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Handheld AR Template Quickstart in Unreal Engine | Unreal Engine 5.1 Documentation

The Handheld AR Template is available for Unreal Engine projects using UE 4.27 or later. This template provides a simple base for augmented reality projects targeting Android and iOS devices, which you can modify to suit your project's needs.

This guide walks you through the features the AR Template comes with, how to launch and navigate it on a mobile device, and where you can locate its features in the Unreal Editor so you can begin creating your own handheld AR applications.

1\. Overview of User Journey and Features

The AR Template is a simple handheld AR application with a user journey that follows these steps:

1. The user opens the application.
2. The application displays a prompt to begin scanning the environment. The user must provide camera permissions to continue.
3. When the user confirms the prompt, the application scans the environment with the user's camera, then defines a virtual scene by adding planes to the environment.
4. The application prompts the user to select a plane to interact with.
5. When the user selects a plane, they can place a virtual object on it.
6. Once a virtual object is placed, the user can manipulate it with a variety of transformation tools. A HUD provides configuration options, the ability to take snapshots of the AR scene, and the option to reset back to selecting a plane.

This template showcases the following features:

- * An application flow controlled by a simple state machine.
- * Scanning an environment to gather data for:
 - * Defining interactive planes in a virtual scene.

- * Lighting and scene depth information.
- * Using a UMG widget to display the environment captured from the camera.
- * Touchscreen-based interactions in the virtual scene.
 - * Manipulating virtual objects.
 - * Selecting planes defined by the user's environment.
- * Use of gesture-based touch input for different types of interactions.
- * A basic UI with options for different styles targeting different types of applications.
- * Capturing images from the fully composited AR scene and saving them to your camera roll.

2\ . Compatibility

The Handheld AR Template works on any device that fulfills the following requirements:

- * The device must be supported by Unreal Engine.
- * The device must support ARKit (iOS) or ARCore (Android).

Refer to the

`\[iOS Device Compatibility\](sharing-and-releasing-projects/iOS-and-tvOS/DeviceCompatibility)`

and

`\[Android Device Compatibility\](sharing-and-releasing-projects/android/packaging-and-publishing/DeviceCompatibility)`

pages for a list of devices that are supported by the current version of Unreal Engine.

For a list of iOS devices that support ARKit, refer to the [Apple Developer ARKit documentation](https://developer.apple.com/documentation/arkit/verifying_device_support_and_user_permission)

For a list of Android devices that support ARCore, refer to the [Google Developer AR documentation](https://developers.google.com/ar/devices).

3\ Setting Up the Template

To use the AR Template, you need to create a project using the template as a base, then set up your project for packaging on your desired Mobile device. This section walks you through the steps needed.

1. Open **Unreal Editor**. In the **Select or Create New Project** menu, scroll down to **New Project Categories** and select **Games**, then click **Next**.

![Creating a new project using the Games category](https://docs.unrealengine.com/5.1/Images/sharing-and-releasing-projects/xr-development/handheld-augmented-reality/handheld-ar-quickstart/NewProjectCategory.jpg)

The AR template is also available using Architecture, Engineering, and Construction as well as Automotive, Product Design, and Manufacturing.

1. In the **Select Template** menu, choose the **Handheld AR** template. Choose a **Name** and **Location** for your project. In this example, the project is called **ARTemplateGame**. Once you have finalized your settings, click **Create Project**.

![Selecting the Handheld AR Template](https://docs.unrealengine.com/5.1/Images/sharing-and-releasing-projects/xr-development/handheld-augmented-reality/handheld-ar-quickstart/NewProjectARTemplate.jpg)

After finishing these steps, the project opens in Unreal Editor, with **HandheldARBlankMap** as the default map.

4\ Packaging and Deploying on Your Device

To complete your project setup, you need to prepare your project to package on your mobile device. Both Android and iOS require different setup steps in your project settings.

Android Setup

To prepare your handheld AR project for Android, complete the following steps:

1. Install the required version of **Android Studio** on your computer.
2. Run the **AndroidSetup** script in your engine folder to make sure the required SDK and NDK components are installed on your computer. Depending on your operating system, you may need to reboot your computer to make sure changes take effect.
3. In your **Project Settings**, locate the Android settings and click the **Configure Now** button under APK Packaging to configure your project for the Android platform. If you have not already accepted the Android SDK license, click the **Accept SDK License** button as well.
4. Make sure your device is set to **Developer Mode** and is set up to accept USB connections with your computer.

You can find more detailed information about these steps in the [Android Setup section](<https://docs.unrealengine.com/5.1/en-US/getting-started-and-setup-for-android-projects-in-unreal-engine>).

iOS Setup

To prepare your handheld AR project for iOS, follow these steps:

1. Install the latest version of **Xcode** on your Mac.
2. Obtain a **provisioning profile** and **signing certificate** from the Apple Developer Portal for your project.
 - * The provisioning profile should have permissions to use your device's camera.
3. Open your **Project Settings** and import the provisioning profile and signing certificate.

You can find more detailed information about these steps in the [iOS Setup section](<https://docs.unrealengine.com/5.1/en-US/building-packaging-and-publishing-unreal-engine-projects-for-ios-tvos-and-ipados>).

Packaging and Launching

Once you have performed the necessary setup to support your mobile device, you can package your project by clicking **File > Package Project** and selecting a packaging option for the appropriate device. This creates a packaged build that you can deploy on a device later.

You can also launch directly on your device by clicking the **Launch** dropdown in the main toolbar, then selecting your device from the list of devices shown. You can check the status of your device in the **Device Manager** menu to verify that it is connected. The engine then automatically packages your project and pushes it to your device before launching.

5\ Navigating the Application

This section provides a walkthrough of the user journey for the out-of-the-box configuration of the Handheld AR Template.

Scanning and Object Placement

When the Handheld AR Template launches, it uses your device's camera to display your surroundings. A prompt asks you to scan your environment.

![The Begin Scan prompt in the AR Template](https://docs.unrealengine.com/5.1/Images/sharing-and-releasing-projects/xr-development/handheld-augmented-reality/handheld-ar-quickstart/BeginScanPrompt.jpg)

Click the **Begin Scan** button to start. This gathers the data needed to build the 3D scene for virtual objects.

The application asks you to allow permissions to take pictures and record video. These permissions are required for the camera to scan and display the environment.

Once your mobile device has finished scanning, the application displays several **planes** and prompt you to select one by tapping it on your screen. Planes are displayed with colored waves across the surface. The application only displays one plane at a time to reduce visual noise, and sets the closest plane to being visible.

![The display when scanning for planes](https://docs.unrealengine.com/5.1/Images/sharing-and-releasing-projects/xr-development/handheld-augmented-reality/handheld-ar-quickstart/ScanningPlanes.jpg)

After you select a plane, the bottom toolbar UI appears, and you can place a virtual object.

![Bottom toolbar UI](https://docs.unrealengine.com/5.1/Images/sharing-and-releasing-projects/xr-development/handheld-augmented-reality/handheld-ar-quickstart/UIBottomToolbar.jpg)

The template can place one virtual object at a time, but you can use

the workflow for placing this object to place others in your own applications.

Manipulating Objects.

In the Handheld AR Template, you can **Translate**, **Scale**, or **Rotate** a virtual object using the touchscreen.

To translate an object, tap it and drag it along the ground where you want to place it. Any one-finger touch displays the translation HUD. Objects are confined to the bounds of the plane they are placed on. Those bounds are displayed on the HUD when you start translating the object.

To scale an object, use your thumb and forefinger to pinch or expand the object. The template recognizes pinches that are mostly vertical relative to the orientation of the screen. The UI displays the new size of the object in centimeters as you scale it.

To rotate an object, place two fingers on the screen and swipe them left or right. The system recognizes swipes and drags that are mostly horizontal relative to the screen as being rotations. This displays the rotation HUD, which includes a circle around the base of the object and its current world rotation in degrees.

Navigating the UI and Menus

By default, the Handheld AR Template's UI is displayed at the bottom of the screen. This includes a toolbar as well as a floating **Info** button in the lower-left corner.

Snapshot

The **Snapshot** button takes a picture with your virtual objects displayed on the screen and saves it to your device's camera roll. A prompt displaying the text **Snapshot Saved** confirms that the snapshot was successfully taken.

As of 4.27, the Handheld AR Template saves screenshots to the camera roll on Android, but not on iOS.

Reset

The **Reset** button removes the virtual object and return the user to the prompt for selecting a plane.

The **Options** button opens a menu that provides configuration options.

![The options menu](

and-releasing-projects/xr-development/handheld-augmented-reality/
handheld-ar-quickstart/UIOptionsMenu.jpg)

Toggling **Snapping** makes virtual objects snap to discrete 1 cm increments when translating or scaling. Rotations snaps to 5 degree angles.

Toggling **Interact HUD** turns the HUD off until you interact with the screen. This lets you take clean screenshots from within the app.

The **UI Style** selector cycles through three UI styles. The Light and Dark styles show the default UI with the toolbar at the bottom of the screen. The **Game** style shows a more stylized HUD with all the tools arranged in a circular element instead of a horizontal one. The Game style supports all of the same functions and flows as the Light and Dark styles, but demonstrates a different layout for using them.

![The HUD displaying the Game style](https://docs.unrealengine.com/5.1/Images/sharing-and-releasing-projects/xr-development/handheld-augmented-reality/handheld-ar-quickstart/UIGameStyle.jpg)

The **Info Menu** displays a simple visual guide to the gestures for manipulating virtual objects.

![The Info menu displaying tutorials on recognized gestures](https://docs.unrealengine.com/5.1/Images/sharing-and-releasing-projects/xr-development/handheld-augmented-reality/handheld-ar-quickstart/UIInfoMenu.jpg)

6\. Template Quick Reference

All assets for the Handheld AR Template are located in the **Handheld AR** folder in the Content Browser. The Handheld AR template primarily depends on the following assets:

*	Asset Name	:
	BP_ARGameMode	
*	Path	:
	HandheldAR/Blueprints/GameFramework/BP_ARGameMode	
*	Summary	:
	The game mode used in the Handheld AR Template. Initializes the AR Pawn.	
*	Asset Name	:
	BP_ARPawn	

```

*           Path           :
  HandheldAR/Blueprints/GameFramework/BP_ARPawn

*           Summary        :
  The Pawn class for the Handheld AR Template. Initializes the
  HUD and handles setup of the virtual scene, as well as input from the
  user.
*           Asset Name      :
  BP_MainMenu
*           Path           :
  HandheldAR/Blueprints/UI/BP_MainMenu
*           Summary        :
  The main UI for the Handheld AR Template. Controls other menus
  and initializes the AR scene from the camera.
*           Asset Name      :
  BP_Plane
*           Path           :
  HandheldAR/Blueprints/Placeable/BP_Plane
*           Summary        :
  A plane that placeable objects can be placed on. These are set
  up by the AR Pawn after scanning the environment.
*           Asset Name      :
  BP_Placeable
*           Path           :
  HandheldAR/Blueprints/Placeable/BP_Placeable

*           Summary        :
  A base Blueprint class for placeable objects that the user can
  interact with.

```

For more information about these actors and where to look for key functionality, refer to the [Handheld AR Template Reference](<https://docs.unrealengine.com/5.1/en-US/handheld-ar-template-technical-reference>) page.

7\. On Your Own

Now that you have set up the Handheld AR Template and can explore it on your mobile device, you can start using it as a jumping-off point for developing handheld AR applications of your own. Check the Handheld AR Template Reference page for more detailed information about the classes that make up this template and how you can modify them.