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Virtual Reality (VR) PBF-LB Training Scenario

Set up Instructions

Project Nr: *2021-1-PT01-KA220-VET-000034876*

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1. Overview

Development of Extended Reality (xR) training tools was central to the Areola project. The aim of the project was to explore how digital technologies could be used to provide more effective and flexible training for Powder Bed Fusion-Laser Beam (PBF-LB) operators to meet the needs of the aerospace sector.

Practical Additive Manufacturing (AM) machine operations, highly applicable to the aerospace industry, were identified by the partners to form the basis of AR/VR training scenarios to be progressed in the project. The xR tools were then selected to provide the most effective approach for each of the selected scenarios. The down selection process also involved a detailed review of how these practical operations are currently taught, including the associated training material for each of the Competence Units (CUs) which comprise the PBF-LB operator qualification within the International Additive Manufacturing Qualification System (IAMQS).

This document contains information and set up instructions for the three Virtual Reality (VR) training scenarios developed as part of the project. The three developed scenarios accessible through the Areola website are 'Recoater Blade Alignment Operation', 'Health and Safety Walkaround – Electric Current Hazards' and 'Laser Power Measurement Operation'. The aforementioned training scenarios were built around the EOS M400 PBF-LB machine in reference to the manufacturer's training manuals using the Unity Game Engine, for Oculus Quest 2 VR headset.

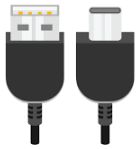
The training scenarios are available as .APK files, which is the common format for the installation of applications for Android operating systems, and can be deployed onto the Oculus Quest 2 headset as detailed below.

2. VR PBF-LB Training Scenario Set up Instructions

2.1 Prerequisites

To set up and configure the Virtual Reality (VR) training scenarios developed as part of the project, the following hardware, software and applications are required:

Hardware		Software	
Computer or Laptop https://www.pcgamebenchmark.com/oculus-quest-2-system-requirements		Oculus App https://www.meta.com/en-gb/help/quest/articles/headsets-and-accessories/oculus-rift-s/install-app-for-link/	

Oculus Quest 2 VR Headset		Android SDK Platform-Tools	Developers
USB-C or C-C Cable		Training scenario .apk files. Available on the Areola website	

2.2 Set up Instructions

Step 1: If you are setting up the Oculus Quest 2 for a first time, follow the set-up instructions as stated on the supplier website.

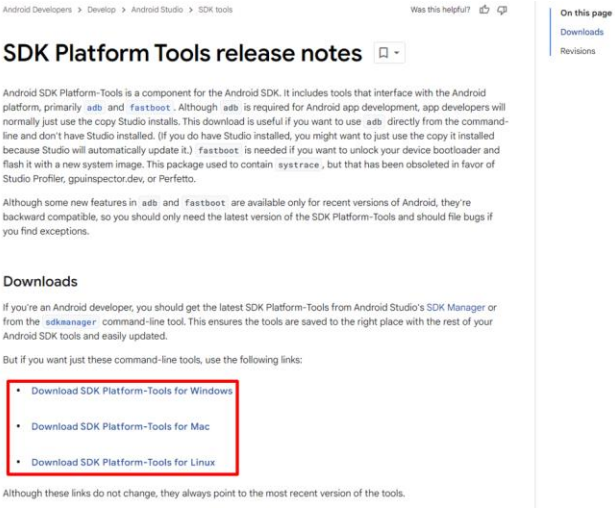
Set up-instructions: https://www.meta.com/en-gb/blog/quest/you-got-a-quest-2-heres-how-to-set-it-up/

Step 2: On the Oculus Quest 2 headset, enable Developer Mode.

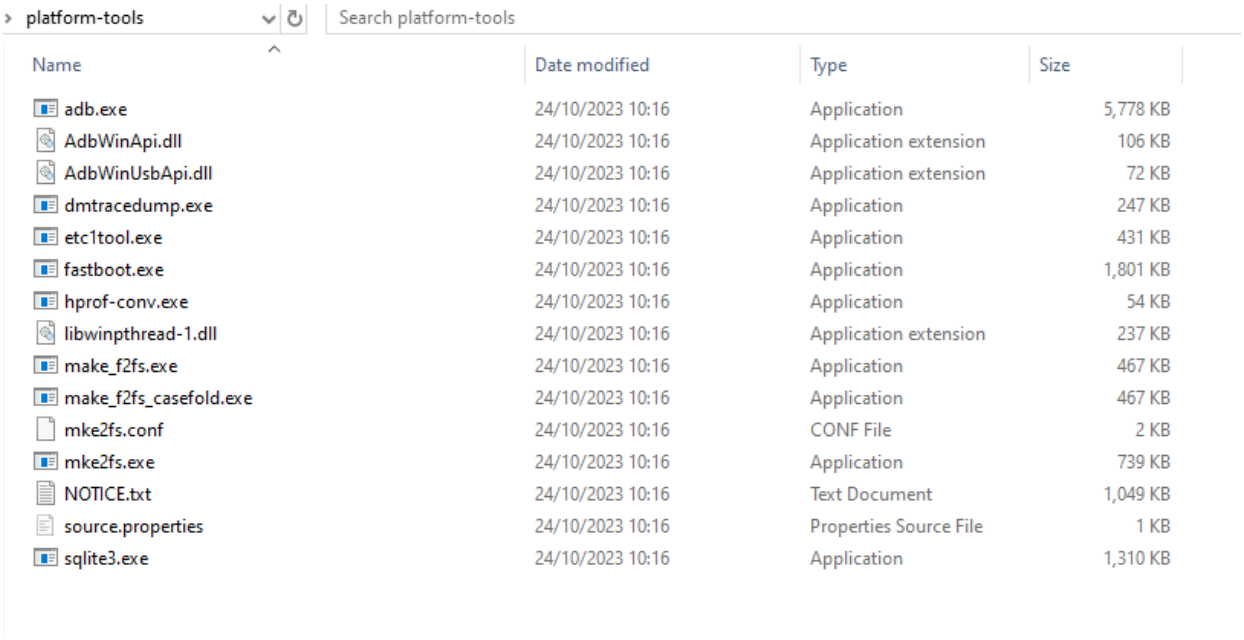
Developer Mode: https://developer.oculus.com/documentation/native/android/mobile-device-setup/

Step 3: On a computer or a laptop, download the Android SDK Platform Tools for the relevant Operating System. Application allows for Android .apk file deployment from computer devices onto Android devices such as Oculus Quest 2 headset.

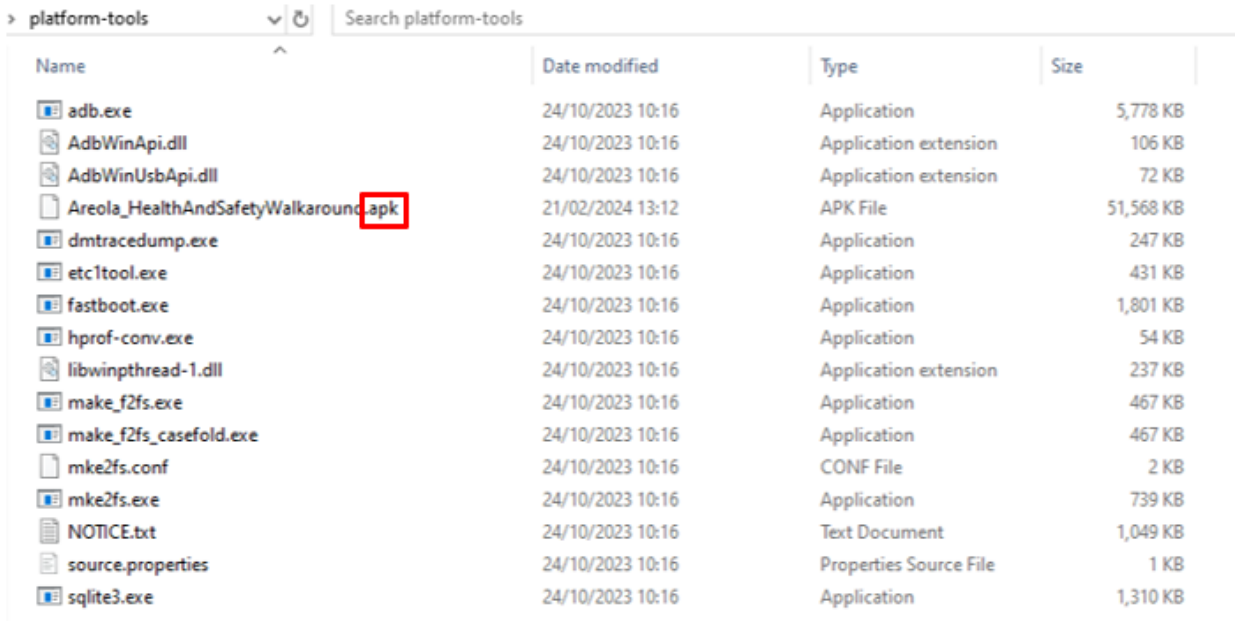
SDK Platform Tools: https://developer.android.com/tools/releases/platform-tools



Step 4: Extract the downloaded SDK Platform Tools .zip file on a computer device. The following files will be found in the extracted folder.

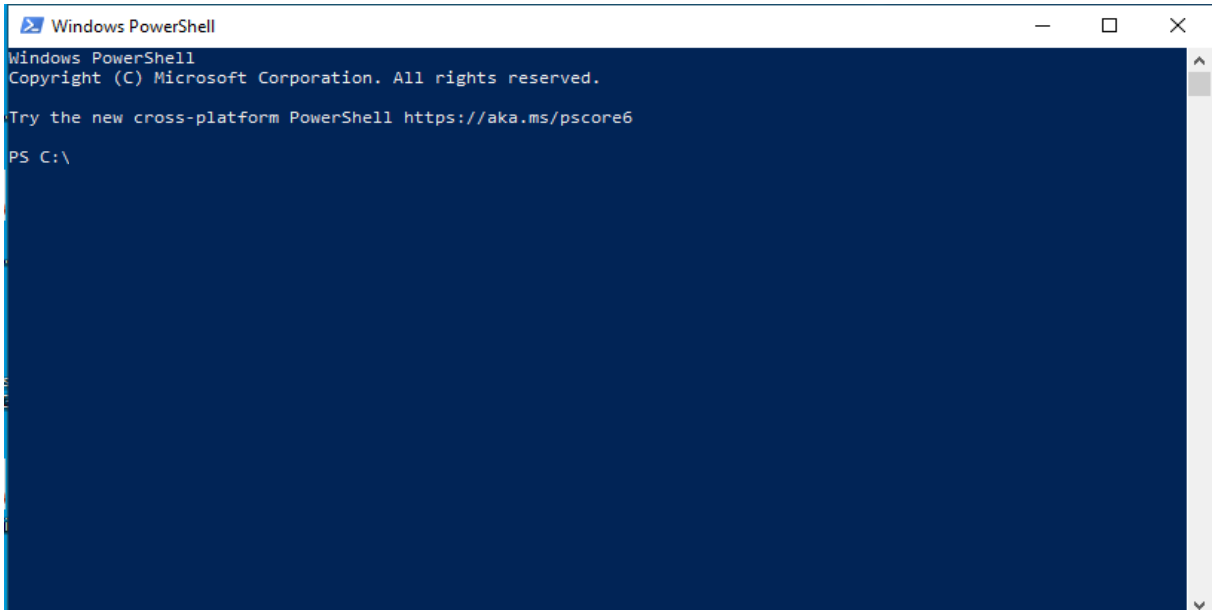


Step 5: Copy the VR PBF-LB training scenario (.apk) files, one at a time of deployment, into the SDK Platform Tools extracted folder.

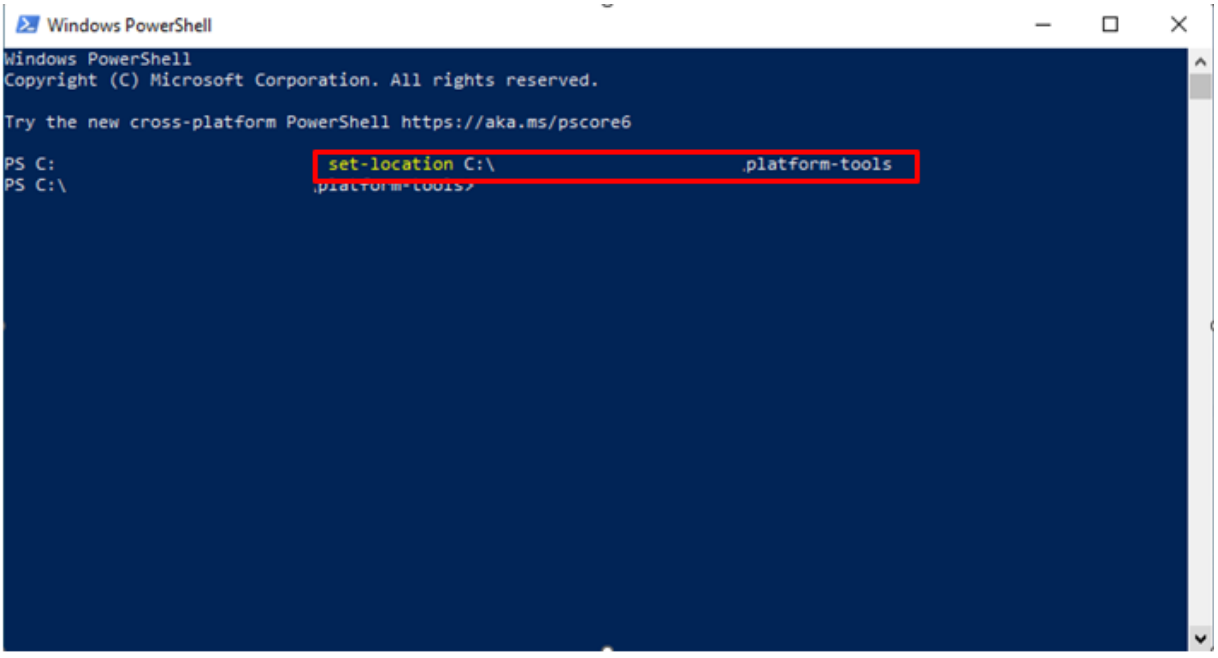


Step 6: Connect Oculus Quest 2 headset to a computer device via USB – C or C – C cables, and allow USB debugging and connection with a computer device.

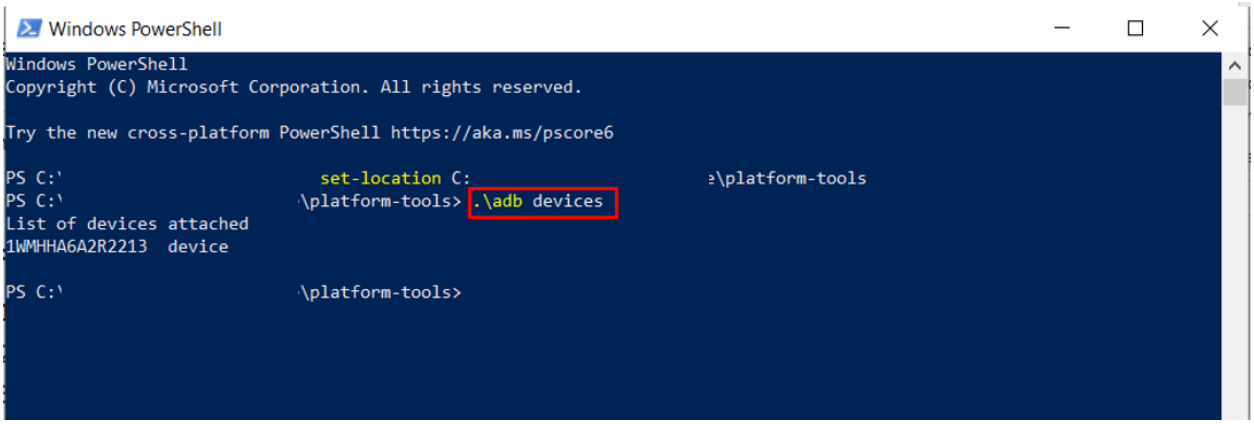
Step 7: The SDK Platform Tools application contains several command-lines, which can be executed using the Microsoft PowerShell. On a computer device, open PowerShell.



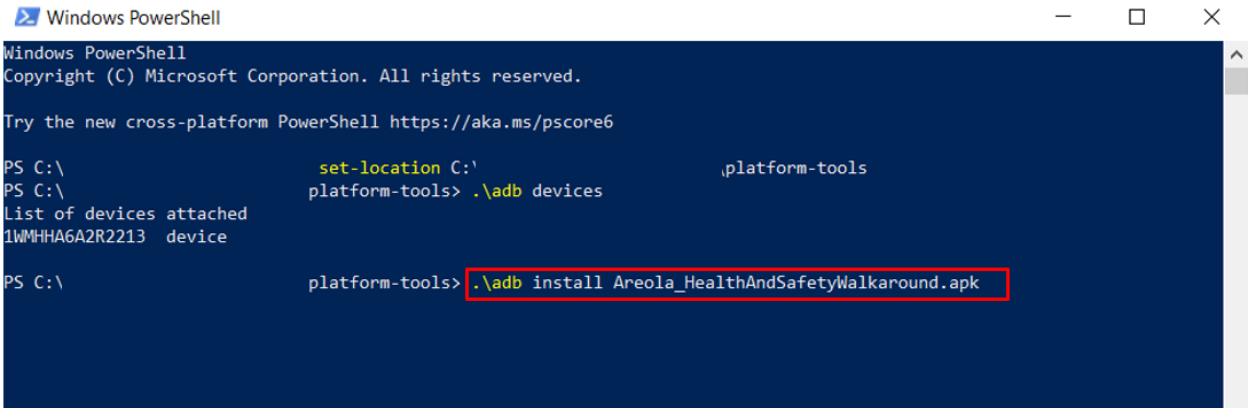
Step 8: In PowerShell set directory location to be the extracted SDK Platform Tools folder. Use command 'Set-location <file path> and press 'Enter' to execute.



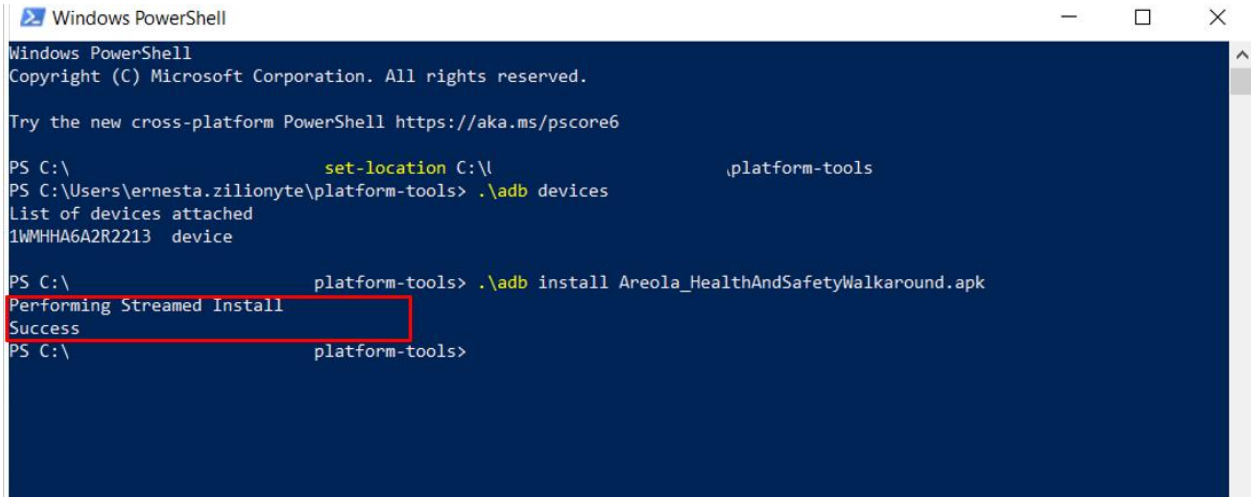
Step 9: Check that an Oculus Quest 2 is connected to a computer device. Use command '.\adb devices' and press 'Enter' to execute. The response message should be an alphabetical / numeric device identifier.



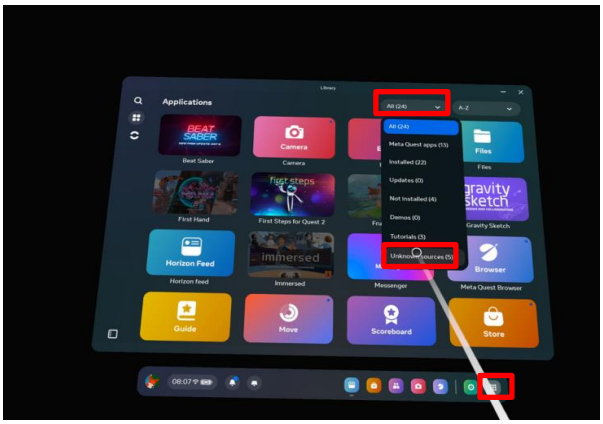
Step 10: To install VR PBF-LB training scenario file saved in SDK Platform Tools folder onto an Oculus Quest 2, on the PowerShell command line use command '.\adb install <name of an .apk file saved in the SDK Platform Tools folder>' and press 'Enter' to execute. Ensure that the file name has .apk extension at the end.

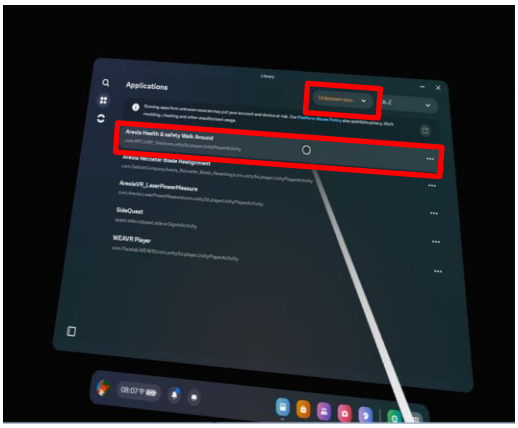


After a successful installation the following message will be displayed.



Step 11: On the Oculus Quest 2 headset, go to the Library and navigate to Unknown sources. Installed VR PBF-LB training scenario application should be on a list. Click on it to launch it.





Step 13: VR PBF-LB training scenario should now be visible on an Oculus 2 headset.

VR PBF-LB Training Scenario on Oculus Quest 2