Developing a 2D Game in Unity Utilizing the Photon Unity Network for Multiplayer Capabilities

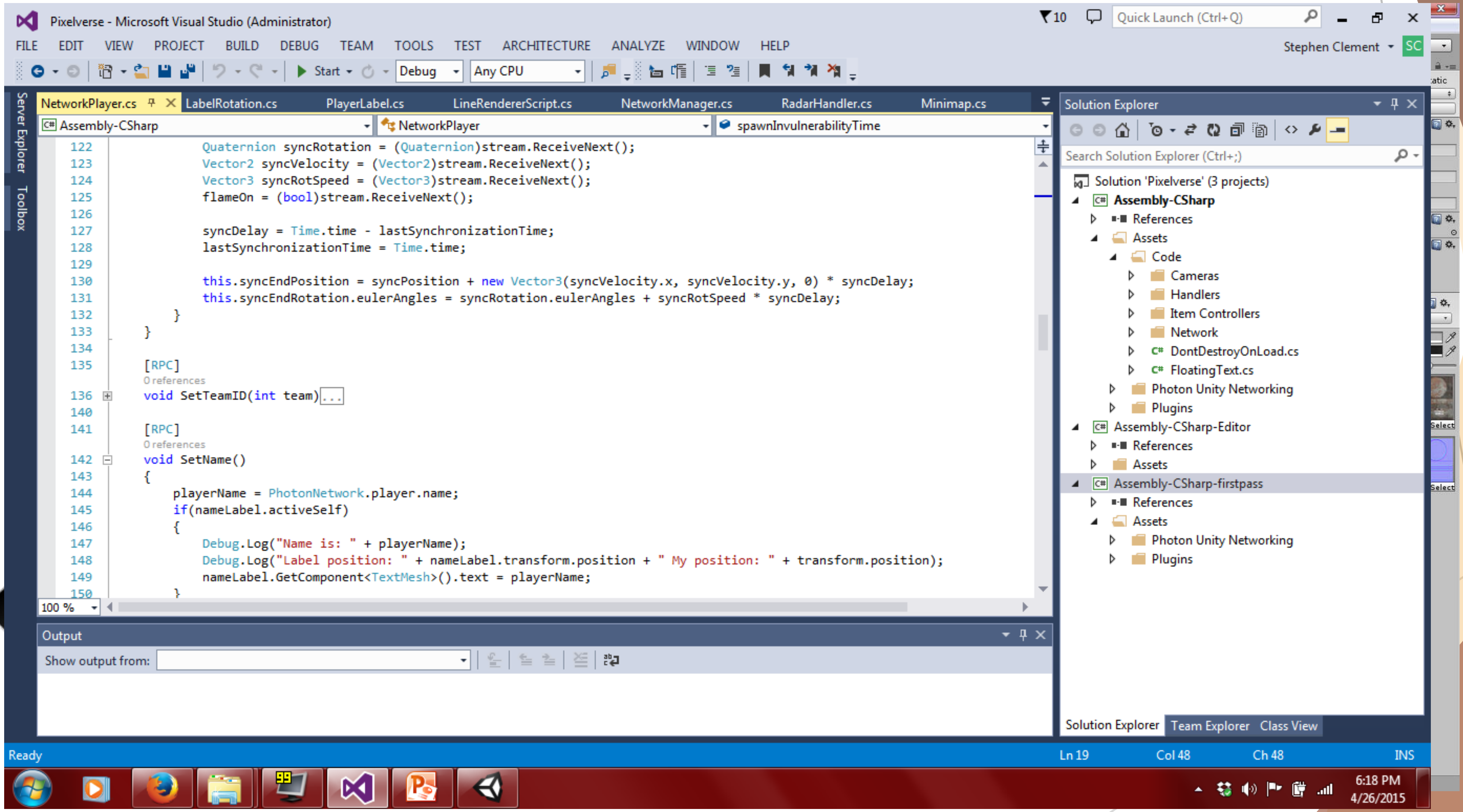
Presenter: Stephen Clement

Faculty Advisor: Dr. Jim Kirk

Pre-Credit

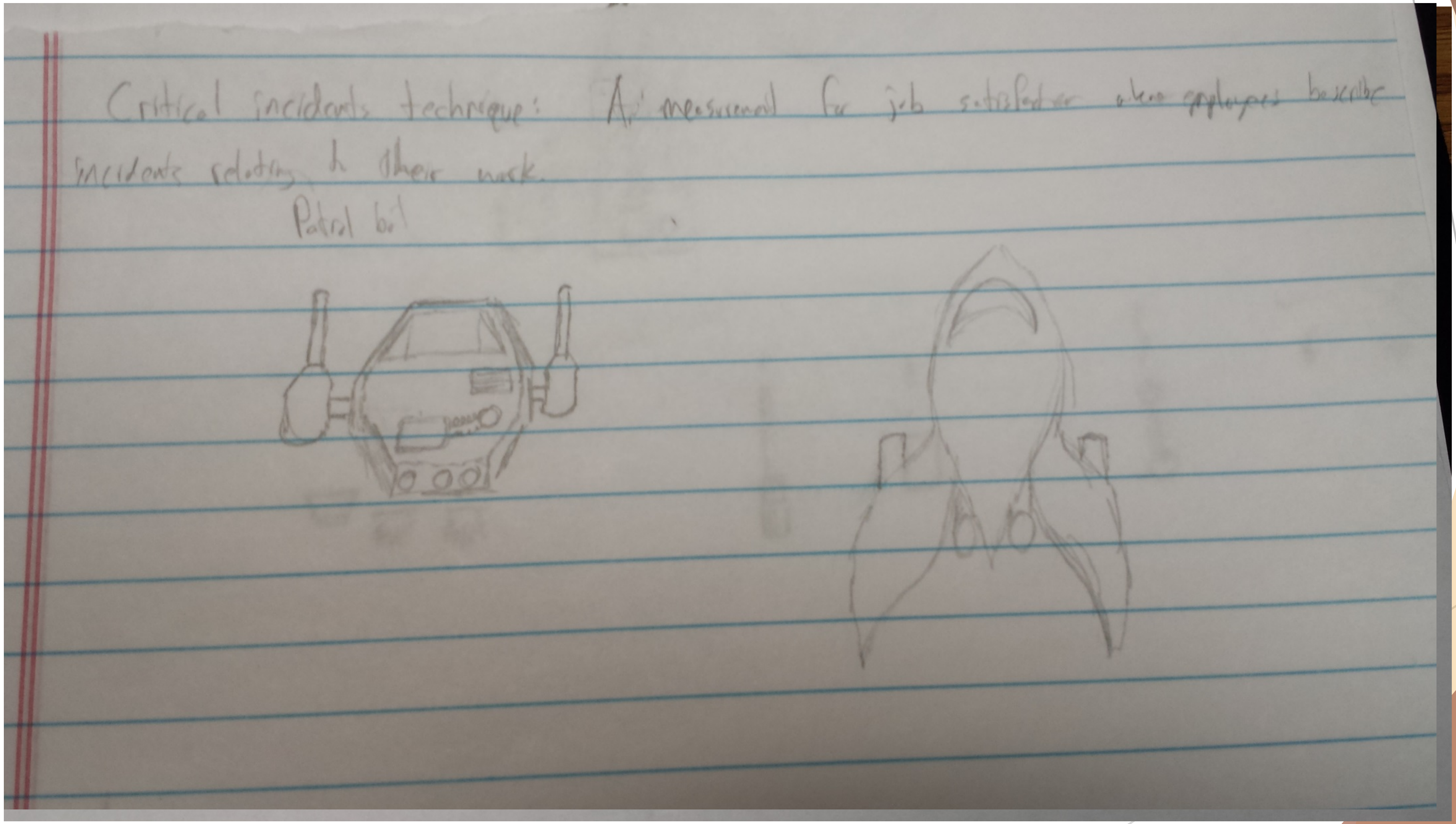
- Resolve, Creativity and Strength
  - God
- Motivational Verse: Colossions 3:23
  - Whatever you do, work at it with all your heart, as working for the Lord, not for human masters,

What is Unity?



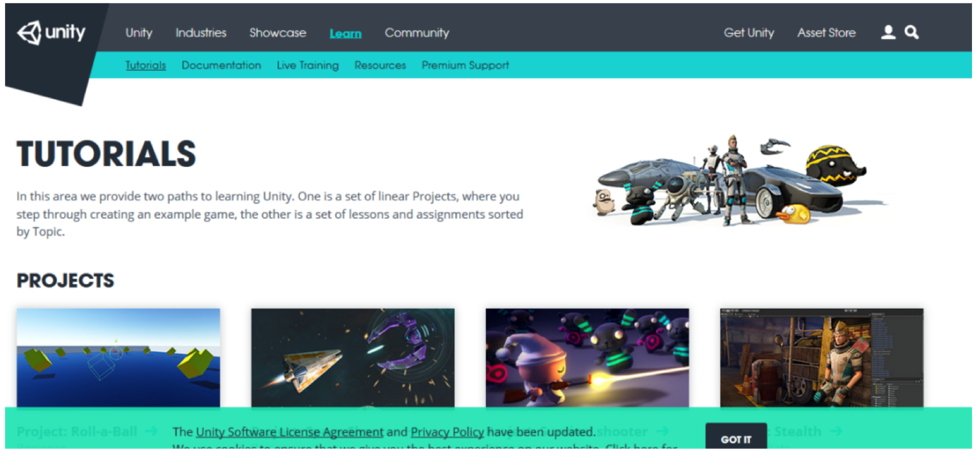
```
            Quaternion syncRotation = (Quaternion)stream.ReceiveNext();
            Vector2 syncVelocity = (Vector2)stream.ReceiveNext();
            Vector3 syncRotSpeed = (Vector3)stream.ReceiveNext();
            flameOn = (bool)stream.ReceiveNext();

            syncDelay = Time.time - lastSynchronizationTime;
            lastSynchronizationTime = Time.time;

            this.syncEndPosition = syncPosition + new Vector3(syncVelocity.x, syncVelocity.y, 0) * syncDelay;
            this.syncEndRotation.eulerAngles = syncRotation.eulerAngles + syncRotSpeed * syncDelay;
        }
    }

    [RPC]
    0 references
    void SetTeamID(int team)...

    [RPC]
    0 references
    void SetName()
    {
        playerName = PhotonNetwork.player.name;
        if(nameLabel.activeSelf)
        {
            Debug.Log("Name is: " + playerName);
            Debug.Log("Label position: " + nameLabel.transform.position + " My position: " + transform.position);
            nameLabel.GetComponent<TextMesh>().text = playerName;
        }
```

Development Process - Art



Critical incidents technique: A measurement for job satisfaction where employees describe incidents relating to their work.

Developing - Lots of tutorial videos



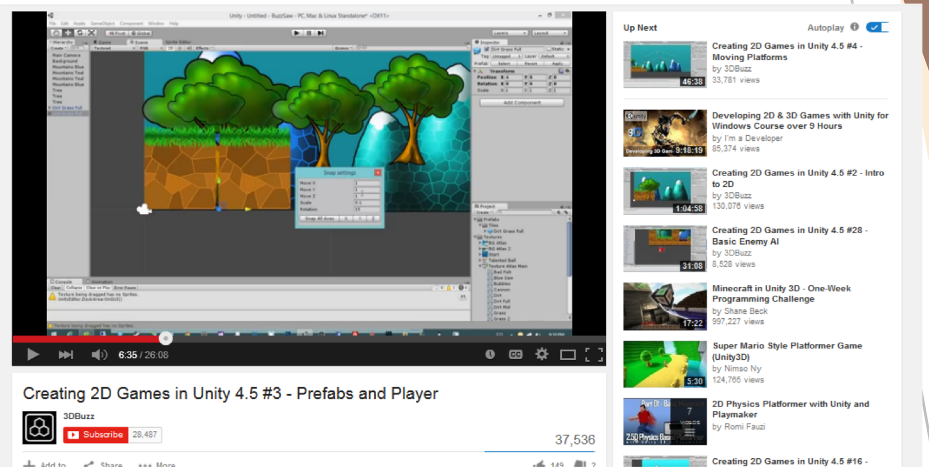
TUTORIALS

In this area we provide two paths to learning Unity. One is a set of linear Projects, where you step through creating an example game, the other is a set of lessons and assignments sorted by Topic.

PROJECTS

The Unity Software License Agreement and Privacy Policy have been updated.

Unity 5 Tutorials



Creating 2D Games in Unity 4.5 #3 - Prefabs and Player

3DBuzz

37,536

Creating 2D Games in Unity 4.5 #4 - Moving Platforms
by 3DBuzz
33,781 views
46:38

Developing 2D & 3D Games with Unity for Windows Course over 9 Hours
by I'm a Developer
85,374 views
9:18:19

Creating 2D Games in Unity 4.5 #2 - Intro to 2D
by 3DBuzz
130,076 views
1:04:58

Creating 2D Games in Unity 4.5 #28 - Basic Enemy AI
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Minecraft in Unity 3D - One-Week Programming Challenge
by Shane Beck
997,227 views
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Super Mario Style Platformer Game (Unity3D)
by Nimso Ny
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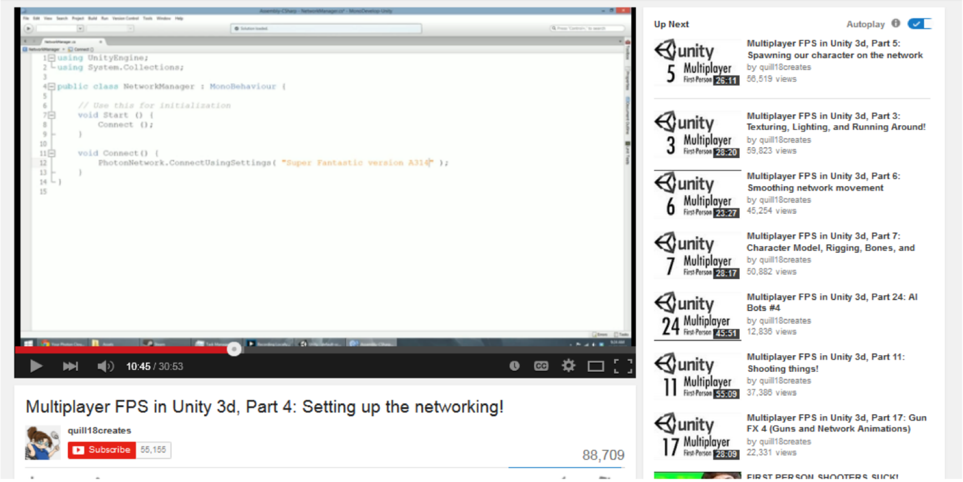
2D Physics Platformer with Unity and Playmaker
by Romi Fauzi

Creating 2D Games in Unity 4.5 #16 -

3DBuzz Tutorials



```
using UnityEngine;
using System.Collections;

public class NetworkManager : MonoBehaviour {

	// Use this for initialization
	void Start () {
		Connect ();
	}

	void Connect() {
		PhotonNetwork.ConnectUsingSettings( "Super Fantastic version A314" );
	}
}
```

Multiplayer FPS in Unity 3d, Part 4: Setting up the networking!

quill18creates

88,709

Multiplayer FPS in Unity 3d, Part 5: Spawning our character on the network
by quill18creates
56,519 views
26:11

Multiplayer FPS in Unity 3d, Part 3: Texturing, Lighting, and Running Around!
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59,823 views
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Multiplayer FPS in Unity 3d, Part 6: Smoothing network movement
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45,254 views
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Multiplayer FPS in Unity 3d, Part 7: Character Model, Rigging, Bones, and
by quill18creates
50,882 views
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Multiplayer FPS in Unity 3d, Part 24: AI Bots #4
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Multiplayer FPS in Unity 3d, Part 11: Shooting things!
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37,386 views
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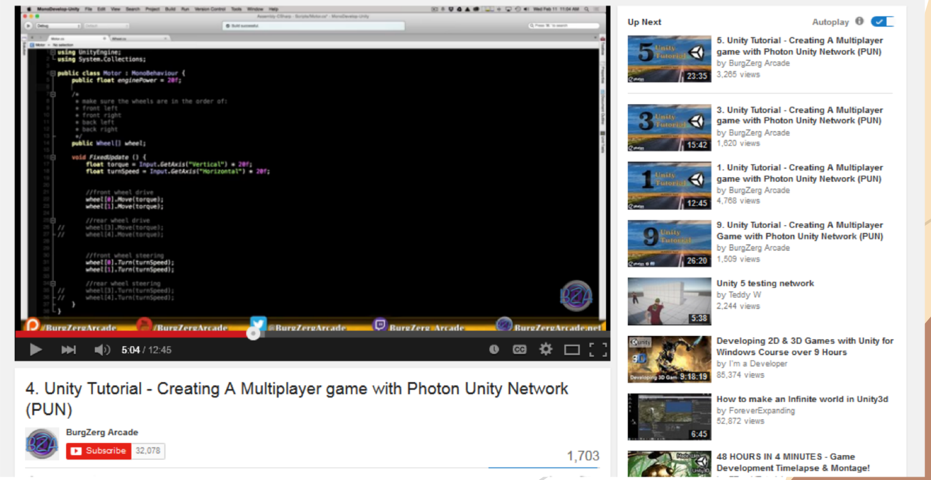
Multiplayer FPS in Unity 3d, Part 17: Gun FX 4 (Guns and Network Animations)
by quill18creates
22,331 views
28:09

FIRST PERSON SHOOTERS SUCK!

Quill18creates Tutorials



```
using UnityEngine;
using System.Collections;

public class Motor : MonoBehaviour {
	public float enginePower = 20f;

	/*
	 * make sure the wheels are in the order of:
	 * front left
	 * front right
	 * back left
	 * back right
	 */
	public Wheel[] wheel;

	void FixedUpdate () {
		float torque = Input.GetAxis("Vertical") * 20f;
		float turnSpeed = Input.GetAxis("Horizontal") * 20f;


		//front wheel drive
		wheel[0].Move(torque);
		wheel[1].Move(torque);

		//rear wheel drive
//		wheel[3].Move(torque);
//		wheel[4].Move(torque);


		//front wheel steering
		wheel[0].Turn(turnSpeed);
		wheel[1].Turn(turnSpeed);

		//rear wheel steering
//		wheel[3].Turn(turnSpeed);
//		wheel[4].Turn(turnSpeed);
	}
}
```

4. Unity Tutorial - Creating A Multiplayer game with Photon Unity Network (PUN)

BurgZerg Arcade

1,703

5. Unity Tutorial - Creating A Multiplayer game with Photon Unity Network (PUN)
by BurgZerg Arcade
3,265 views
23:35

3. Unity Tutorial - Creating A Multiplayer game with Photon Unity Network (PUN)
by BurgZerg Arcade
1,620 views
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1. Unity Tutorial - Creating A Multiplayer game with Photon Unity Network (PUN)
by BurgZerg Arcade
4,768 views
12:45

9. Unity Tutorial - Creating A Multiplayer Game with Photon Unity Network (PUN)
by BurgZerg Arcade
1,509 views
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Unity 5 testing network
by Teddy W
2,244 views
5:38

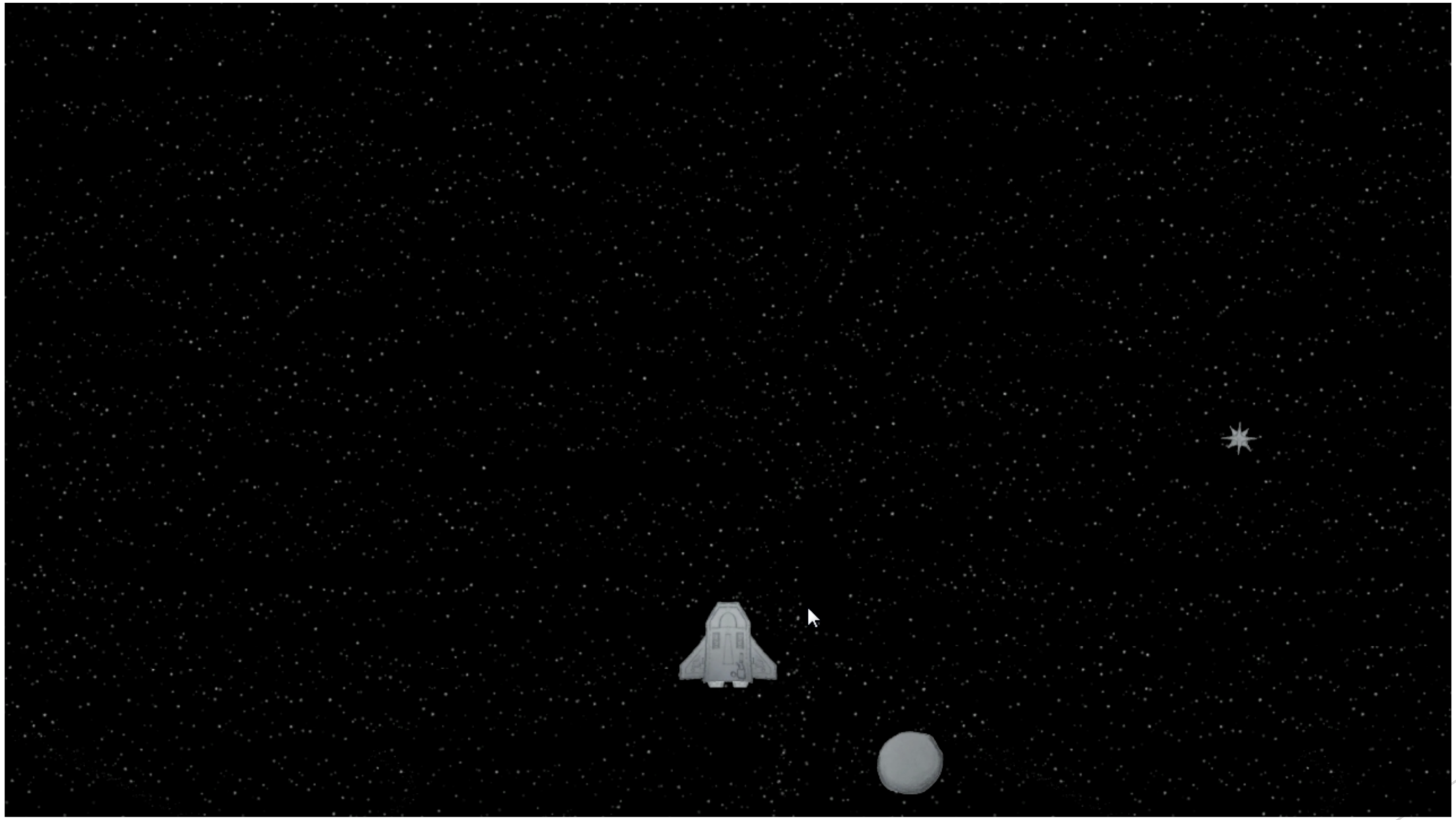
Developing 2D & 3D Games with Unity for Windows Course over 9 Hours
by I'm a Developer
85,374 views
9:18:19

How to make an Infinite world in Unity3d
by ForeverExpanding
52,872 views
6:45

48 HOURS IN 4 MINUTES - Game Development Timelapse & Montage!

BergZergArcade Tutorials

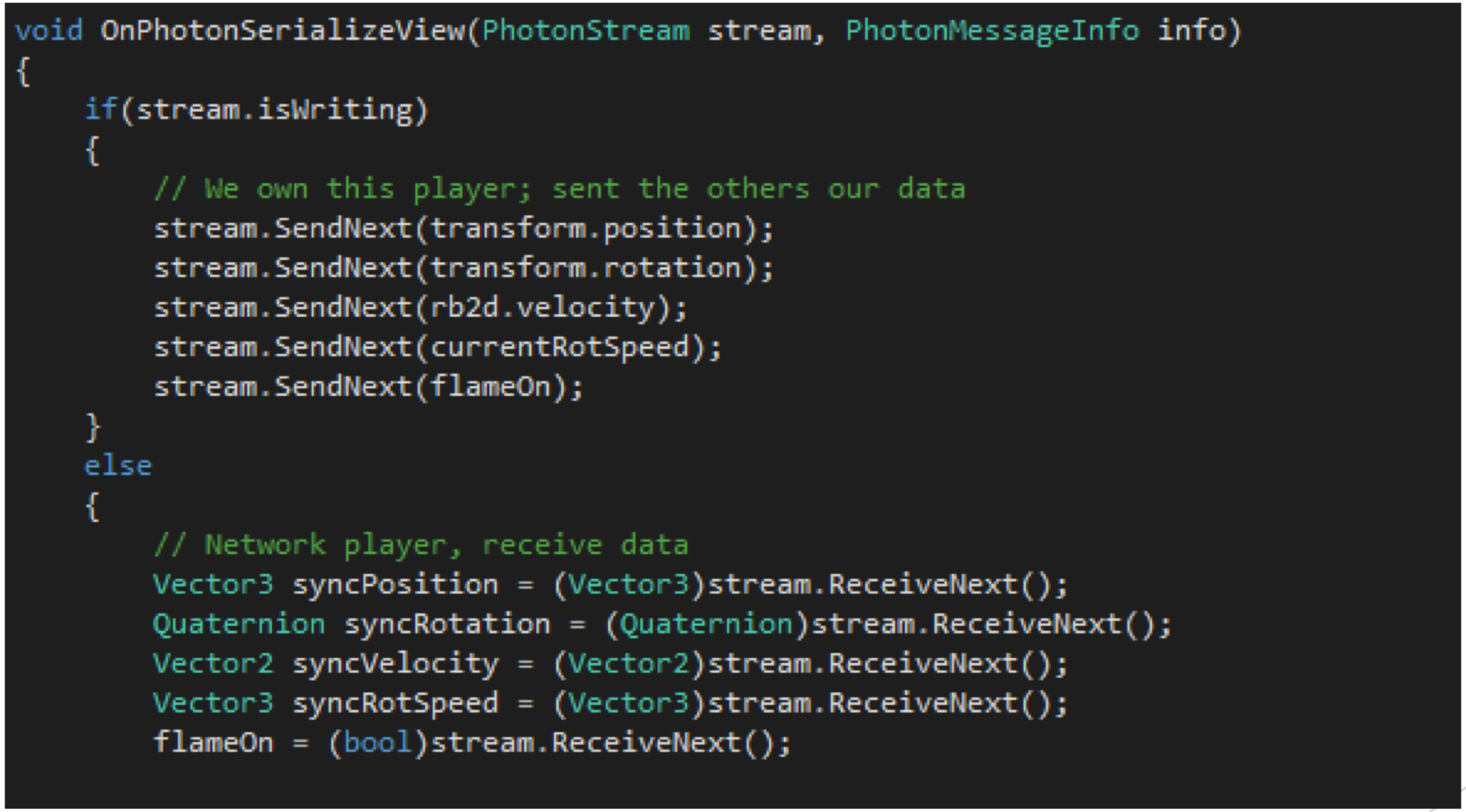
Developing - Start With The Basics



Networking – Challenges

- Sending data
- Control
- Smoothing movements & movement prediction
- Remote procedure calls

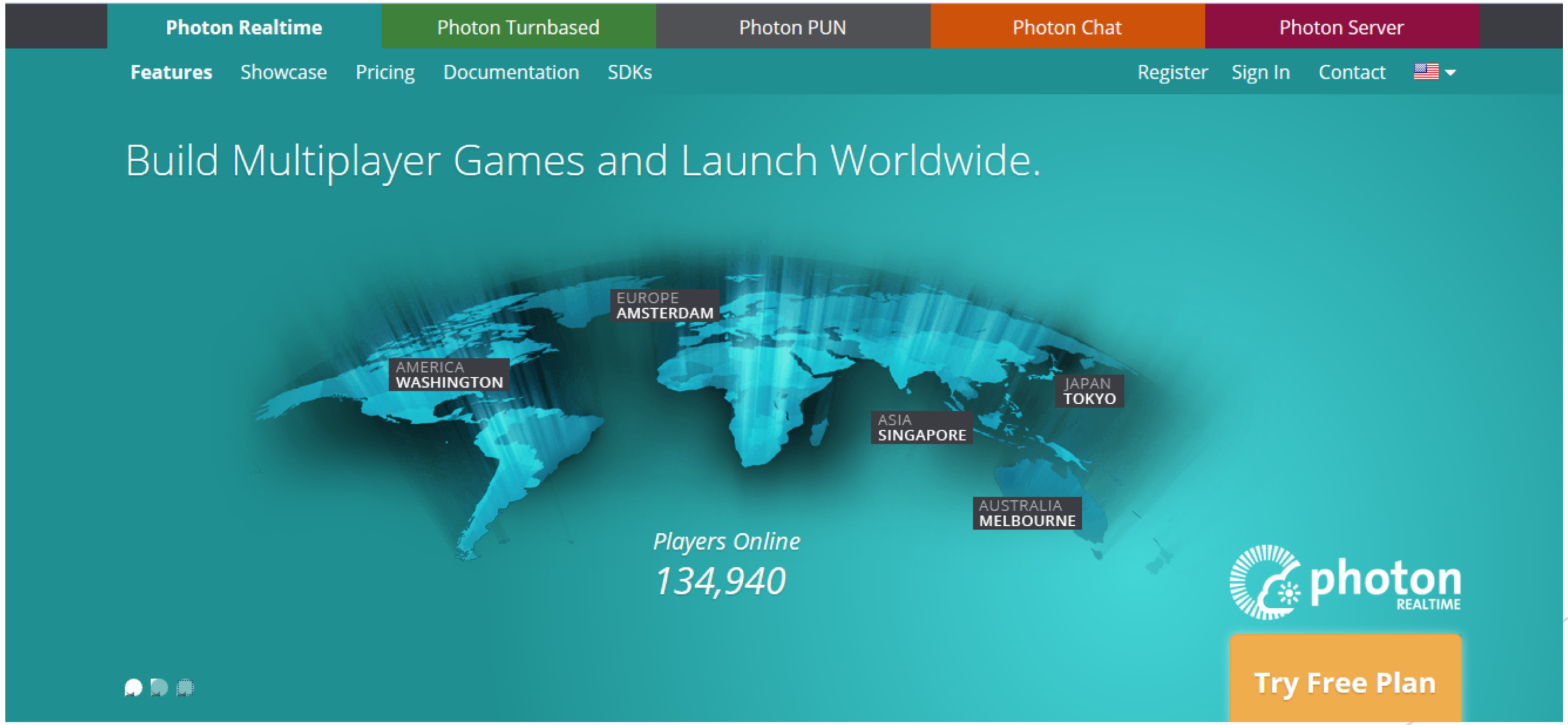
Developing - Setup Basic Networking Capabilities (Challenge: Sending Data)



```
void OnPhotonSerializeView(PhotonStream stream, PhotonMessageInfo info)
{
    if(stream.isWriting)
    {
        // We own this player; sent the others our data
        stream.SendNext(transform.position);
        stream.SendNext(transform.rotation);
        stream.SendNext(rb2d.velocity);
        stream.SendNext(currentRotSpeed);
        stream.SendNext(flameOn);
    }
    else
    {
        // Network player, receive data
        Vector3 syncPosition = (Vector3)stream.ReceiveNext();
        Quaternion syncRotation = (Quaternion)stream.ReceiveNext();
        Vector2 syncVelocity = (Vector2)stream.ReceiveNext();
        Vector3 syncRotSpeed = (Vector3)stream.ReceiveNext();
        flameOn = (bool)stream.ReceiveNext();
```

Developing - Setup Basic Networking Capabilities

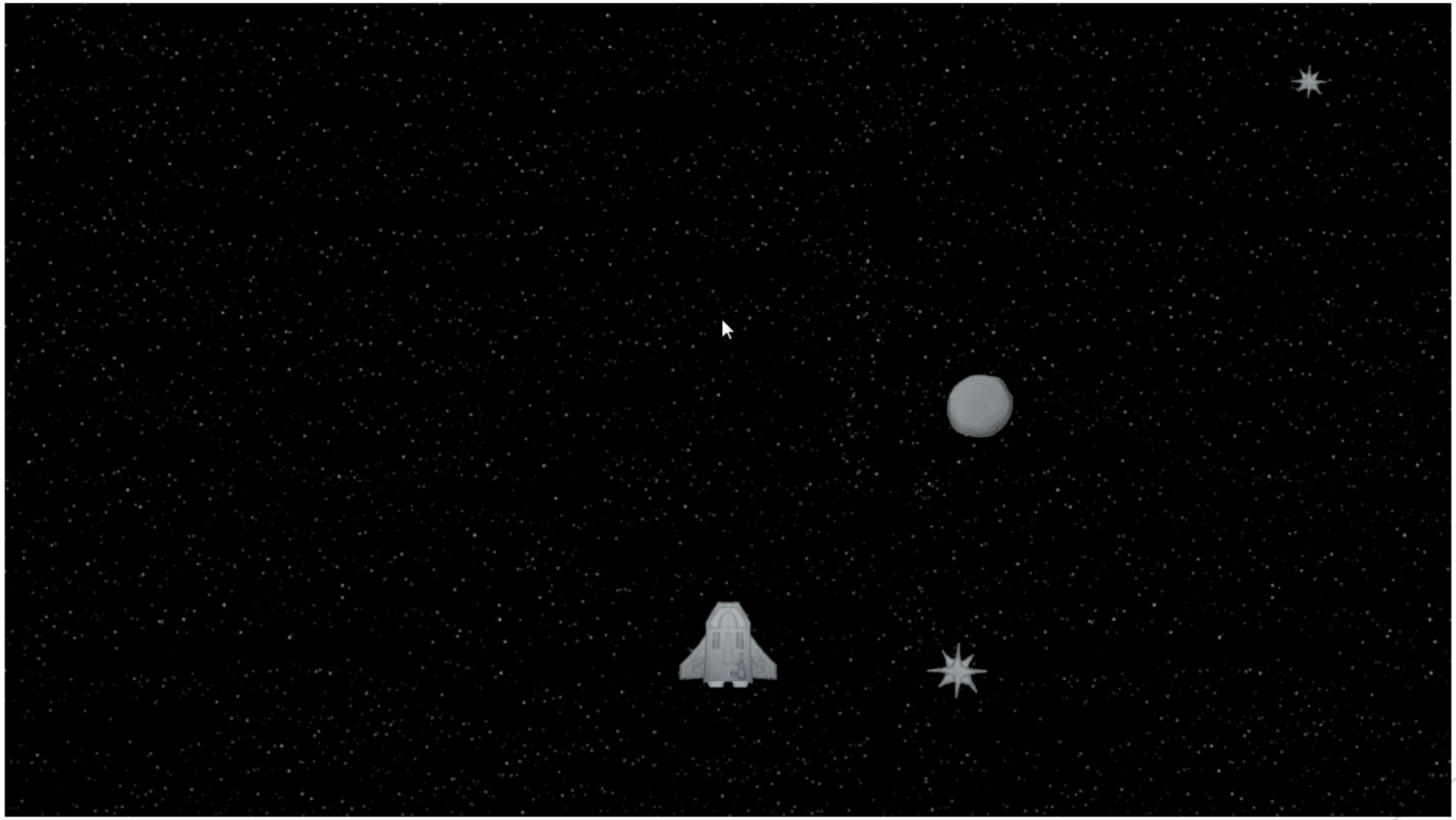
- Photon Unity Network
- Free Online Server With 20 Concurrent Users



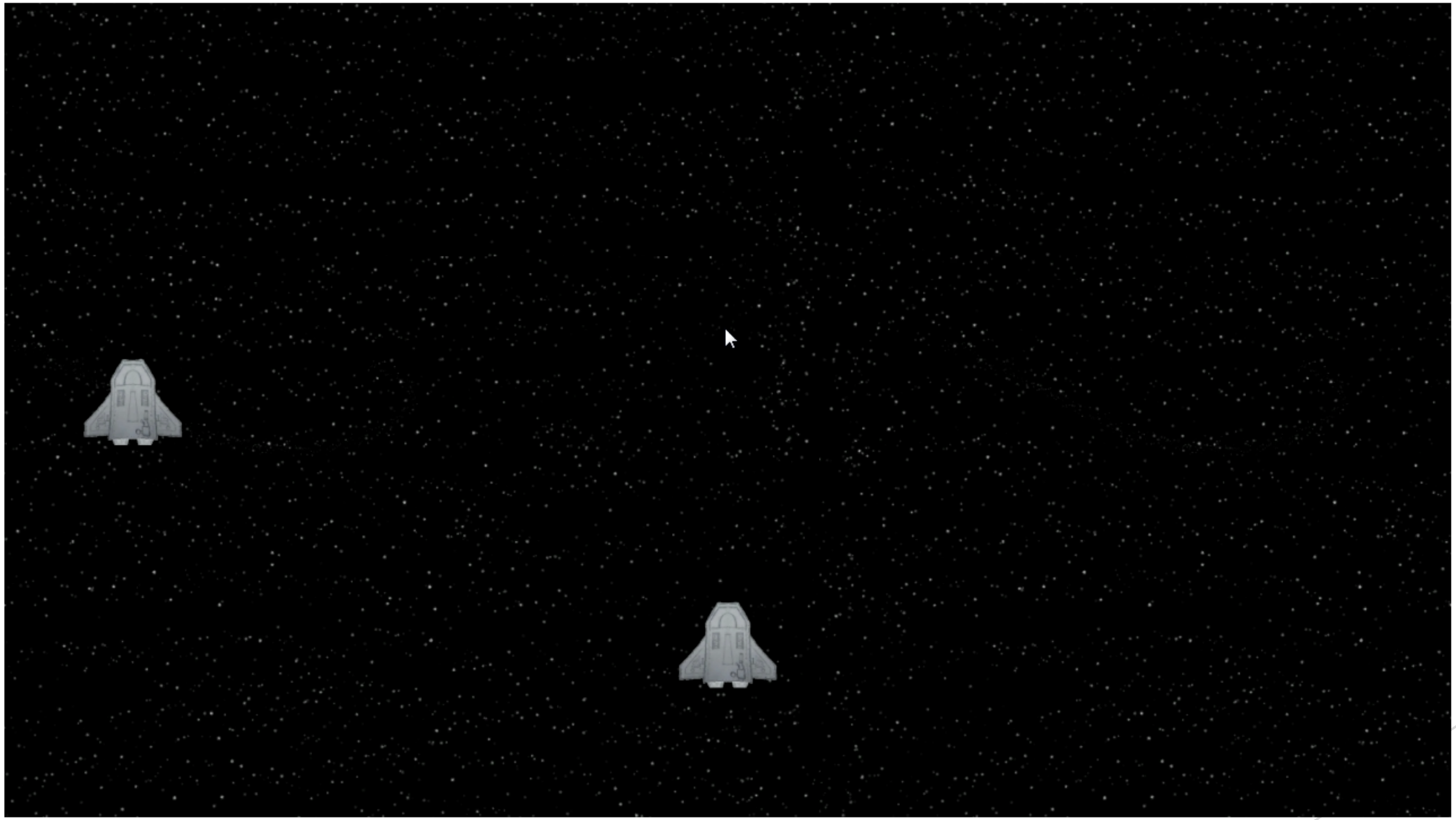
Build Multiplayer Games and Launch Worldwide.

Players Online
134,940

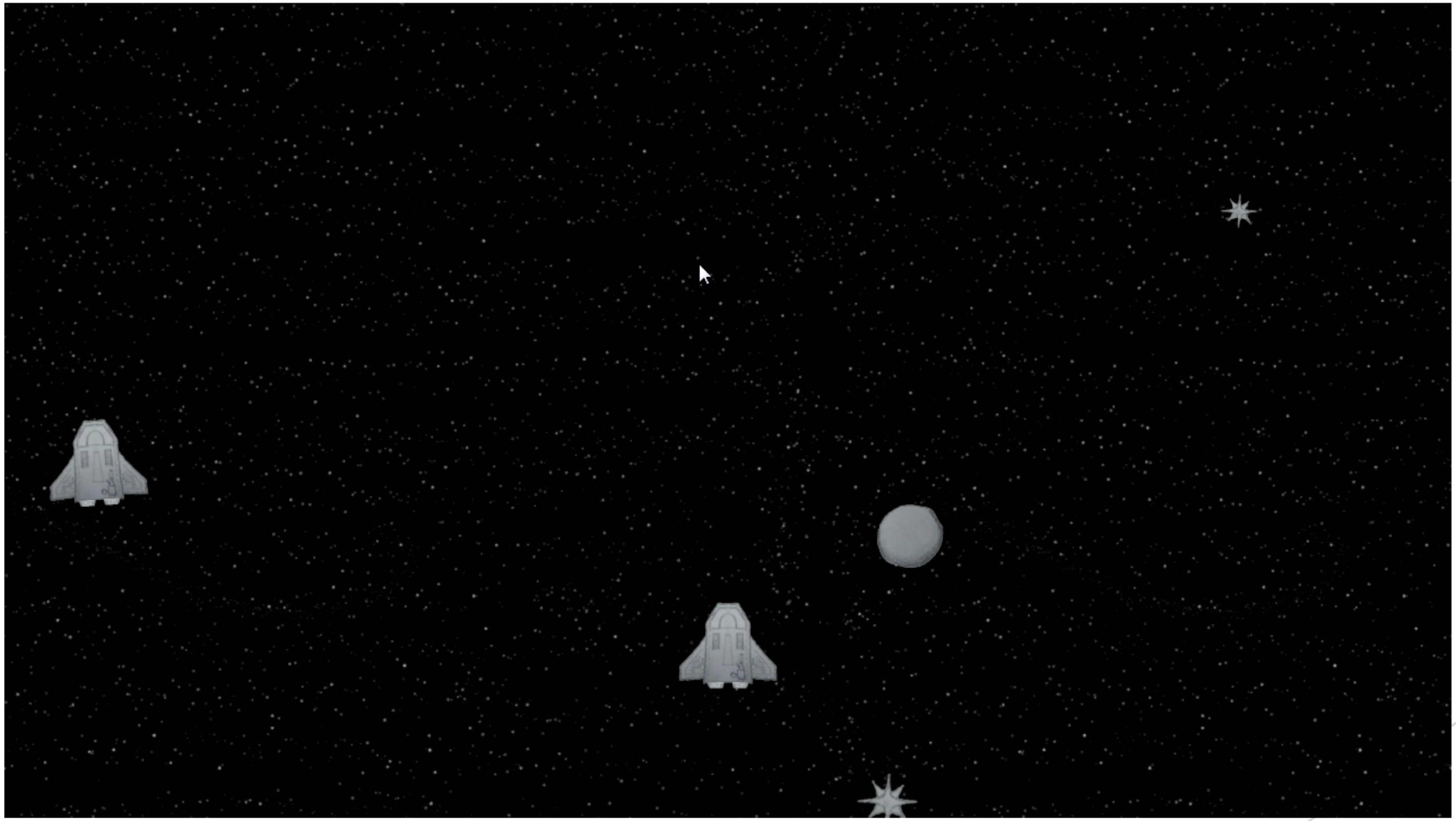
Developing - Setup Basic Networking Capabilities (Challenge: Control)



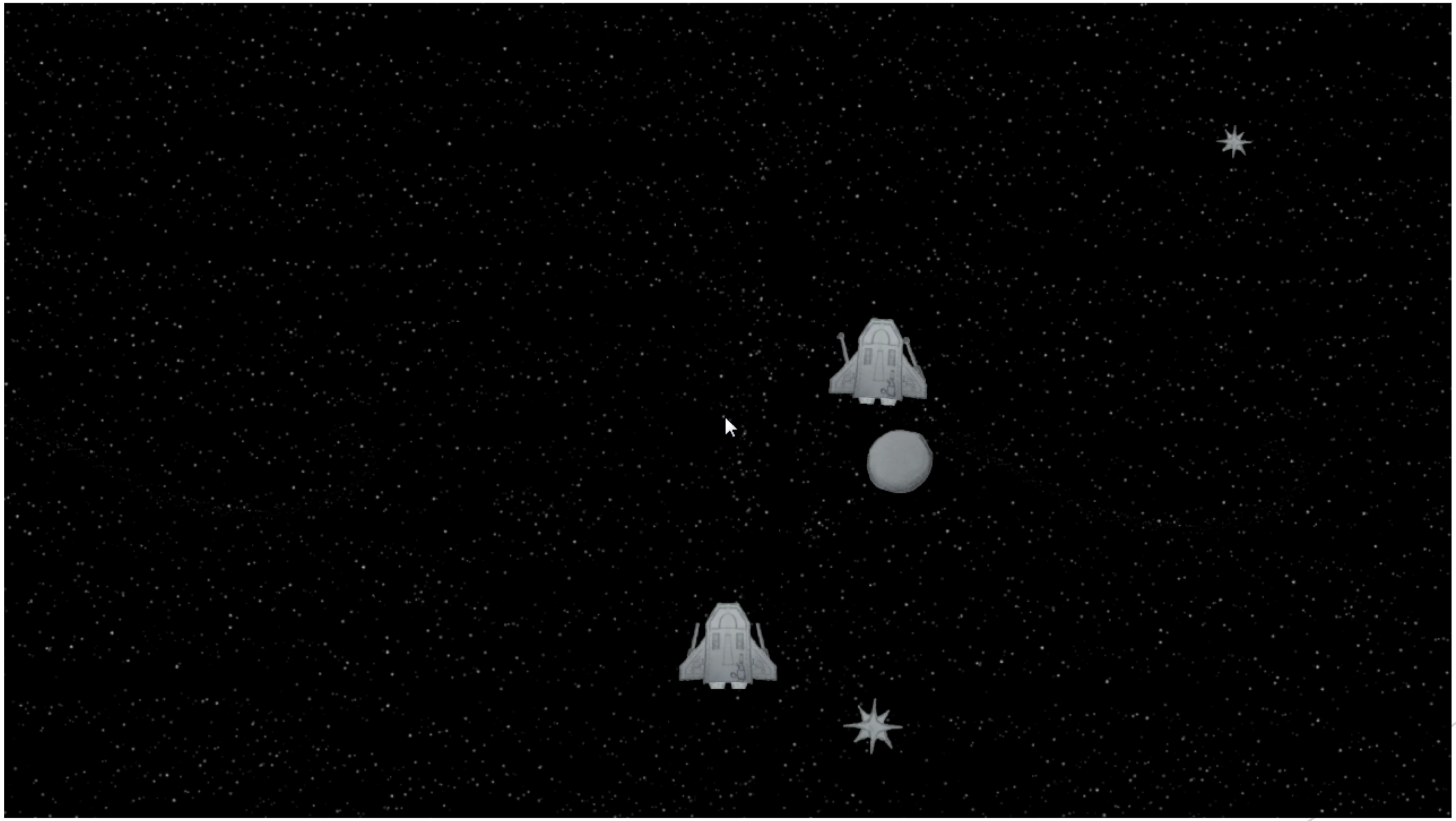
Developing - Advancing Gameplay and Networking (Challenge: Smoothing Movements)



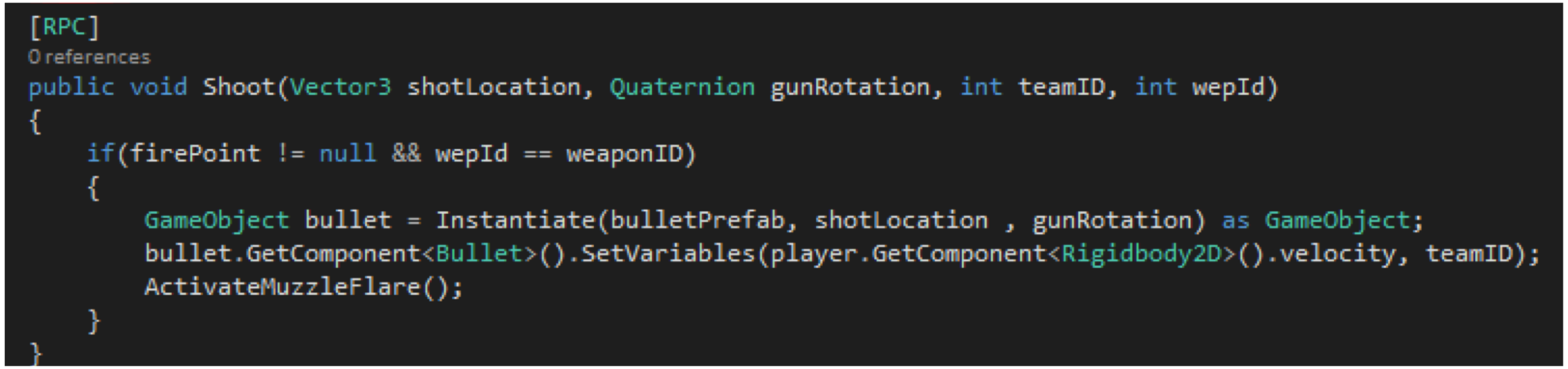
Developing – Advancing Gameplay and Networking (Challenge: Smoothing Movements)



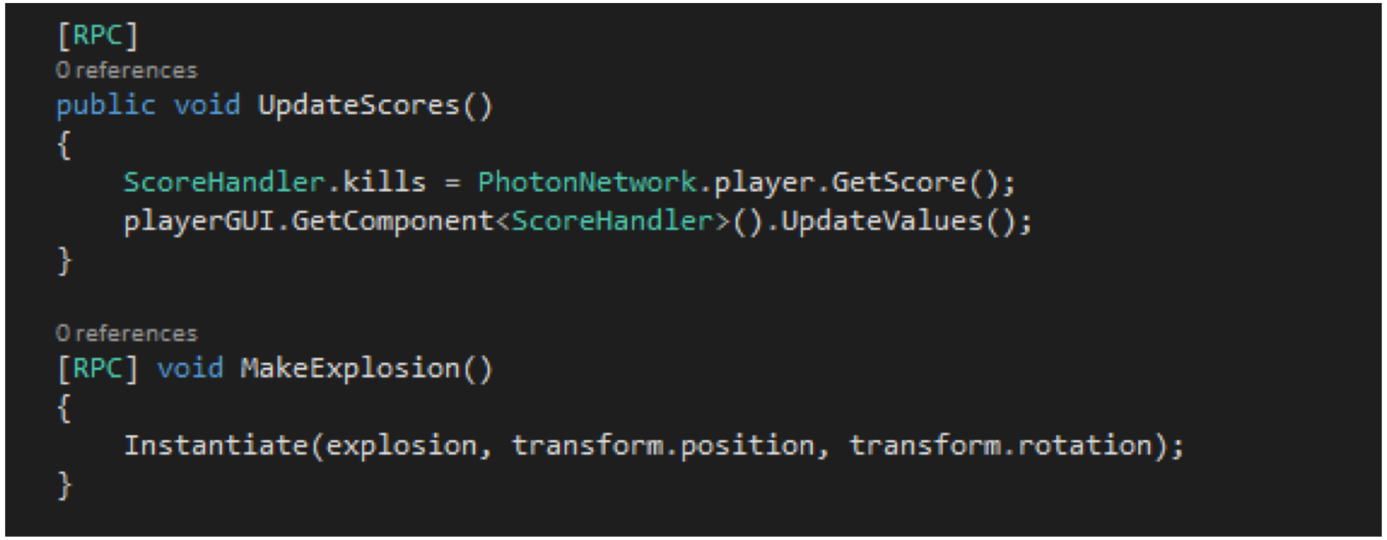
Developing - Advancing Gameplay and Networking (Challenge: Remote Procedure Calls)



Developing - Advancing Gameplay and Networking (Challenge: Remote Procedure Calls)



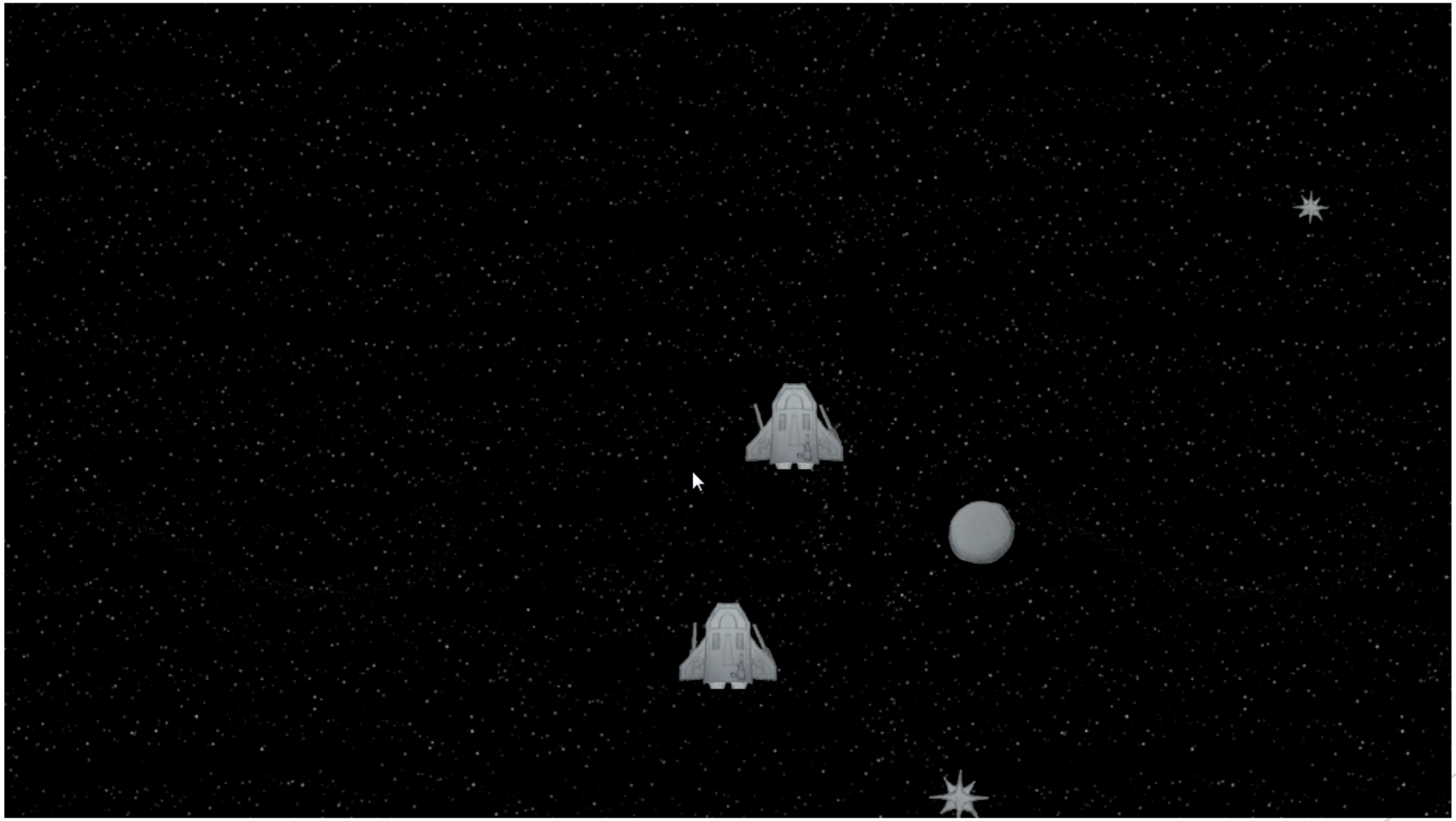
```
[RPC]
0 references
public void Shoot(Vector3 shotLocation, Quaternion gunRotation, int teamID, int wepId)
{
    if(firePoint != null && wepId == weaponID)
    {
        GameObject bullet = Instantiate(bulletPrefab, shotLocation , gunRotation) as GameObject;
        bullet.GetComponent<Bullet>().SetVariables(player.GetComponent<Rigidbody2D>().velocity, teamID);
        ActivateMuzzleFlare();
    }
}
```



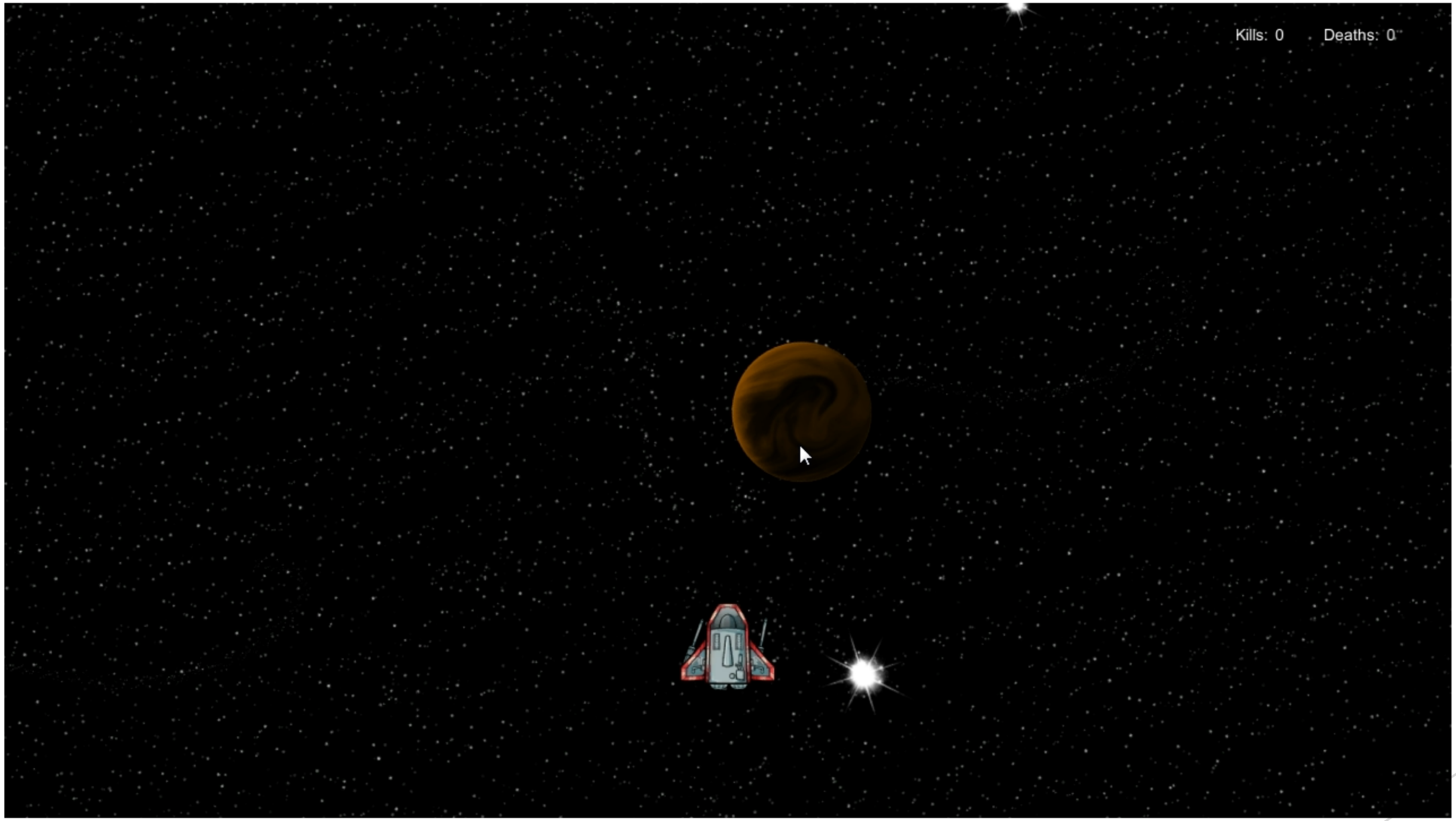
```
[RPC]
0 references
public void UpdateScores()
{
    ScoreHandler.kills = PhotonNetwork.player.GetScore();
    playerGUI.GetComponent<ScoreHandler>().UpdateValues();
}

0 references
[RPC] void MakeExplosion()
{
    Instantiate(explosion, transform.position, transform.rotation);
}
```

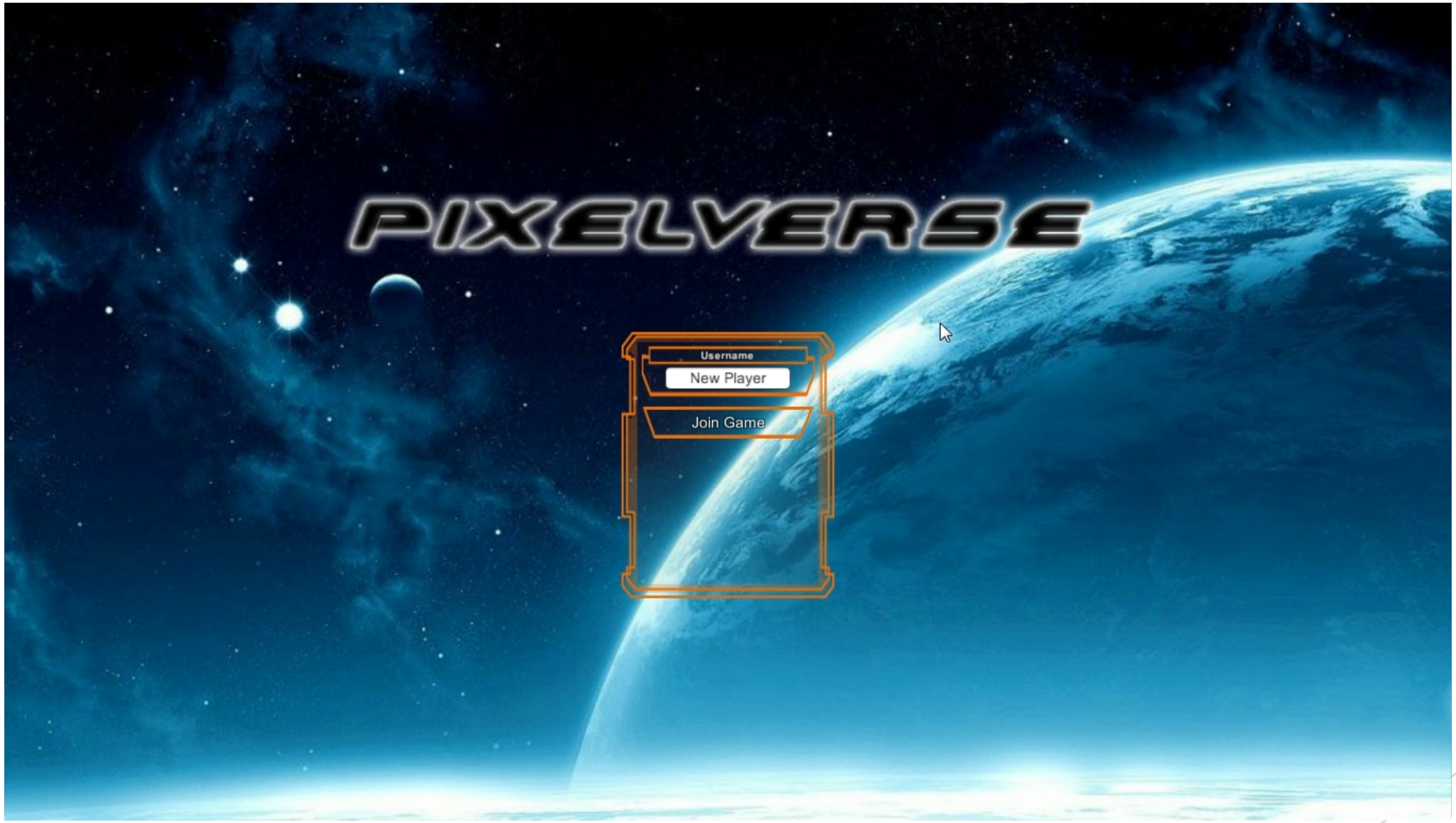
Pixelverse Evolution



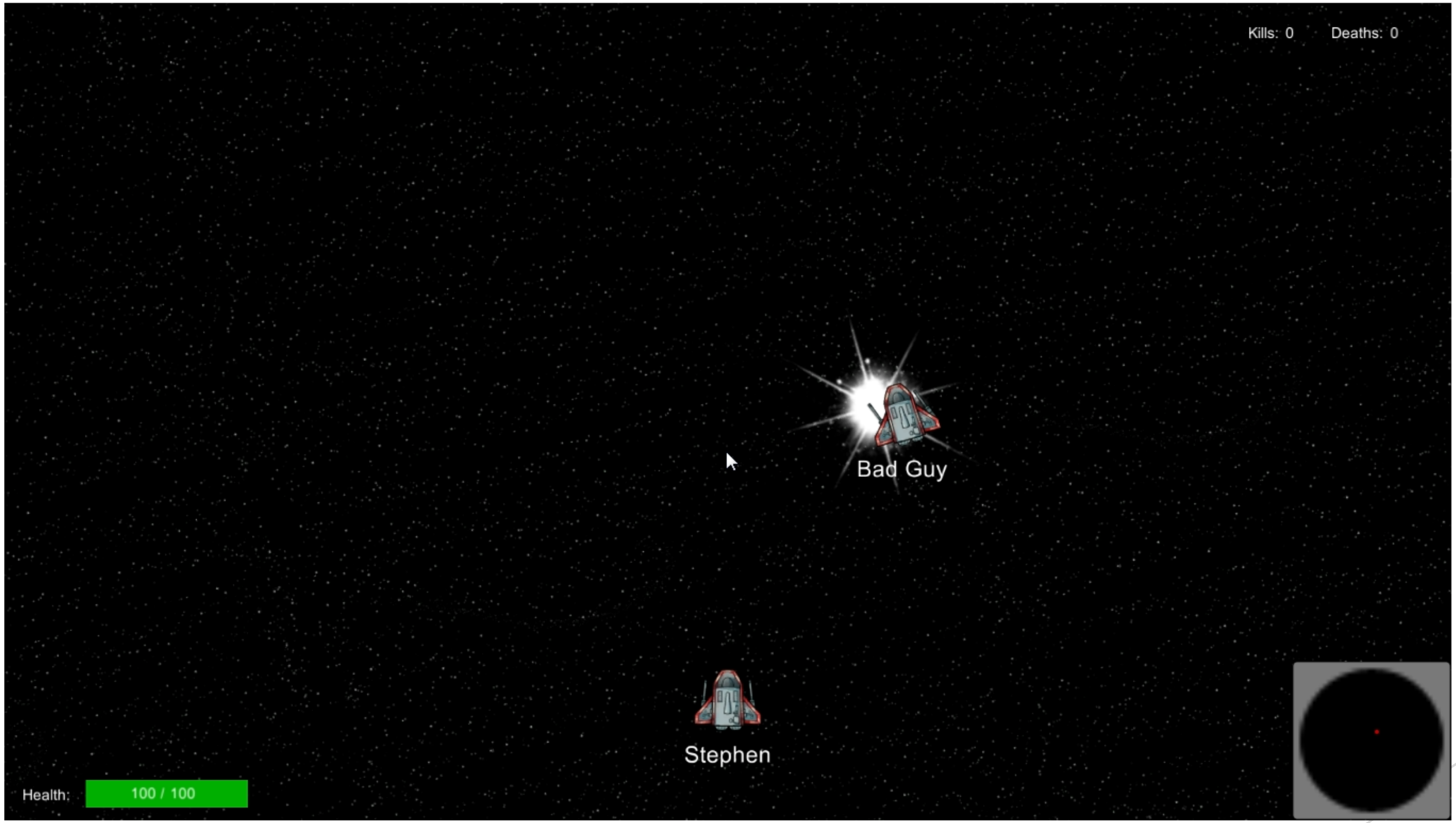
Pixelverse Evolution



Pixelverse Evolution



Pixelverse Evolution



Credits

- Art
  - Special Thanks To:
    - **Katie Little**
  - Stephen Clement
  - Google Images (Several Images)

Credits

- Tutorials
  - Unity Tutorials (http://unity3d.com/learn/tutorials/modules)
  - Exit Games Tutorials (http://doc.exitgames.com/en/pun/current/tutorials/photon-unity-and-networking-links)
  - Paladin Studios (http://www.paladinstudios.com/2014/05/08/how-to-create-an-online-multiplayer-game-with-photon-unity-networking/)
  - Quill18 (https://www.youtube.com/user/quill18)
  - 3DBuzz (https://www.youtube.com/user/3DBuzz)
  - BergZerg (https://www.youtube.com/user/BurgZergArcade)

Credits

- Play testers
  - Special Thanks To:
    - **Sam Mitchel, Zach Preston, Josiah Hubin and James Vo**
  - Sam Jeong, Cale Little, Katie Little and Joshua Stucky

Questions and Answers