FlexXR: UI Elements in World Space and Mixed Reality

FlexXR puts your UI Elements GUIs into world space and mixed reality. UI Elements, Unity's latest GUI technology, was formerly known as UI Toolkit.

Contents

FlexXR is a general solution to extend Unity's UI Elements (originally the UI Toolkit package and now part of core Unity since the 2021.3 LTS) with support for

- world space rendering and interaction, and
- mixed reality interaction via XR Interaction Toolkit.

FlexXR was originally conceived as a solution for our company's own flagship product, LiquidEarth, where we use the same UI Elements GUI across desktop, mobile, and mixed reality platforms.

Primary features include:

- The FlexXR Panel prefab is pre-configured to embed your GUI in world space. All that is missing is setting your custom UXML (UI Elements) source asset.
- Render and interact with the panel in screen or world space.
- Interact with the world space panel using either a mouse or any action-based mixed reality pointer supported by Unity's XR Interaction Toolkit.
- Mixed reality interaction uses the XR Interaction Toolkit XR Simple Interactable component, making it easily extensible.
- Auto-size the panel to perfectly fit the UI Elements content by using the provided FlexXR Content UI Element.
- The FlexXR Panel Manager component has many well-organized settings (all with tooltips) that can be adjusted seamlessly during runtime.
- Curved panel for ideal user experience in mixed reality.

1. Dependencies

Packages **required** for basic usage:

- Unity's new Input System

Packages **required** for mixed reality interaction:

- Unity's XR Interaction Toolkit (XRI)

Optional packages:

- Unity's XR Plugin Management
  Needed for advanced demo where XR interaction is enabled/disabled at runtime.

2. Demo scenes

The demo scenes are organized into folders in `Assets/FlexXR/Scenes`.

2.1. Demo 1- Simple World Space Panel

This demo includes a single FlexXR Panel configured for world space interaction with the GUI defined by a single UI Document.

Controlling the Fly Camera

The camera movement is controlled with WASD (also Q and E for down and up) on the keyboard and angle with holding right-click on the mouse. See the publicly available `FlyCamera` script.

2.2. Demo 2- Mixed Reality Interaction

This demo uses the same GUI as Demo 1 but configures the FlexXR Panel for mixed reality interaction and includes the XR Device Simulator for testing in the Unity Editor.

Controlling the XR Device Simulator

In the Unity Editor's play mode, the camera is controlled using XR Interaction Toolkit's XR Device Simulator.

See the Sample Controls section of the XR Device Simulator docs for how to control the device simulator with your mouse and keyboard.

In short: Hold Keyboard Left-Shift or Space respectively to activate the left or right controllers. Hold mouse right-click to activate the camera. Drag the mouse to move active devices. Hold the mouse wheel while dragging to rotate. and angle with holding right-click on the mouse.

2.3. Demo 3- Multiple Panels

This demo is like Demo 1 but with two world space panels. Mixed reality interaction has not been configured for this demo.

2.4. Advanced Demos

Advanced Demo 0 - Unified for screen, world, and mixed reality

This demo highlights all main features of FlexXR with a unified GUI, allowing for switching between Screen, World, or Mixed Reality interaction at runtime, working whether or not XR Interaction Toolkit is installed.

The demo GUI has a dropdown to select between Screen, World, or Mixed Reality demo modes.

World mode uses the Fly Camera and Mixed Reality mode uses the XR Device Simulator.

Mixed Reality mode is only available for selection if XR Interaction Toolkit is installed.

The demo GUI sizing and placement is optimized for 1920x1800p resolution (e.g., for the Quest 2/Pro).

3. Setting up your own scene

3.1. FlexXR Panel

Required steps:

- Add `Assets/FlexXR/Prefabs/FlexXR Panel.prefab` to your scene.
- Set the Source Asset of the FlexXR Panel game object's UI Document to your choice of UXML.

Recommended steps:

- Add the `FlexXRContainer` `UIElement` as a parent in your UXML to enable auto-sizing of the panel in world space. See the demo for an example.
- Review the Settings in the FlexXR Panel game object's FlexXR Panel Manager component. They all have tooltips.

3.2. XR Rig for mixed reality interaction

Required: In general, the only requirement is to use XRI's action-based controllers. XRI and its Input Actions provide a great amount of flexibility for you to specialize your application.

Recommended: Add the preconfigured `Assets/FlexXR/Prefabs/XR Rig.prefab` to your scene.