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Meta Quest
+ Unity
+ C#

Building an XR Experience

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+ C#

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lance@lancelarsen.com

HOLOSOFT.COM

HOLO

SOFT

MADdotNET

MADISON .NET DEV COMMUNITY

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WHAT IS XR?

(XR) eXtended Reality

==

(VR) Virtual Reality +
(AR) Augmented Reality +
(MR) Mixed Reality

There are 2 types of people...

Those who know that XR will change the world...

And those who haven't tried it yet...

WHAT DO YOU NEED TO START BUILDING IN XR?

WHAT DO YOU NEED?

XR DEVICE

Physics Engine

SDK

unity

MRTK
Mixed Reality Toolkit
For UNITY

OpenXR™

XR DEVICES

VR FOCUS

20 MILLION SOLD!

META QUEST 2

$299

Released - Oct 2020

META QUEST PRO

$999

Released - Oct 2022

META QUEST 3
$499
Expected Release - Oct 2023
Meta Connect @ September 27th

XR DEVICES

AR FOCUS

HOLOLENS 2
$3500
Released - Nov 2019

APPLE VISION PRO
$3499
Expected Release - Early 2024

WHAT DO YOU NEED?

PHYSICS ENGINE

C#

FREE <100k

~50% Market

Easy to Learn

LARGE Dev Community

C++

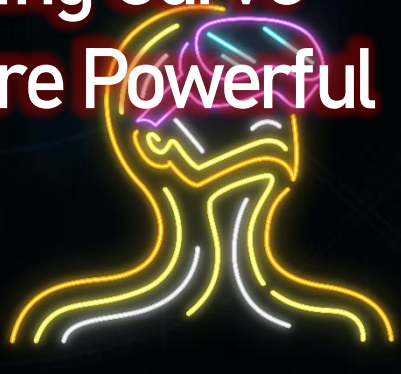
FREE <1M

then 5%

~17% Market

Steeper Learning Curve

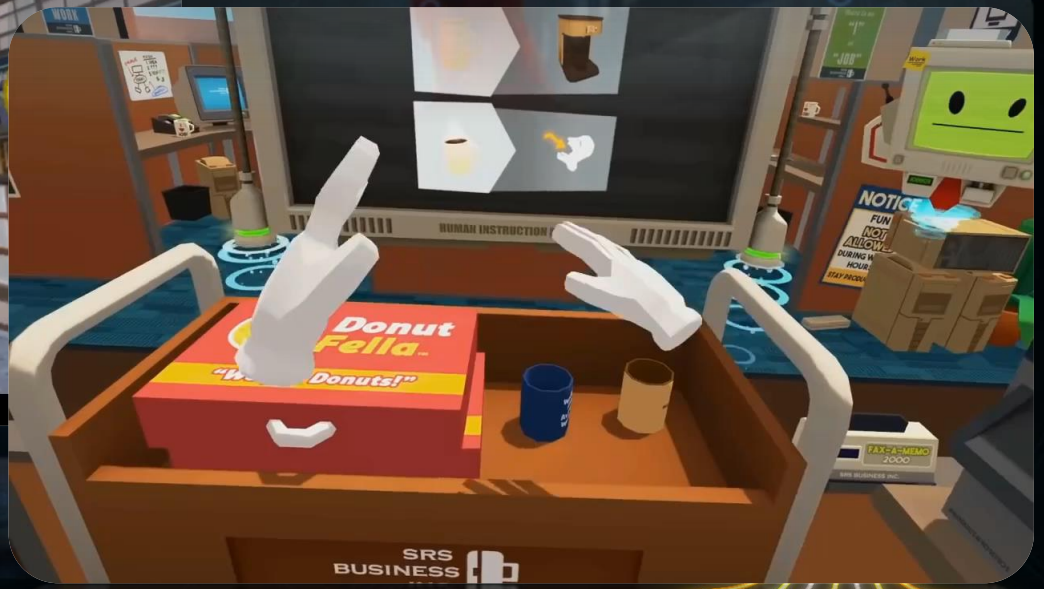
Potentially More Powerful



WINNER Unity

COMBO
37
$100 MILLION!!!!

68
BEST: 68


Donut Fella
SRS BUSINESS

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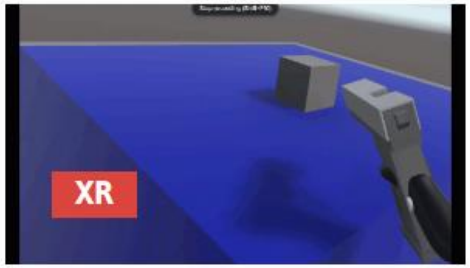
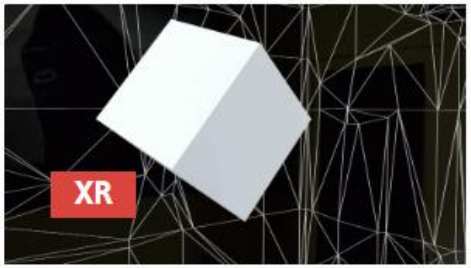
META QUEST: XR WORKSHOP!



July 30, 2023 0

Meta Quest: XR Workshop! Unity 2022 + OpenXR + XR Interaction Toolkit

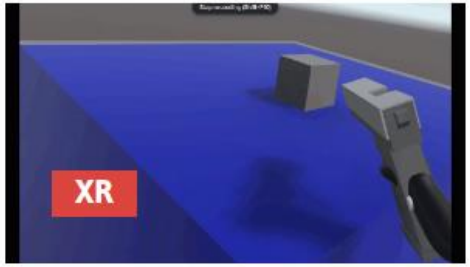


July 26, 2023 8

XR Step-by-Step! Quick links to all XR articles...

July 24, 2023 0

XR Step-by-Step 2023! Meta Quest: Targets and Explosions! Unity 2022 + Open XR + XR Interaction Toolkit



July 24, 2023 0

XR Step-by-Step 2023! Meta Quest: Sound and

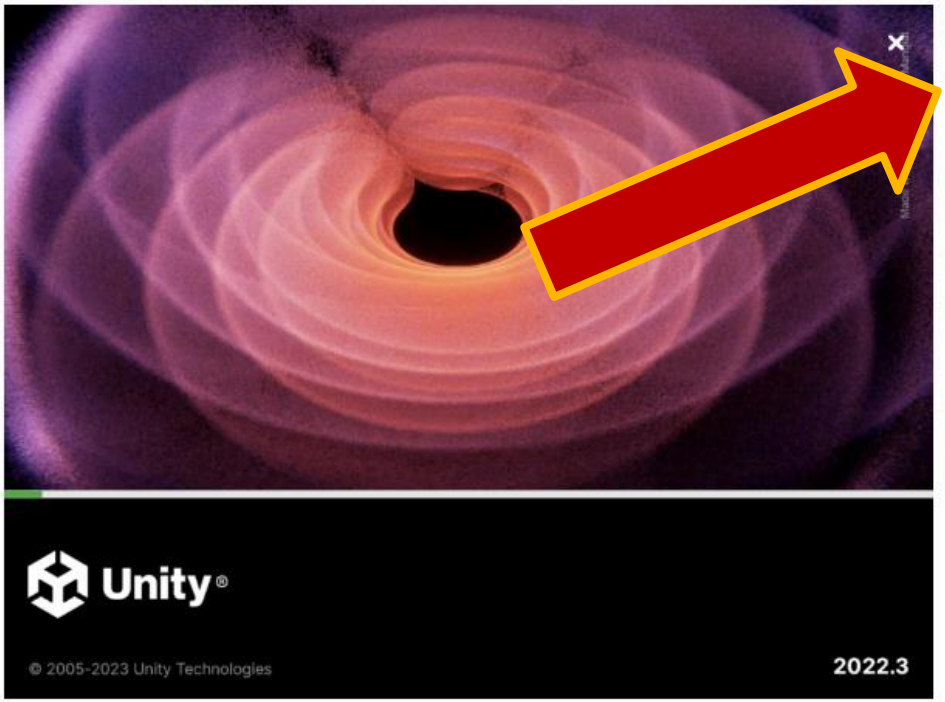
July 24, 2023 0

XR Step-by-Step 2023! Meta Quest: Shooting a

July 23, 2023 1

XR Step-by-Step 2023! Meta Quest: Grab

INSTALLING THE TOOLS YOU NEED FOR XR



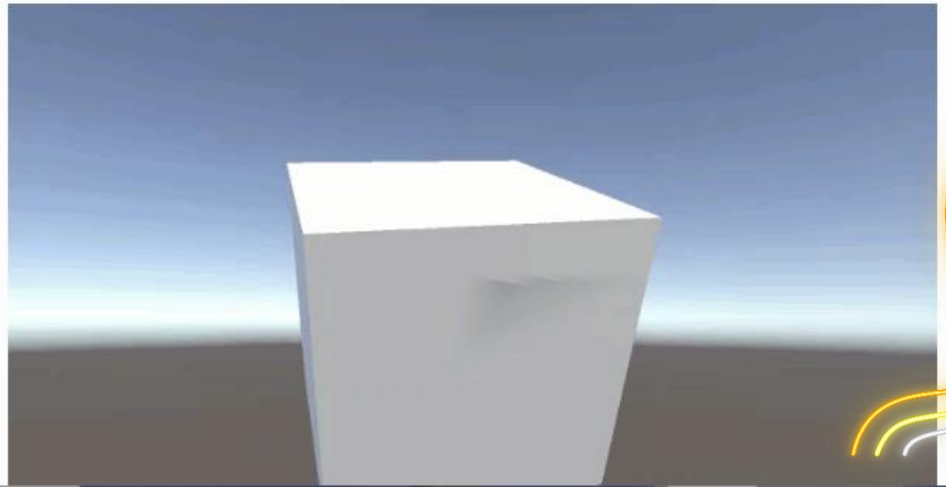
Meta Quest: Installing the Tools you need for XR!

Let's get started with installing our XR development tools!

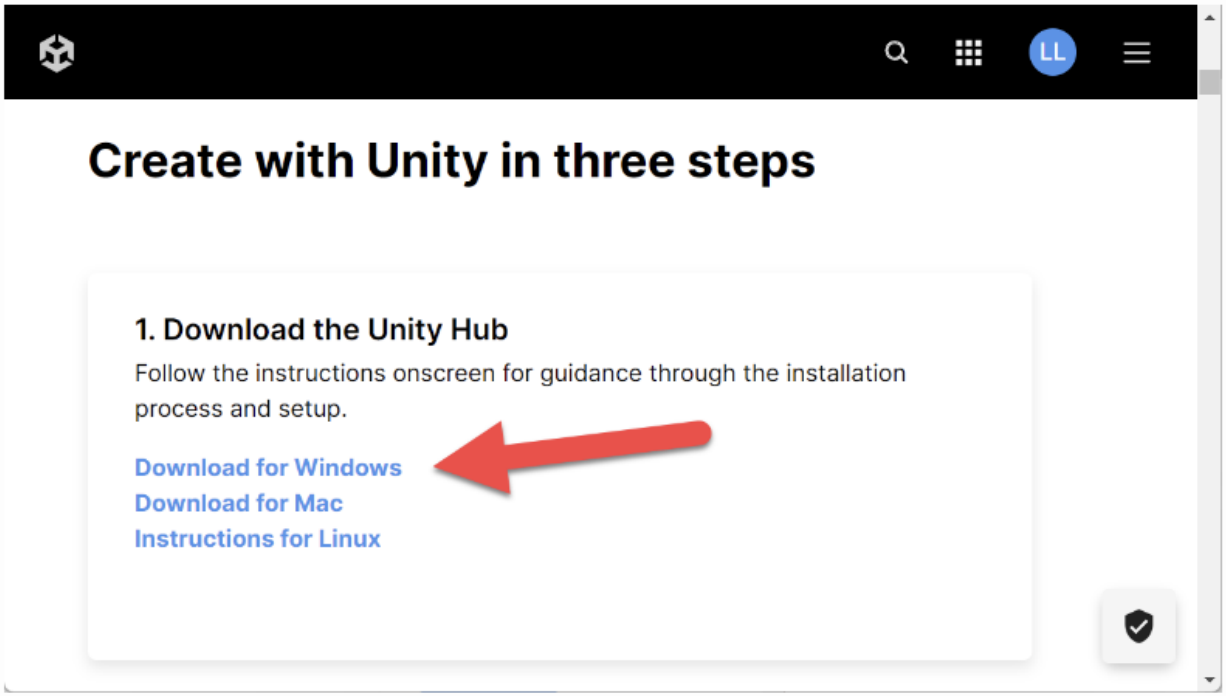
We'll be using the latest Unity 2022 version + Visual Studio 2022.

Meta Quest: Setting up your Meta Quest XR Project!

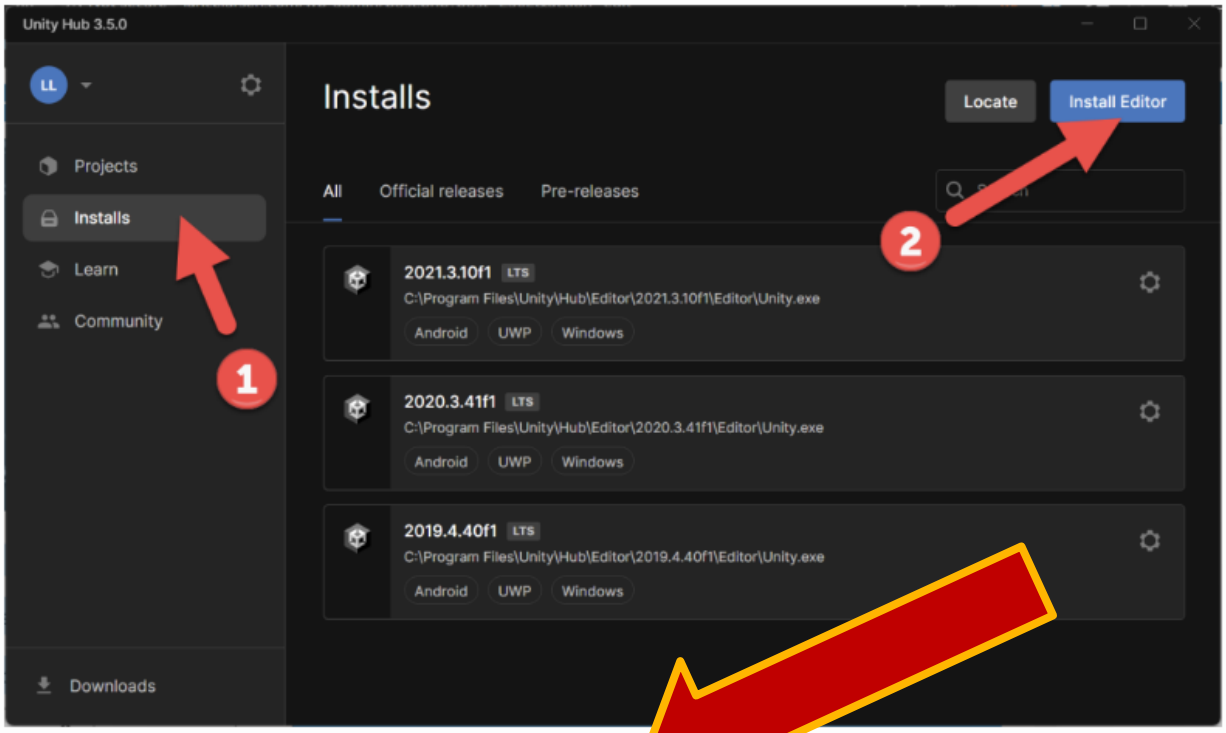
Here is where we begin our XR experience journey! We'll be setting up a completely new XR experience, from beginning



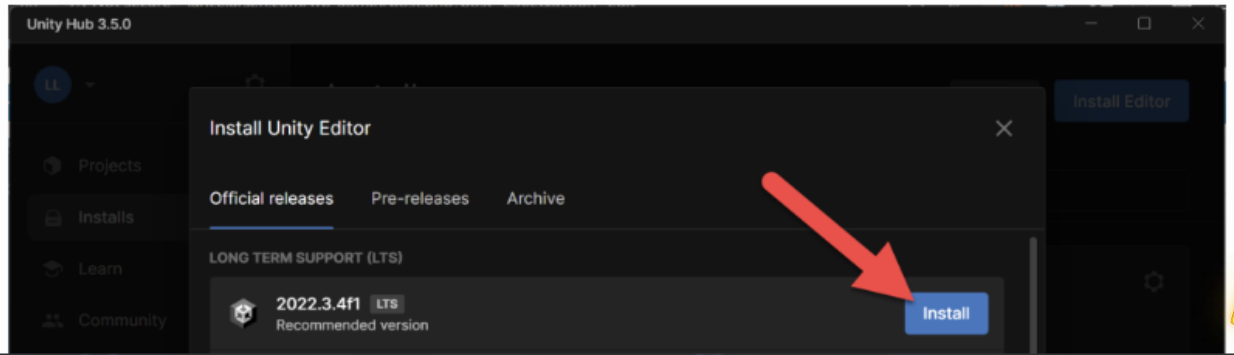
- Download and install **Unity Hub** (https://unity3d.com/get-unity/download)



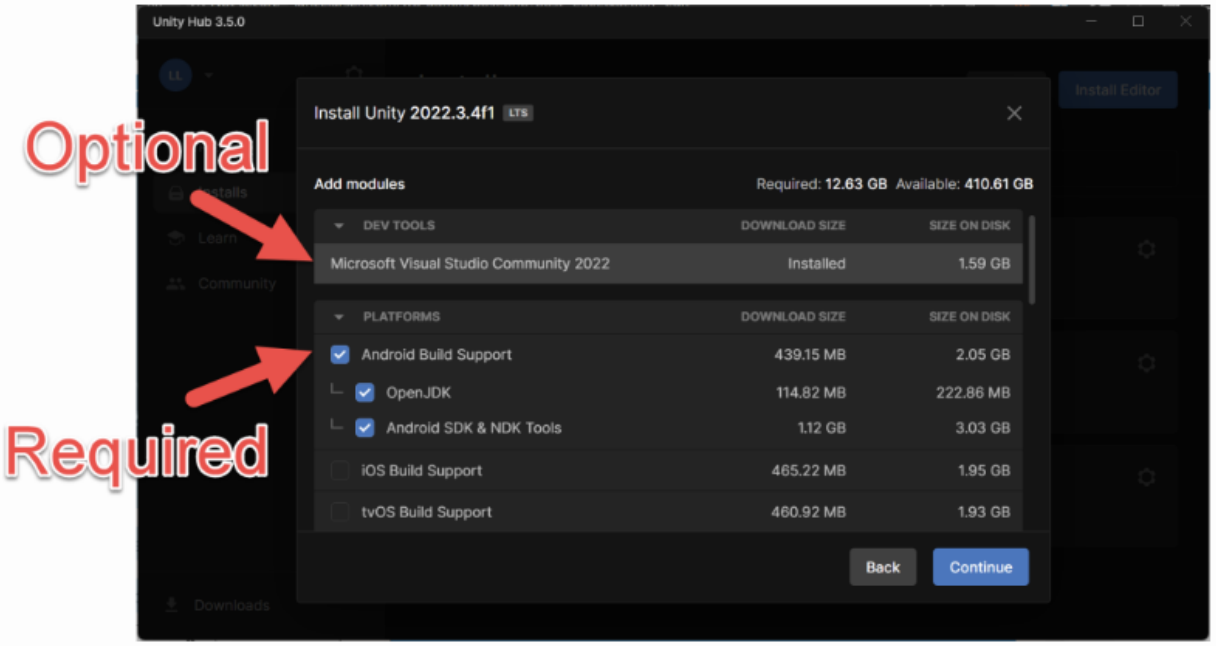
- **Unity** is constantly releasing new versions of their tools (very exciting to see the investments they're making in our favorite XR tools) – so **Unity Hub** is the best way to keep up to date with the newest versions and manage your projects!
  1. Click on **Installs**
  2. Click on **Install Editor**
     - Here we can see the Unity versions I currently have installed. I keep



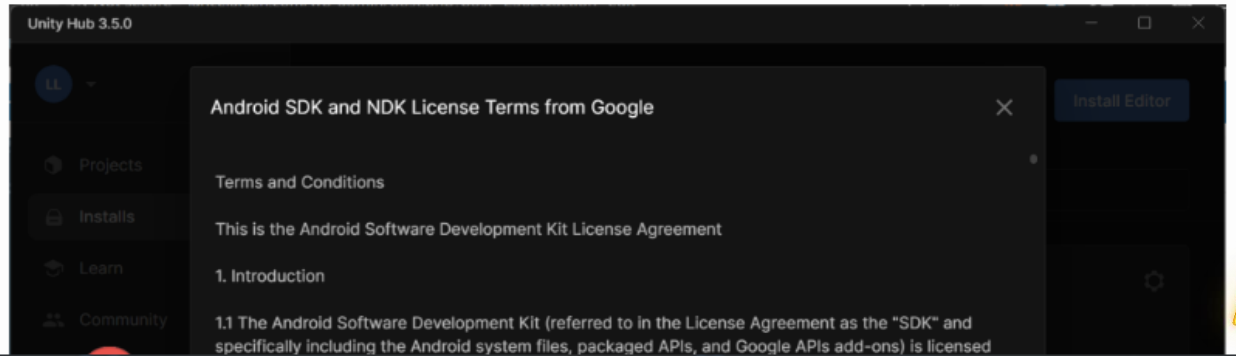
- Click **Install** on the latest version of 2022



- Click **Continue**

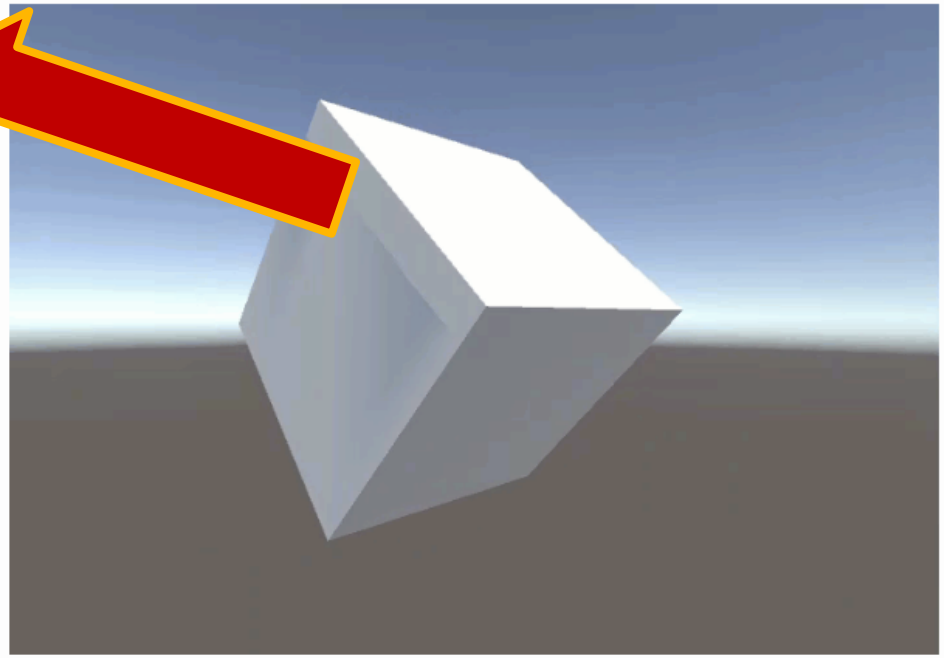


- Accept the EULA -> Click **Install**



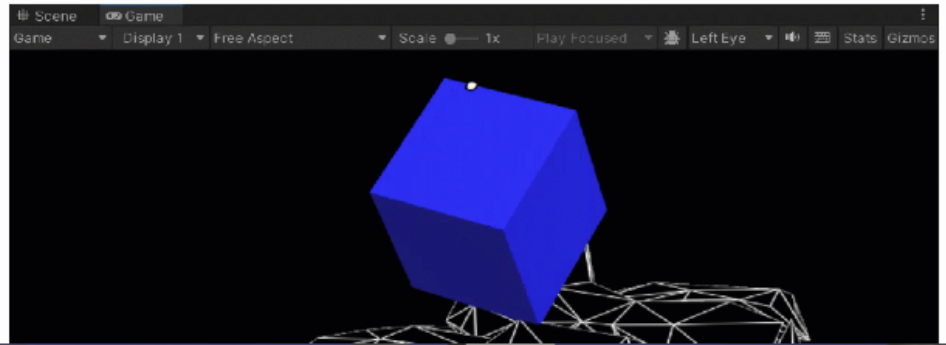
SETTING UP YOUR XR PROJECT UNITY 2022 + OPEN XR + XR INTERACTION TOOLKIT

Meta Quest: Setting up your Meta Quest XR Project!



Here is where we begin our XR experience journey! We'll be setting up a completely new XR experience, from beginning to end.

This may seem like a lot, but take it one section at a time – the payoff is well worth it...



ChatGPT: Mastering AI-Powered XR Coding

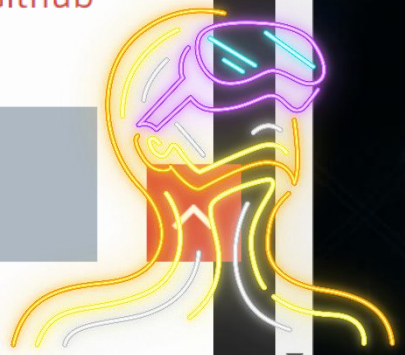
This is optional – but HIGHLY recommended – as learning how to

Full Step-by-Step Instructions!

Goals...

1. Create a New Project
2. Setup Unity Environment
3. Change the Project to Build for the Quest
4. Add a New Scene
5. Customize Project Info
6. Add OpenXR
7. Add XR Interaction Toolkit (XRI)
8. Setup New Scene
9. Build and Run on Quest
10. Bonus: Spinning Cube!

GitHub Download the finished code for this blog article @ Github Repo

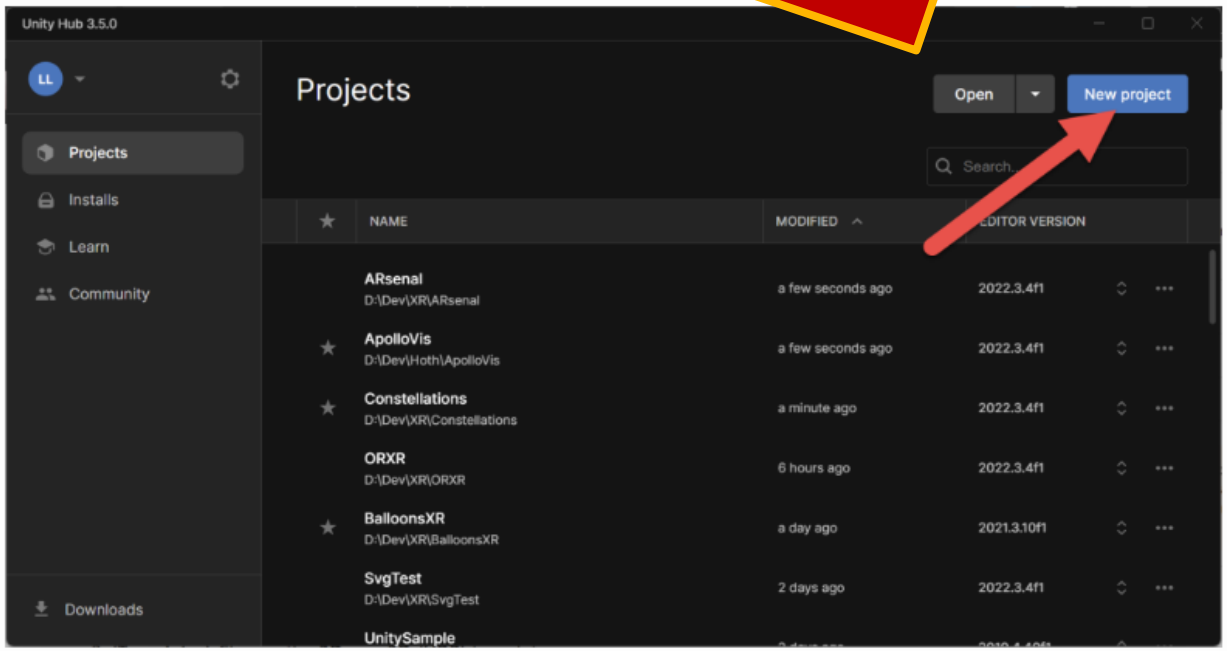


Creating a New Project

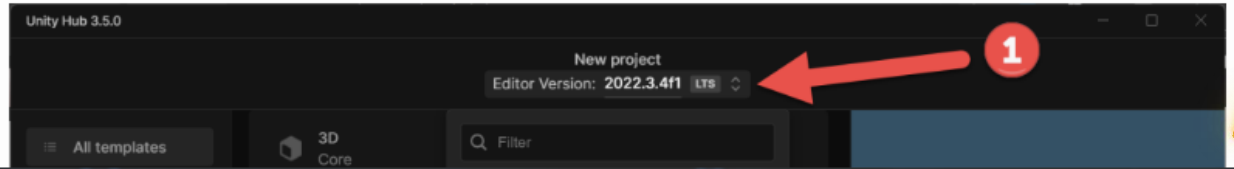
- Open **Unity Hub** and click **New Project**

Creating a New Project

- Open **Unity Hub** and click **New Proj**



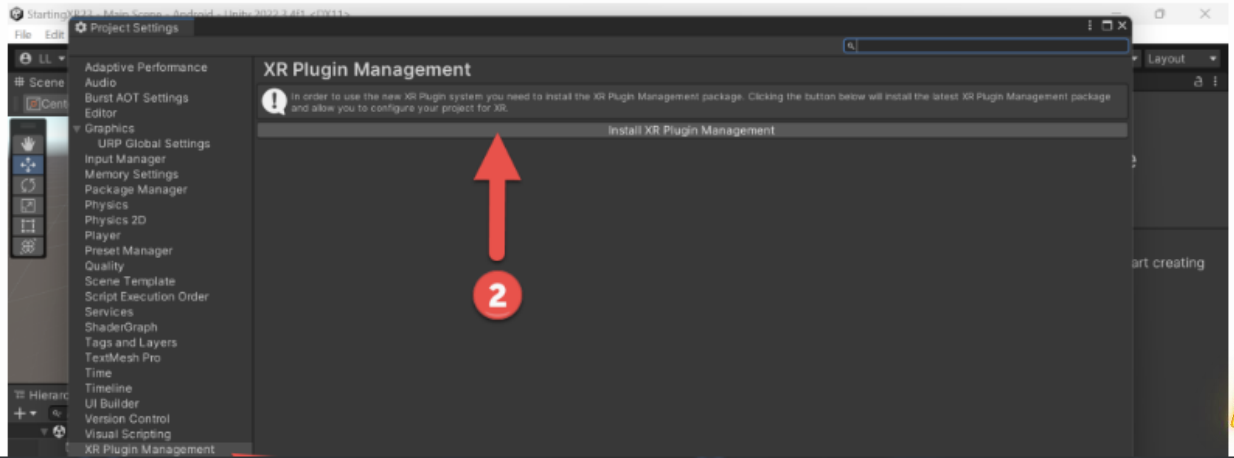
1. **(New Project Window)** -> **Editor Version** -> Select the latest version of **2022** in the drop down



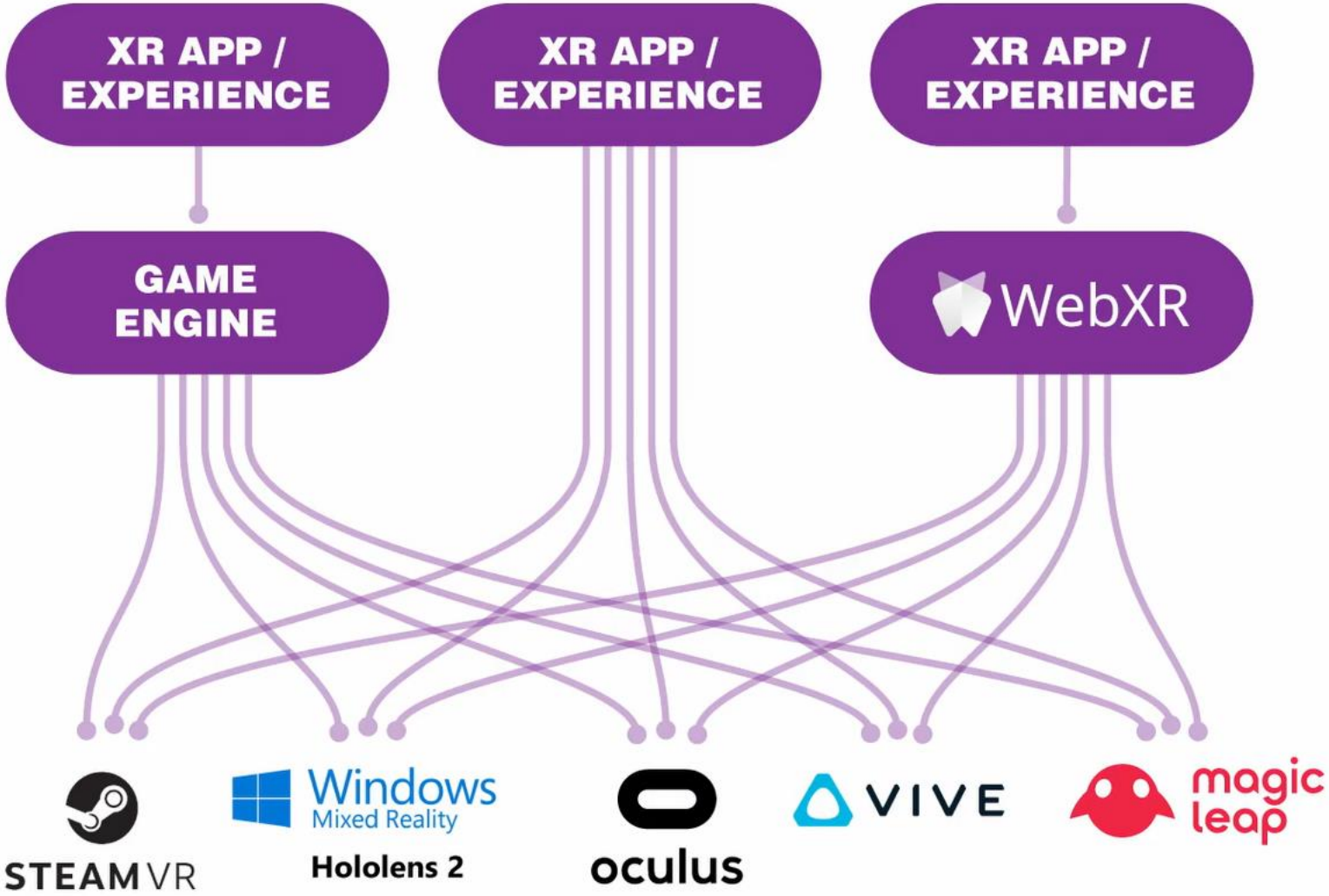
Add OpenXR

- So as more and more XR d… …market of the past several years, more and more different libraries were being … each of them. So while Unity could be used to develop for each, we couldn't have one XR project that could be easily run across multiple devices – uggg…
- OpenXR to the rescue. OpenXR is a standard that allows developers to (generally) write one Unity application and run it across multiple devices.
- Not until THIS year (really only in the past several months) has OpenXR matured to the point where I'd recommend it over device specific libraries – now that it has – awesome XR experiences are even easier to create!

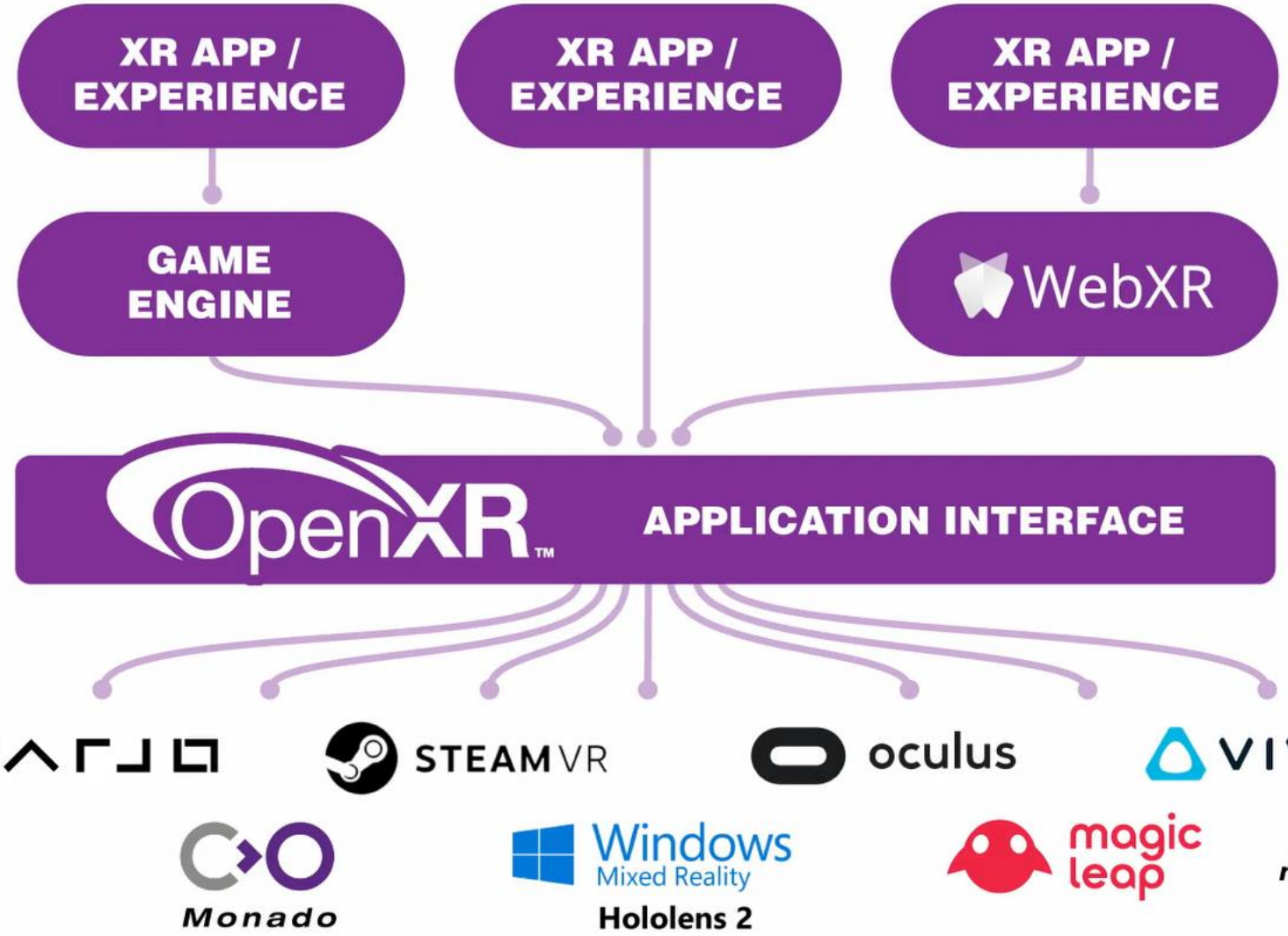
1. **(Project Settings)** Click **XR Plug-in Management**
2. Click **Install XR Plugin Management**



WHAT IS OPENXR?



Before OpenXR: Applications and engines needed separate proprietary code for each device on the market.



OpenXR provides a single cross-platform, high-performance API between applications and all conformant devices.

acer AMD antilatency AREA arm ATLATL AUTODESK

blender CO DIMENCO DisplayLink XR EPIC GAMES ERICSSON Google HAPTICS INDUSTRY FORUM

hp HOLOCHIP htc HUAWEI Imagination INFINADECK intel LG

immersion JUICE MTA SZTAKI LW logitech LUNARG magic leap

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oppo Pico pluto Qualcomm RAZER Rokid SAMSUNG

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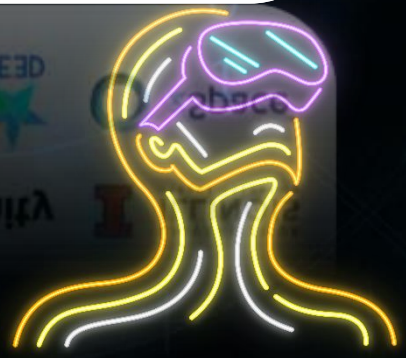
UX3D VALVE VARJO VeriSilicon 兆芯 vivo XE3D zSpace

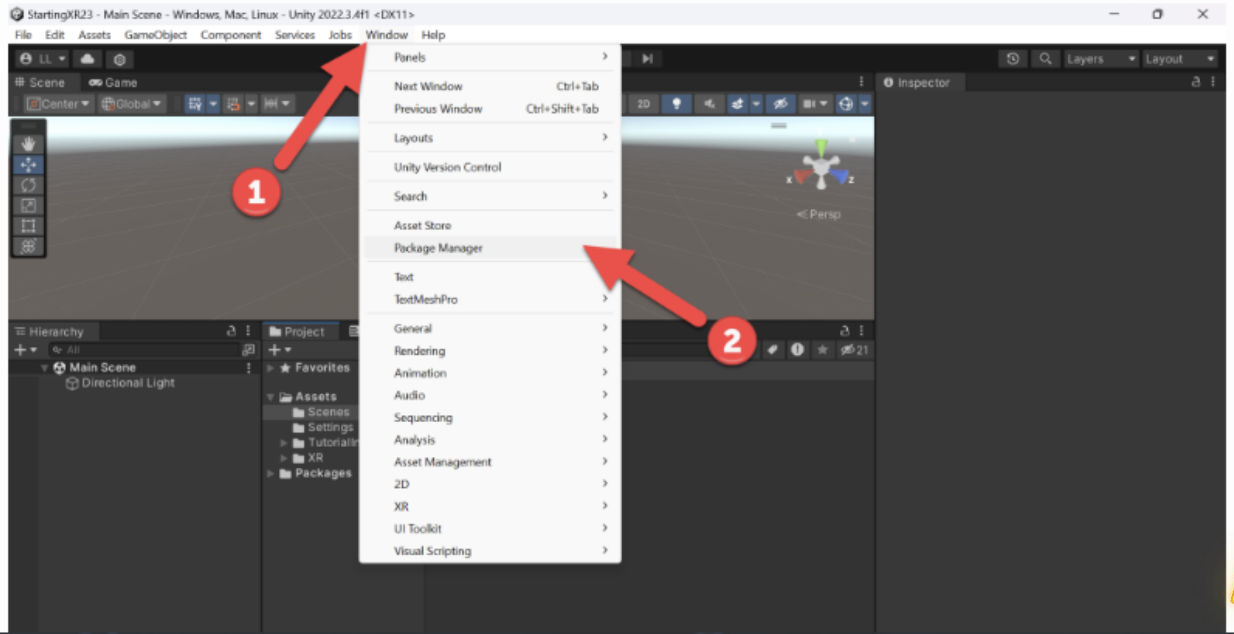


OpenXR™
CROSS-PLATFORM REALITY
Transforming Cross Platform XR

Add XR Interaction Toolkit (XRI)

- Building on top of the OpenXR standard, the XR[illegible] Toolkit (XRI) is a high-level, component-based interaction system for **creating [illegible] experiences**. It provides a common framework for interactions and streamlines cross-platform creation.
- This too has only very very recently become mature enough to be usable and thus why we're fully embracing it to build the best XR experiences in Unity!

1. **(Toolbar)** Click **Window**
2. Click **Package Manager**



WHAT IS XR INTERACTION TOOLKIT?

unity

XR Interaction Toolkit

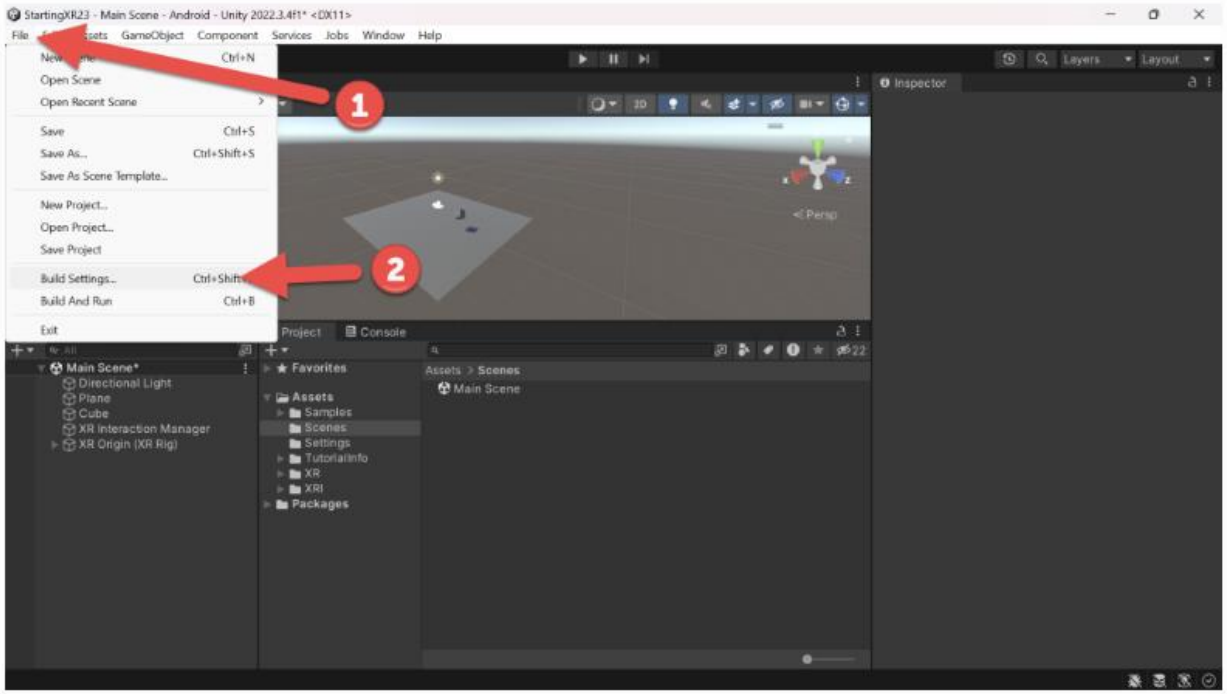
AR/VR app interactivity without coding

Collection of components that enable us to build interactive and immersive experiences quickly and easily!

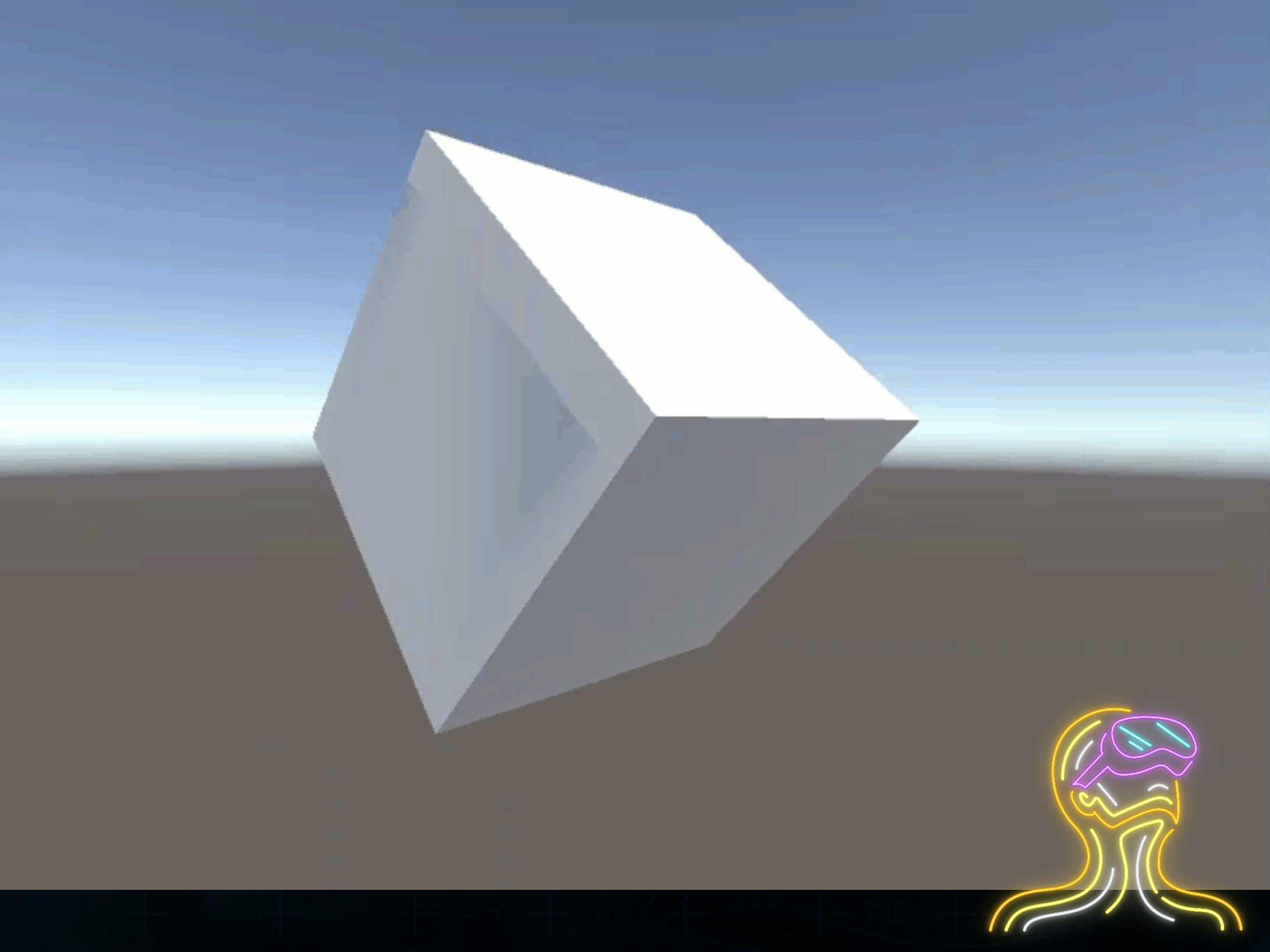
Build and Run on Quest

- Ok, can't wait anymore – we need to see [illegible] on our Meta Quest!

1. **(Toolbar)** Click **File**
2. Click **Build Settings...**



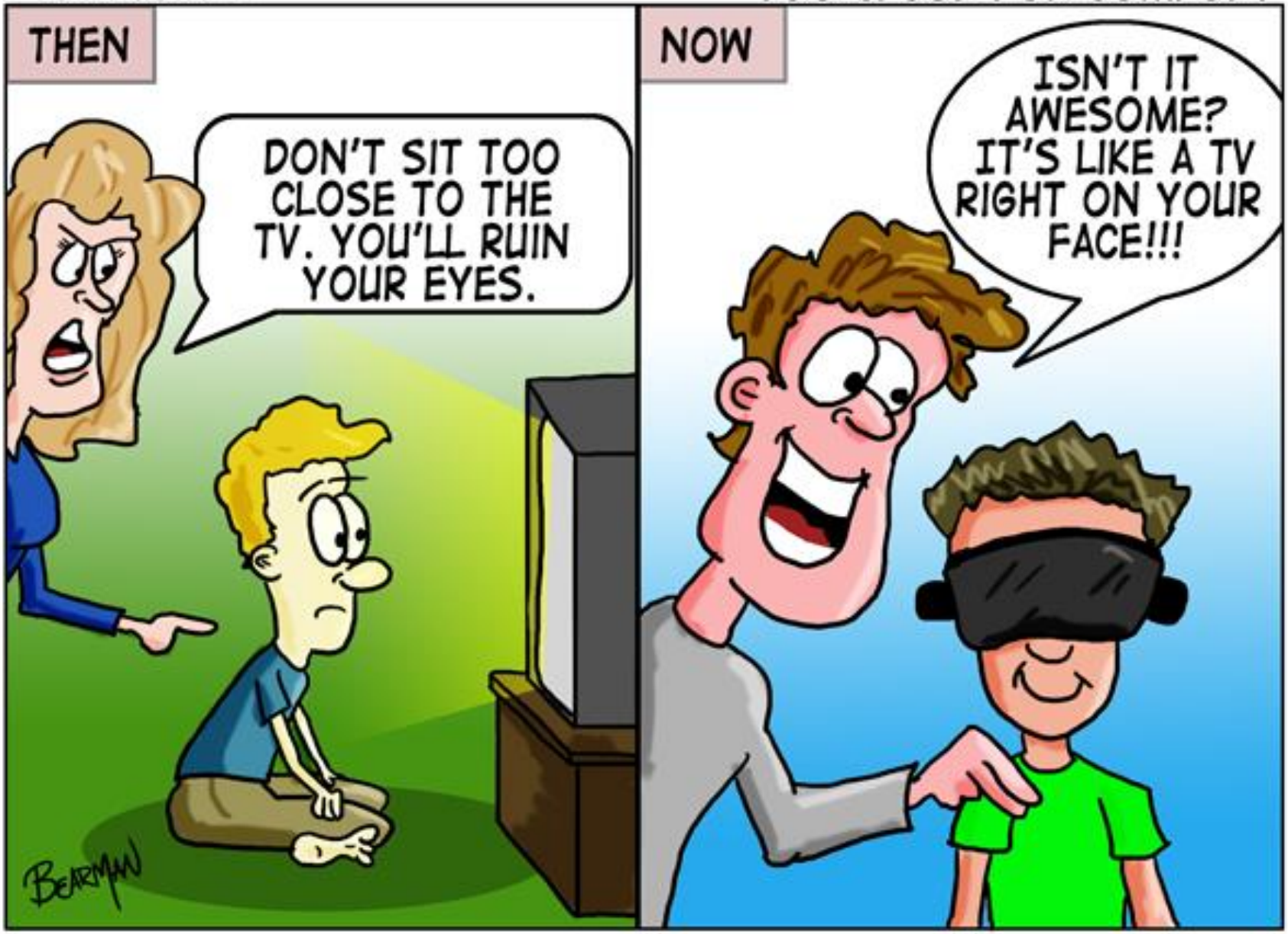
1. **(Build Settings)** Click the arrow dropdown next to **Run Device**
2. If your Quest is connected to your computer, and you've given it permissions – you should see your device



Achievement Unlocked

BEARMAN CARTOONS

TOO CLOSE FOR COMFORT



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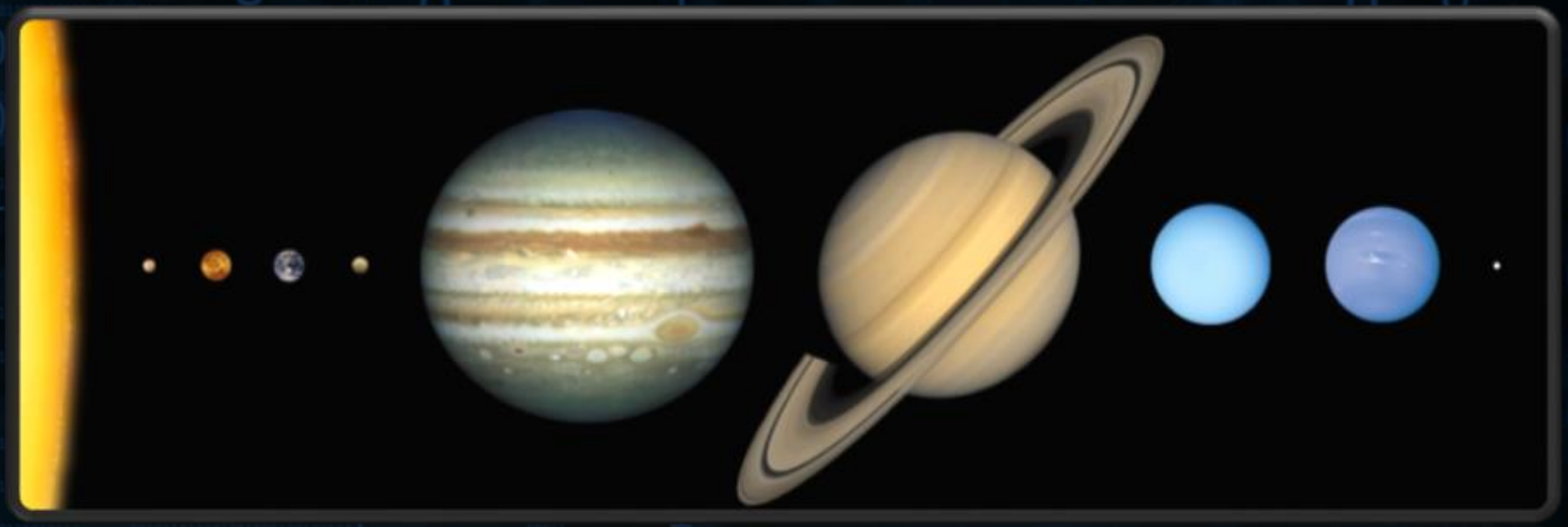
WHERE TO START WITH OUR XR EXPERIENCE?

IDEAS FOR OUR EXPERIENCE?



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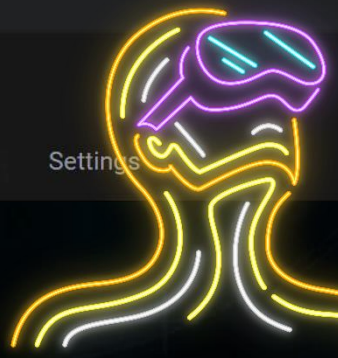

SETUP THE WORLD

CREATE THE UNIVERSE

solar system - Asset Store

assetstore.unity.com/?q=solar%20system&orderBy=1

Unity Asset Store

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3D 2D Add-Ons Audio Essentials Templates Tools VFX Sale Sell Assets

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-50% RECOMMENDED BY OUR USERS

Space Graphics Toolkit

CARLOS WILKES ★★★★★ (344)

$49.98 ~~$99.95~~

T TLCraddock ★★★★★ 8 days ago

SO GLAD I GOT THIS!!

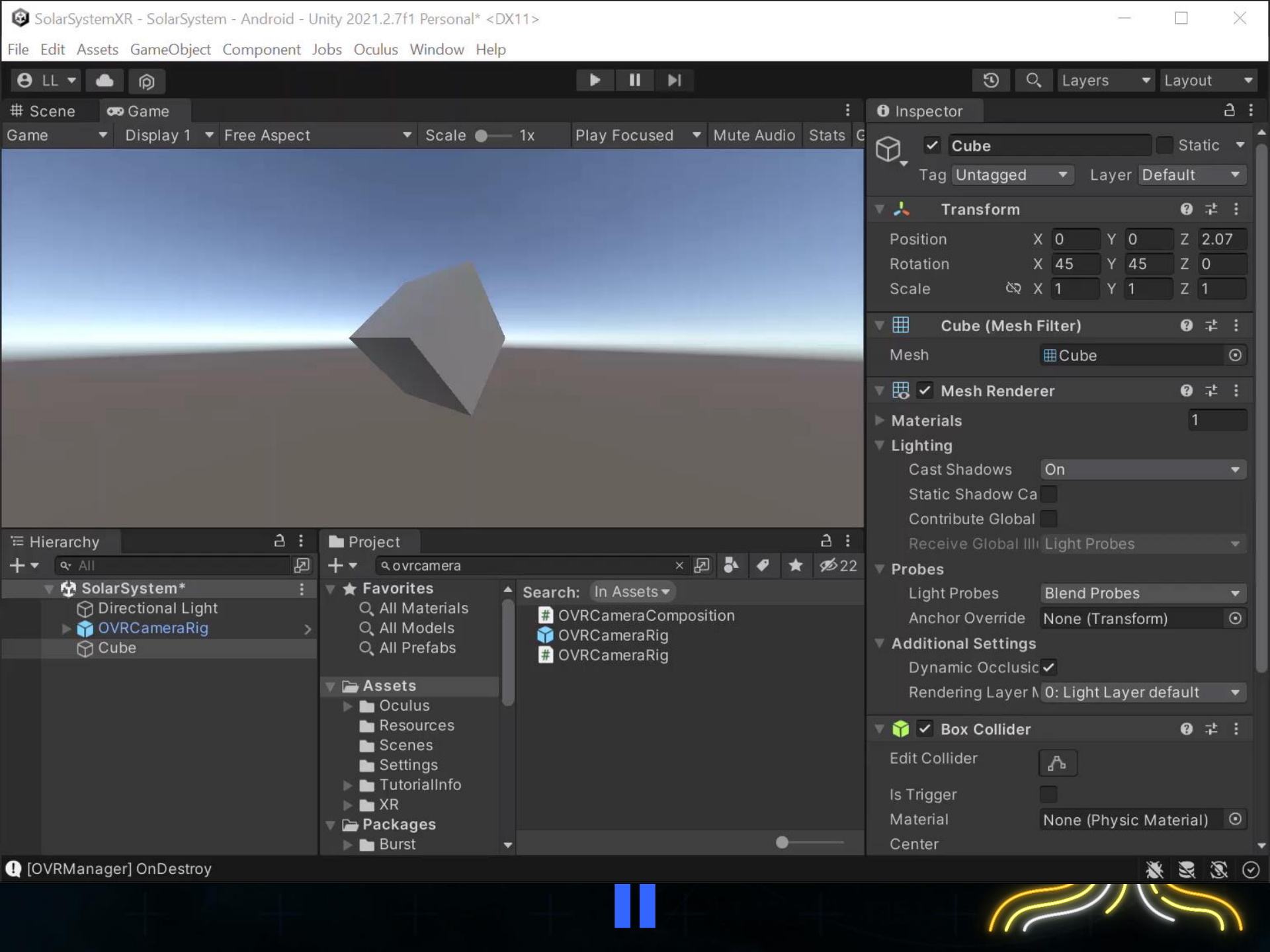
This asset is fantastic! I have had this for a little over a week, I will admit there is a bit of a ... Read more

Refine by clear filters

- 50% off assets (8)
- 30% off bundles
- Hide Purchased Assets

All Categories

- 3D (49)
- 2D (9)
- Audio (1)
- Templates (8)
- Tools (4)
- VFX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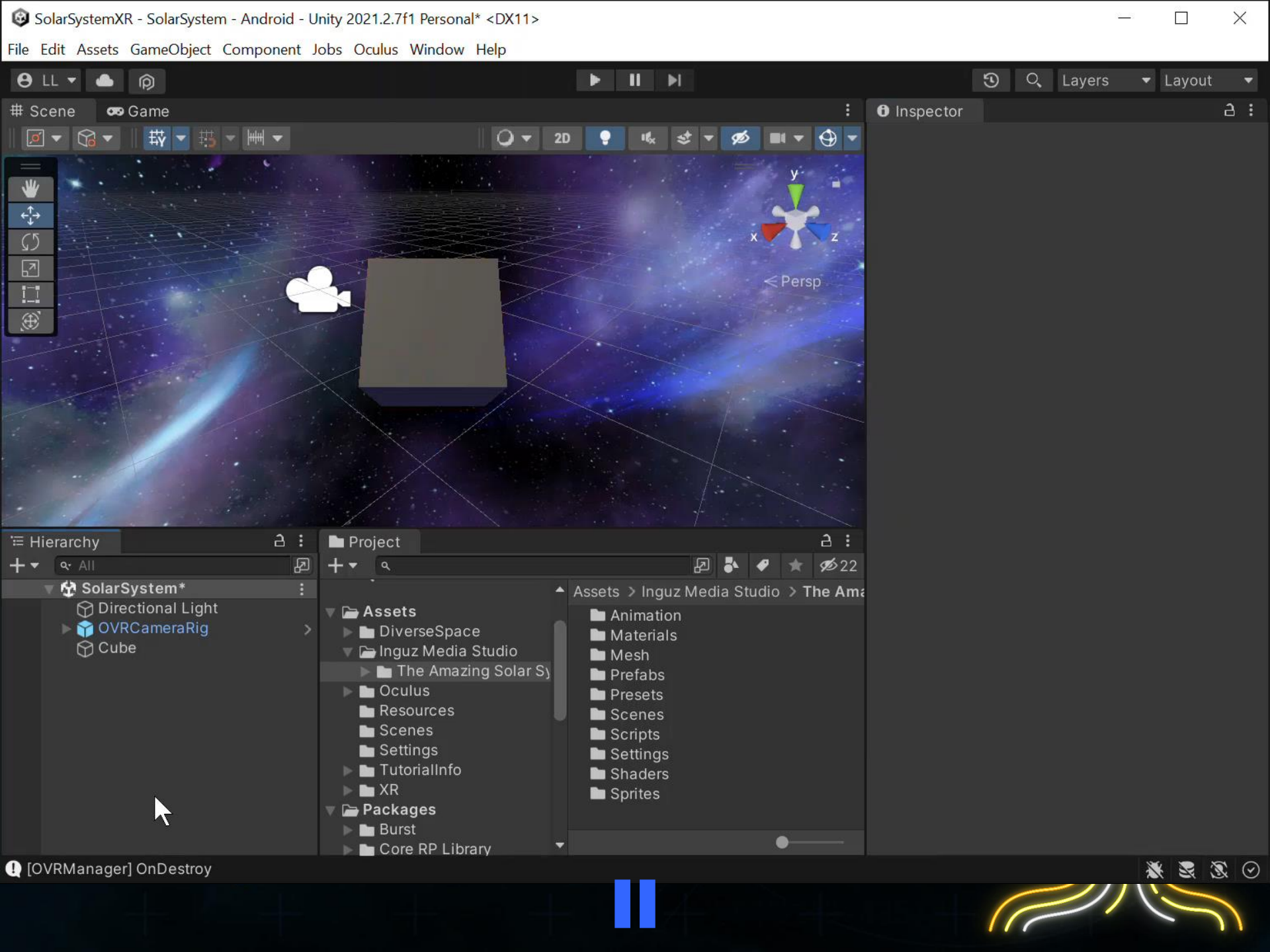
[OVRManager] OnDestroy

SETUP THE WORLD

AND THE EARTH TURNS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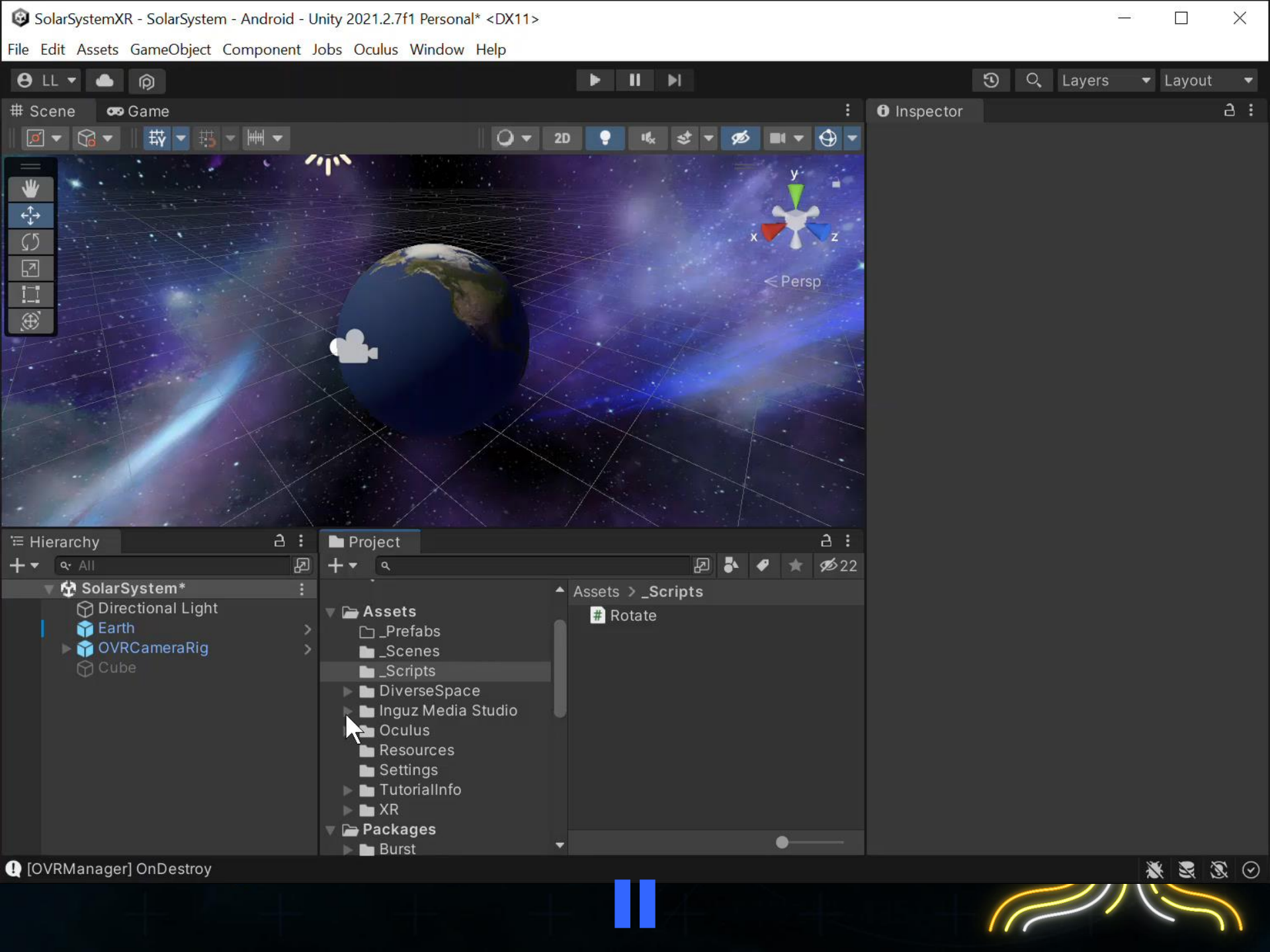
[OVRManager] OnDestroy

Achievement Unlocked

CAUTION
VIRTUAL REALITY ZONE

SETUP THE WORLD

WHAT ABOUT THE MOON?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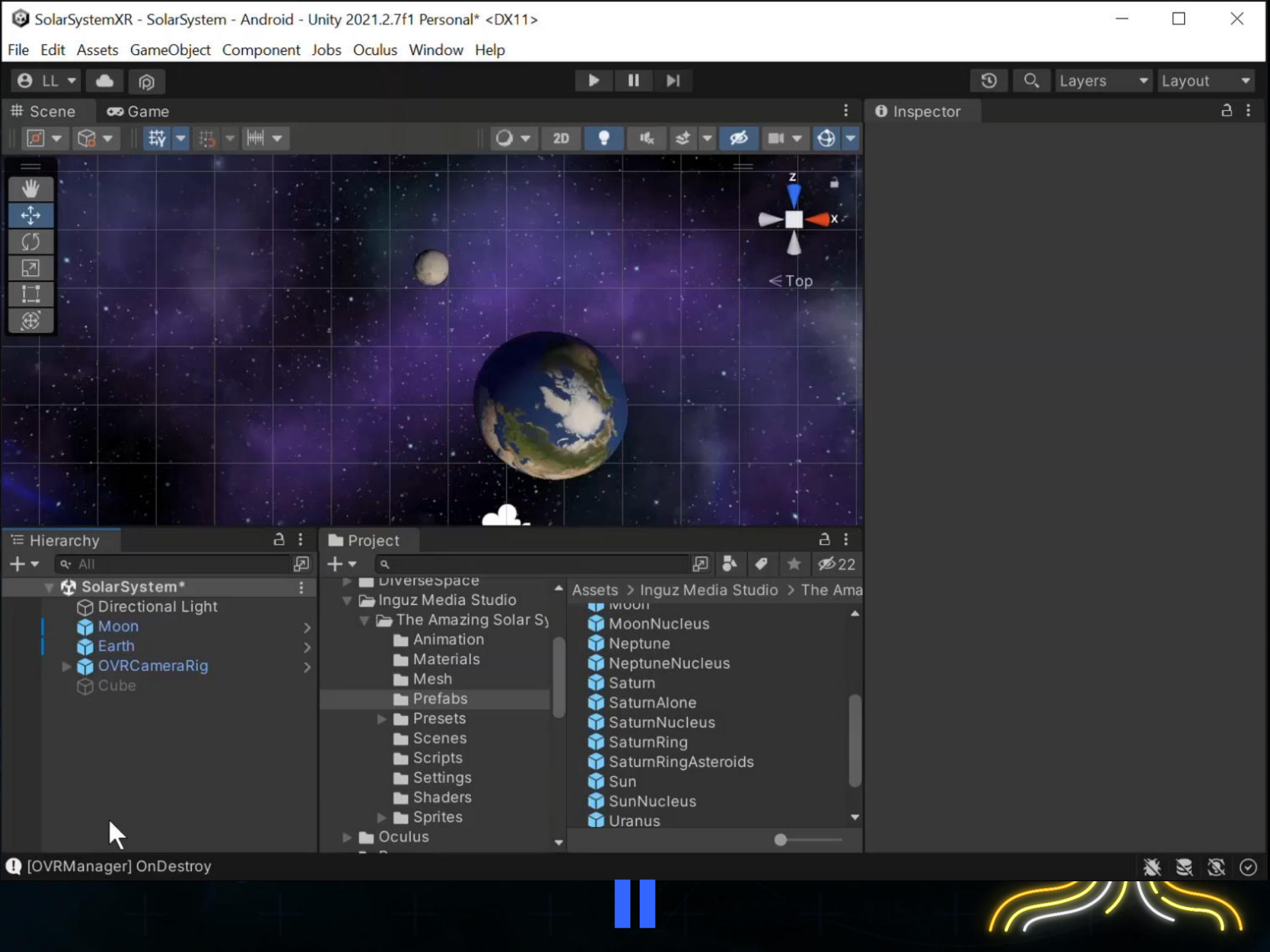
[OVRManager] OnDestroy

SETUP THE WORLD

REST OF THE PLANETS???
(x10 Speeeeeed)


SolarSystemXR - SolarSystem - Android - Unity 2021.2.7f1 Personal* <DX11>
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Saturn
SaturnAlone
SaturnNucleus
SaturnRing
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Sun
SunNucleus
Uranus
[OVRManager] OnDestroy

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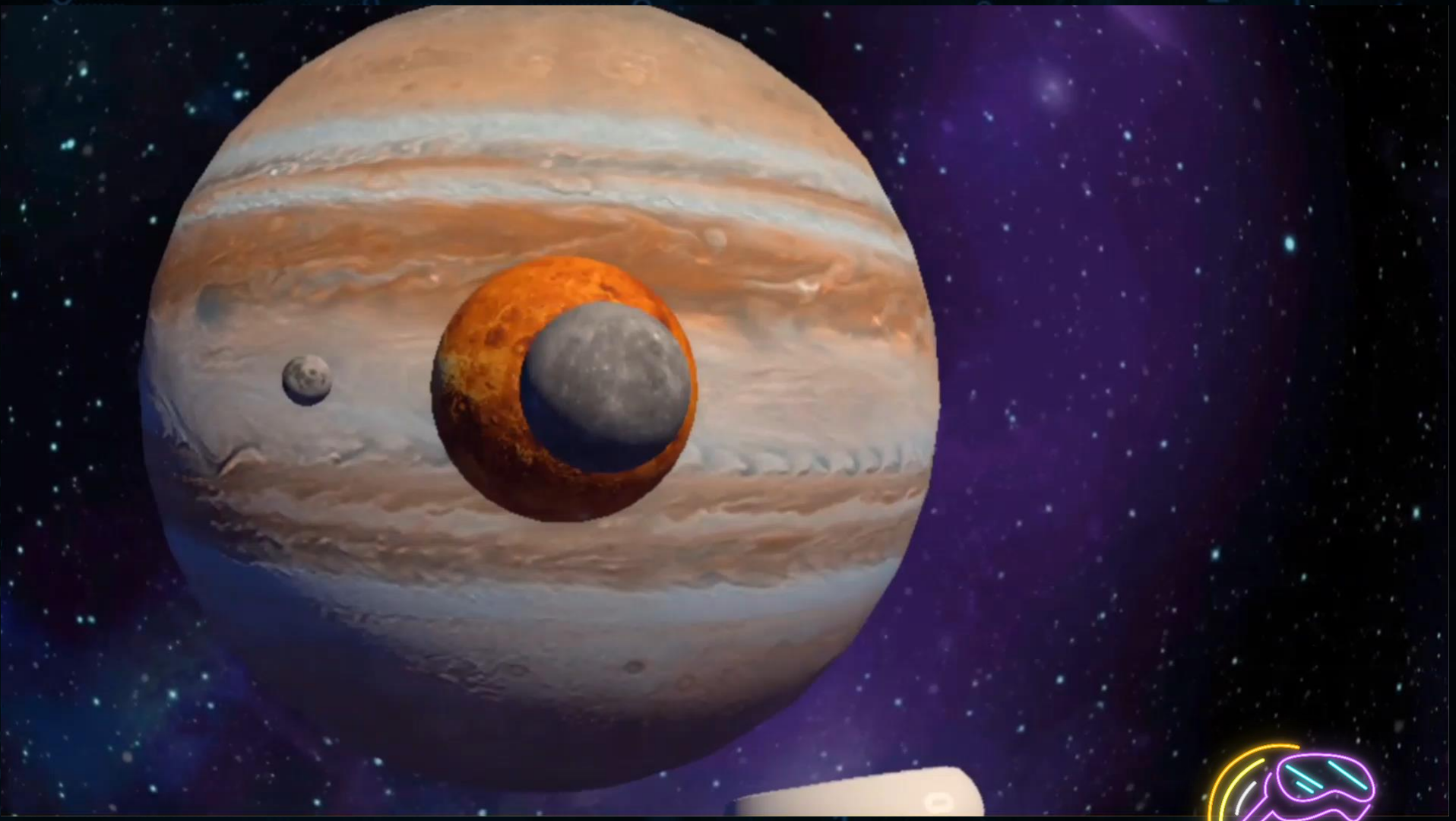
Shoot.cs* | PostProcessManager.cs | Controllers.cs | Rotate.cs | OVRControllerTest.cs | Orbit.cs

Assembly-CSharp.Player | Shoot | Update()

```
        Unity Message | 0 references
19      void Update()
20      {
21          transform.position += Time.deltaTime * speed * transform.forward;
22      }
23
        Unity Message | 0 references
24      void OnCollisionEnter(Collision collision)
25      {
26          if (collision.collider.tag == "planet")
27          {
28              Debug.Log("Hit!");
29
30              Instantiate(explosion, transform.position, transform.rotation);
31
32              AudioSource.PlayClipAtPoint(_audio, this.gameObject.transform.position);
33
34              Destroy(gameObject);
35          }
36      }
37  }
38
```



Achievement Unlocked

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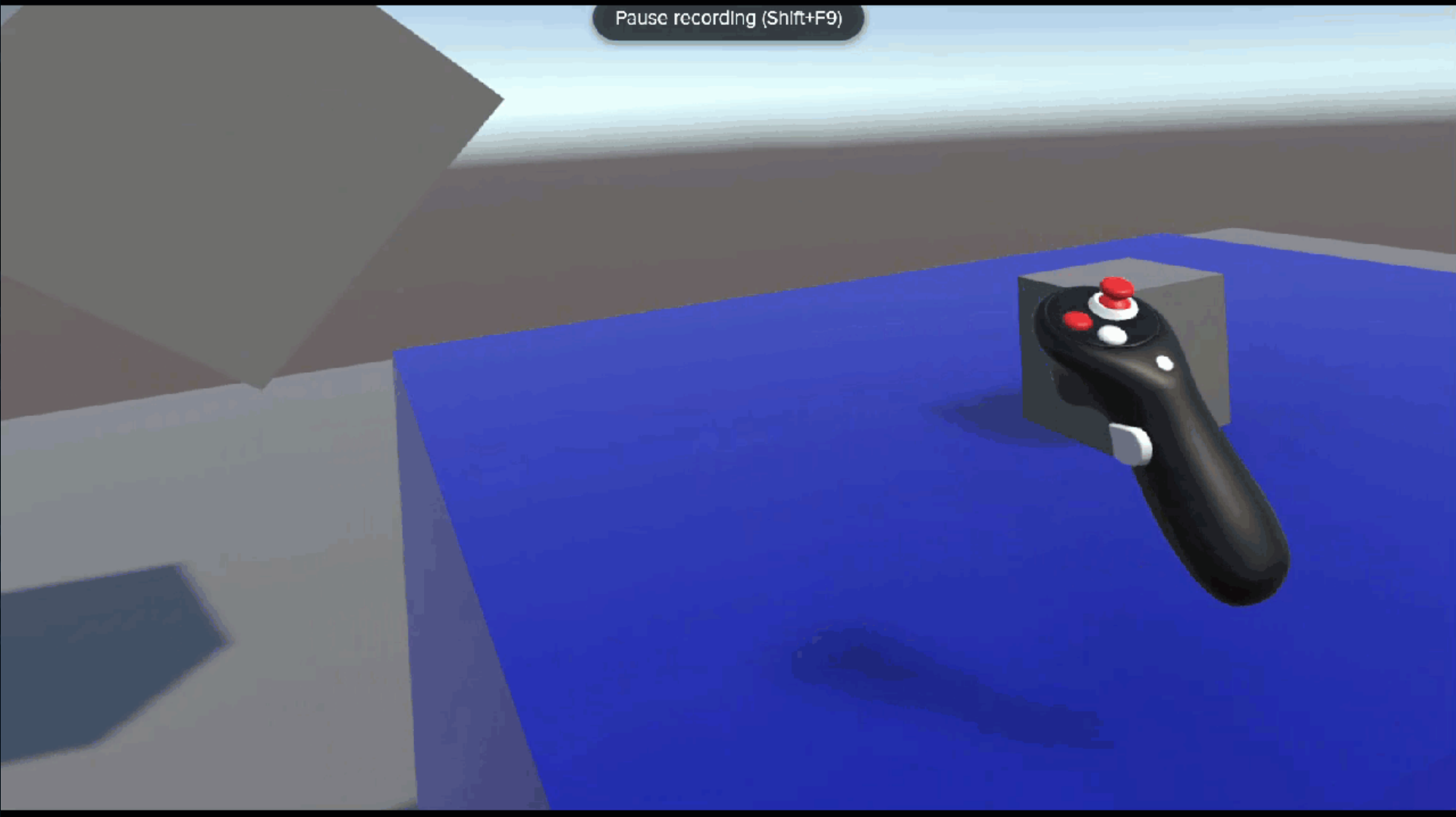
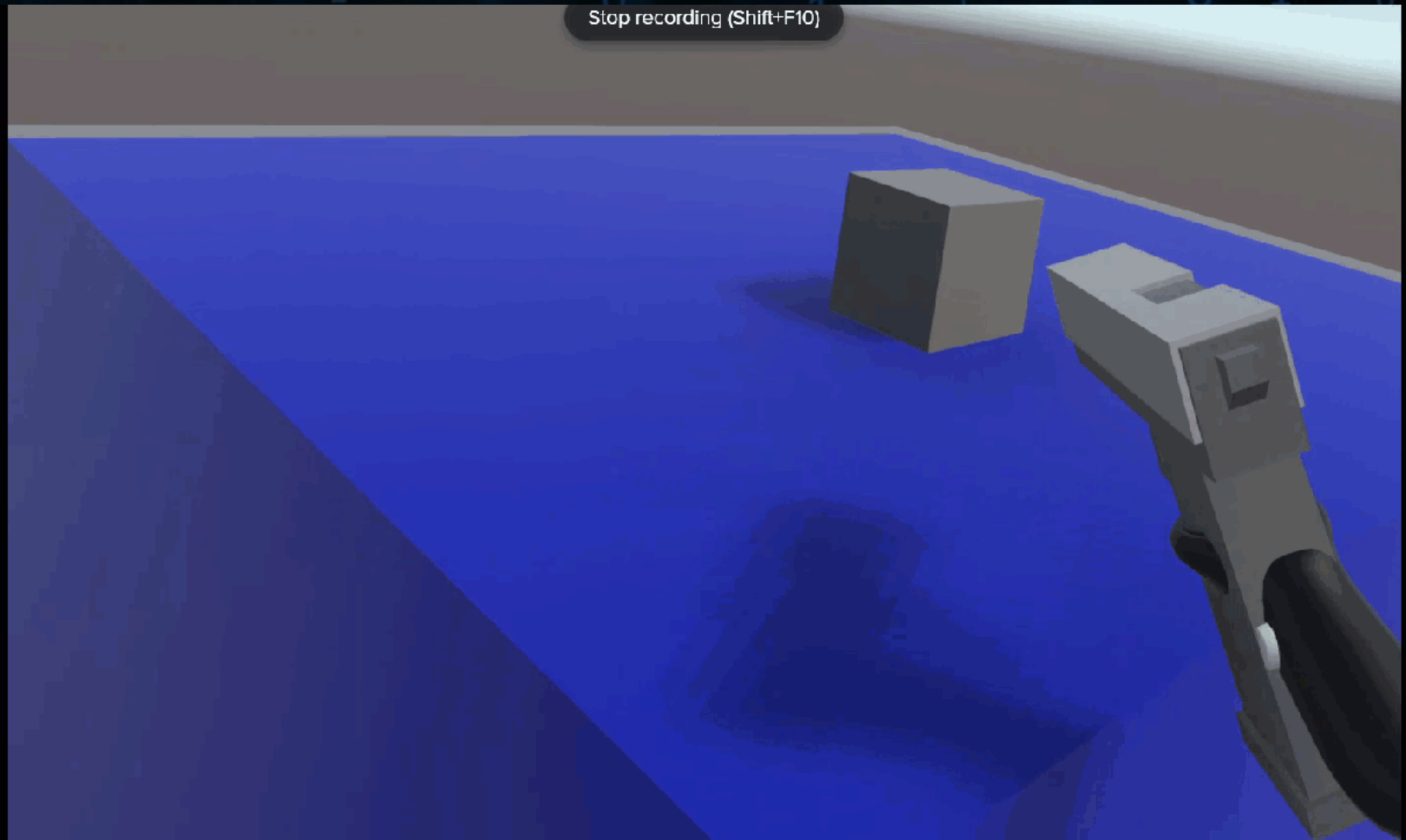
META QUEST: XR WORKSHOP! BONUS CONTENT

XR WORKSHOP:
Grab, Tractor Beam and Yeeting!

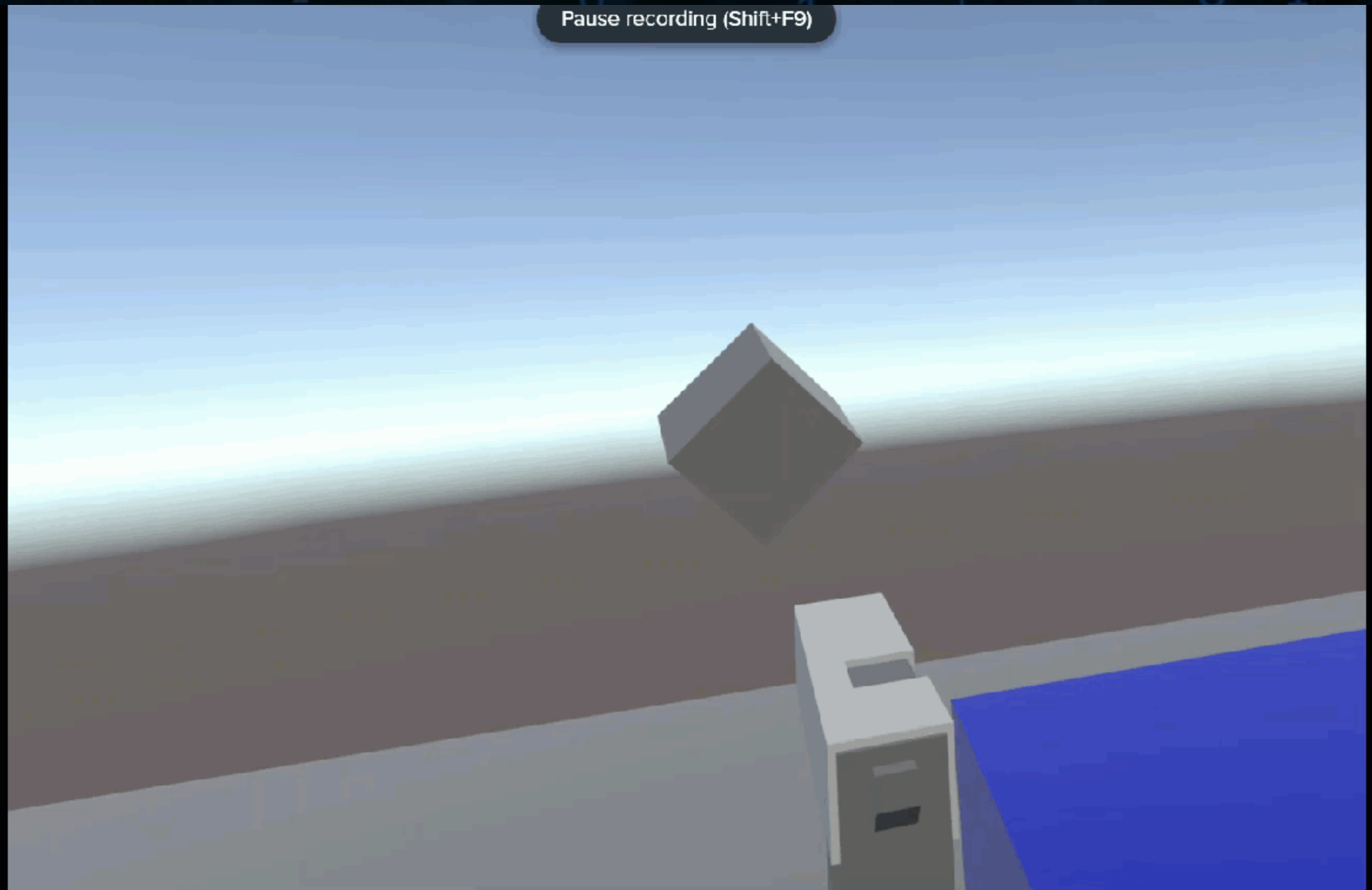


XR WORKSHOP:
Shooting a Pistol!

XR WORKSHOP:
Sound and Animations!



XR WORKSHOP:
Targets and Explosions!



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QUESTIONS?