



# areola

## Virtual Reality (VR) PBF-LB Training Scenario Set up Instructions

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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.

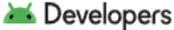
The training scenarios are available as .APK files, which is the common format for the installation of applications for Android operating systems, and can be deployed onto the Oculus Quest 2 headset as detailed below.

## 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	
<a href="https://www.pcgamebenchmark.com/oculus-quest-2-system-requirements">Computer or Laptop</a> <a href="https://www.pcgamebenchmark.com/oculus-quest-2-system-requirements">https://www.pcgamebenchmark.com/oculus-quest-2-system-requirements</a>		<a href="https://www.meta.com/en-gb/help/quest/articles/headsets-and-accessories/oculus-rift-s/install-app-for-link/">Oculus App</a> <a href="https://www.meta.com/en-gb/help/quest/articles/headsets-and-accessories/oculus-rift-s/install-app-for-link/">https://www.meta.com/en-gb/help/quest/articles/headsets-and-accessories/oculus-rift-s/install-app-for-link/</a>	

Oculus Quest 2 VR Headset		Android SDK Platform-Tools	
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>

Android Developers > Develop > Android Studio > SDK tools Was this helpful? 🗨️ 🗨️

### SDK Platform Tools release notes 🗨️

Android SDK Platform-Tools is a component for the Android SDK. It includes tools that interface with the Android platform, primarily `adb` and `fastboot`. Although `adb` is required for Android app development, app developers will normally just use the copy Studio installs. This download is useful if you want to use `adb` directly from the command-line and don't have Studio installed. (If you do have Studio installed, you might want to just use the copy it installed because Studio will automatically update it.) `fastboot` is needed if you want to unlock your device bootloader and flash it with a new system image. This package used to contain `sysrtrace`, but that has been obsoleted in favor of Studio Profiler, `gpuspector.dev`, or `Perfetto`.

Although some new features in `adb` and `fastboot` are available only for recent versions of Android, they're backward compatible, so you should only need the latest version of the SDK Platform-Tools and should file bugs if you find exceptions.

#### Downloads

If you're an Android developer, you should get the latest SDK Platform-Tools from Android Studio's SDK Manager or from the `sdkmanager` command-line tool. This ensures the tools are saved to the right place with the rest of your Android SDK tools and easily updated.

But if you want just these command-line tools, use the following links:

- [Download SDK Platform-Tools for Windows](#)
- [Download SDK Platform-Tools for Mac](#)
- [Download SDK Platform-Tools for Linux](#)

Although these links do not change, they always point to the most recent version of the tools.

On this page

[Downloads](#)

[Revisions](#)

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

> platform-tools    Search platform-tools

Name	Date modified	Type	Size
adb.exe	24/10/2023 10:16	Application	5,778 KB
AdbWinApi.dll	24/10/2023 10:16	Application extension	106 KB
AdbWinUsbApi.dll	24/10/2023 10:16	Application extension	72 KB
dmtracedump.exe	24/10/2023 10:16	Application	247 KB
etc1tool.exe	24/10/2023 10:16	Application	431 KB
fastboot.exe	24/10/2023 10:16	Application	1,801 KB
hprof-conv.exe	24/10/2023 10:16	Application	54 KB
libwinpthread-1.dll	24/10/2023 10:16	Application extension	237 KB
make_f2fs.exe	24/10/2023 10:16	Application	467 KB
make_f2fs_casefold.exe	24/10/2023 10:16	Application	467 KB
mke2fs.conf	24/10/2023 10:16	CONF File	2 KB
mke2fs.exe	24/10/2023 10:16	Application	739 KB
NOTICE.txt	24/10/2023 10:16	Text Document	1,049 KB
source.properties	24/10/2023 10:16	Properties Source File	1 KB
sqlite3.exe	24/10/2023 10:16	Application	1,310 KB

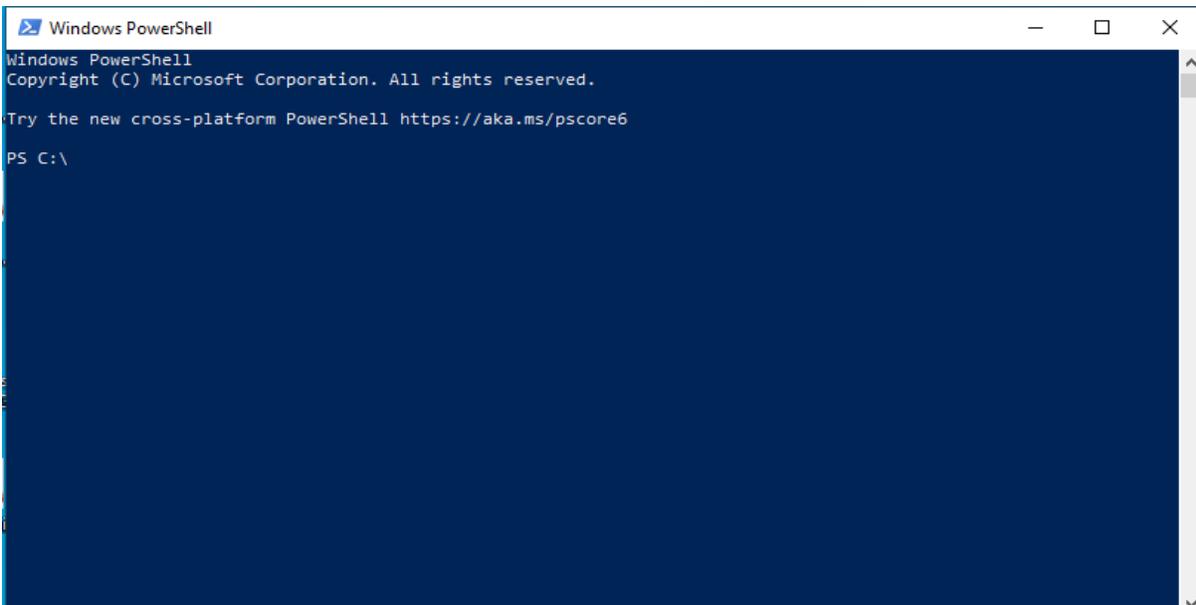
**Step 5:** Copy the VR PBF-LB training scenario (.apk) files, one at a time of deployment, into the SDK Platform Tools extracted folder.

> platform-tools    Search platform-tools

Name	Date modified	Type	Size
adb.exe	24/10/2023 10:16	Application	5,778 KB
AdbWinApi.dll	24/10/2023 10:16	Application extension	106 KB
AdbWinUsbApi.dll	24/10/2023 10:16	Application extension	72 KB
Areola_HealthAndSafetyWalkaround.apk	21/02/2024 13:12	APK File	51,568 KB
dmtracedump.exe	24/10/2023 10:16	Application	247 KB
etc1tool.exe	24/10/2023 10:16	Application	431 KB
fastboot.exe	24/10/2023 10:16	Application	1,801 KB
hprof-conv.exe	24/10/2023 10:16	Application	54 KB
libwinpthread-1.dll	24/10/2023 10:16	Application extension	237 KB
make_f2fs.exe	24/10/2023 10:16	Application	467 KB
make_f2fs_casefold.exe	24/10/2023 10:16	Application	467 KB
mke2fs.conf	24/10/2023 10:16	CONF File	2 KB
mke2fs.exe	24/10/2023 10:16	Application	739 KB
NOTICE.txt	24/10/2023 10:16	Text Document	1,049 KB
source.properties	24/10/2023 10:16	Properties Source File	1 KB
sqlite3.exe	24/10/2023 10:16	Application	1,310 KB

**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.

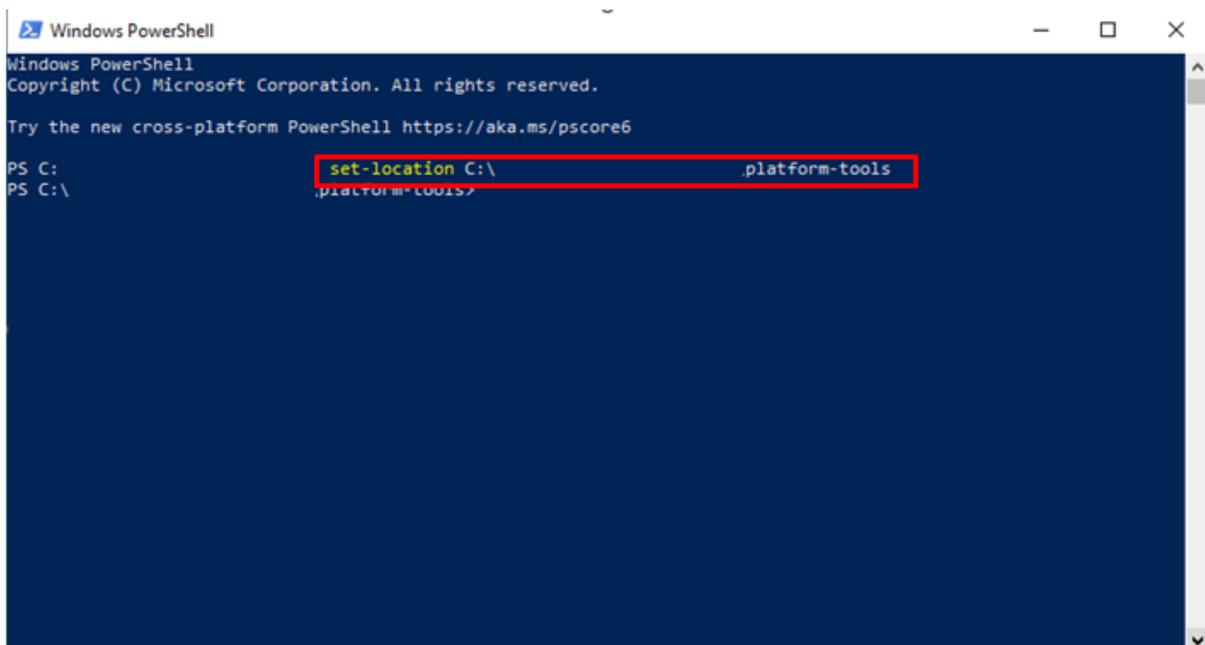


```
Windows PowerShell
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Try the new cross-platform PowerShell https://aka.ms/pscore6

PS C:\
```

**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.

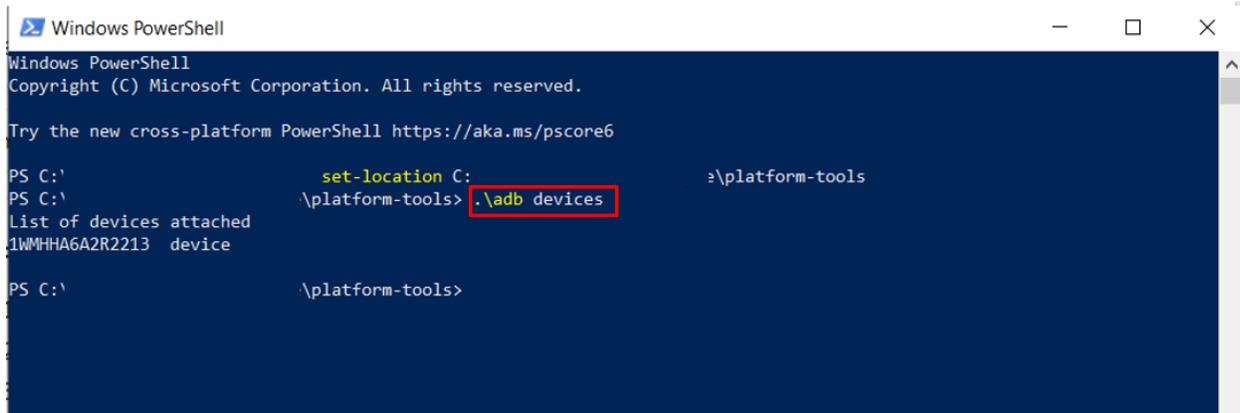


```
Windows PowerShell
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Try the new cross-platform PowerShell https://aka.ms/pscore6

PS C:\
set-location C:\platform-tools
PS C:\
```

**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.



```

Windows PowerShell
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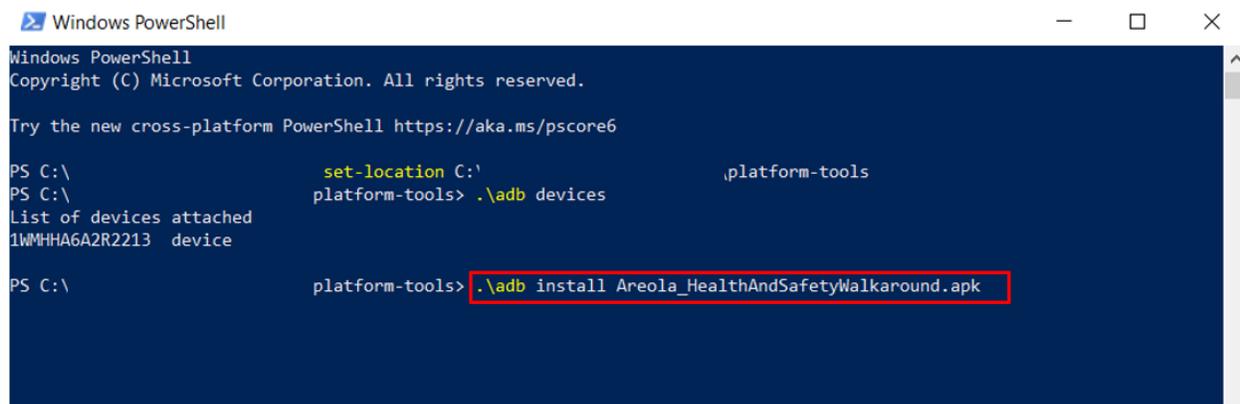
Try the new cross-platform PowerShell https://aka.ms/pscore6

PS C:\> set-location C:\platform-tools
PS C:\platform-tools> .\adb devices
List of devices attached
1WMHHA6A2R2213 device

PS C:\platform-tools>

```

**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.



```

Windows PowerShell
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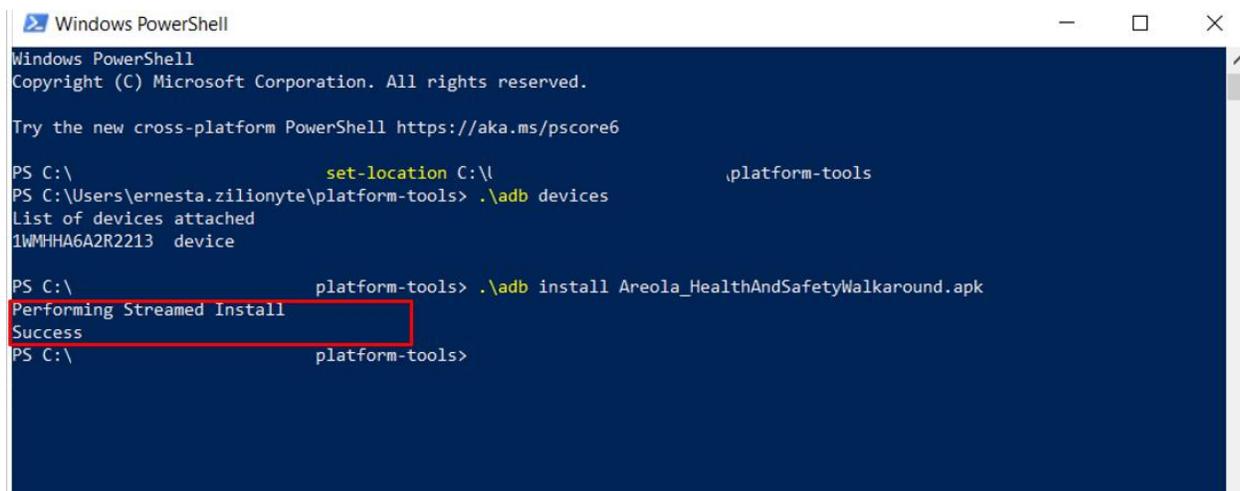
Try the new cross-platform PowerShell https://aka.ms/pscore6

PS C:\> set-location C:\platform-tools
PS C:\platform-tools> .\adb devices
List of devices attached
1WMHHA6A2R2213 device

PS C:\platform-tools> .\adb install Areola_HealthAndSafetyWalkaround.apk

```

After a successful installation the following message will be displayed.



```

Windows PowerShell
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Try the new cross-platform PowerShell https://aka.ms/pscore6

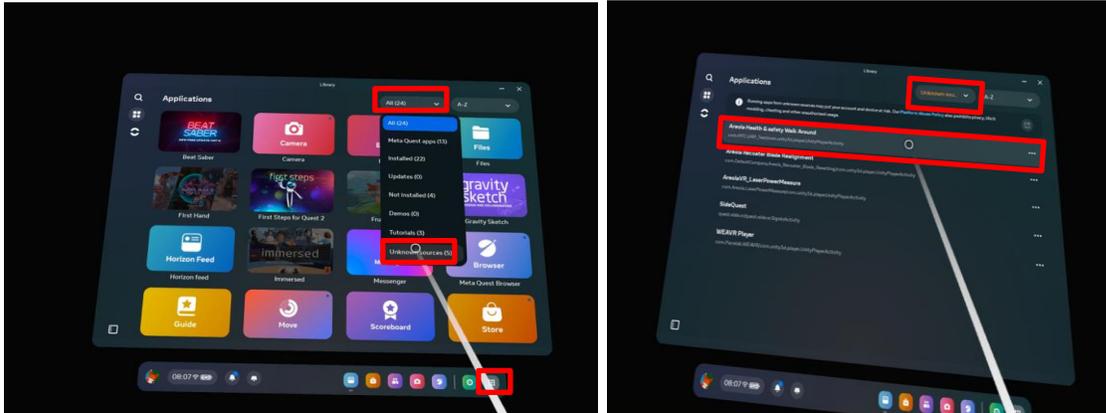
PS C:\> set-location C:\platform-tools
PS C:\Users\ernesta.zilionyte\platform-tools> .\adb devices
List of devices attached
1WMHHA6A2R2213 device

PS C:\platform-tools> .\adb install Areola_HealthAndSafetyWalkaround.apk
Performing Streamed Install
Success

PS C:\platform-tools>

```

**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