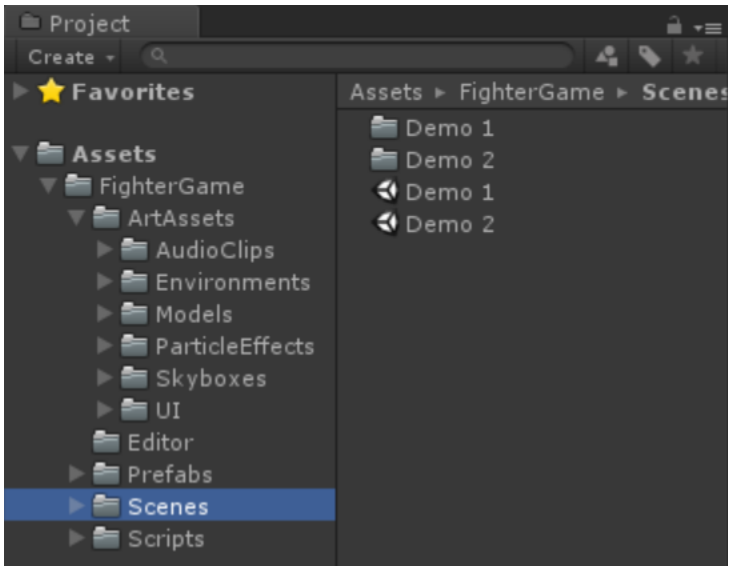
Fighter Weapon System Template

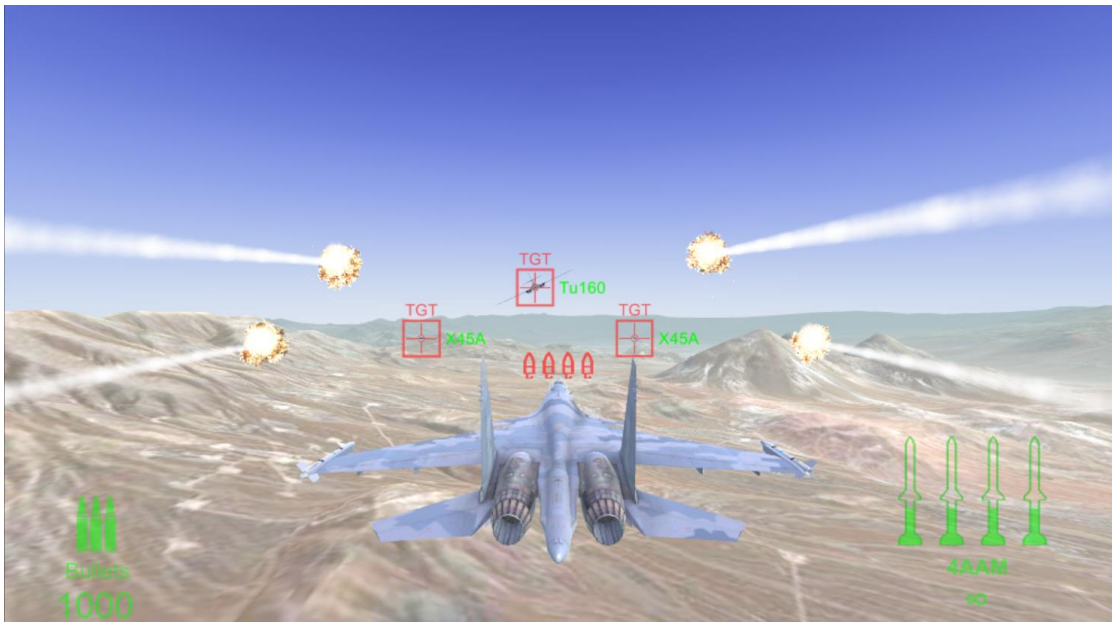
1. Synopsis

This Fighter Weapon System Template can allows you to create your own fighter game.

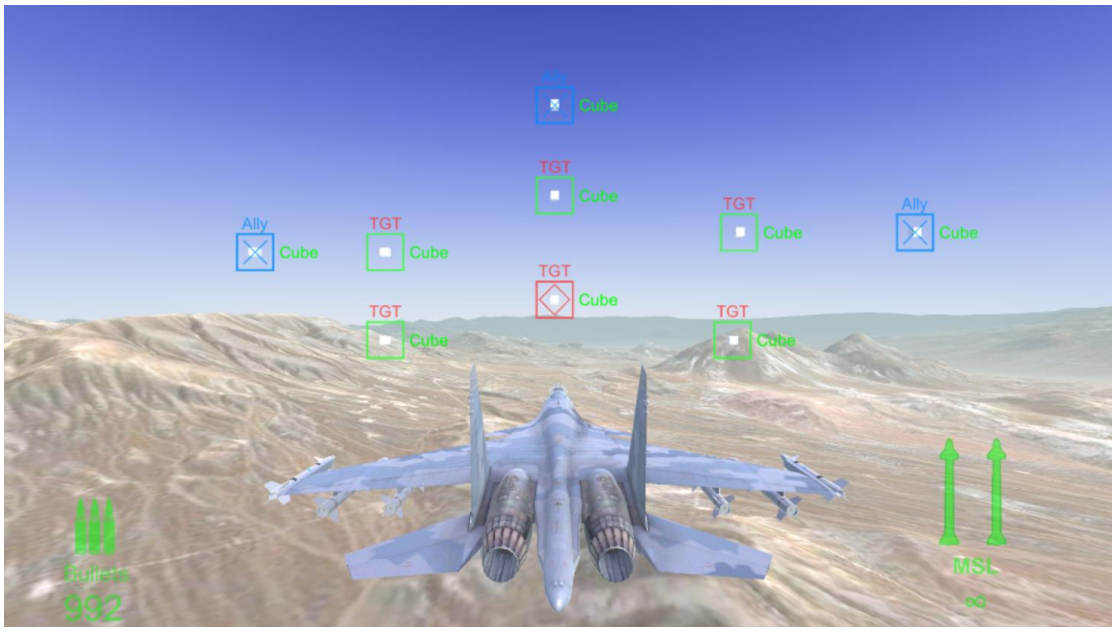
There are two demo scenes in this package:



In the scene named Demo 1, you can control the fighter to attack the six drones and a bomber in front of you.



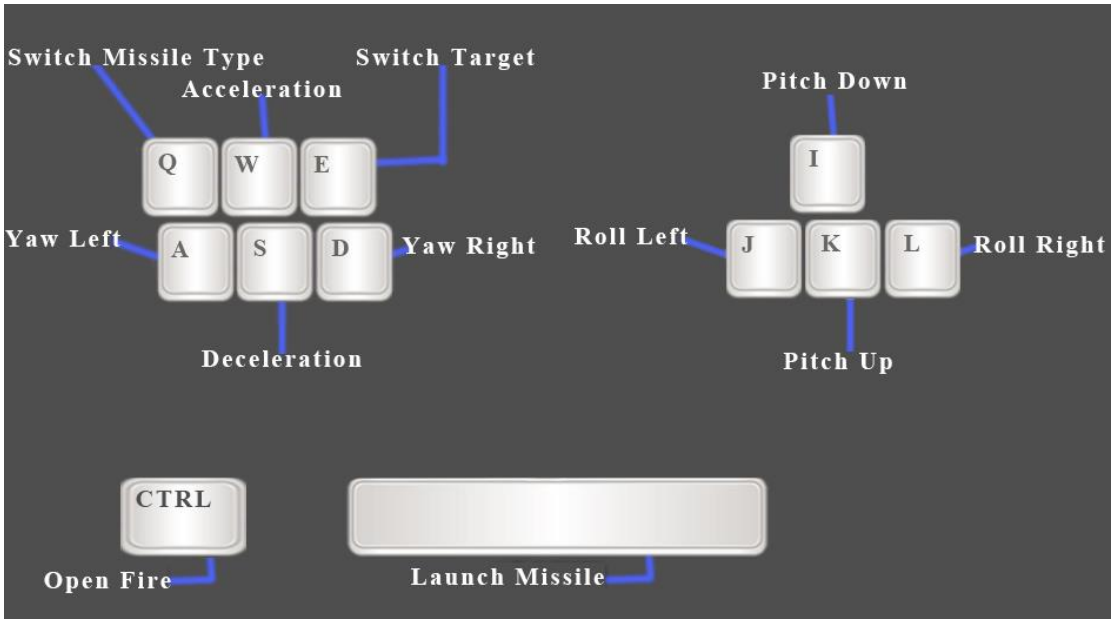
In the scene named Demo 2, you can control the fighter to test the machine gun system and the missile system.



These scenes have a big and beautiful environment, and the terrains of this environment are generated from the data of real world on Bing Map.

You can build your own fighter game based on either of these scenes.

2. Control On PC



3.Machine Gun System Introduction

When you use machine gun to open fire, there will display the crosshair at center of the screen,and the inner circle display the current temperature of machine gun.

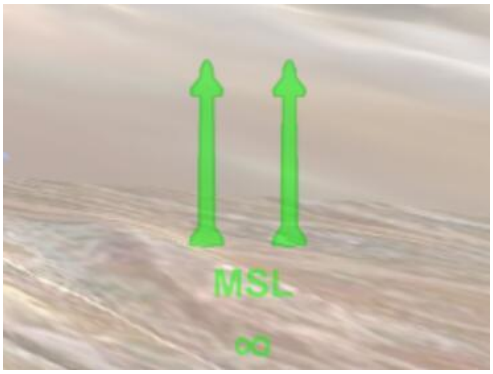
The temperature of machine gun has the maximum value, if machine gun is overheat,then the machine gun will enter cool down state,you should wait a few seconds until it could open fire again.

4.Missile System Introduction

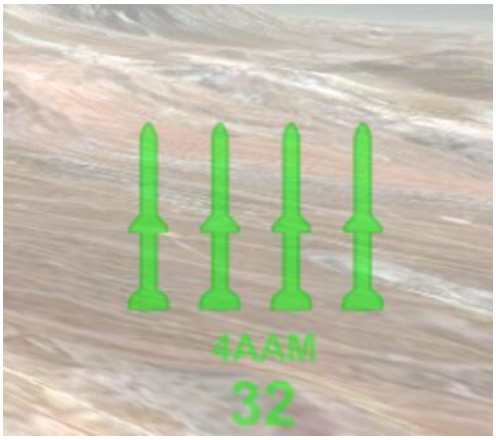
Switch Type Of Aim Mode:

The aim module have two working modes:

One mode is called single target mode,which means only one attack target can be locked at a time and the missile you will launch is called the general missle(this missile is a short range missile).



Another mode is called multiTarget mode, which means aim system can locked multiple target at a time,and the missiles you will launch is called the special missile(these missiles are the long range missiles).

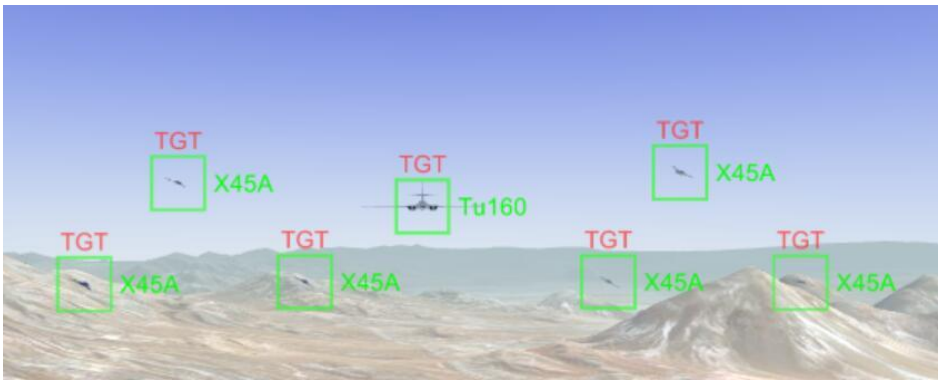


You can press switch missile type key(Q) to switch the type of aim module

Aim Single Target Mode:

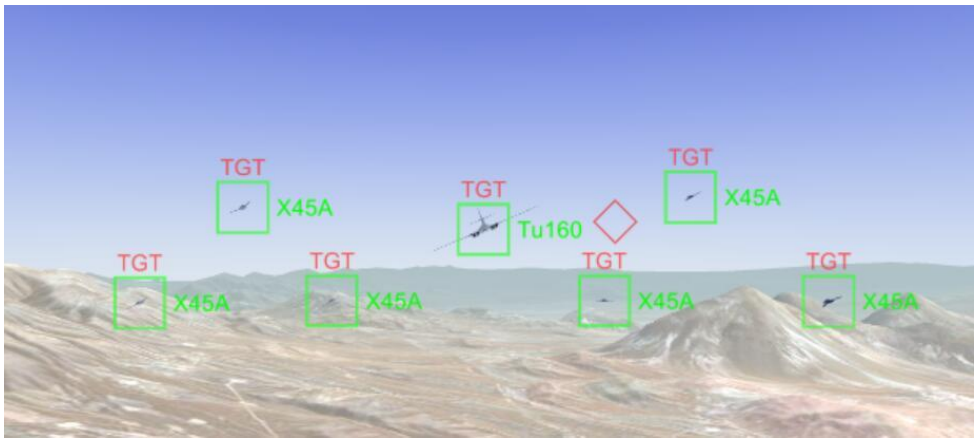
Corresponding to this aiming mode the type of the missile is the general missile.

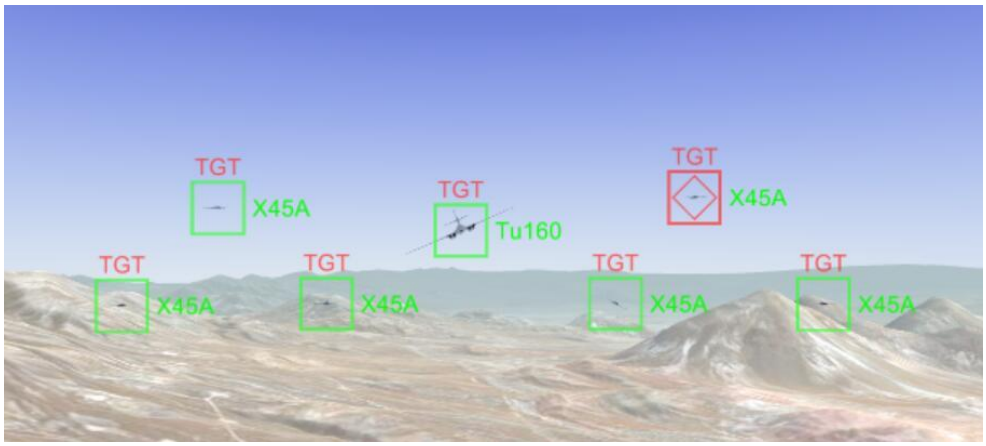
If there have enemy in the sight range of the aim module,then the green UI boxes which stands for the enemies will display on the screen, and current target will flash on the screen.



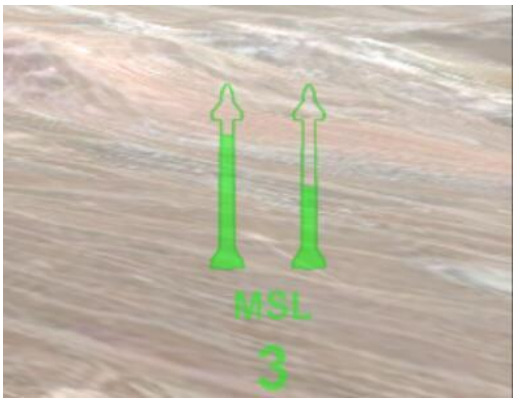
If enemy enter the attack range of the aim module,the color of UI box will turn red and the locked sound will be played to tell you that current attack target has been locked by the aim module and you can launch the missile.

By the way,you can press switch target key(E) to switch current attack target if you want.





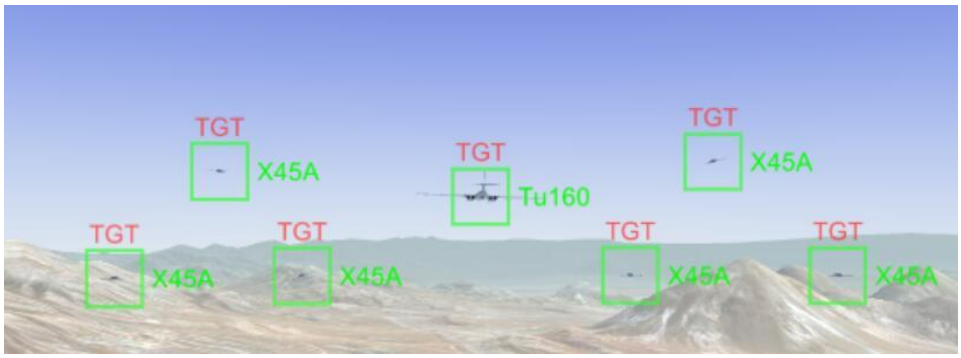
After launching the general missile,the missile will be automatically reloaded in a few seconds, and the process of reloading missile will display at right bottom of the screen.



Aim Multi Target Mode:

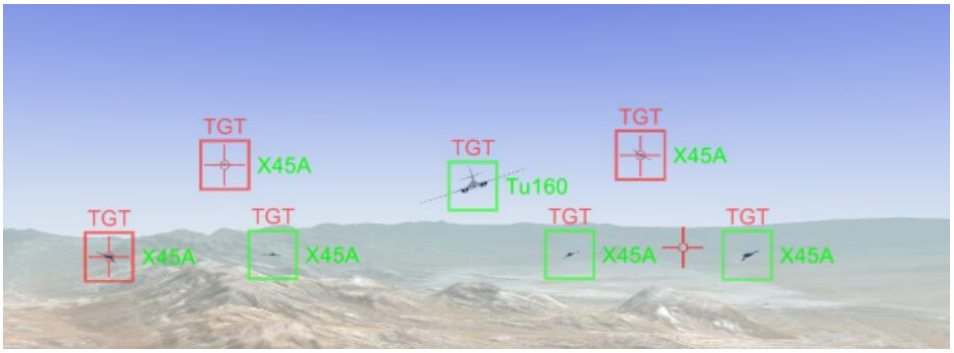
Corresponding to this aiming mode the type of the missile is the special missile.

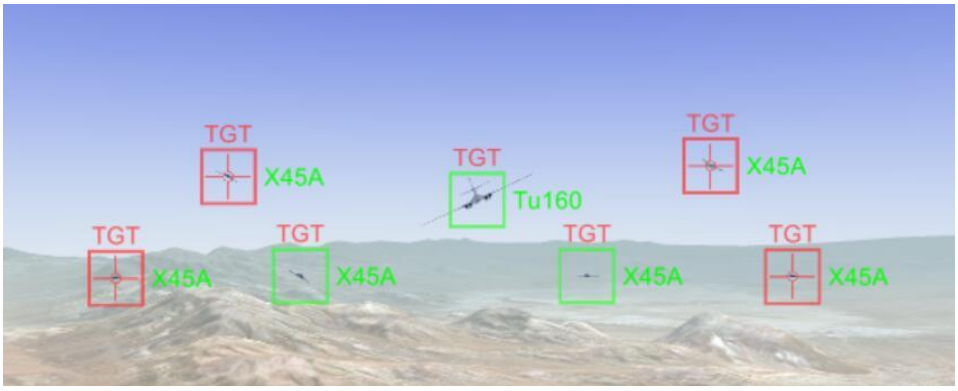
If there have enemies in the sight range of the aim module,then the green UI boxes which stand for the enemies will display on the screen.



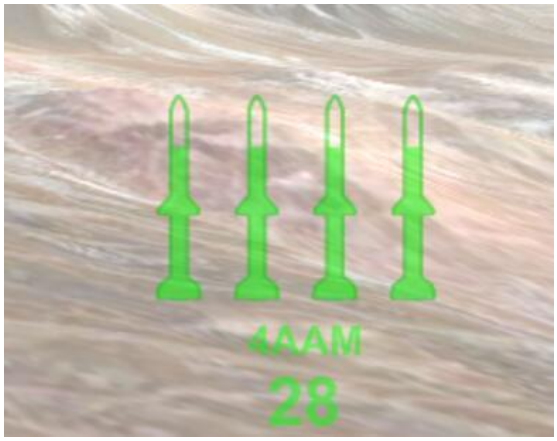
If one enemy enter the attack range of the aim module,the color of corresponding UI box will turn red,if all the target has been locked, then the locked sound will be played to tell you that all the attack target has been locked by the aim module and you can launch the missile.

By the way,you can press switch target key(E) to re-aiming attack targets if you want.





After launching the special missile,the missile will be automatically reloaded in a few seconds, and the process of reloading missile will display at right bottom of the screen.

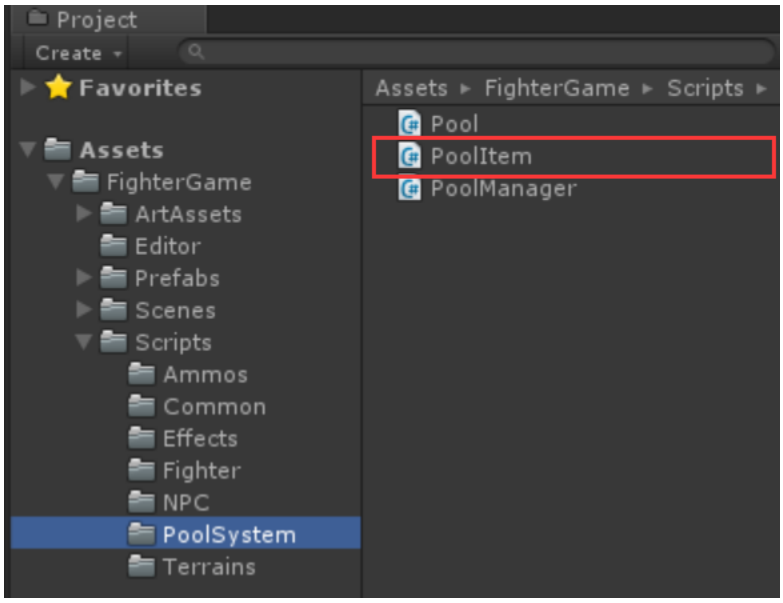


5.Pool System Introduction

If we don't use the pool system, we will instantiate and destroy lot of GameObjects in the game, it has a big impact on performance.

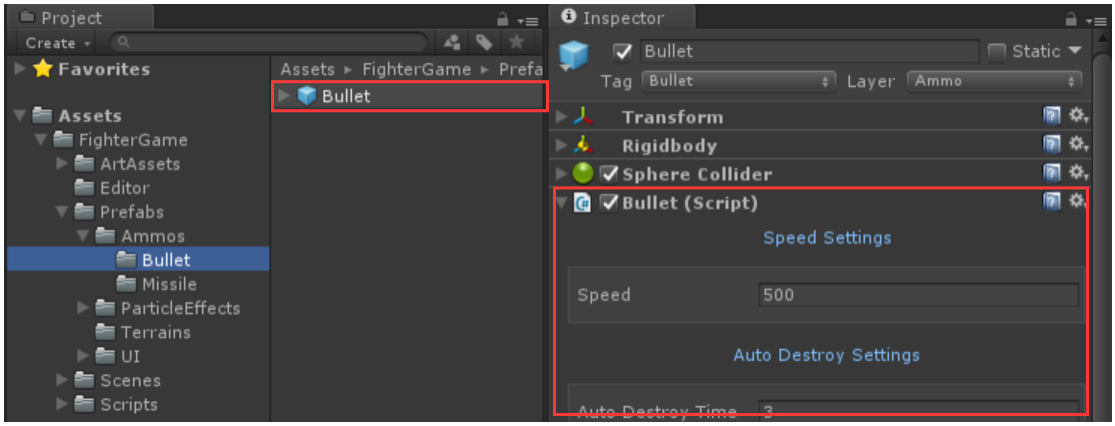
In order to avoid this situation, we will use the pool system to spawn and recycle the GameObjects in this template,including the bullets,the missiles, the Aim HUD UI Items of the missile system,and all the particle effects.

All the GameObject which use the pool system to spawn and recycle must have a component that inherits from the *Pool Item* clas.



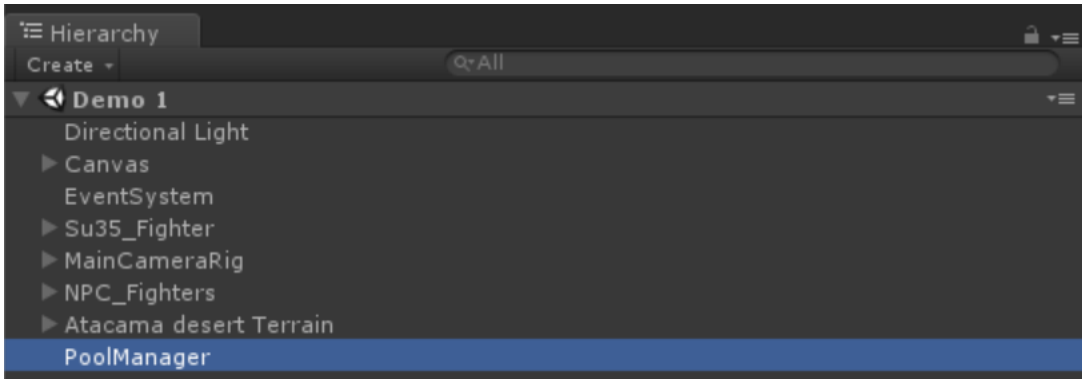
Let’s take the bullets as an example:

1. The bullet prefab have a component called *bullet*,and this *bullet* class is inherits from the *Pool Item* class

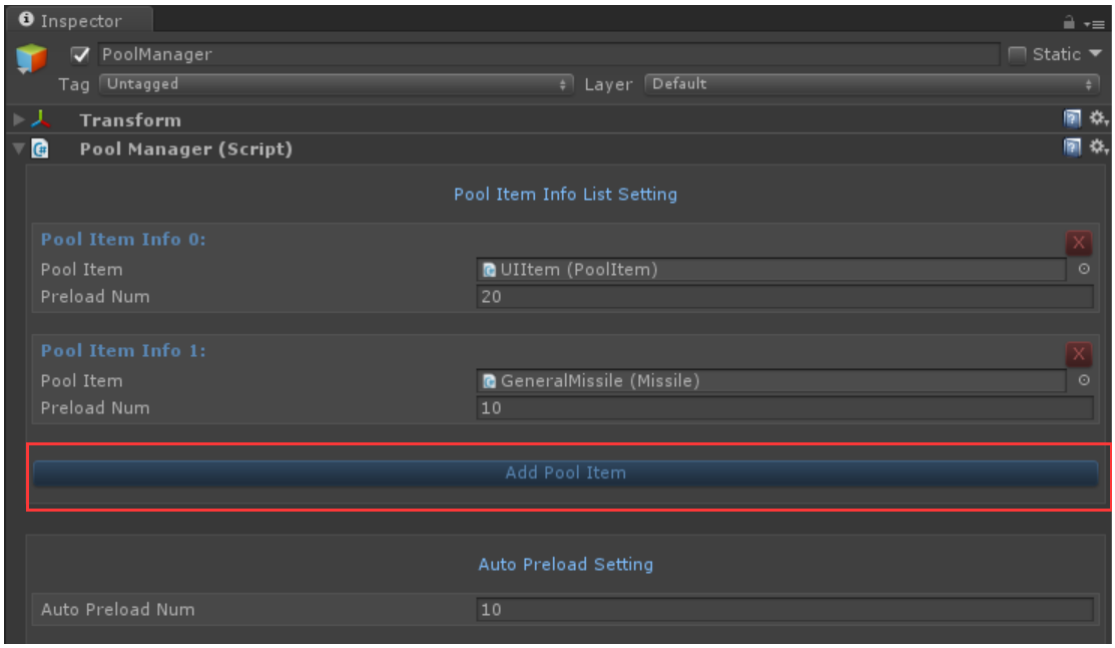


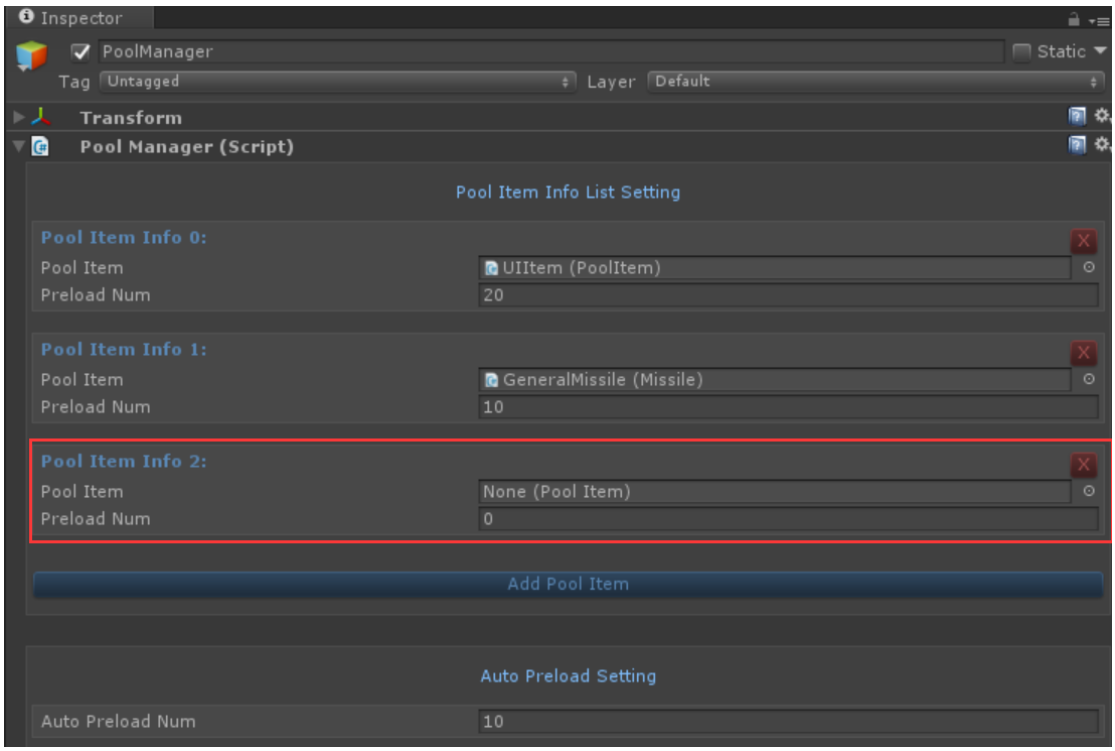

```
using ...

/// <summary> This script is used to control the bullet
public class Bullet : PoolItem
{
    // the bullet is the high speed GameObject, ...
    public Transform collisionDetectPoint;

    // the layerMask about detecting collisions, ...
    public LayerMask collisionDetectLayer = -1;
```

2. Find the Pool Manager in the scene.

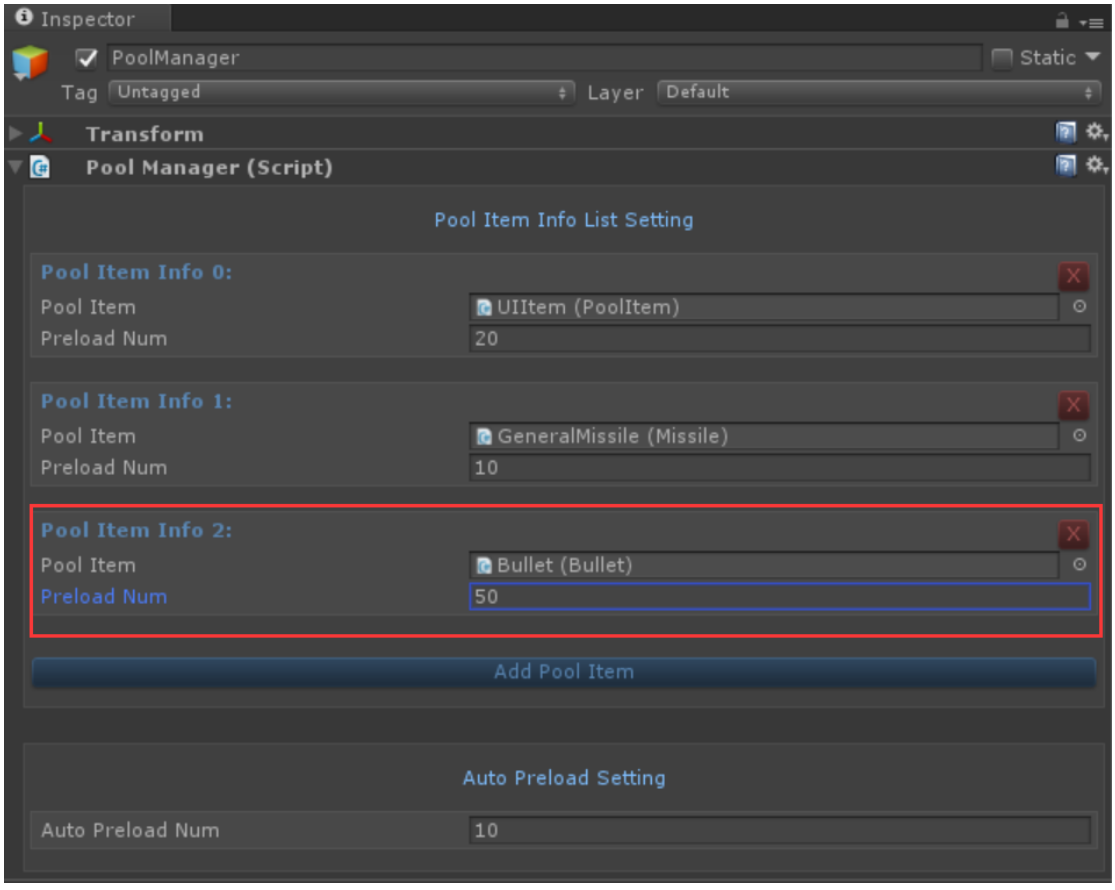


on its editor,click the “Add Pool Item” button to add a new *Pool Item Info*





Drag the bullet prefab to the *Pool Item* field and set the *Preload Num* value



3.In the *Fighter Machine Gun System* class, we get the pool of the bullet at first,

```
void Awake()...

void Start()
{
    //hold the reference of bullet pool
    m_BulletPool = PoolManager.GetInstance().GetPool_AutoCreate(bulletPrefab);
```

then we use the bullet pool to spawn the bullet with given position and rotation when fighter open fire.

```
/// <summary> open fire
public void FireGun(bool fire)
{
    //if machine gun openfire
    if (fire == true && m_IfOverHeat == false)
    {
        //activate machine gun open fire effect
        if (Time.time - m_OpenFireTimer >= m_FireTimeInterval
            && m_BulletCurrentNum > 0)
        {
            m_OpenFireTimer = Time.time;

            float randomXValue = Random.Range(-openFirePosRandomOffset, openFirePosRandomOffset);
            float randomYValue = Random.Range(-openFirePosRandomOffset, openFirePosRandomOffset);
            float randomZValue = 0.0f;
            Vector3 randomLocalPosition = new Vector3(randomXValue, randomYValue, randomZValue);

            Vector3 spawnPos = openFirePoint.TransformPoint(randomLocalPosition);
            Quaternion spawnRot = openFirePoint.rotation;
            GameObject muzzleEffect = m_OpenFireEffectPool.SpawnGameObjectPoolItem(spawnPos, spawnRot);
            muzzleEffect.transform.SetParent(openFirePoint);

            GameObject bulletGameObject = m_BulletPool.SpawnGameObjectPoolItem(spawnPos, spawnRot);
```

4. In the bullet class,because it inherits from the *Pool Item* class,so we just invoke the Recycle() function to recycle this bullet when auto destroy time of the bullet is reached,or the bullet is collided with something:

```
        // Destroy the bullet
        Recycle();
```

Summary:

1. **The GameObject Prefab which uses the Pool System to spawn and recycle must have a component that inherits from the *Pool Item* class.**

2. **Regist this GameObject Prefab to the Pool Manager in the scene.**

3. **In the script,use the *PoolManager.GetInstance().GetPool()* API to get the Pool of corresponding GameObject.**

   then use the pool of corresponding GameObject to spawn the GameObject with given position and rotation.

   (If you forget to regist the GameObject to the Pool Manager in the scene and you still want to get Its Pool,you must use the *PoolManager.GetInstance().GetPool_AutoCreate()* API to get the Pool of corresponding GameObject.

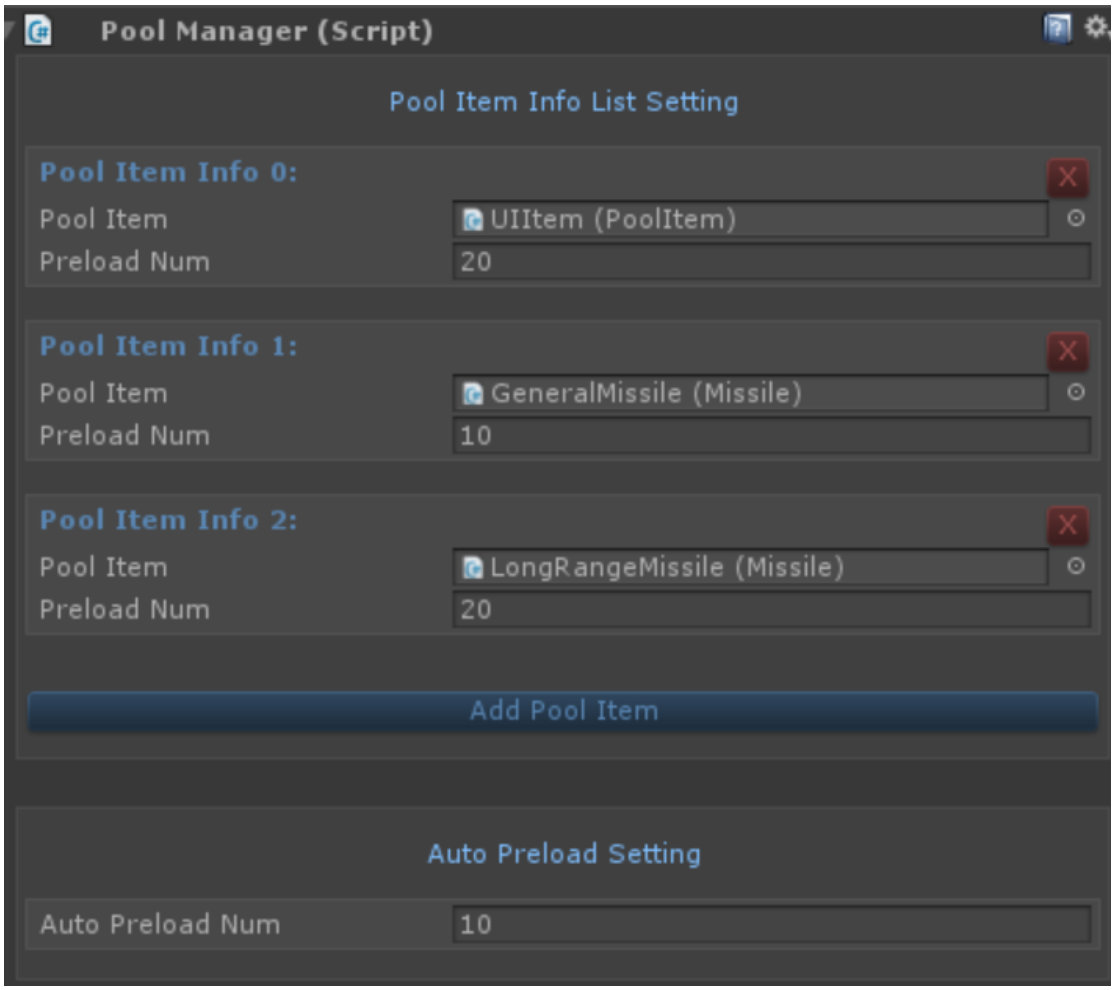
   ***PoolManager.GetInstance().GetPool_AutoCreate()* API will check whether you regist the GameObject to the Pool Manager or not,.**
   If it find that you have registed the GameObject to the Pool Manager, it will return the Pool.
   If it find that you have not yet registed the GameObject to the Pool Manager, it will create the Pool automatically and return it。

   So we recommend you use the *PoolManager.GetInstance().GetPool_AutoCreate()* API.)

4. **In the script that inherits from the *Pool Item* class on your GameObject, just call the *Recycle()* API when you want to recycle your GameObject to its pool**

6. Editor Fields Description

(1) Pool Manager



Pool Item Info List Setting

Pool Item Info

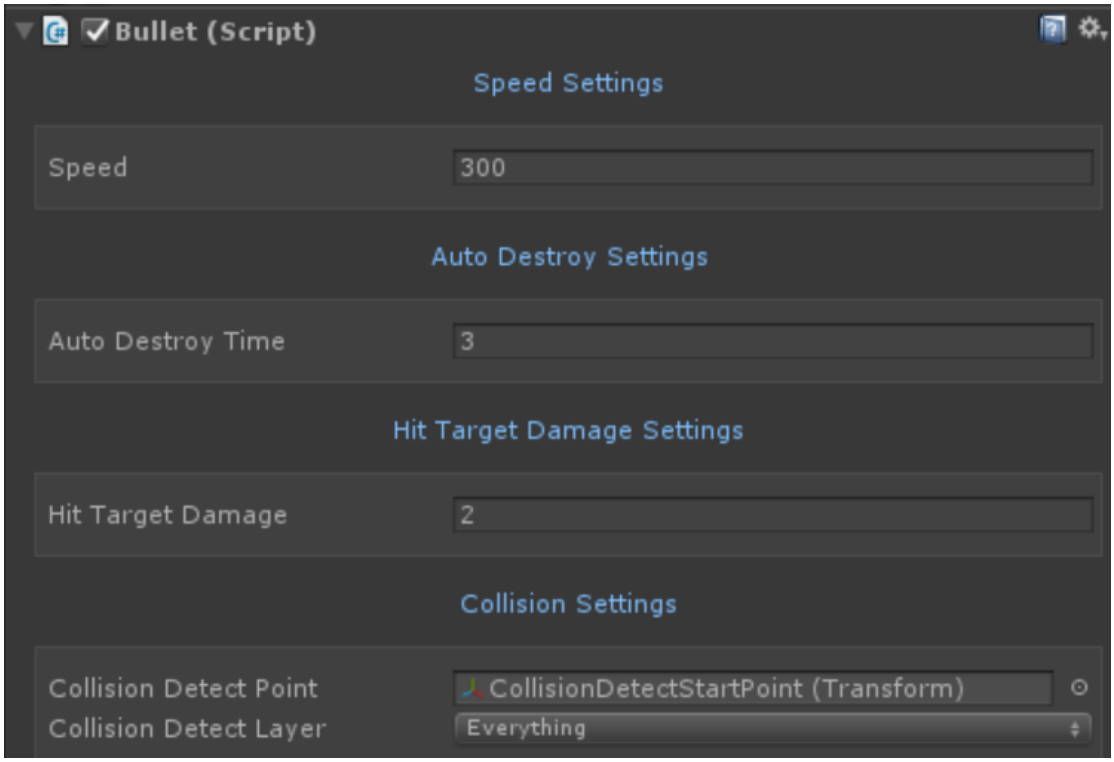
Pool Item: The pool Item which will be preloaded

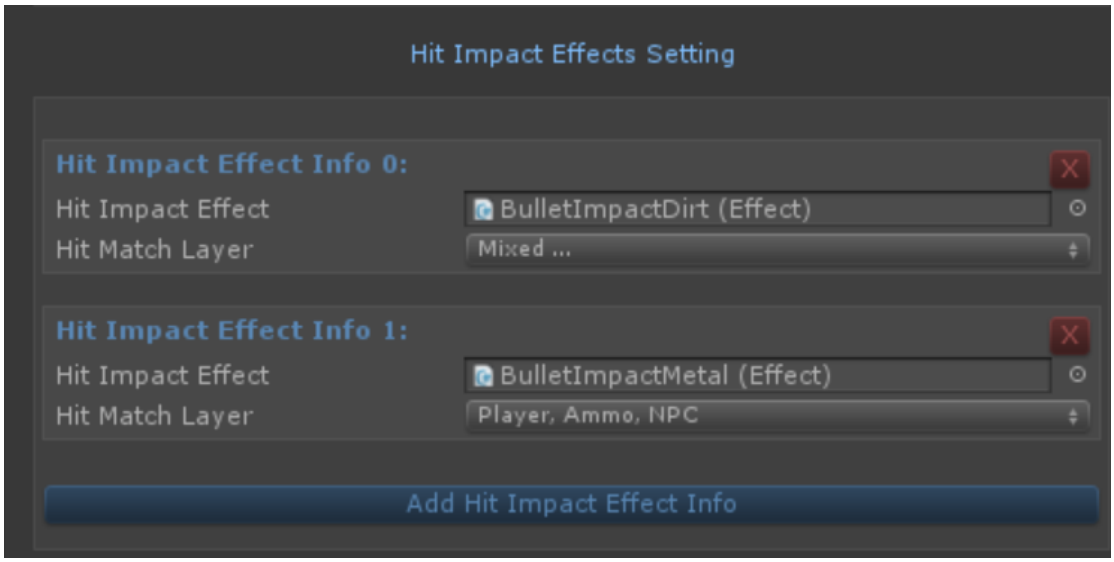
Preload Num: The preload num

Auto Preload Setting

Auto Preload Num: This value represents the preload num of the specific pool item when the GetPool_AutoCreate() function automatically create the corresponding pool.

(2) Bullet


Bullet (Script)
Speed Settings
Speed
300
Auto Destroy Settings
Auto Destroy Time
3
Hit Target Damage Settings
Hit Target Damage
2
Collision Settings
Collision Detect Point
CollisionDetectStartPoint (Transform)
Collision Detect Layer
Everything


Hit Impact Effects Setting
Hit Impact Effect Info 0:
Hit Impact Effect
BulletImpactDirt (Effect)
Hit Match Layer
Mixed ...
Hit Impact Effect Info 1:
Hit Impact Effect
BulletImpactMetal (Effect)
Hit Match Layer
Player, Ammo, NPC
Add Hit Impact Effect Info

Speed Settings

Speed: The speed of the bullet when machine gun open fire

Auto Destroy Settings

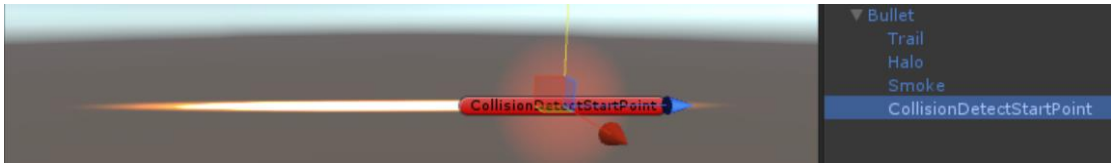
Auto Destroy Time: After this time, we recycle this bullet

Hit Target Damage Settings

Hit Target Damage: When bullet hit something, the damage it causes

Collision Settings

CollisionDetectPoint: The bullet is the high speed GameObject,in order to avoid pass through collider object,based on the position of this point,the bullet casts a ray from the previous frame to the current frame to detect collisions



CollisionDetectLayer: The layerMask of detecting collisions,the bullet will detect collisions with the GameObjects which layer are contained in this layerMask.make sure the bullet are not in this layer

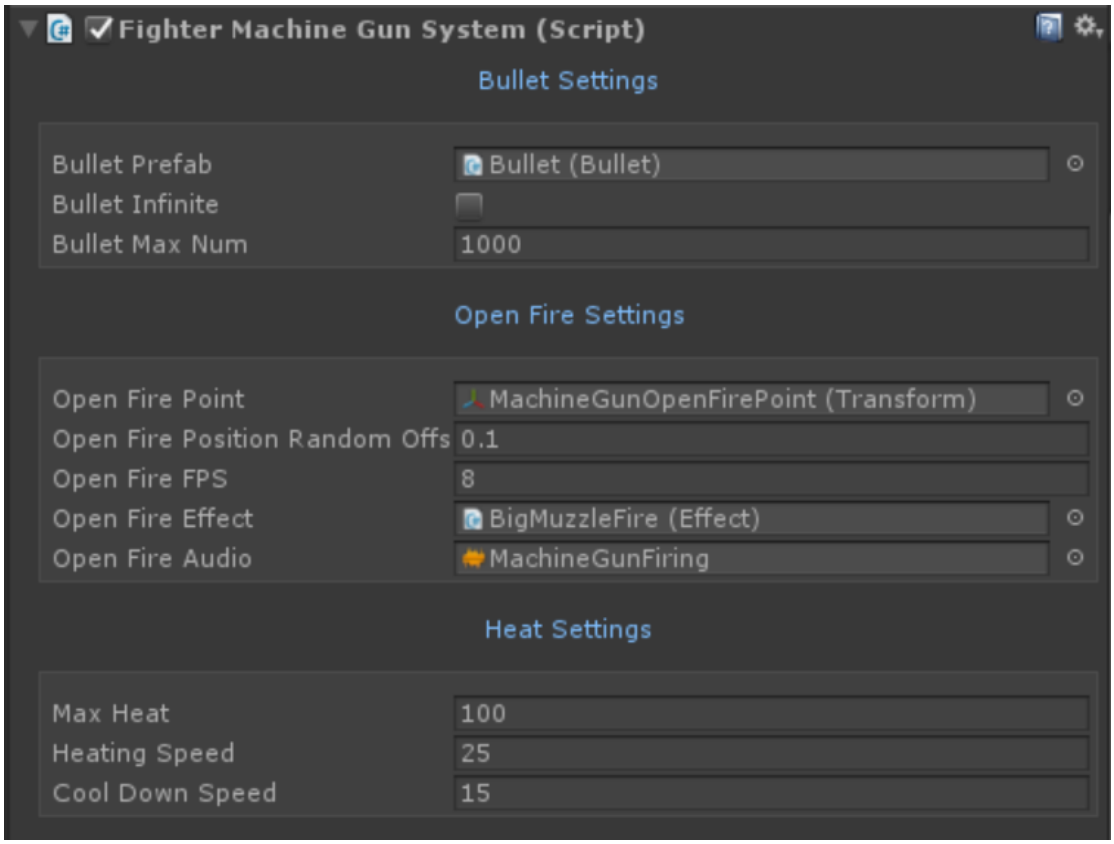
Hit Impact Effects Settings

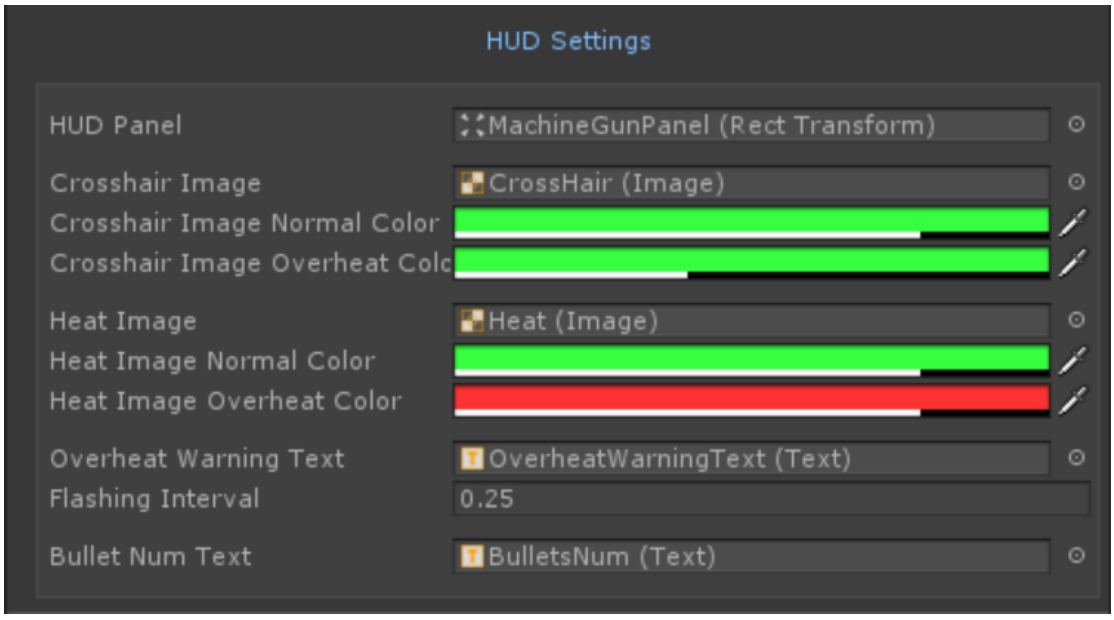
Hit Impact Effect Info:

Hit Impact Effect: When bullet hit somthing,then we spawn this impact effect at corresponding position

Hit Impact Effect: This layerMask is used to compare with the layer of the GameObject, which is hitted by the bullet.
If this layerMask contains the layer,we spawn the impact effect which is defined in this class

(3) Fighter Machine Gun System





Bullet Settings

Bullet Prefab: The bullet prefab

Bullet Infinite: Whether the number of bullets is Infinite

Bullet Max Num: The max number of bullets

Open Fire Settings

Open Fire Point: Machine gun muzzle point

Open Fire Position Random Offset: The random offset distance of the open fire point

Open Fire FPS: The number of bullets fired per second

Open Fire Effect: Muzzle particle effect

Open Fire Audio: Open fire sound

Heat Settings

Max Heat: The max heat of machine gun

Heating Speed: The heating speed of the machine gun

Cool Down Speed: The cool down speed of the machine gun

HUD Settings

HUD Panel: The HUD panel

Crosshair Image: Machine gun crosshair Image

Crosshair Image Normal Color: The color of the crosshair image when machine gun is not over heat

Crosshair Image Overheat Color: the color of the crosshair image when machine gun is over heat

Heat Image: The fill amount of this image presents current heat of the machine gun

Heat Image Normal Color: the color of the heat image when machine gun is not over heat

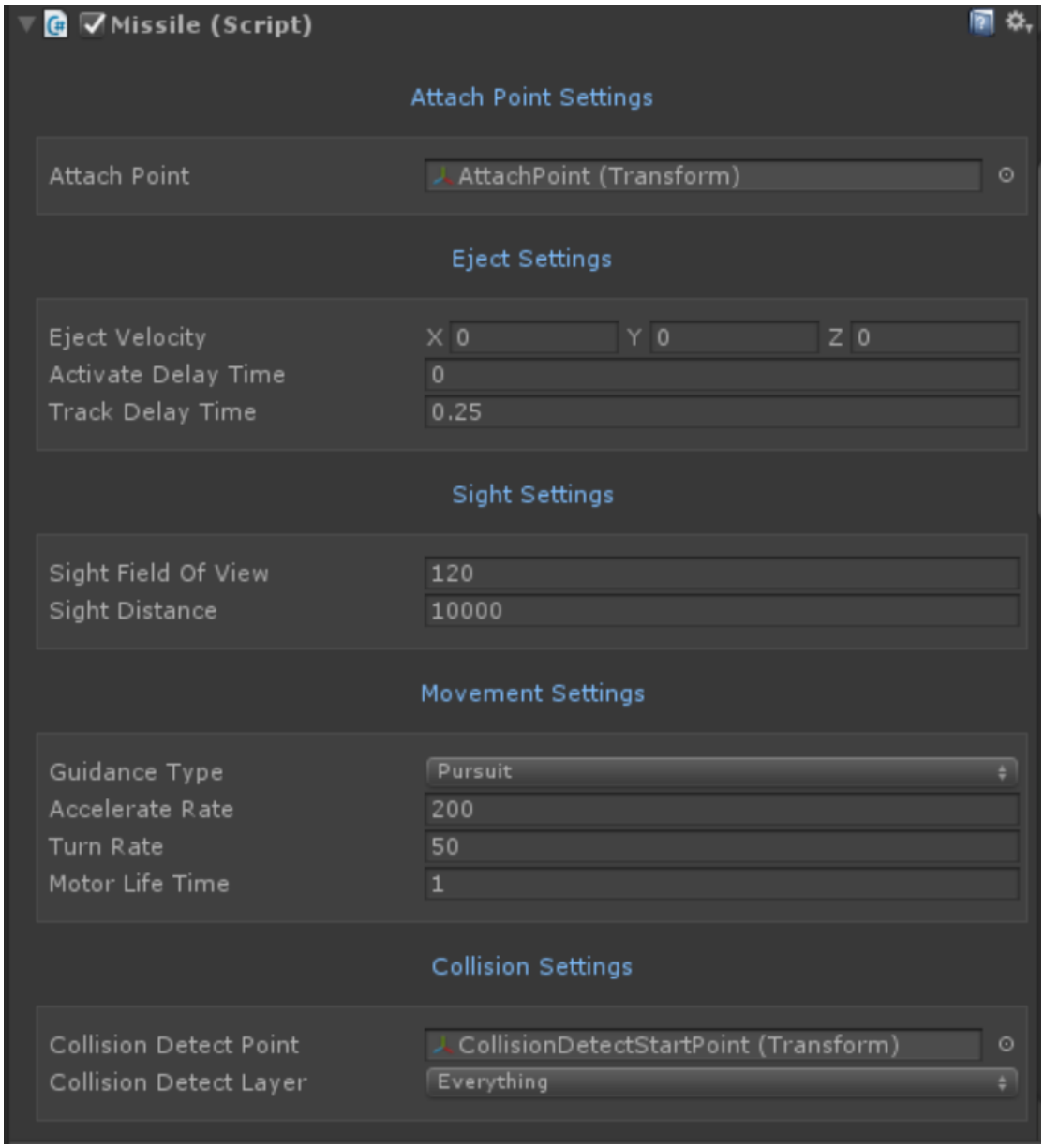
Heat Image Overheat Color: the color of the heat image when machine gun is over heat

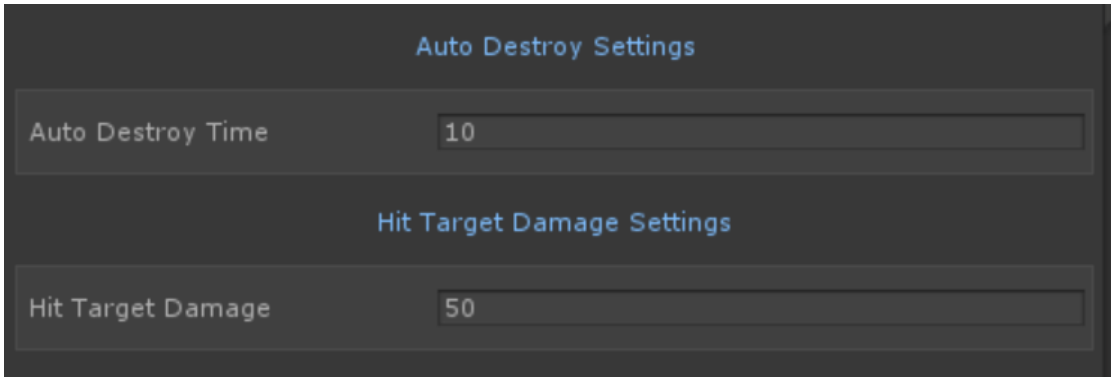
Overheat Warning Text: The overheat warning text

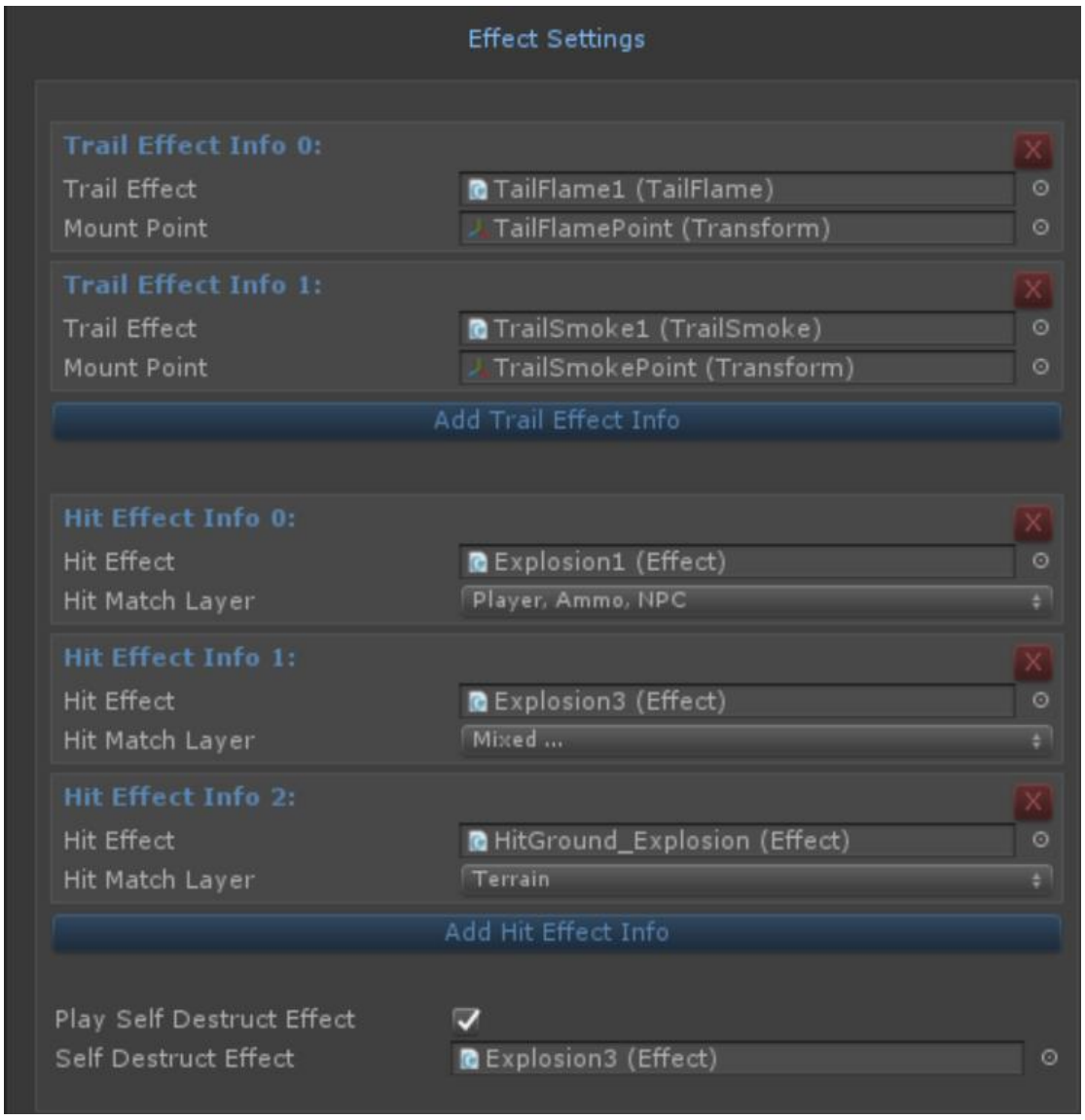
Flashing Interval: The flashing interval of the overheat warning text when machine gun is overheat

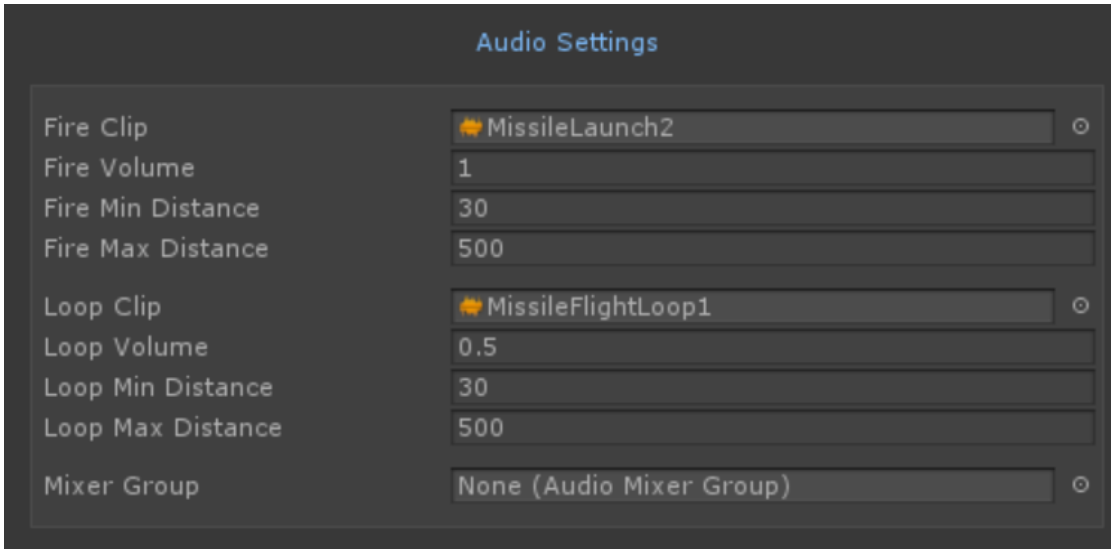
Bullet Num Text: Bullet num text

(4) Missile


Missile (Script)
Attach Point Settings
Attach Point
AttachPoint (Transform)
Eject Settings
Eject Velocity
X 0
Y 0
Z 0
Activate Delay Time
0
Track Delay Time
0.25
Sight Settings
Sight Field Of View
120
Sight Distance
10000
Movement Settings
Guidance Type
Pursuit
Accelerate Rate
200
Turn Rate
50
Motor Life Time
1
Collision Settings
Collision Detect Point
CollisionDetectStartPoint (Transform)
Collision Detect Layer
Everything

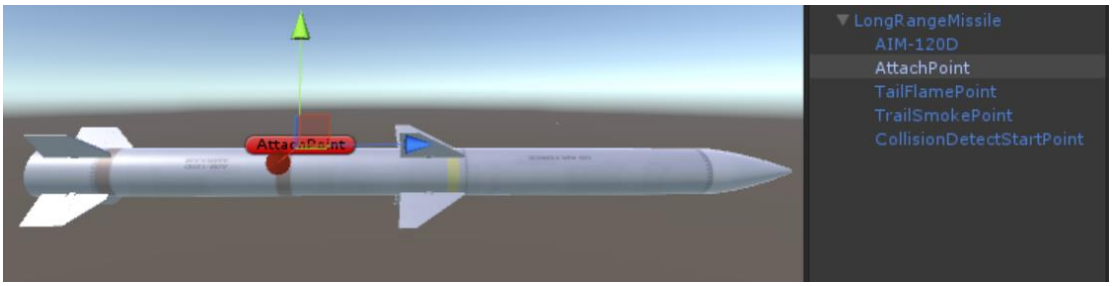

Auto Destroy Settings
Auto Destroy Time
10
Hit Target Damage Settings
Hit Target Damage
50


Effect Settings
Trail Effect Info 0:
Trail Effect
TailFlame1 (TailFlame)
Mount Point
TailFlamePoint (Transform)
Trail Effect Info 1:
Trail Effect
TrailSmoke1 (TrailSmoke)
Mount Point
TrailSmokePoint (Transform)
Add Trail Effect Info
Hit Effect Info 0:
Hit Effect
Explosion1 (Effect)
Hit Match Layer
Player, Ammo, NPC
Hit Effect Info 1:
Hit Effect
Explosion3 (Effect)
Hit Match Layer
Mixed ...
Hit Effect Info 2:
Hit Effect
HitGround_Explosion (Effect)
Hit Match Layer
Terrain
Add Hit Effect Info
Play Self Destruct Effect
Self Destruct Effect
Explosion3 (Effect)


Audio Settings
Fire Clip
MissileLaunch2
Fire Volume
1
Fire Min Distance
30
Fire Max Distance
500
Loop Clip
MissileFlightLoop1
Loop Volume
0.5
Loop Min Distance
30
Loop Max Distance
500
Mixer Group
None (Audio Mixer Group)

Attach Point Settings

Attach Point: This is a Transform that the missiles uses as reference for where to attach to a mount point of the fighter.
If this field don't assign the attach point, the missile will use its origin as an attach point.



Eject Settings

Eject Velocity: Velocity (in local space) at which the missile will be ejected from its launch point.

Activate Delay Time: When the missile is launched, after this time, the missile will be activated.

Track Delay Time: When the missile is activated, after this time, the missile will track the attack target.

Sight Settings

Sight Field Of View: The field of view of this missile

Sight Distance: The sight distance of this missile

Movement Settings

Guidance Type: The guidance type has two types,the Pursuit and the Lead.when you choose the pursuit type,the missile will move to current position of the attack target.when you choose the lead type,the missile will predict the position of the attack target based on the velocity of attack target,then move to the predicted position.

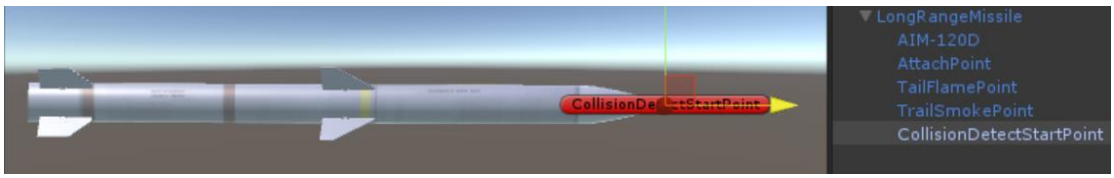
Accelerate Rate: How much speed per second the missile will gain after launch

Turn Rate: How many degrees per second the missile can turn

Motor Life Time: How long the missile will accelerate. After this time, the missile maintains a constant speed

Collision Settings

Collision Detect Point: The missile is the high speed GameObject,in order to avoid pass through collider object,it use ray to detect collision. Based on the position of this point, the missile casts a ray from the previous frame to the current frame.



Collision Detect Layer: the layerMask about detecting collision,the missile will detect collisions with the gameObjects which layer are contained in this layerMask.make sure we are not in this layer.

Auto Detroy Settings

Auto Destroy Time: After this time, we let this missile explode and recycle this missile

Hit Target Damage Settings

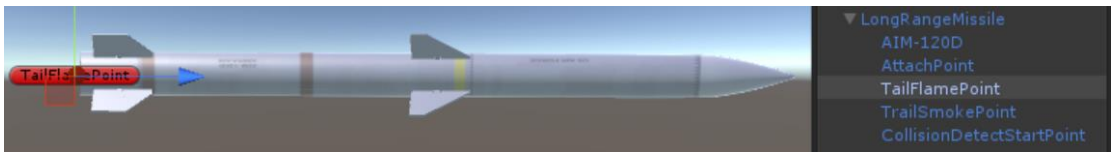
Hit Target Damage: When missile hit something,the damage it causes

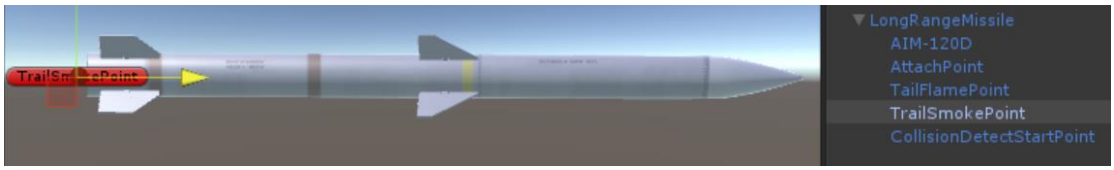
Effect Settings

Trail Effect Info

Trail Effect: Trail effect

Mount Point: Trail effect mount point,It is a transform that is used as the reference for where the trail effect should play.





Hit Effect Info

Hit Effect: when missile hit somthing,then we spawn this impact effect at corresponding position

Hit Match Layer: this layerMask is used to compare with the layer of the GameObject which is hitted by the missile.if this layerMask contains the layer, we spawn the impact effect which is defined in this class

Self Detruct Effect Info

Play Self Destruct Effect: Whether play the self-destruct effect, when missile exist time larger than autoDestroyTime value

Self Destruct Effect: Self destruct effect

Audio Settings

Fire Clip: This missile sound will play when missie is lauched

Fire Volume: The audio volume of Fire Audio Clip

Fire Min Distance: The volume will stay at the loudest possible,outside this min distance,it begins attenuate

Fire max Distance: Fire Man Distance is the distance the Fire Audio Clip stop Attenuating

Loop Clip: This missile sound will loop until the missile is destroyed

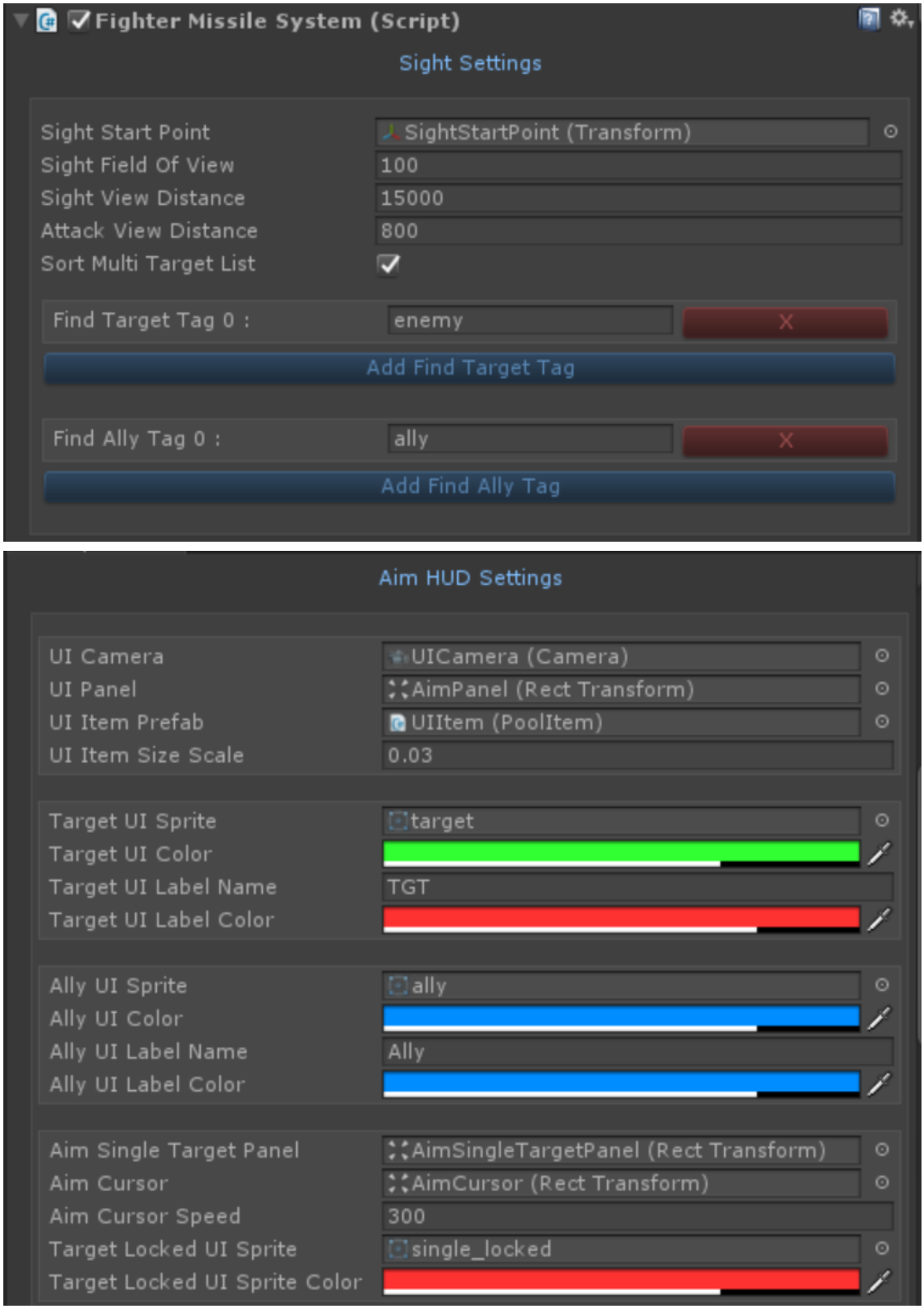
Loop Volume: The audio volume of Loop Audio Clip

Loop Min Distance: Within the Loop Min Distance, the volume will stay at the loudest possible,outside this min distance,it begins attenuate

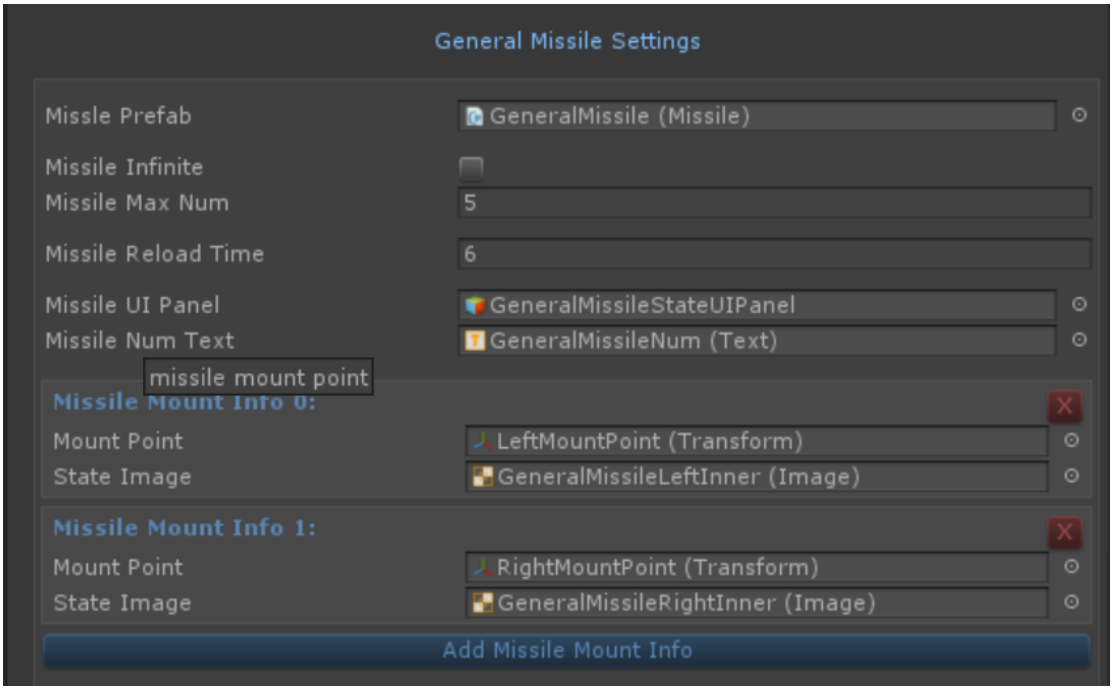
Loop Max Distance: Loop Max Distance is the distance the Loop Audio Clip stop Attenuating

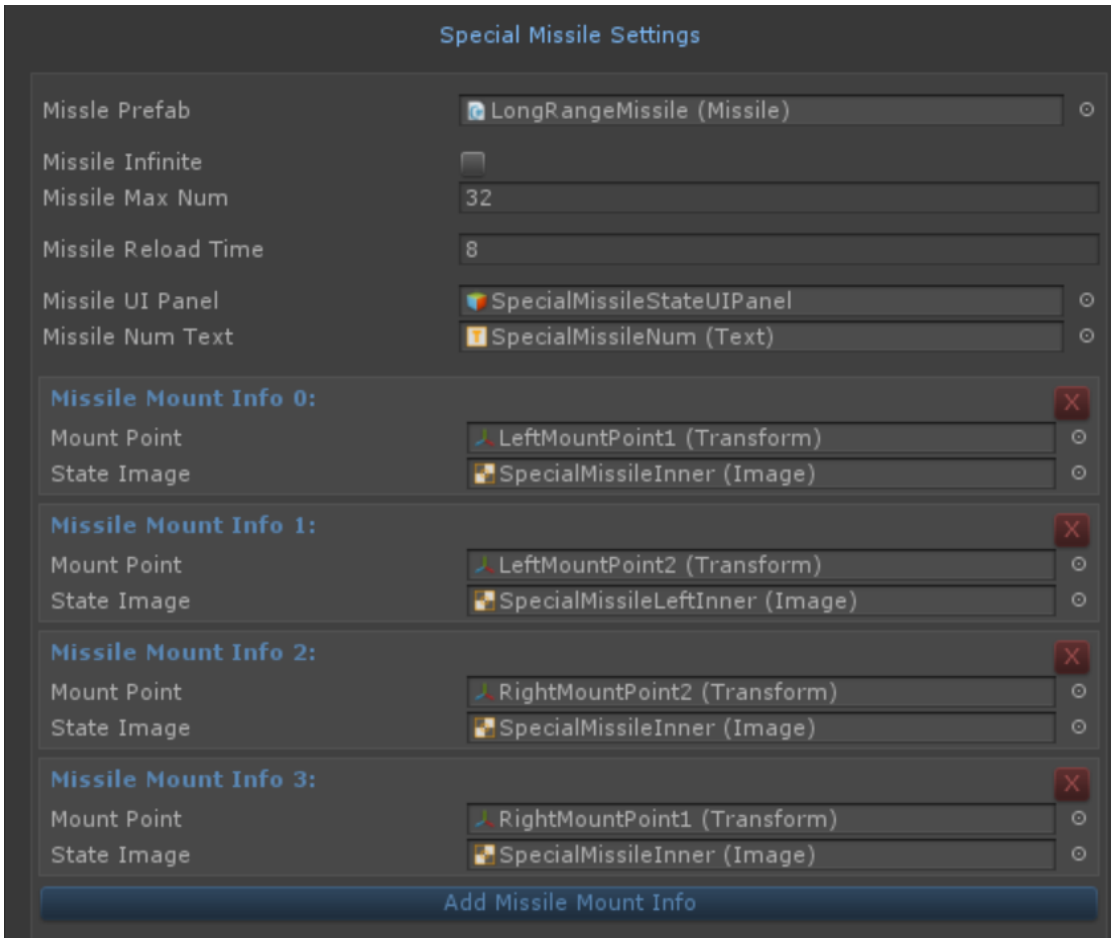
Mixer Group: The audio mixer group

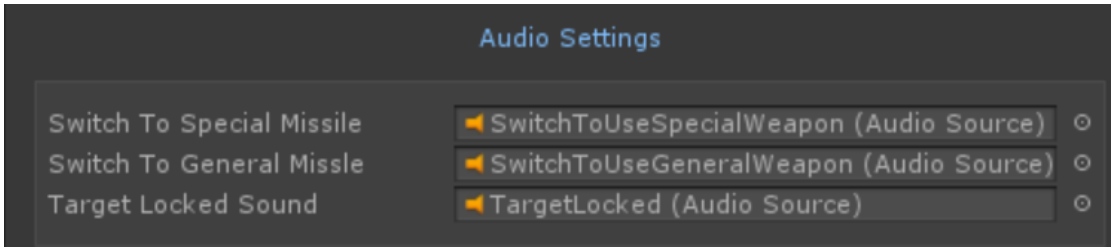
(5) Fighter Missile System




Aim Multi Target Panel
AimMultiTargetPanel (Rect Transform)
Aim Cursor
AimCursor (Rect Transform)
Aim Cursor Speed
250
Target Locked UI Sprite
multi_locked
Target Locked UI Sprite Color
Missile Aim UI Panel
MissileAimUIPanel (Rect Transform)
Missile Aim UI
MissileAimUI
Missile Aim UI Item Unlocked C
Missile Aim UI Item Locked Col

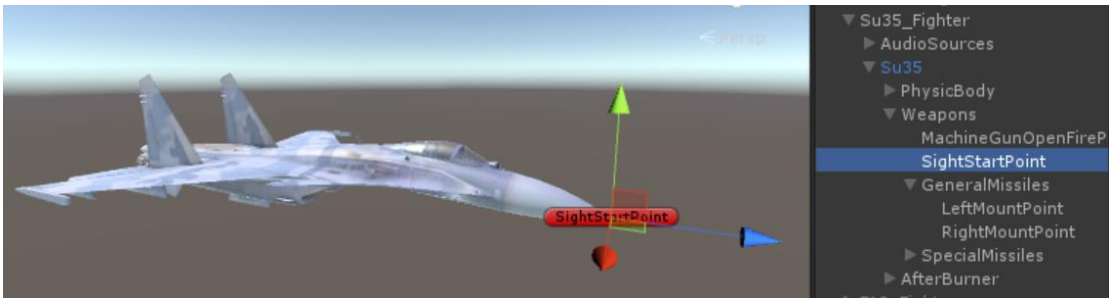

General Missile Settings
Missle Prefab
GeneralMissile (Missile)
Missile Infinite
Missile Max Num
5
Missile Reload Time
6
Missile UI Panel
GeneralMissileStateUIPanel
Missile Num Text
GeneralMissileNum (Text)
missile mount point
Missile Mount Info 0:
Mount Point
LeftMountPoint (Transform)
State Image
GeneralMissileLeftInner (Image)
Missile Mount Info 1:
Mount Point
RightMountPoint (Transform)
State Image
GeneralMissileRightInner (Image)
Add Missile Mount Info


Special Missile Settings
Missle Prefab
LongRangeMissile (Missile)
Missile Infinite
Missile Max Num
32
Missile Reload Time
8
Missile UI Panel
SpecialMissileStateUIPanel
Missile Num Text
SpecialMissileNum (Text)
Missile Mount Info 0:
Mount Point
LeftMountPoint1 (Transform)
State Image
SpecialMissileInner (Image)
Missile Mount Info 1:
Mount Point
LeftMountPoint2 (Transform)
State Image
SpecialMissileLeftInner (Image)
Missile Mount Info 2:
Mount Point
RightMountPoint2 (Transform)
State Image
SpecialMissileInner (Image)
Missile Mount Info 3:
Mount Point
RightMountPoint1 (Transform)
State Image
SpecialMissileInner (Image)
Add Missile Mount Info


Audio Settings
Switch To Special Missile
SwitchToUseSpecialWeapon (Audio Source)
Switch To General Missle
SwitchToUseGeneralWeapon (Audio Source)
Target Locked Sound
TargetLocked (Audio Source)

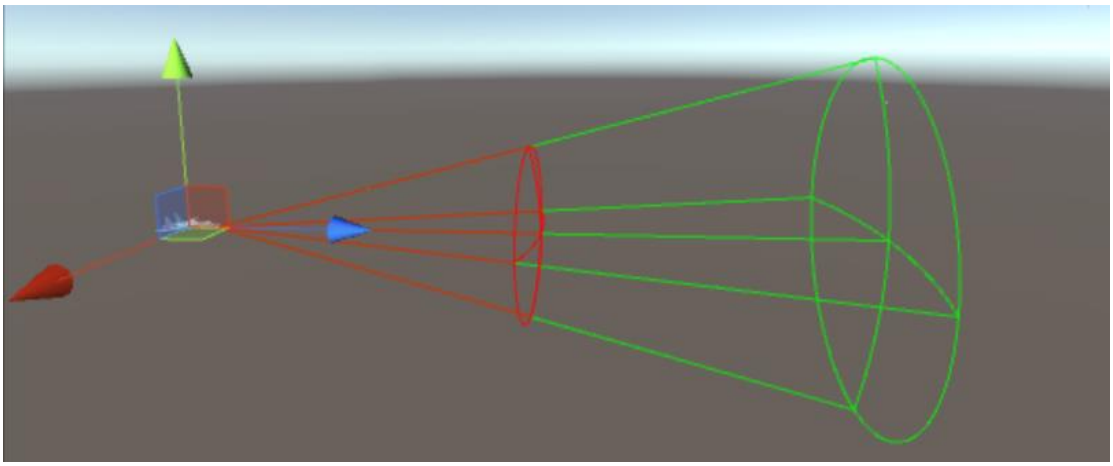
Sight Settings

Sight Start Point: The start point of sight



Sight Field Of View: The field of view of the aim module
Sight View Distance: The max sight distance of the aim module
Attack View Distance: The max attack distance of the aim module

(Select fighter in the scene and click the Fighter Missile System component,you will see a cone shape area just like the image display below:
the green area stand for the sight of the fighter
and the meaning of red area is that when the attack target enter this area then the fighter could lock target and launch missiles.
The green cone shape area is determined by the field named Sight View Distance and the field named Sight Field Of View.
The red cone shape area is determined by the field named Attack View Distance and the field named Sight Field Of View.)



Sort Target List: Whether sort the target list of special missiles in ascending order according to the target GameObject's x-coordinate on the screen
Find Target Tag: This tag is used to identify which units are targets
Find Ally Tag: this tag is used to identify which units are allies

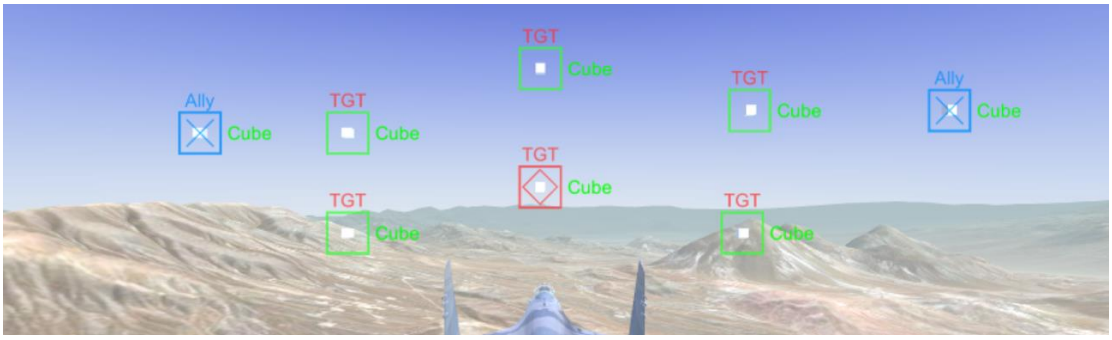
Aim HUD Settings

UI Camera: This camera is use to render the UI of aim module
UI Panel: The UI panel of the aim module
UI Item Prefab: UI prefab use to show unit on screen
UI Item Size Scale: The size scale of the UI item

Target UI Sprite: The UI sprite of target
Target UI Color: The UI sprite color of target
Target UI Label Name: The label name of target unit
Target UI Label Color: The label color of target unit

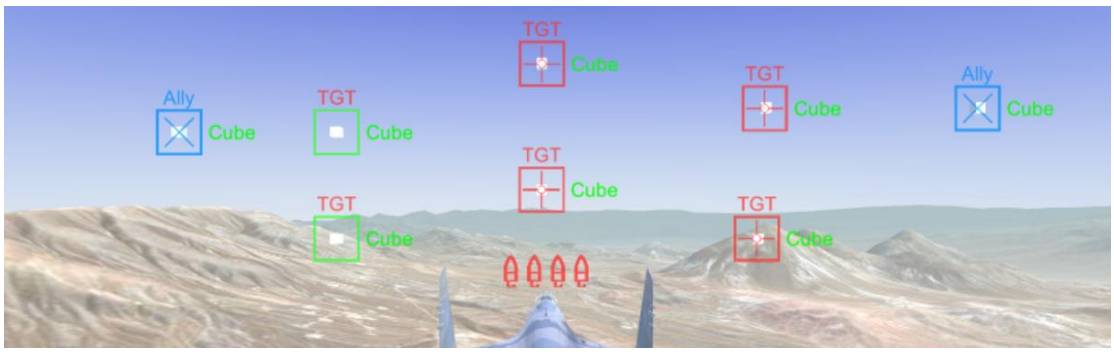
Ally UI Sprite: The UI sprite of ally
Ally UI Color: The UI sprite color of ally
Ally UI Label Name: The label name of ally unit
Ally UI Label Color: The label color of ally unit

Aim Single Target Panel: The Aim Single Target UI panel which is used to show the targets



Aim Cursor: The aim cursor when aiming attack target
Aim Cursor Speed: The speed of aim cursor when it move to the position of attack target on screen
Target Locked UI Sprite: The UI sprite when the target was locked
Target Locked UI Sprite Color: The UI sprite color when the target was locked

Aim Multi Target Panel: The Aim Multi Target UI panel which is used to show the targets



Aim Cursor: This missile sound will play when missie is lauched
Aim Cursor Speed: The speed of aim cursor when it move to the position of attack target on screen
Target Locked UI Sprite: The UI sprite when the target was locked
Target Locked UI Sprite Color: The UI sprite color when the target was locked

Missile Aim UI Panel: The UI panel of the missile aiming UI

Missile Aim UI: The prefab of the missile aiming UI
Missile Aim UI Item Unlocked Color: the color when the missile has not locked the attack target
Missile Aim UI Item Locked Color: the color when the missile has locked the attack target

General Missile Settings

Missile Prefab: General missile prefab

Missile Infinite: Whether the number of general missiles is infinite

Missile Max Num: The total number of general missiles

Missile Reload Time: General missile reload time

Missile UI Panel: The UI panel which will show the current state of general missiles

Missile Num Text: This UI text will show current number of general missiles in the lower right corner of the screen

Missile Mount Info

Mount Point: Missile mount point

State Image: This UI image will show current state of the missile

Special Missile Settings

Missile Prefab: Special missile prefab

Missile Infinite: Whether the number of special missiles is infinite

Missile Max Num: The total number of special missiles

Missile Reload Time: Special missile reload time

Missile UI Panel: The UI panel which will show the current state of special missiles

Missile Num Text: This UI text will show current number of special missiles in the lower right corner of the screen

Missile Mount Info

Mount Point: Missile mount point

State Image: This UI image will show current state of the missile

Audio Settings

Switch To Special Missile: When fighter switch to use the special missile, it will play this sound

Switch To General Missile: When fighter switch to use the genral missile, it will play this sound

Target Locked Sound: When attack target was locked by the fighter, it will play this Sound

7. Scripting Reference

(1) Pool Manager

public Pool GetPool(PoolItem poolItem)

Get the pool which caches the specific pool item

public Pool GetPool_AutoCreate(PoolItem poolItem)

Get the pool which caches the specific pool item.
If the pool manager has not created the pool which caches the specific pool item.
this function will automatically create and return it

public bool HasPool(PoolItem poolItem)

Whether pool manager contains the pool which caches the specific pool item

public void DestroyPool()

Destroy the pool which caches the specific pool item

public void DestroyAllPools()

Destroy all the pools

(2) Pool

public GameObject SpawnGameObjectPoolItem(Vector3 position, Quaternion rotation)

Spawn the pool item at given position and rotation

(3) Pool Item

public void Recycle()

Recycle this pool item,then put it back to the pool which it belongs to

(4) Fighter Missile System

public void SwitchTarget()

Switch Attack Target In Sight

public void SwitchMissileType()

Switch the type of missile which the fighter uses,from the general missiles to special missiles, or from the special missiles to general missiles

public void LaunchMissile()

Launch missiles .

(5) Bullet

public void OpenFire (GameObject owner,Vector3 baseVelocity)

Fire the bullet with an inherited velocity for correct behavoir

(6) Fighter Machine Gun System

public void FireGun(bool fire)

Open fire

(7) Missile

public void Load(GameObject owner, Transform parent)

Use the attach point on the missile to dock with the mount point of the fighter

public void Launch(Vector3 basicVelocity, GameObject attackTarget)

Launch the missile at the given attack target with an inherited velocity, If no attack target is given, the missile will fire without guidance

(8) TrailSmoke

public void Attach(Transform parent)

let smoke effect attach to mount point

public void Detach()

let flame effect detach to mount point

(9) TailFlame

public void Attach(Transform parent)

let tail Flame effect attach to mount point

public void Detach()

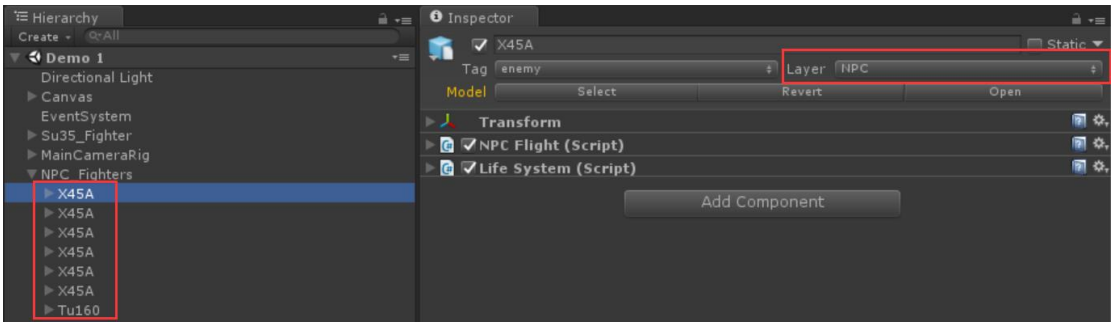
let tail flame effect detach to mount point

8. Layer Settings

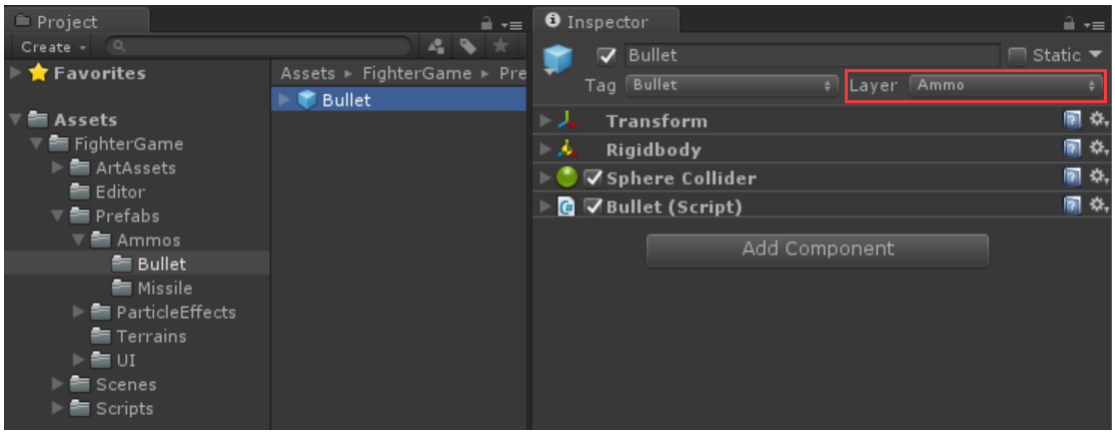
In order to make this template work correctly,

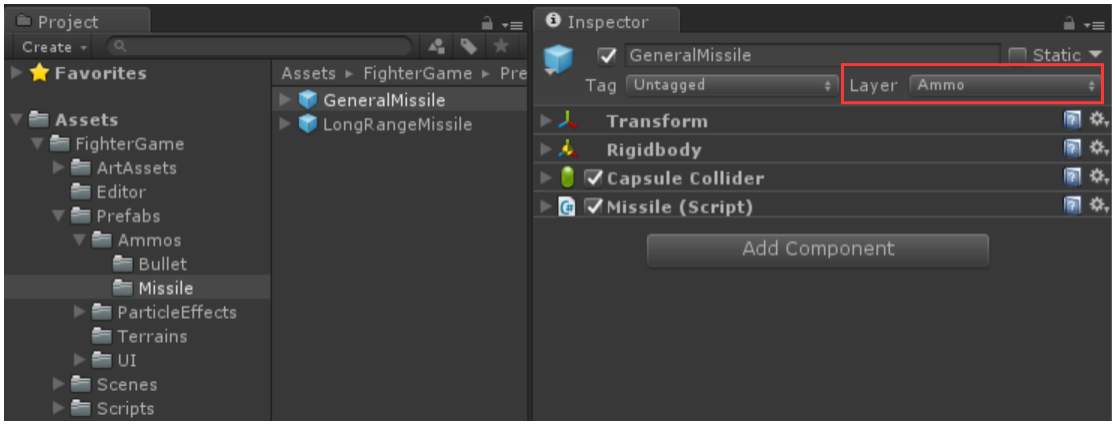
please keep or set the Layer of the Player to be the *Player*:

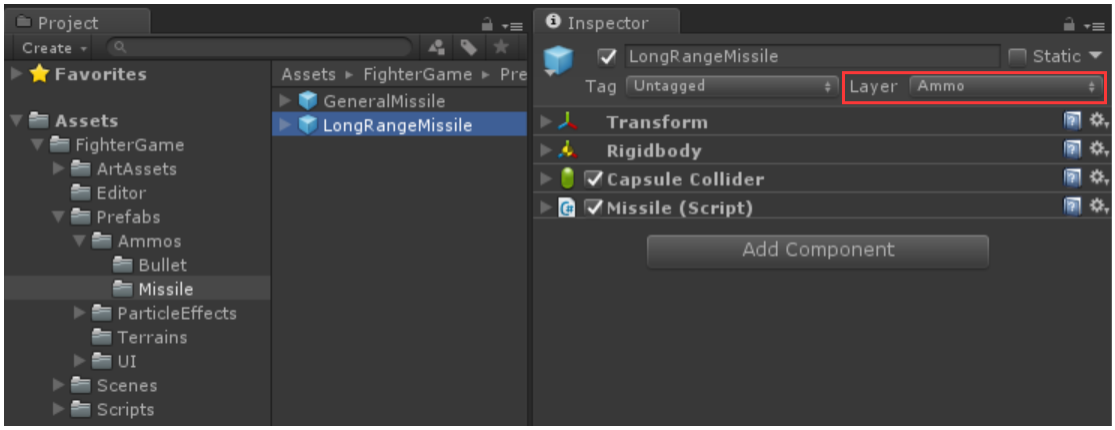
keep or set the Layer of the NPCs to be the *NPC*:



keep or set the Layer of the bullet sand the missiles to be the *Ammo:*





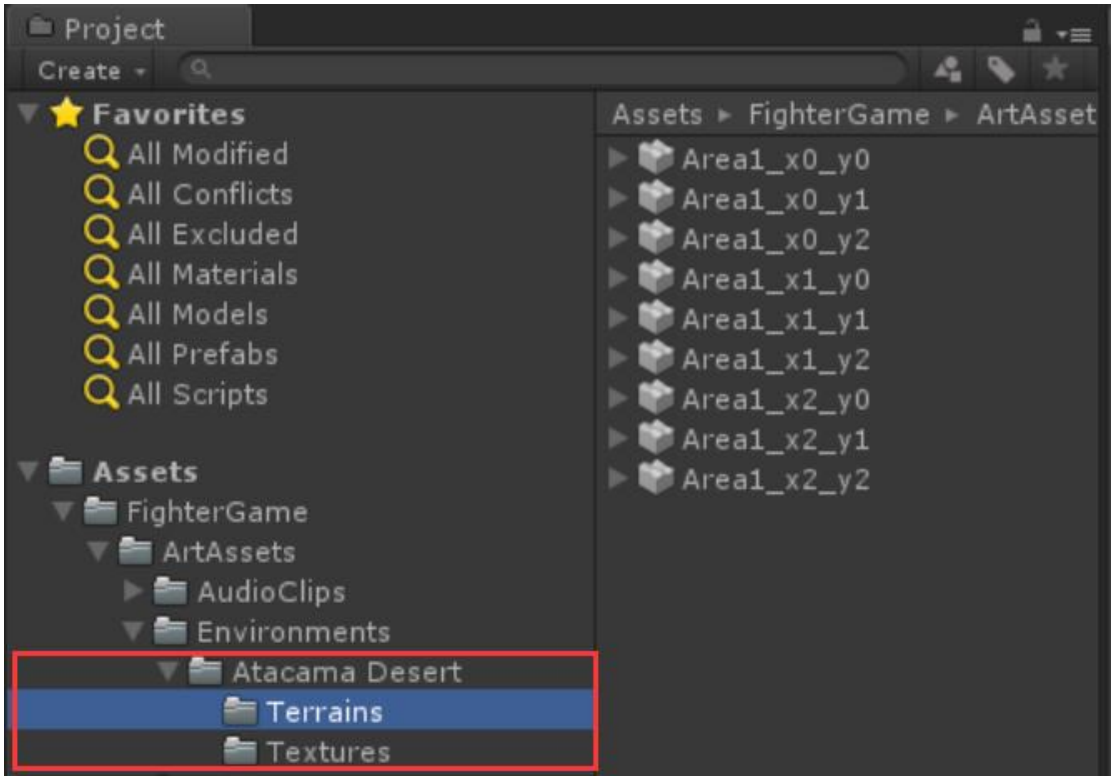


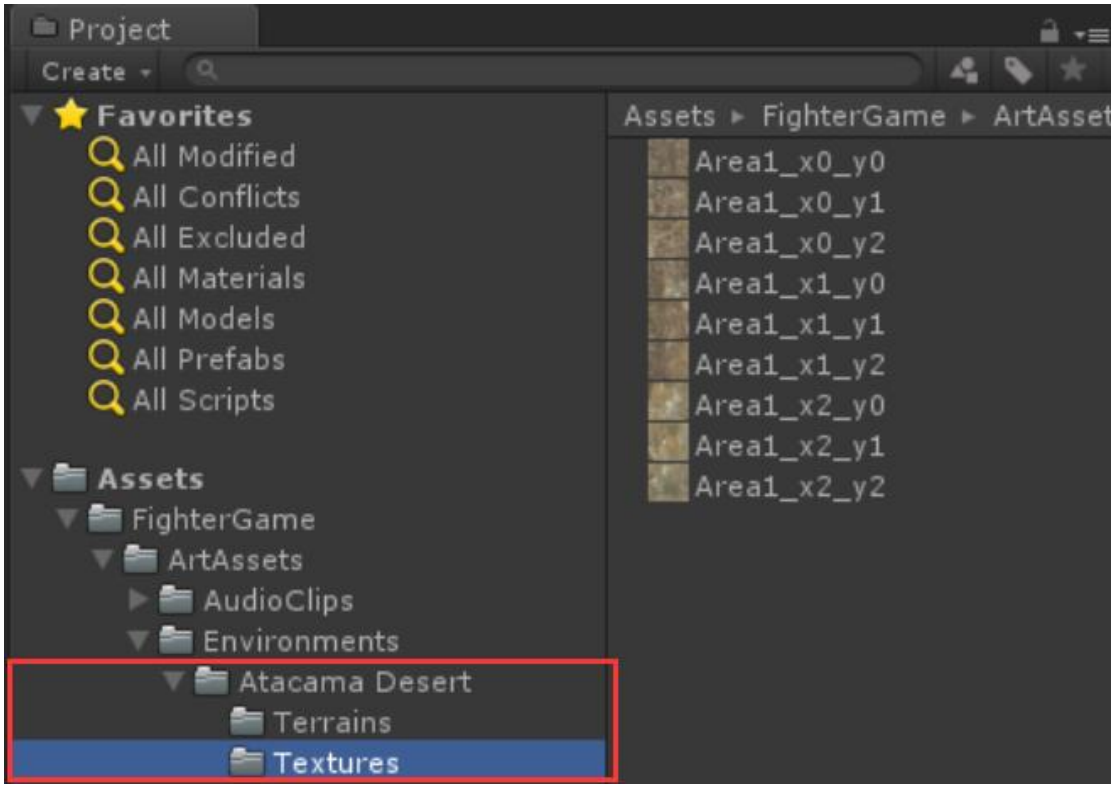
9. Environments

There is a big and beautiful environment in this package, it is the Atacama Desert.

This environment is made up of nine terrain blocks,and these terrains are generated from the the data of the real world on Bing Map.

The longitude of the center of this Atacama Desert on Bing Map is -69.1328
and the latitude of the center of this Atacama Desert on Bing Map is -23.8634





10. Contact

If you have any questions,please email me: swordmaster0080@gmail.com