This program is a Mixed Reality(MR) application developed in Unity for OpenXR compatible hardware. The included prebuilt applications are an apk compatible with Android headsets (Meta Quest, Vive, etc) and a UWP compatible with Microsoft Hololens 2.

The purpose of this application is to facilitate the design and development of workspaces and procedures by visually demonstrating the effects of ALARA principles of time, distance and shielding in practice. Know that all measurements in the virtual environment are relative and should not be considered absolute when performing predictive dose calculations. Rather, the measurements taken in the virtual environment should help inform decision making such as “Will this shielding provide significant protection to a lab worker or would it be more efficient to adjust the procedure to reduce their exposure time.”

**Installing the APK to Meta Quest**

To install the included APK on Meta Quest and Occulus devices, you will need a Meta developer account, the Meta Quest Developer Hub and a USB-3 cable.

Information on setting up a Meta Developer account can be found at https://developers.meta.com/horizon/sign-up/

Information on setting up the Meta Quest Developer Hub(MQDH) can be found at

<https://developers.meta.com/horizon/documentation/native/android/ts-odh-getting-started/>

Pair your headset with the MQDH via USB-C (air link can be used but is not preferred).

Keep the MQDH window open and navigate to the folder containing the apk file. Click and drag the apk to the MQDH window. The MQDH window should change to show two sections. On the right will be a picture of a headset. Drop the apk on this image and the upload should begin. Do no unplug or turn off the headset until the installation is complete. Do not attempt to install or uninstall other applications while another installation or uninstallation is in progress.  
Once complete, the application will be available in your headset app library under unknown sources

**Installing on Hololens 2**

In order to deploy the application to a Hololens 2 headset, the device will need to have developer mode enabled and it must be paired to your computer and its instance of Visual Studio. Navigate to Settings > Update and Security > For Developers. From here, turn on Developer Mode and Device Discovery. Open Visual Studio and then connect your Hololens to your computer via USB-C. A dialog box should appear in Visual Studio asking for a code. This code should be visible in the headset. If it is not, press the pair button from the Developer menu (see above).

Navigate to the folder *DeployToHololens2* and open MRRadLabSim.sln.

From the toolbar on the top of the screen, use the drop down menus to change Debug to Master, x64 to ARM64 and Local Machine to Device. Click the Green “Run” Arrow and wait for the application to deploy. This may several minutes up to half an hour depending on your specific hardware configuration.

**Using the Application and Code**

The default scene provided represents a very basic lab space with several Uranium and Cesium Sources. The scene can be edited or new scenes can be added by using the Unity Game Engine Editor version 6.0.32f1 (or newer). Sources can be added by using the existing prefabs or by adding the radiation source component to any GameObject. All objects with a mesh collider are treated as shield with a shielding value of .5 for all sources of radiation. This value be adjusted by adding a Shielding component and adjusting the float value of shieldValue.