Fee type	fee_type	Yes	String	The currency user chose.
Total fee	total_fee	Yes	String	Total fee of the order
Receipt fee	receipt_fee	Yes	String	Actual value of the order
Buyer pay fee	buyer_pay_fee	No	String	The fee user paid
Coupon fee	coupon_fee	No	String	Coupon fee
Merchant data pack age	attach	No	String	Merchant data package
Pay time	pay_time	Yes	String	Payment finish time, yyyy -MM-dd HH:mm:ss

List 7.4 Return result

Field name	Variable name	Required	Туре	Description
Return code	ret_code	Yes	String	SUCCESS/FAIL SUCCESS: merchant received the n otification and verify is successful

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Return mess age	ret_msg	No	String	Return message, if not null, it cont ains error message: signature failed, parameter format check error
				parameter format check error

Special reminder: developer system must sign to verify the contents for payment results to

prevent data leakage, which could result in "false notification" and loss of funds.

The signature check rule is:

1. For the returned list of parameters, remove the signature parameter, and adds key = "app\_secret",

value=paykey. Then, sort out the key value by natural order, separate the parameters by & if there are

more than one, and encrypt by MD5.

2. Compare the encrypted string with the acquired signature

The signature function is as following:

```
public static String createSign(Map<String, Object> result, String paykey)
{
    if (result == null || result.size() == 0)
        return null:
    result.put("app_secret", paykey);
    String sign = result.get("signature");
    result.remove("signature");
    String[] tmp = new String[result.size()];
    int i = 0;
    for (String key : result.keySet())
    {
         tmp[i++] = key;
    }
    Arrays. sort (tmp);
    String sign = "";
    for (String string : tmp)
    {
         if (m.get(string) == null)
             continue;
```

```
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    sign += string + "=" +
URLEncoder.encode(m.get(string).toString()
    , "utf-8") + "&";
}
if (sign.endsWith("&"))
    sign = sign.substring(0, sign.length() - 1);
Log.i(TAG, "createSign: " + sign);
String localSign = MD5.MD5(sign);
return localSign.equal(sign);
```

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## 8 Other Instructions

## 8.1 Goblin HMD Buttons



Figure 8.1 Goblin HMD buttons

Table 8.1 GoblinHMD keys mapping

Goblin HMD buttons Description	
1	Android standard key code - POWER
2	Android standard key code - HOME

Goblin HMD buttons	Description
	🛤 Gamepad Face Button Bottom
	Pressed D
3	Released 🗅
	Key 🔿
4	Android standard key code - VOLUME_UP
5	Android standard key code - VOLUME_DOWN

## 8.2 G2 HMD Buttons



Figure 8.2 G2 HMD button

## 8.3 Pico Neo HMD Buttons



Figure 8.3 Pico Neo HMD buttons

Table	8 2	Pico	Neo	kevs	manning
labie	0.2	F 1 C O	neo	Keys	mapping

Goblin HMD Buttons	Description		
1	Android standard key code - VOLUME_UP		
2	Android standard key code - VOLUME_DOWN		
3	Android standard key code - BACK		
4	Gamepad Face Button Bottom Pressed Released Key		
5	Android standard key code - HOME		

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## 8.4 Pico Neo Safe Area

Pico Neo safe area is similar to the Oculus Rift Guardian System and SteamVR Chaperone System, will show the notice when the player is out of the safe range, in case the player run into the wall or something else. Even though the VR all-in-one device is restricted by the inside-out tracking and have no external sensor to input absolute safe area axis, we still suggest the developers to set a range value to make sure the player's safety.

Thus, we create an Actor blueprint class as the safe area. Actually it is a cylinder with the normals face to the inner side to remind the player of the range of the safe area:



Figure 8.4 Safe area

It is suggested to add the below node after the BeginPlay event of the Default Pawn of the scene:

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Figure 8.5 Add safe area

Then display and hide the safe area dynamically according to the Camera' s or MotionController' s

relative position to parent component

Moreover, Actor SafeArea blueprint class provides two methods to get and set the radius value of the safe area:

<b>f</b> Get Radius	Set Radius
Target is Actor Safe Area	Target is Actor Safe Area
D D Target self Radius O	Target self     Radius 0.0

Figure 8.6 Functions of Safe Area

We suggest that develops would give the ability to users of setting the range of the safe area, so that the safe area could fit the actual environment better.

## 8.5 Enable Pico Neo 6DoF function

The default value of head and hands tracking in SDK is 3DoF. For the devices with 6DoF tracking function, such as Pico Neo, please refer to the following steps to enable 6DoF tracking:

```
Open the menu Edit->Project Settings->Plugins->Pico Neo, enable the options showed in below
```

#### picture:



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Figure 8.7 Pico Neo 6DoF options

## 9 Known Issues

> The SDK doesn't support "VR Preview" in editor.



Figure 9.1 The SDK doesn't support "VR Preview" in editor

For UE4.18, before package, please disable the "Enable Gradle instead of Ant" option in Edit >>Project Settings >>Platform >>Android.



Figure 9.2 Uncheck Enable Gradle instead of Ant

## 10 FAQ

**Q**: Why there are virtual buttons for the Android system after Packaging the project?

**A**: Check: Project Setting→Platform→Android→APKPackaging→Enable FullScreen Immersive on KitKat

and above devices:

Platforms - Android	
Project settings for Android apps	
▲ APKPackaging	
Enable FullScreen Immersive on KitKat and above devices.	

Figure 10.1 Check: Enable FullScreen Immersive on KitKat and above devices

**Q**: How to increase the FPS of a game?

A: To increase the FPS, there are two methods we suggest:

1. Uncheck Ambient Occlusion and Ambient Occlusion Static Fraction. At this stage, global illumination is not highly required in mobile VR games, so ambient light shielding can be turned off. Project Setting/Engine/Default Setting, uncheck Ambient Occlusion and Ambient Occlusion Static Fraction:



Figure 10.2 Uncheck Ambient Occlusion and Ambient Occlusion Static Fraction

2、Uncheck Mobile HDR。Project Setting/Engine/Rendering/Mobile, uncheck Mobile HDR:

Engine - Rendering				
Rendering settings.				
⊿ Mobile				
Mobile HDR				
Max Dynamic Point Lights	4 3			
Use Shared Dynamic Point Light Shaders				
Enable Combined Static and CSM Shadowing				

Figure 10.3 Uncheck Mobile HDR

- **Q**: How to reduce the size of the game package?
- A: Please refer to the following methods:
- 1、Project Setting/ Project /package check Create compressed cooked packages;
- 2、Uncheck the Plugins which are not in use;
- 3、Delete the resources that are not used in the content browser.

11 🕞 Project Settings 🛛 🗴		×
All Settings	cooked	X 📃 👁 -
Project	Project - Packaging	
Description	rine rune now your project is packaged for release.	
GameplayTags GameplayTags Developer	Create compressed cooked packages	
Maps & Modes <u>Movies</u> ▶ Packaging	Engine - Garbage Collection	
Supported Platforms Target Hardware	n prememens une security on galaxye concuron.	
Engine		
Animation Audio		
Collision Console		
Cooker		

Figure 10.4 Create compressed cooked packages

**Q**: How to optimize the display effect?

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**A**: Project Setting/Engine/Rendering/Mobile, Choose the appropriate Mobile MSAA level, which can effectively enhance the display effect by using Anti-Aliasing setting. The higher the multiplier is, the better the optimization effect will be, but it will increase performance consumption and reduce the FPS simultaneously.

🕞 Project Settings 🛛 🗙	Chipheon te hear te hear te hear te hear te				
roiect	Search				ە 🏢 🍳
Description GameplayTags	Engine - Rendering Rendering settings.	5	Set as Default E	xport Import	Reset to Defaults
ameplayTags Developer Iaps & Modes	🔓 These settings are saved in DefaultEngine.ini, which	s currently writable.			
lovies	⊿ Mobile				
ickaging	Mobile HDR	2			
pported Platforms	Disable vertex fogging in mobile shaders				
rget Hardware	Maximum number of CSM cascades to render	2			
	Mobile MSAA	2x MSAA 👻			
aine	▲ Materials				
System	Game Discards Unused Material Quality Levels Clear Coat Enable Second Normal				
dia	▲ Culling				
licion	Occlusion Culling				
acale	Min Screen Radius for Lights	0.03			
nker	Min Screen Radius for Early Z Pass	0.03			
wd Manager	Min Screen Radius for Cascaded Shadow Maps	0.01			
d-Hear Sattinge	Warn about no precomputed visibility				
menlav Dehunder	▲ Textures				
hage Collection					
neral Settings	Use DXT5 Normal Maps				
ut	▲ Reflections				
wination Mesh	Reflection Capture Resolution	128			

Figure 10.5 Choose the appropriate Mobile MSAA

- **Q**: The virtual system buttons are displayed in the scene, how to disable them?
- A: Set "Enable FullScreen ..." option enabled in UE Android project setting.

Platforms - Android	
Project settings for Android apps	
$\eta_{\rm III}$ . These settings are saved in DefaultEngine.ini, which is currently writable.	
Search	
▲ APKPackaging	
Platform files are writeable	
Note to users from 4.6 or earlier: We now GENERATE an AndroidManifest xml when building, so if you har Additionally, we no longer use SigningConfig.xml, the settings are now set in the Distribution Signing section.	ve customized your .xml file, you will need to put all of your changes into the below settings. Note the
Build Folder	Open Build Folder
Android Package Name ('com.Company.Project', [PROJECT] is replaced with project name)	com.pico.sdk
Store Version (1-2147483647)	
Application Display Name (app_name), project name if blank	
Version Display Name (usually x.y)	1.0
Minimum SDK Version (9=Gingerbread, 14=Ice Cream Sandwich, 21=Lollipop)	19
Target SDK Version (9=Gingerbread, 14=Ice Cream Sandwich, 21=Lollipop)	19
Package game data inside .apk?	
Disable verify OBB on first start/update.	
Orientation	Landscape
Ant Verbosity	Quiet -
Enable FullScreen Immersive on KitKat and above devices.	
Preferred Depth Buffer format	Default -
▲ Build	
Support armv7 [aka armeabi-v7a]	

Figure 10.6 Enable full screen

Q: I used the SDK strictly according to this document for my project named "test". Why it still

package failed?

**A:** The word "test" is a command keyword in Unreal Engine. Use command keyword name for project may cause failures in packaging. Thus, you' d better avoid these keywords when creating project as the following picture.

// Configuration names: case "DEBUG": Configuration = UnrealTargetConfiguration.Debug; break; case "DEBUGGAME": Configuration = UnrealTargetConfiguration.DebugGame; break; case "DEVELOPMENT": Configuration = UnrealTargetConfiguration.Development; break; case "SHIPPING": Configuration = UnrealTargetConfiguration.Shipping; break; case "TEST": Configuration = UnrealTargetConfiguration.Test; break;

Q: Why Goblin motion controller flashes sometimes?

A: Epic moves the smooth motion controller by default and updates the motion controller's position and

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pose by default, but this also creates a bug that the model sometimes flashes. To avoid this flicker, simply

select the Motion Controller component and check Disable Low Latency Update in its detail panel:

▲ Motion Controller					
	Player Index	0	2		
	Hand	Left	-		
	Disable Low Latency Update	<b>v</b> 5			