

RAYCAST_PRO V1.1.0

KIYN_L

GENERAL:

Dear customer, with thanking to you for your purchase this asset, we hope that the Raycast Pro will improving your professional workflow and accuracy of projects. In the introduction below, you will get to know the function of different parts of the tool. Also, if you are satisfied, suggest, criticize and report any problem, please refer to Kian.tianxuan@gmail.com.

This tool consists of different cores, each of which works in a complementary or independent way. This system was chosen because it increases the extensibility of the tool and allows special features to reach all subsets.

For see the main menu of the plugin after installation, you can go in ***Tools*** > ***RaycastPro***. In the following menu, you can easily access most of the components and fast setup them to the Scene.

CONTENTS

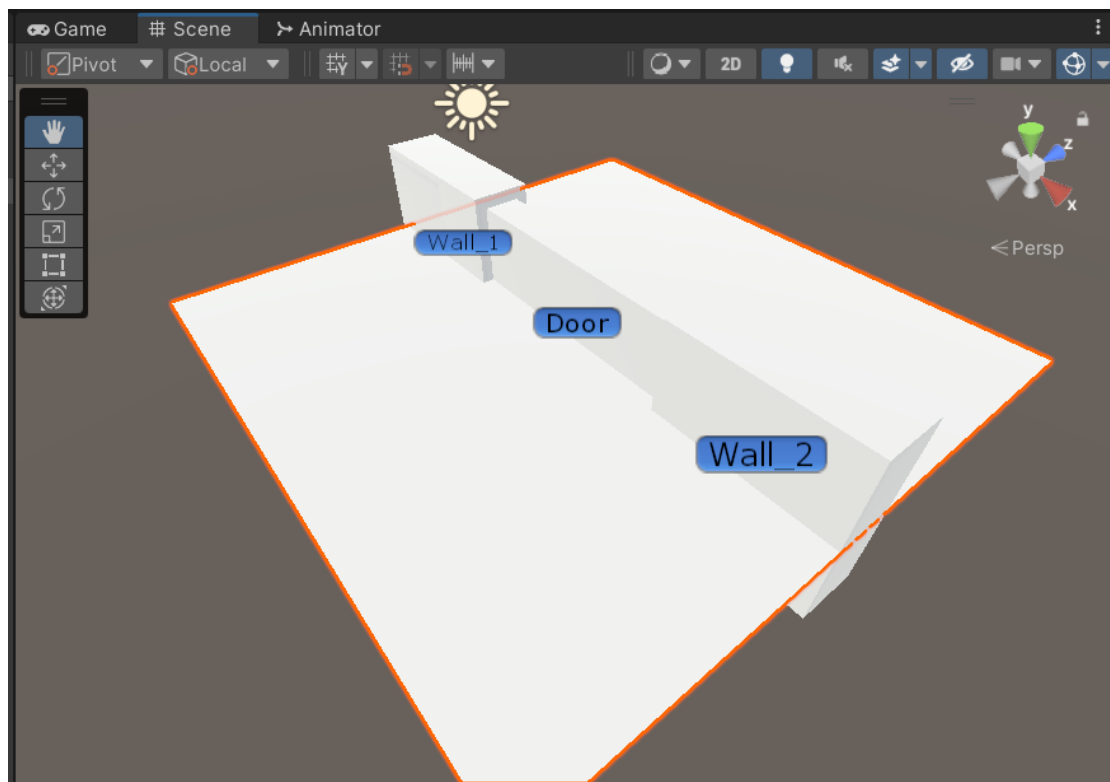
General:	1
How To Setup	4
Description	10
Tags:	11
General Parameters:.....	12
Detect Layer:.....	12
Influence:	13
Trigger Iteraction:	13
Auto Update:	13
Gizmos:	13
Events:.....	14
RaySensors:	14
Liner:	15
Stamp:	18
Path Ray:.....	19
Path Rays List:	20
Properties.....	21
Detectors:	22
Collider Detectors:	22
Smart Solver:.....	23
Ignore:	24
PivoT:	24
NearesT:	25
Furthest:	25
Focused:	26
Dodge:.....	26
How to Get Component Types (Optimize way)	27
How To Setup Target Detector	28
Planers:	32
How To Setup Planar:	32
Base Direction:.....	36
Length Controll:	36
Outer Type:	36
Clone Ray:.....	37
Casters:	37
Basic Caster:	37

How To Setup Basic Caster:	38
Advance Caster:	41
Setup Advance Caster:	41
Ammo:	46
Array Casting (Pool Manager):	48
Bullets:	49
Instant Bullet:	50
Path Bullet:	50
Physical Bullet:	51
Tracker Bullet:.....	51

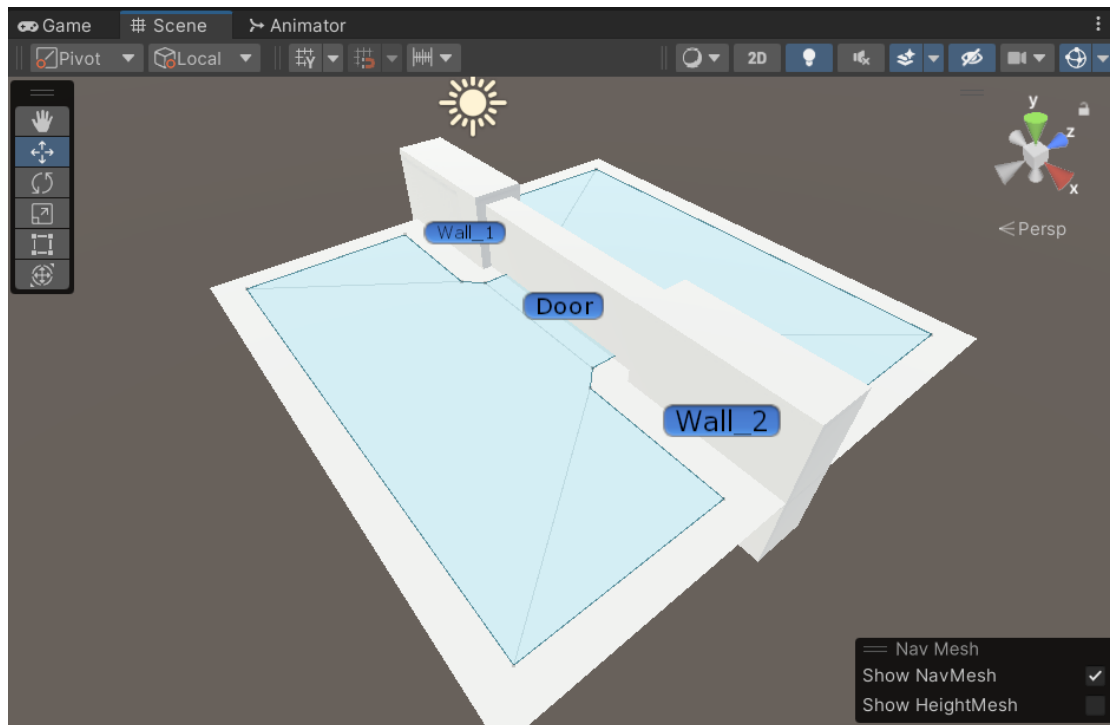
HOW TO SETUP

In the following tutorial, we will learn how to create a simple control with the help of a Pointer Ray and Pipe Ray. It is necessary to have some navigation knowledge before starting the tutorial.

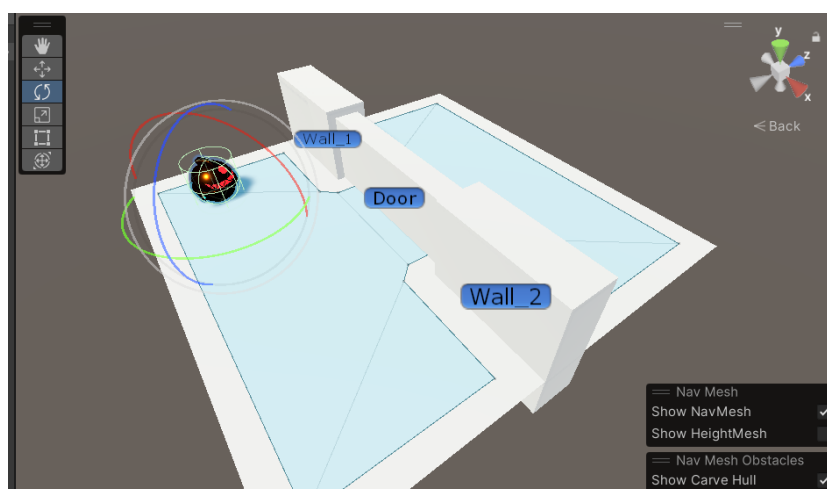
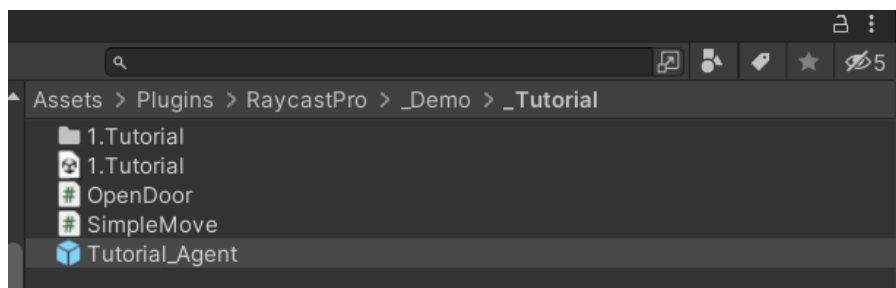
1. First step, make a scene like below, and make the floor and walls 1 and 2 static.



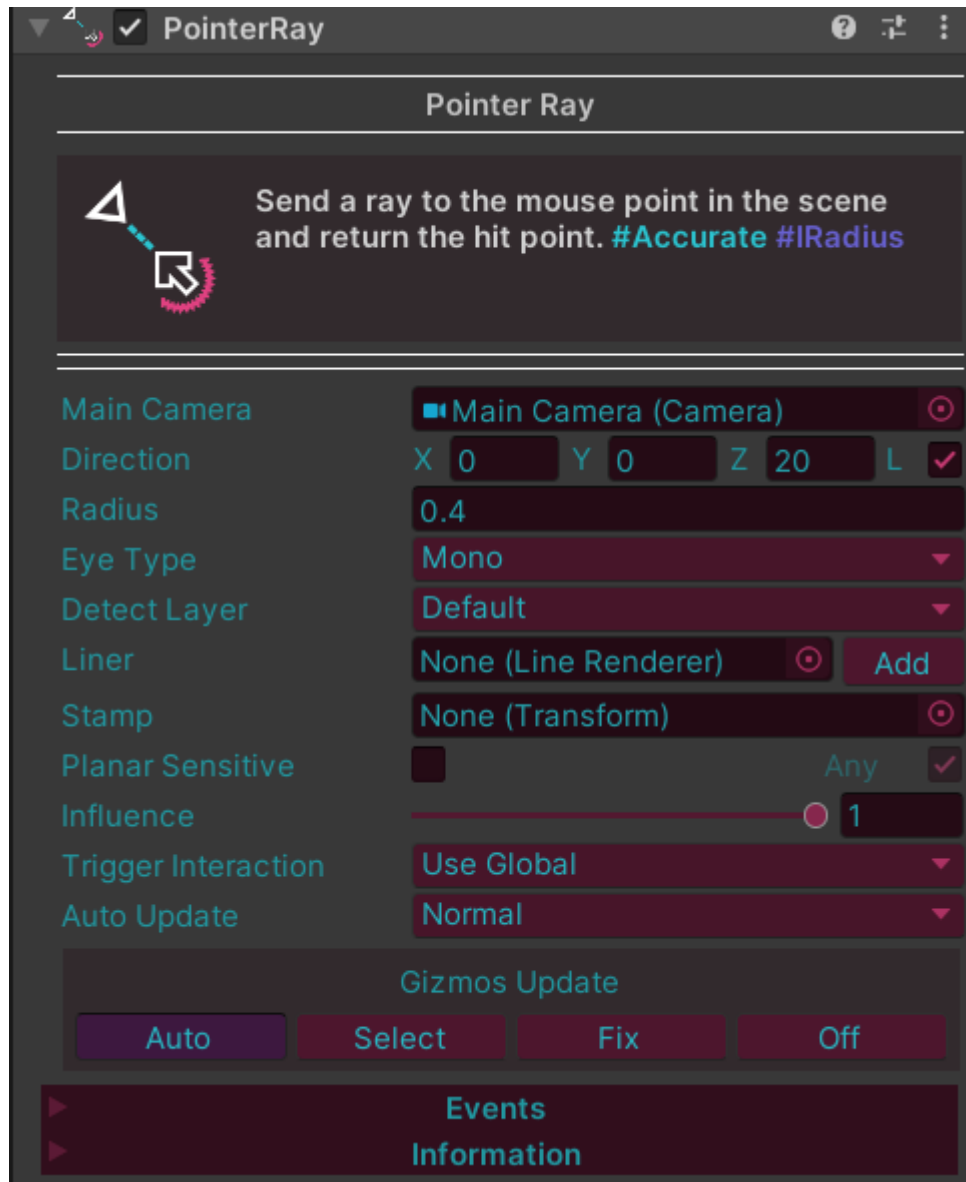
2. After finishing the work, open the menu Windows => AI => Navigation and from Bake Panel, press Bake Button.



3. After doing this, you can take the following prefab from the Tutorial folder and place it on the plane. This prefab includes navmesh agent.



4. To write a simple click mouse control, just select the PointerRay component and add it to the camera. Then increase the length of Ray in the Z direction as below. Now, by pressing the Play key in Editor, you can see the Pointer Ray gizmo on the screen.

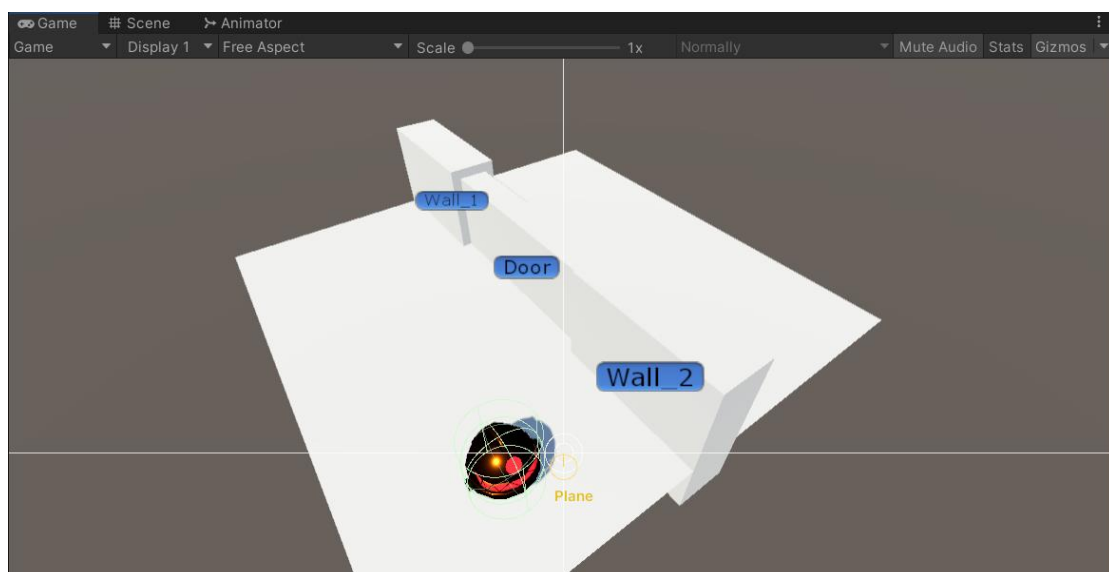


5. Now it is enough to move the agent with a few lines. Create a script like below and connect it to the agent body. Enter the agent and pointer ray in

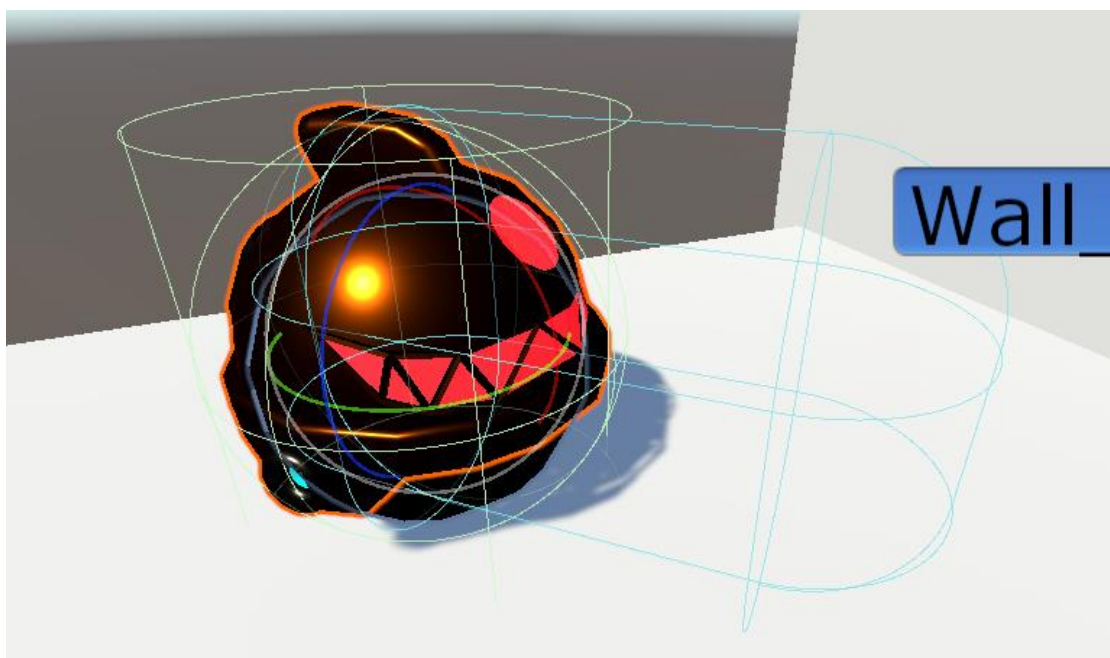
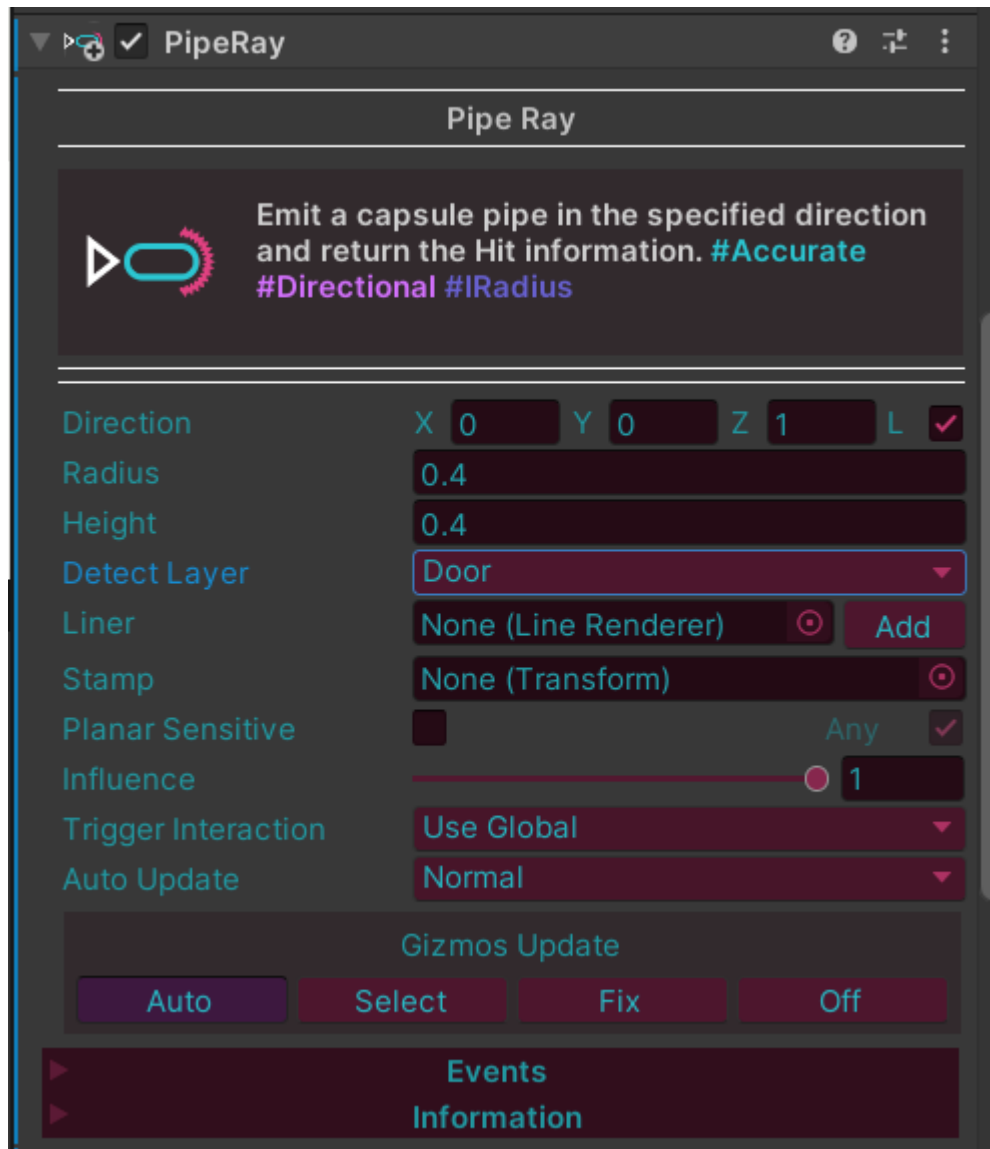
inspector and you will see agent moving by clicking on the plane.

```
1 asset usage
public class SimpleMove : MonoBehaviour
{
    public RaySensor raySensor;  Changed in 1+ assets
    public NavMeshAgent agent;  Changed in 1+ assets

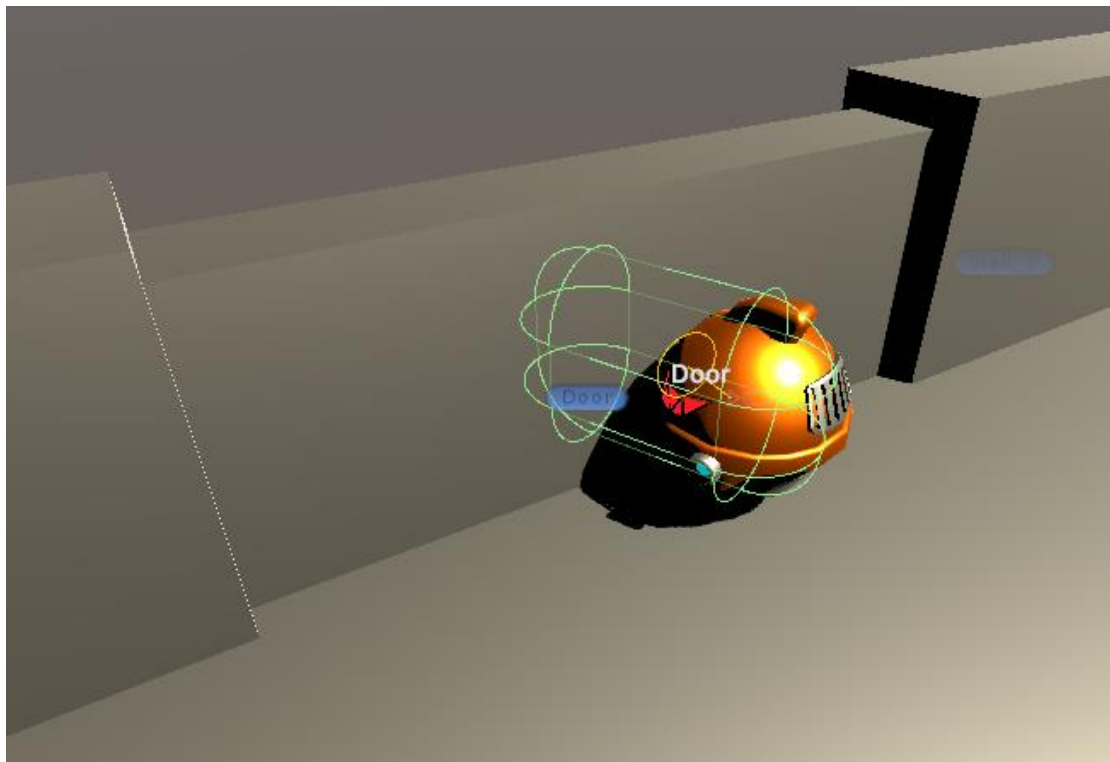
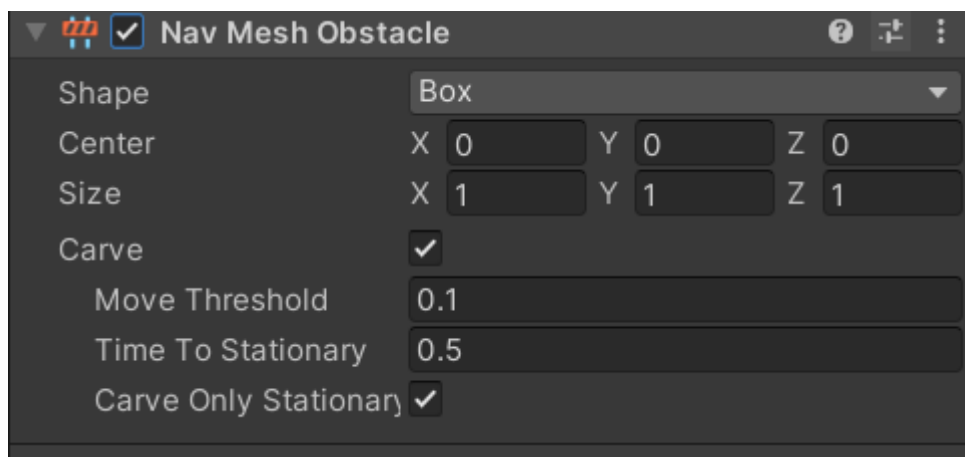
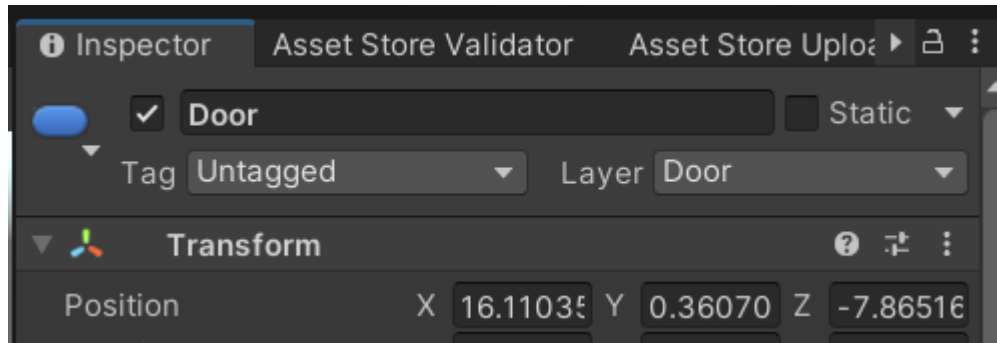
    Event function
    void Update()
    {
        if (Input.GetMouseButtonDown(0))
        {
            agent.destination = raySensor.HitPoint;
        }
    }
}
```





6. Now, in the next step, to open the door, you need to add a pipe ray to the Agent as shown below. Set the dimensions as below and create a layer called Door and set it to Ray.

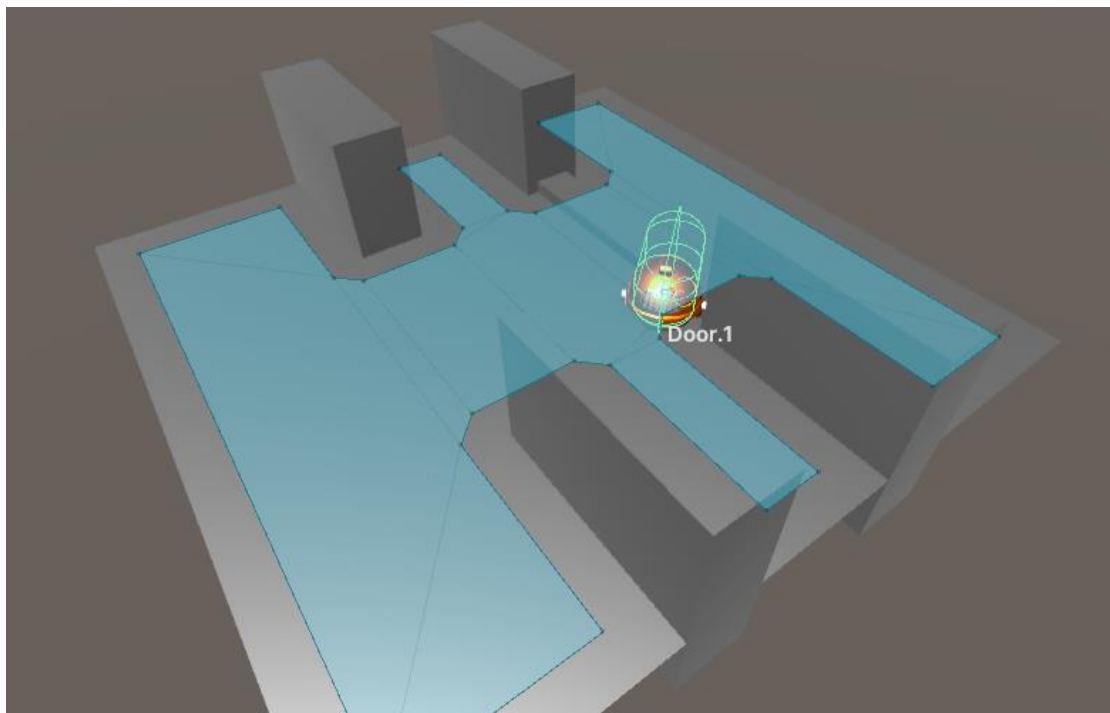


7. Now go to the Door object as shown below, set its layer to Door and also add the Nav Mesh Obstacle component to it.



8. Give the following code to the Agent and just enter the pipe ray in the inspector. After that, every object that is in the Door layer goes to the ground.

```
public class OpenDoor : MonoBehaviour
{
    public RaySensor _pipeRay;  Pipe Ray (PipeRay)
     Event function
    void Start()
    {
        _pipeRay.onDetect.AddListener(call: hit =>
        {
            hit.transform.Translate(translation: Vector3.down*Time.deltaTime);
        });
    }
}
```

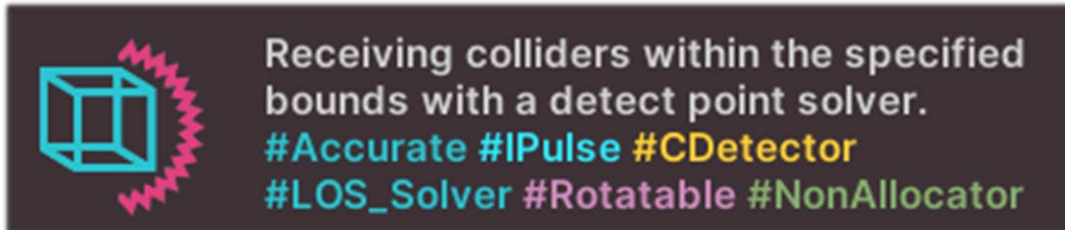


DESCRIPTION

After completing the tutorial above, you may be familiar with Ray's functionality. Now, the following explanations are for getting to know the more advanced and extensive features of this plugin.

TAGS:

Currently, there are about 80 components in the package, whose brief description is provided in the component's header. In addition, the following hashtags will help you to learn more about its function and the ambiguities of its use.



- **#Accurate**: This tag means full accuracy of ray in matching between gizmo and physics calculation.
- **#Directional**: This tag means ray support in directional mode. Some rays without this tag don't need it logically.
- **#PathRay**: These types of rays can reference or calculate a chain of vectors and control casting along the path and support some special RCPRO features.
- **#CDetector**: in short of Collider Detector. The focus of this detector is on detecting colliders with enter and exit events or sync a special component type for find.
- **#RDetector**: in short of RaycastHit Detector. The focus of this detector is on finding Raycast hits.
- **#LOS_Solver**: This tag shows that the desired detector covers Los directly and you don't need to implement it manually.
- **#Recursive**: This tag is for rays that have used recursive functions to determine the path.
- **#Virtual**: This tag shows that the component is virtual and cannot be adjusted in the editor.
- **#Dependent**: This tag shows that the component needs other tools as reference to be used.
- **#IRadius**: This tag indicates that ray uses IRadius interface, which usually supports radius.

- **#IPulse**: Covers a variable that called **pulse**, which creates a gap between the processing to greatly help optimization.
- **#INonAllocator**: Indicates that the desired Detector supports NonAllocator detection. This reduces the possibility of generating garbage, but because the detectors also perform other filtering, it does not necessarily mean that they become zero.
- **#Scalable**: For components whose detection dimensions change by changing the transform's scale.
- **#Rotatable**: For components whose direction is also changed by changing the transform's rotation.
- **#Preview**: Probably this tool has been recently added and is in the testing phase. The name of the parameters or its mechanism may be changed for better performance and efficiently later.
- **#Experimental**: Experimental tools have more limited functionality and may cause crashes that alert you to be careful while using them.

GENERAL PARAMETERS:

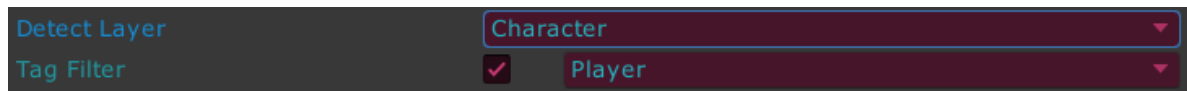
The following variables exist in most components and are effective for use in all tools.

DETECT LAYER:

The detection layer is the most important parameter of all the components with which you can identify and separate the detectable colliders. Specifying layers is accessible in the header of each GameObject.



In **Detectors**, also **Tag filter** has been added for more control.



INFLUENCE:

Influence parameter is used for ease of coding. From where it is considered, your ray works together with other scripts. The influence value can be used as a coefficient. For example: ***HP -= influence * damage***

TRIGGER INTERACTION:

Specifies how ray collides with ***IsTrigger*** colliders. ***Use Global*** means to use project settings and ***Collide*** means to accept ***IsTrigger*** for hitting.

AUTO UPDATE:

Automatic processing mode between **Fixed**, **Normal** and **Late**. If you need to update the manual, just **Turn off the component**. In this case, the gizmos may not be updated quickly in **PlayTime**, because the **casting** isn't always performed, but it works completely reliably in the **Editor**, and you can test them perfectly real-time.

If you have many Rays that performance is important to you, it is highly recommended to use them as Manuel.

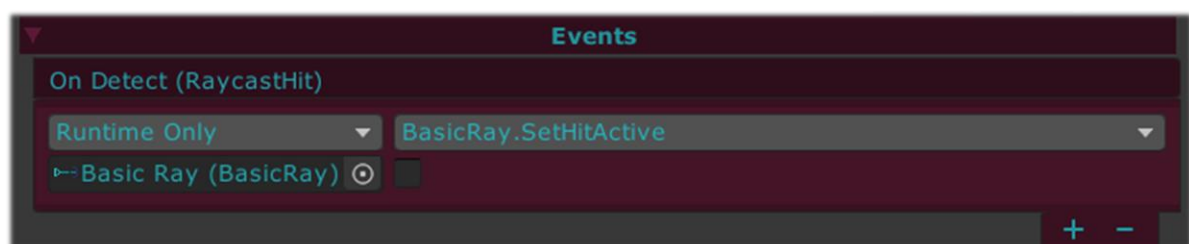
GIZMOS:

This option specifies how the gizmo should be updated. The **Select** option works only when object is selected, and **Fix** will permanently active. It is recommended to set it to **Off** when you are sure It works to increase scene performance.

Auto: Automatic mode shows the gizmo when detecting in-game and it works in Scene as well as during Select.

EVENTS:

Events help you to have detection and non-detection events and to be able to control scripts through it. Keep in mind that some functions are placed in the body of the component itself for ease of coding.



This code shows you how to submit orders to events from Script.

```
[SerializeField] private BasicRay basicRay;  🔄 Unchanged
🔄 Event function
private void Start()
{
    basicRay.onBeginDetect.AddListener(R :RaycastHit =>
    {
        Debug.Log($"{R.transform.name} is Detected!");
    });
}
```

RAYSENSORS:

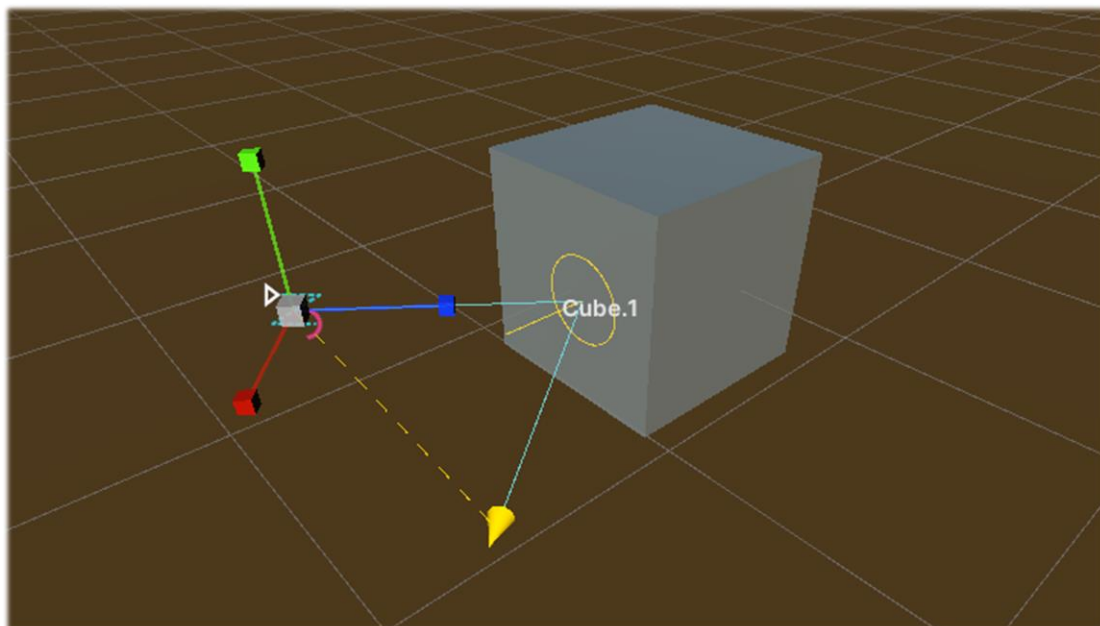
In general, RaySensors return an output of type RaycastHit. They can cover the ray path by a **LineRenderer** and leave a **stamp** at the hit point.

LINER:

Liner is an abbreviation of LineRenderer, which is named so because of its ease of use. All Rays in the plugin can place one or more LineRenderer on their path with full precision.

1. Although adding a Liner is very simple and doesn't really require a long explanation, in this example I will teach a Reflect Projection. Just add a ReflectRay from the RaycastPro panel.

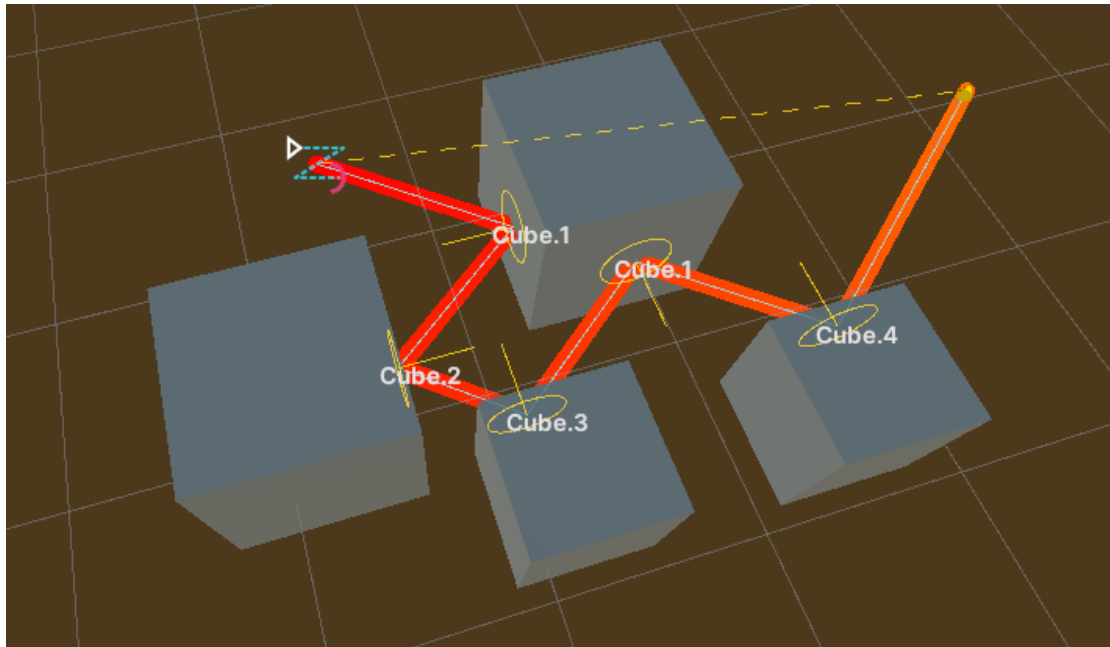
2. Bend the angle a bit, increase length by adjust Z, so that it touches a Cube, then change the **Reflect layer** to Default and **Detect Layer** to Nothing so that the Ray only reflects itself and you will see something like below.



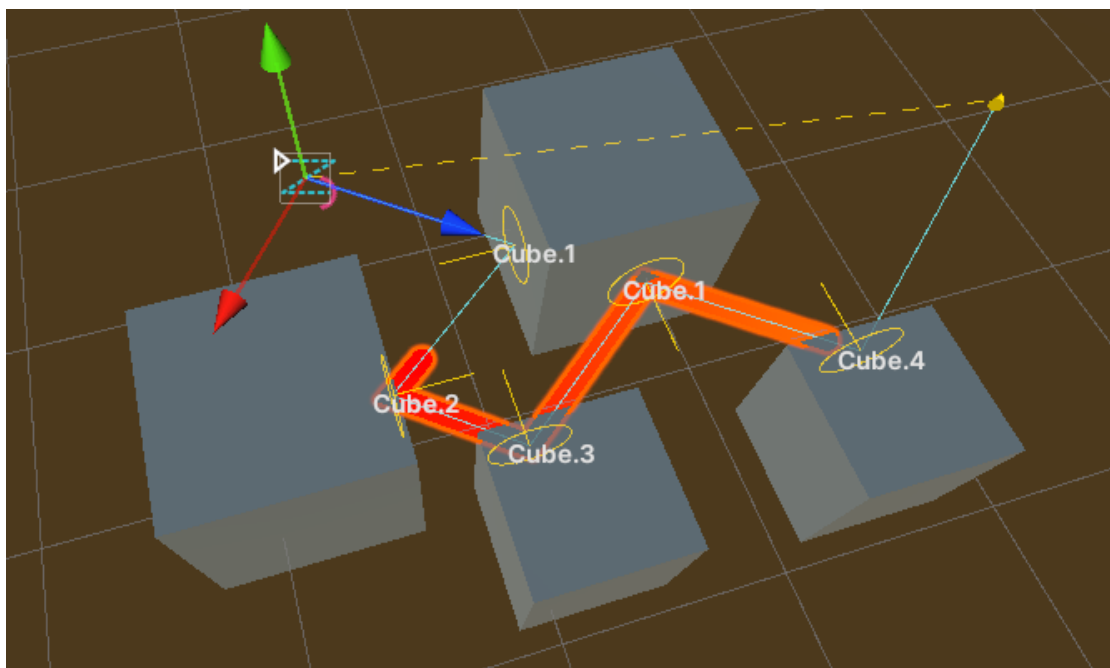
3. Click Add next to the Liner to automatically add it to the Ray. Now is the only need. To adjust the color and dimensions of the projection.



4. By placing the Gizmo in **Fix** mode, you can see and adjust the projection in real time in the Editor. There is no problem by changing parameters and adding Cube.

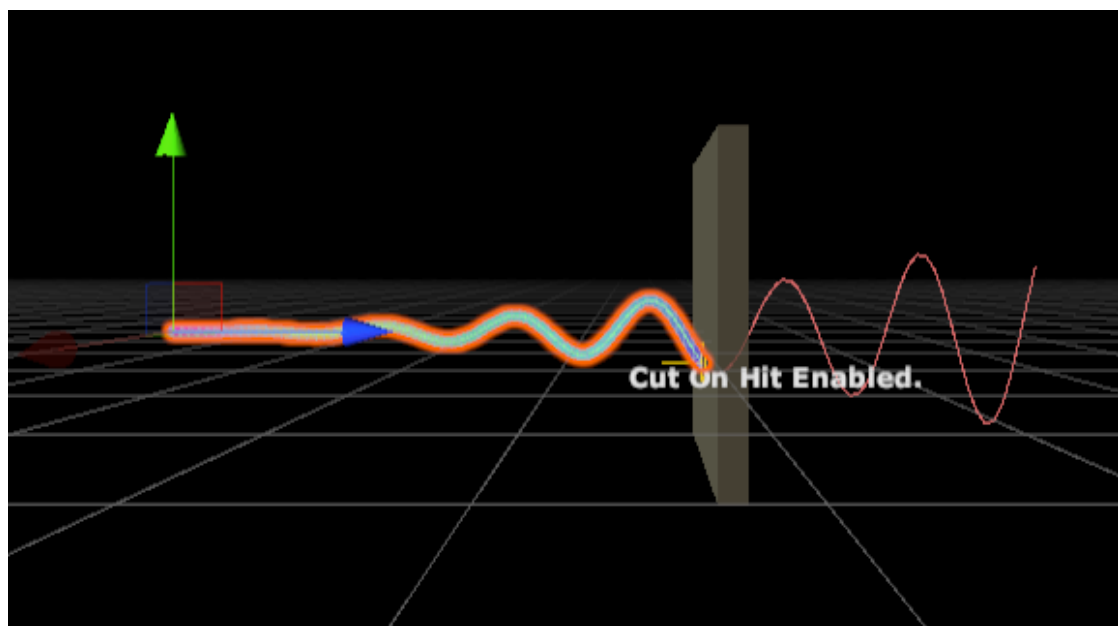
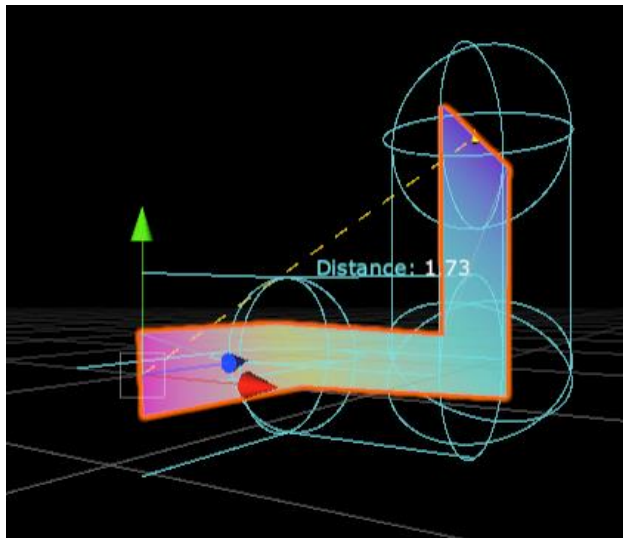


5. And by changing the Clamped Position values, the LineRenderer will be cut in its area.





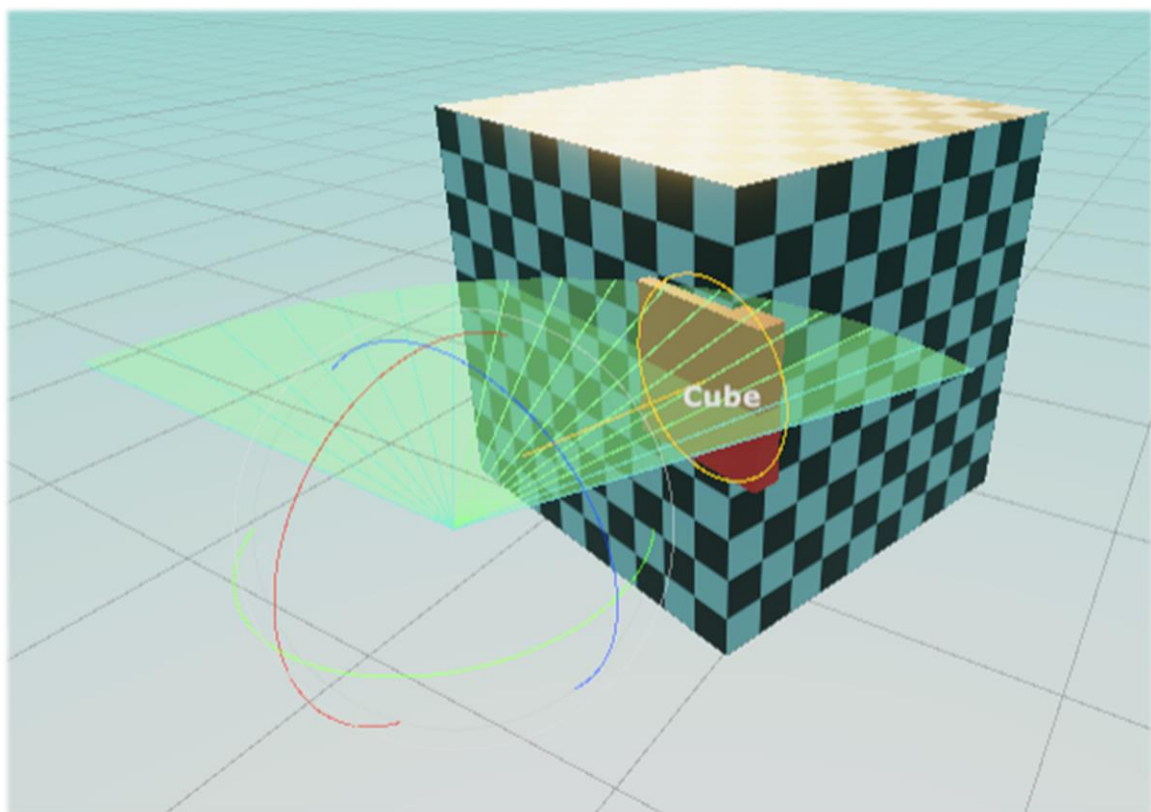
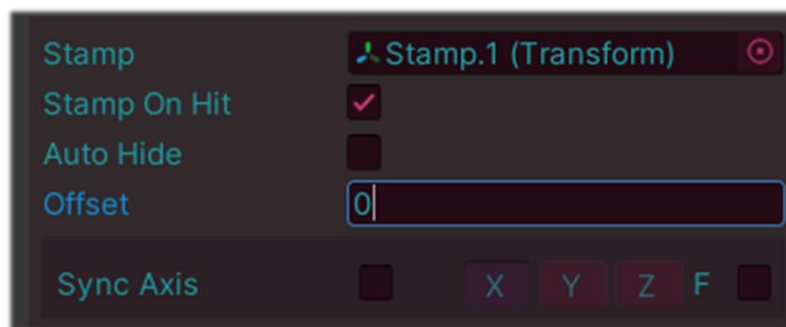
Cut on Hit: It will be cut off when hitting the collider.



If you need to have more liners. Just select RayLiner from the Utility panel and add ray to it.

STAMP:

In the stamp settings, **Stamp on Hit** moves its location to the Hit Point when it hits, and it is placed on the Tip otherwise. At the bottom of the **Auto Hide** option, it will display the stamp only when encountered. Other options are related to specifying offset and direction.

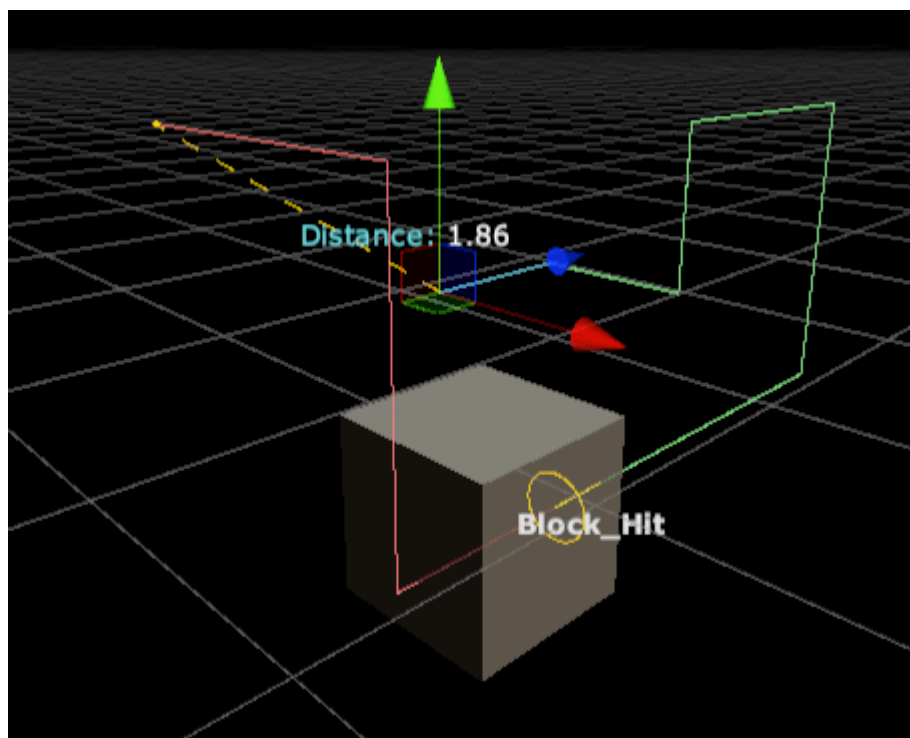


Important Note: If your stamp layer is the same as the ray Detect Layer, you may see a crazy behavior in scene, this is because the Ray tries to target the stamp itself. Make sure that the stamp layer is not the same as the **Detect Layer** or has not a collider.

PATH RAY:

Basically, this category of Rays includes a list of points called **Path Points** and **Detect Index**. These points are calculated in different Path Rays and their system is like this, they send direct rays from one point to the next point in a chain, and the first detection point interrupts the process.

In the example below, you can see a **ChainRay**:



PATH RAYS LIST:

1. **ChainRay:** This Ray normally receives the points and releases the Ray in its path. In Transform mode you will be able to easily animate points.
 2. **ReflectRay:** This Ray, like other Rays, can process collisions in the Reflection Editor itself, such as the impact of a billiard ball, and the collision points will change dynamically. The important part is to place the Reflect layer.
 3. **WaveRay:** This Ray is an algorithmic, mathematical processor that can help you in randomization or accurate processing of sinusoidal functions, although it is natural that it consumes more performance than other Rays.
 4. **ArcRay:** This Ray is a Velocity-based processor that includes local and global states both in the initial and general angle, so that you can use it in Trajectory calculation.
 5. **CurveRay:** This Ray consists of several Animation Curves and segments that help to create the sensor in a curve-shaped manner or creative gun shots.
 6. **HybricRay:** And finally, if you need to combine Rays to create a nested expression, Hybrid Ray solves this problem by stacking other Rays together and processing them in one shot.
- PathCast:** This option processes all Rays one after one as PathCast. This option will show a yellow dotted gizmo around the ray and the ray will be cast seamlessly; your hybrid hit point will be displayed with an offset to its source ray.

Hint: You can remove the PathCast option in PathRays when you only need their Liner to avoid unnecessary processing.

PROPERTIES

Direction: Automatically selects the exact direction in either World or Local mode.

LocalDirection: Returns pure Local direction without the effect of Normalize.

TipDirection: Returns the subtraction of Tip from Base as the direction.

HitDirection: Returns the direction of the last ray break on the surface as the direction.

Tip: Returns the position of the Ray's tip.

TipTarget: Automatically returns the location of the last hit point of the Ray and replaces the Tip point if there is no detection.

HitDistance: Returns the exact distance of the ray to the hit point.

ContinuesDistance: Considers and returns the remaining distance of Ray from the hit point.

DirectionLength: Returns the size of Direction itself in pure form.

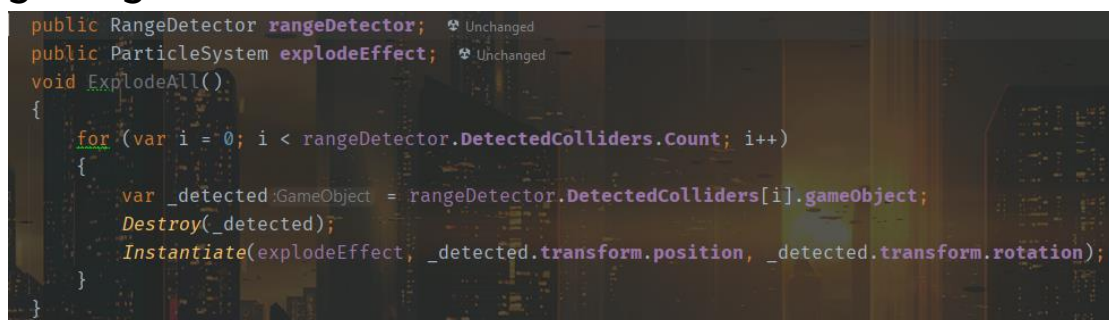
RayLength: This option calculates and returns the total length of the Ray.

DETECTORS:

Detectors have various applications, whose working method is based on sending multiple Raycasts and receiving colliders. In the RaycastPro plugin, the detector tools use their high potential to accelerate and accurately perform detection.

COLLIDER DETECTORS:

The most common and probably the first type you will come across are **Collider Detectors**, they simply detect Colliders in their area and pass through their filters. In the meantime, after setting the parameters that you explain, you only need to access the anthologies by getting the **Detected Colliders** member.

A screenshot of a code editor showing C# code for a RangeDetector class. The code includes two public fields: RangeDetector rangeDetector and ParticleSystem explodeEffect, both marked as 'Unchanged'. A void method ExplodeAll() contains a for loop that iterates over rangeDetector.DetectedColliders.Count. Inside the loop, it gets the GameObject from DetectedColliders[i], destroys it, and instantiates the explodeEffect at its position and rotation.

```
public RangeDetector rangeDetector; * Unchanged
public ParticleSystem explodeEffect; * Unchanged
void ExplodeAll()
{
    for (var i = 0; i < rangeDetector.DetectedColliders.Count; i++)
    {
        var _detected:GameObject = rangeDetector.DetectedColliders[i].gameObject;
        Destroy(_detected);
        Instantiate(explodeEffect, _detected.transform.position, _detected.transform.rotation);
    }
}
```

Radius: The Radius parameter in the Range Detector along with the Height are the dimension setting indicators, and you can visually and live determine the volume of the area whose colliders need to be detected.

TagFilter: As the name suggests, in addition to the Detect Layer, the Tag filter has also been added to the Collider Detectors.

NonAllocator: This tick helps to avoid updating the dimensions of List, With the active option, You will need to reserve enough memory in the detection array and the selection of colliders will be limited to the incoming

array, this will prevent the creation of Garbage, Although the Raycast Pro plugin has extensive settings and filtering, and the overall goal is to make the tools more efficient than just optimization.

SMART SOLVER:

One of the important features of Detectors in Raycast Pro is their Smart Solver option. You can switch between different taps and see how they work. While this is very simple way you can implement an intelligent Line Of Sight system.



Block Layer: A layer intended for blocking objects. If it is the same as the detect layer, it will detect the front object and block the backs.

Bounds Solver: This option is considered for optimization and limits the detection point in the bounds of a cube.

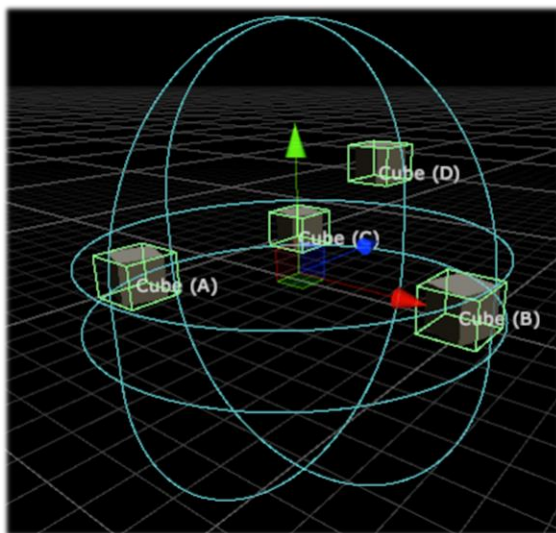
Collect LOS: Be sure to enable this option if you need to get the Hit Info of the LOS block hit point. They are stored in a dictionary with the key to the main blocked Collider and you can easily call them as below.


```
foreach (var detected:Collider in rangeDetector.DetectedColliders)
{
    var blockHit = rangeDetector.DetectedLOSHits[detected];
    Debug.DrawRay( start:blockHit.point, dir:blockHit.normal);
}
```

Check Line Of Sight: By activating this option, the blocking line will be checked.

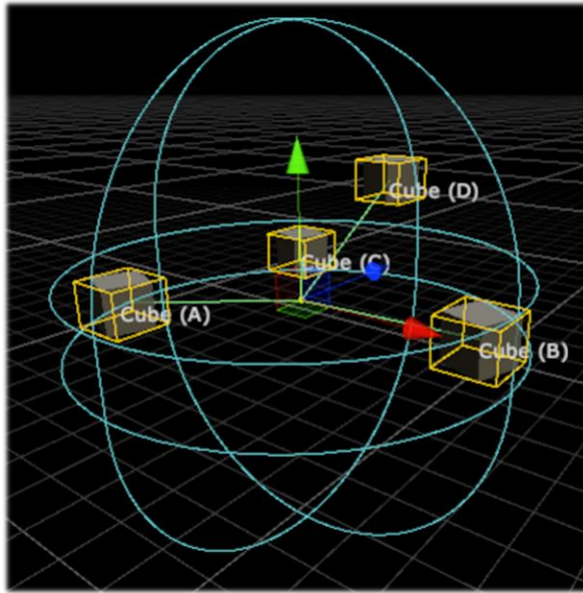
IGNORE:

It only avoids determining the detection point and line of sight and has the best performance.



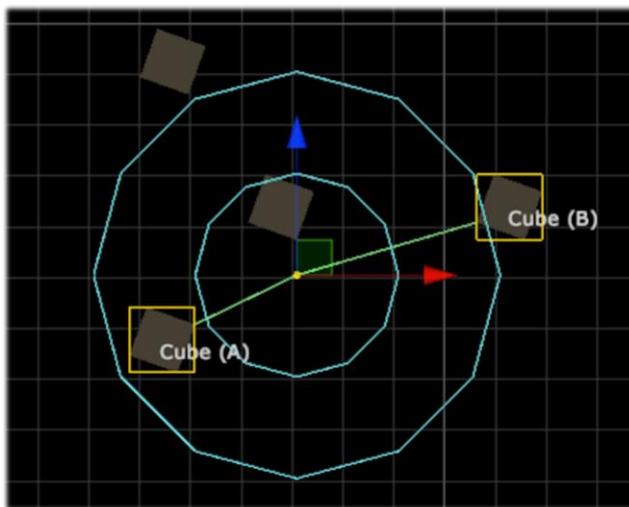
PIVOT:

It places the line-of-sight point in the pivot of every collider and has the highest performance after Ignore.



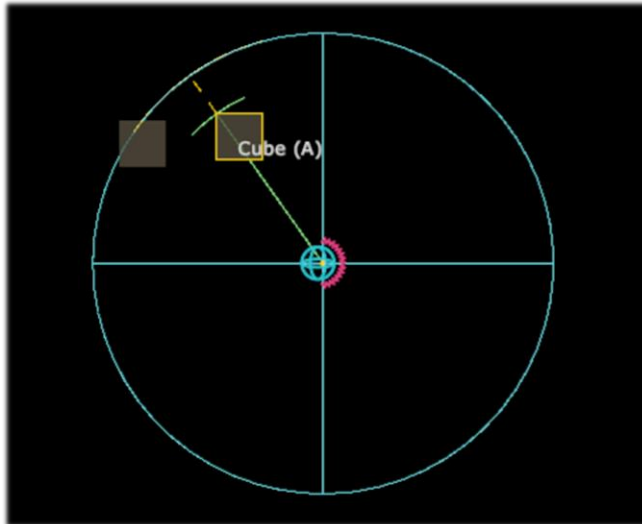
NEAREST:

The detection point is the closest to the center of the detector.



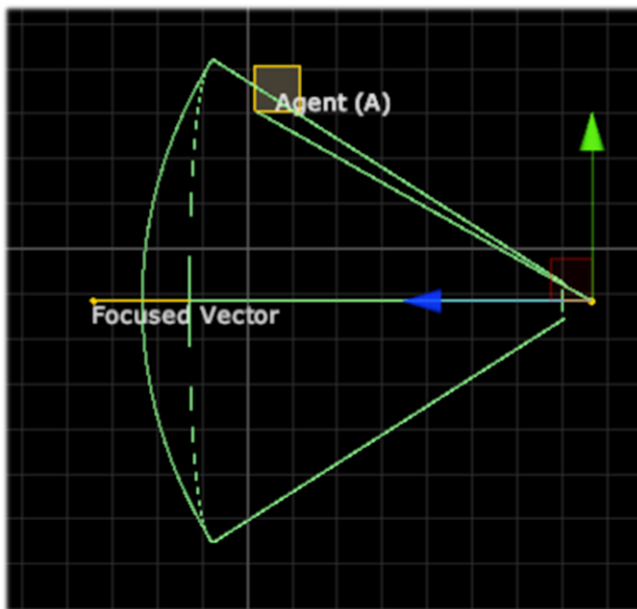
FURTHEST:

Places the detection point at the farthest place from the center of the detector. This option is used when you need your Collider to be 100% inside the area.



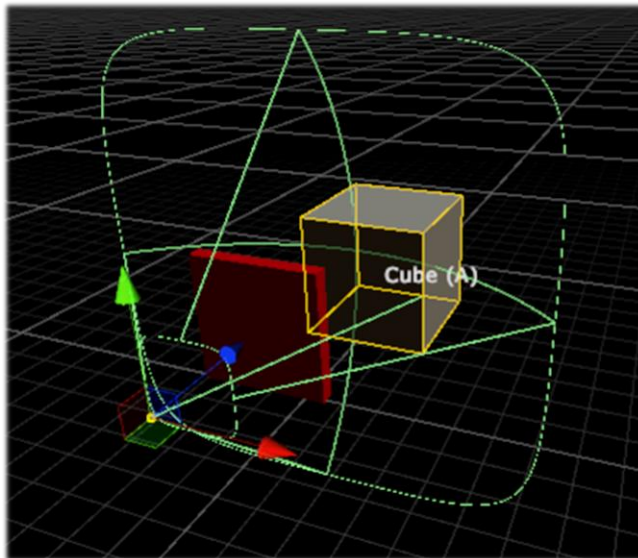
FOCUSED:

As seen in the image below, the detector tries to find the closest point to the focus vector. This option is used for Sight Detector, because your Agent is able to easily detect another Collider from the edge.



DODGE:

It always tries to find the best way to avoid blocking, however, it has the slowest performance compared to other detectors. It is recommended to activate the bounds solver when using it.



HOW TO GET COMPONENT TYPES (OPTIMIZE WAY)

But if you intend to get a specific component in the update function, **GetComponent** is heavy method. The **SyncDetection** function transfers Colliders to the list during the entry and exit event and is optimized to a large extent.

1. Create a script called Agent Data and give it to the enemy characters. Then by Defining a list of AgentData and a little of code, Detector will automatically add it to the list.

```
No asset usages 1 usage
public class AgentData : MonoBehaviour
{
    public float hp = 100f; | Unchanged
}
```

Add this Script to your **Detector Carrier**:

```
public RangeDetector rangeDetector;  ⚙️ Unchanged
public List<AgentData> agentData;  ⚙️ Serializable
⚙️ Event function
private void Start()
{
    // Automatically receives Component: Agent Data.
    rangeDetector.SyncDetection(agentData, onNew: agent =>
    {
        Debug.Log( message: $"{agent.name} has Entered Detector.");
    }, onLost: agent =>
    {
        Debug.Log( message: $"{agent.name} has Exited Detector.");
    });
}
```

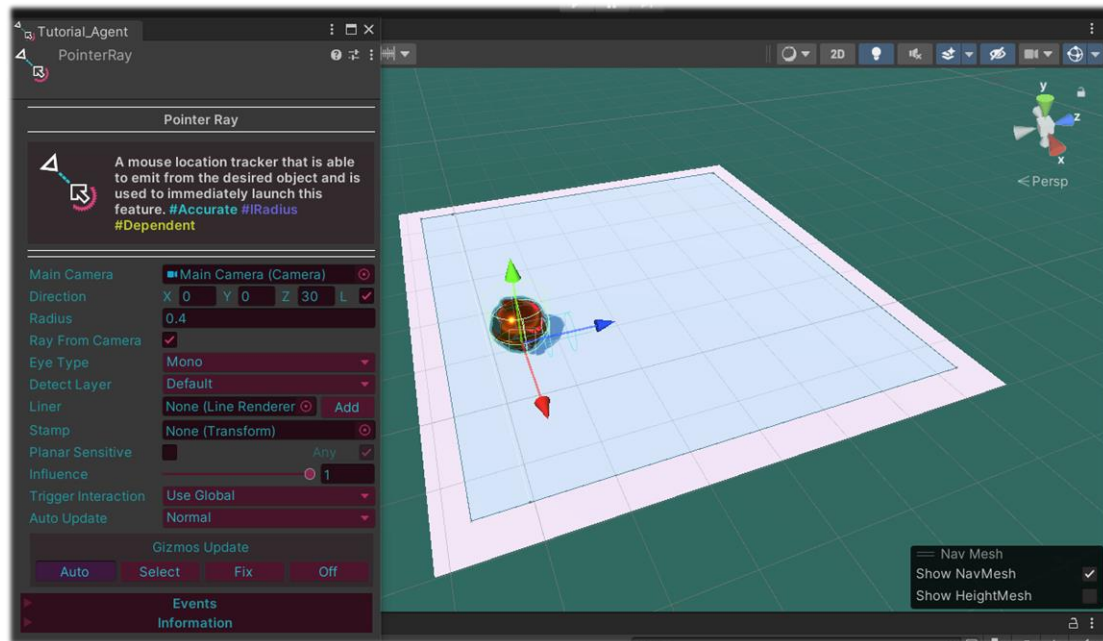
2. After access, it is easy to change any member of this list with codes like below.

```
⚙️ Event function
public void FixedUpdate()
{
    foreach (var data in agentData)
    {
        data.hp -= Time.fixedDeltaTime * 4f; // For example...
    }
}
```

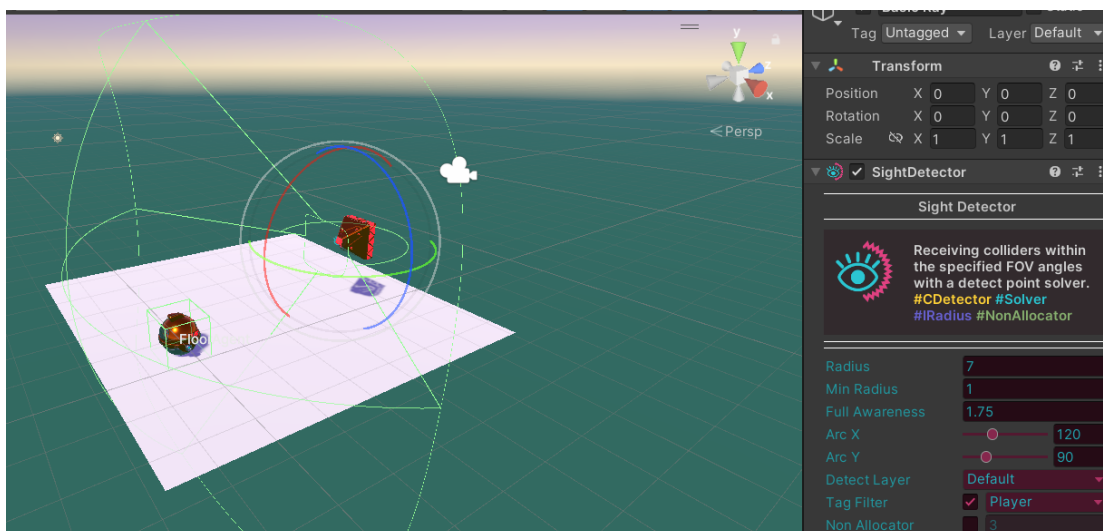
HOW TO SETUP TARGET DETECTOR

In this tutorial, we want to describe how to work with **Target Detector**, although it seems to have a simple function, but by combining it with **Sight Detector**, you can have a member detector that gives you the percentage of sight.

1. So, first of all, make a controllable scene with the help of Pointer Ray and Tutorial Agent and make sure it moves. Place the agent in the Default layer along with the Player tag and enter the next step.

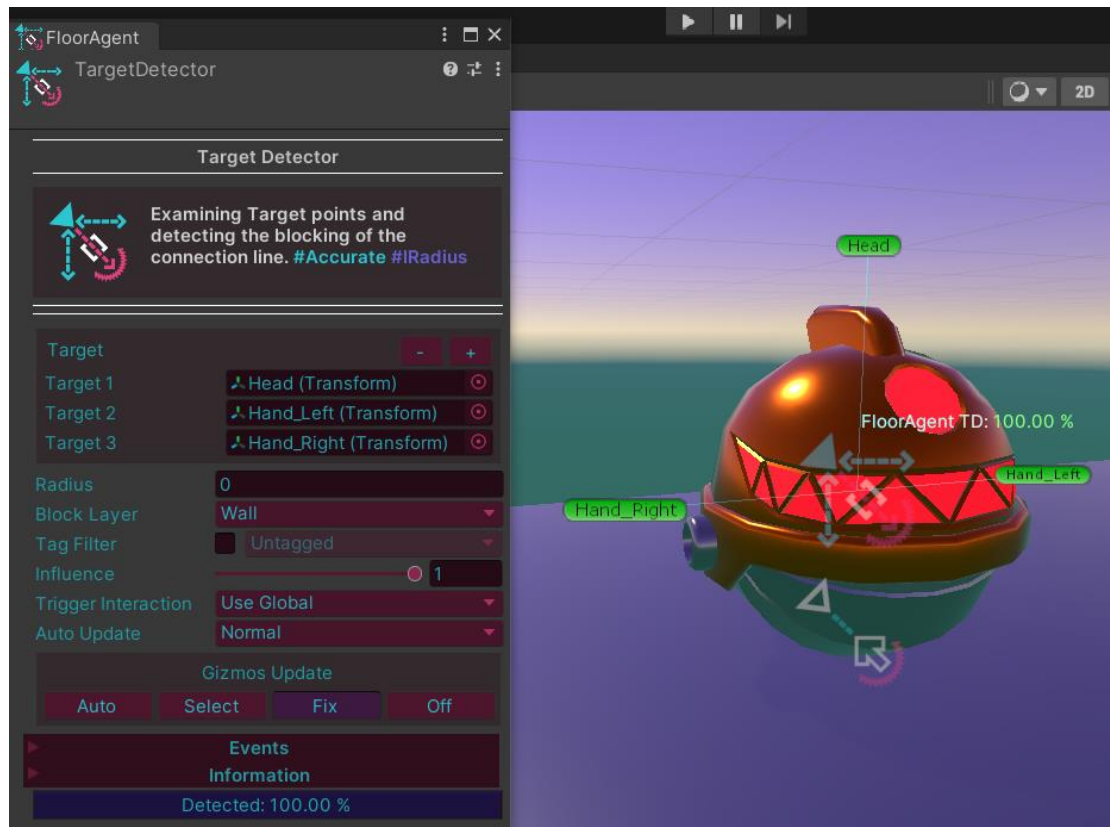


2. After doing this, you need to mount a Sight Detector on your Agent's eye. Now you need a Sight Detector which can be your own or the enemy. For a quick explanation, I use a PyroCaster. Find it in the demo Prefabs and after unpacking, place a Sight Detector on its tip. Set dimensions and size to standard and make sure you are using Tag Filter of Player.



3. If the agent is working properly, it will be displayed in real-time and you don't need continuous tests. Now you need to install a Target Detector on your Agent and

specify the parts. Since this agent has no hands and feet, you can choose hypothetical points around him. If the targets are correct, it will display 100% visibility, now you need to set the Layer block to Wall. Also make sure the component is disabled.

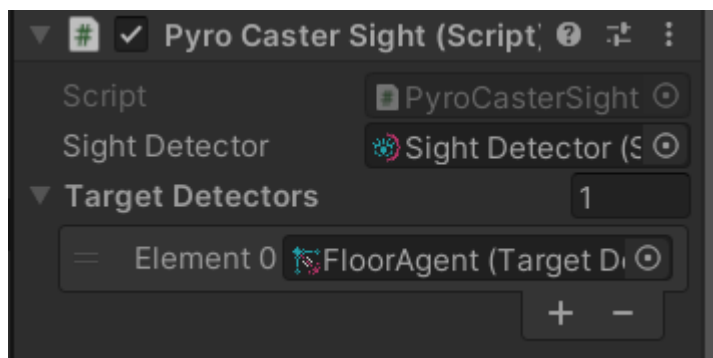


4. The way it works is that our Sight Detector always finds the Target Detector component and then casts it from its point instead of Casting from within the Agent itself and returns visibility information. This method is very flexible, and you can improve your target detector. To run this system, it is enough to create a list of Target Detectors in the special PyroCaster component and sync it to Collider Detection so that the list is automatically updated. Then start casting from there.

Write the following script and add it to PyroCaster as described above. After selecting the SightDetector, press

the Play button and as soon as the Collider is detected, your List will be updated.

```
public class PyroCasterSight : MonoBehaviour
{
    public SightDetector sightDetector; // Unchanged
    public List<TargetDetector> targetDetectors; // Serializable
    // Event function
    void Start()
    {
        sightDetector.SyncDetection(targetDetectors);
    }
}
```



5. The following code starts Casting manually and returns the correct visibility. Here, each TD object is the one that is displayed more than the specified value.

```
// Event function
private void Update()
{
    foreach (var TD : TargetDetector in targetDetectors)
    {
        if (TD.CastFrom(transform.position) > .33f) // If sight more than .33%
        {
            Debug.DrawRay(start: TD.transform.position, dir: TD.transform.up, Color.green); // draw a ray for debug
        }
    }
}
```

6. This solution gives you access to the found object, but easier solutions with simple components will also be developed in the future.

PLANERS:

planar is a tool to guide the direction of the RaySensor and in this version it is offered as an **experimental version**.

HOW TO SETUP PLANAR:

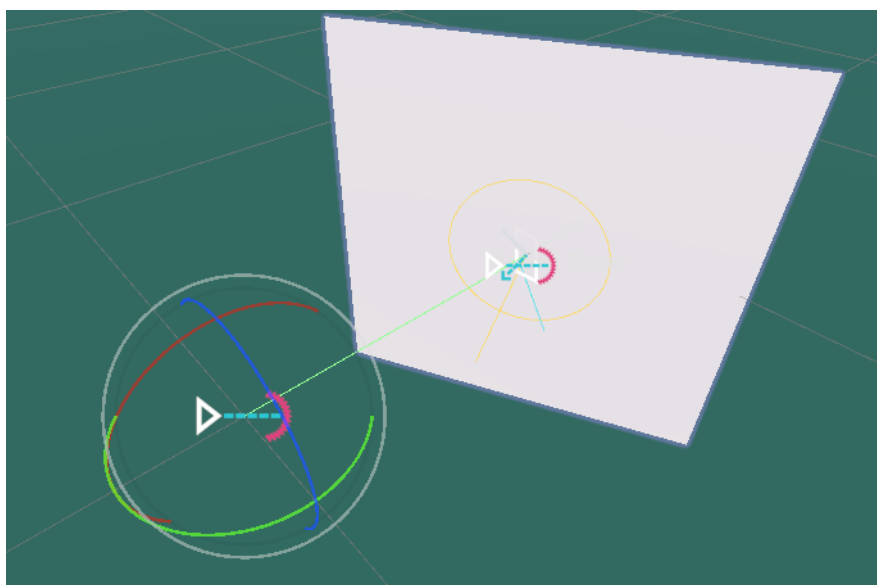
1. Create a new scene and a Basic Ray from the Raycast Pro panel.



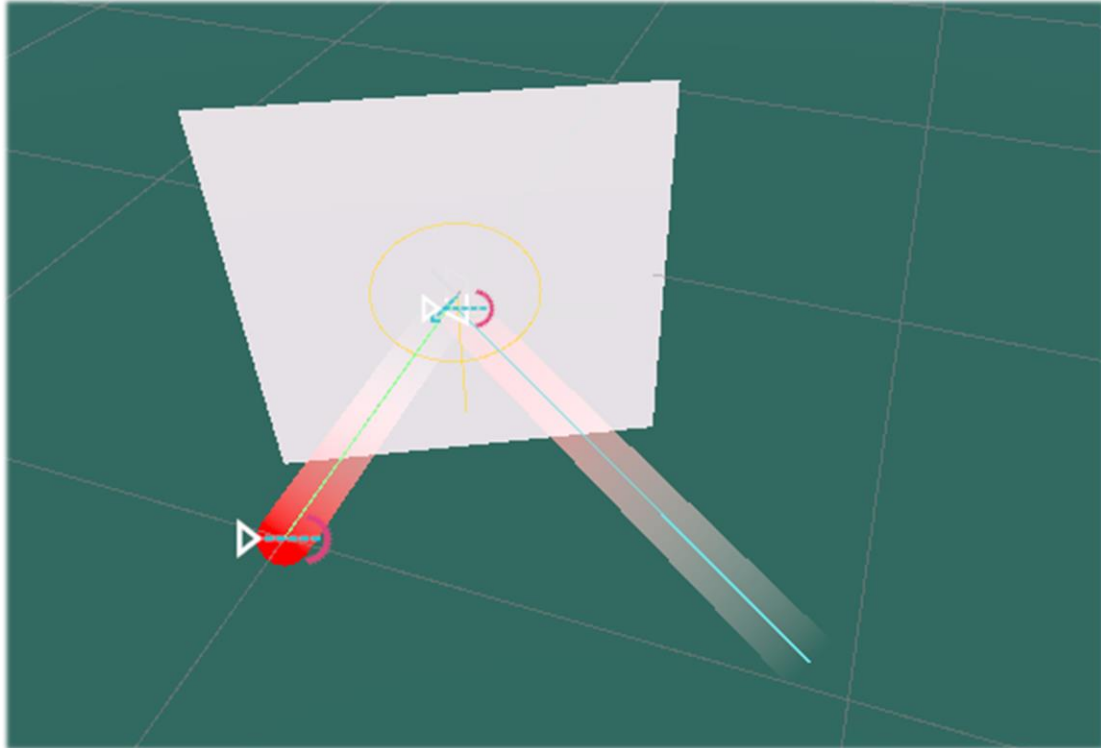
Make sure you tick Planar Sensitive, the Any option means accepting all planers. Otherwise, you have to select planar manually, which of course has better performance.

2. Now select a Reflect Planar from the panel and place it in front of the Ray as shown below. Then turn it slightly until a reflected ray has been seen.

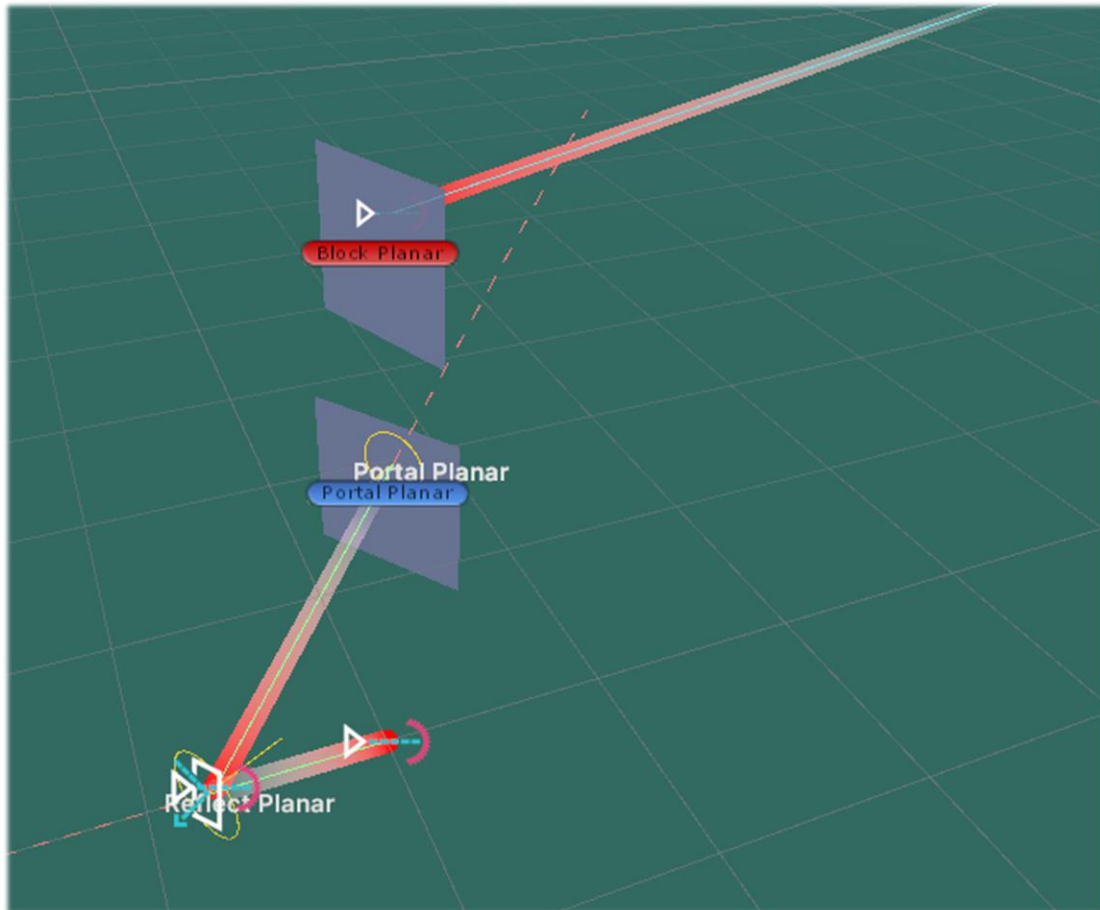
Hint: planers cannot work in Real-time in the Editor due to the creation of clones, but by pressing the play button, the process of creating clones starts.



3. Stop again and play after setting a **Liner** to Cut On Hit mode. The clone automatically tries to copy the parameters of the Ray behind it.

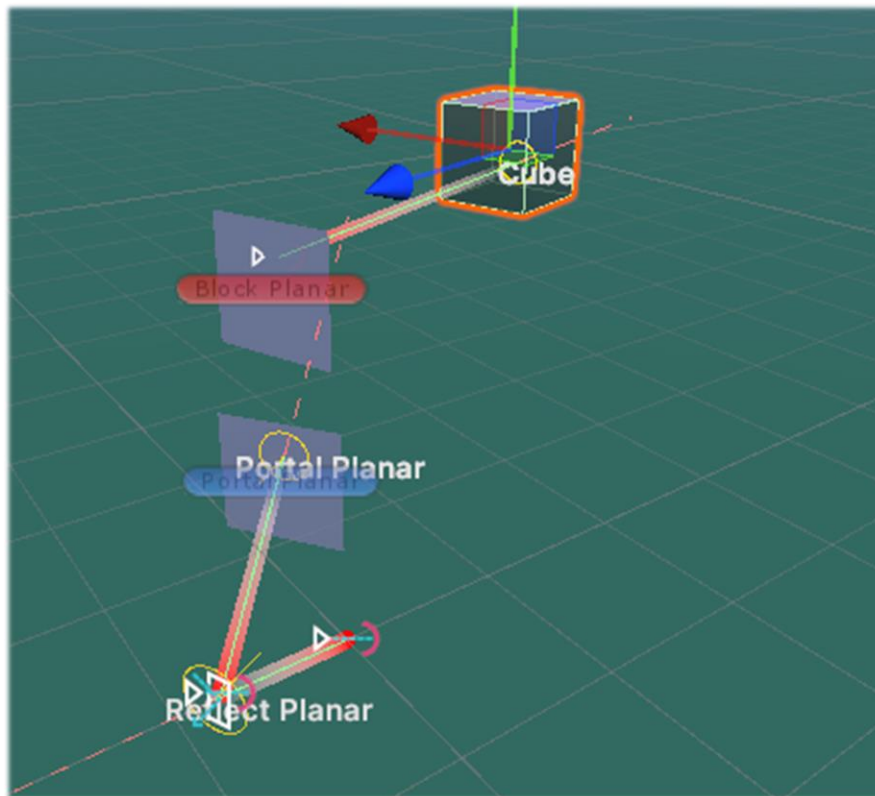


4. Then expand the process and extend the Ray's path by placing a Planar Portal further along. In its first parameter, Portal Planar asks you for the outer location, it is important that the dimensions of the exit object are also flat, otherwise you may experience strange behavior. Use **Block Planar** for output, which is used as an auxiliary Planar.



5. Next you need to access the Clone collision point, there are two ways. An easy way for non-coders is to use Stamp, which you can use as collision coordinates. The second way is Script, which we are currently testing second way.

First create a Box like below in the Wall layer and add this layer to the Ray as well, by adding the following code it will push it back when **CloneHit** hits.



```

No asset usages
public class RayTest : MonoBehaviour
{
    public RaySensor raySensor; // Changed in 0+ assets
    // Event function
    private void Update()
    {
        if (raySensor.ClonePerformed)
        {
            // Box will be force out
            raySensor.CloneHit.transform.Translate(translation: -raySensor.CloneHit.normal * Time.deltaTime);
        }
    }
}

```

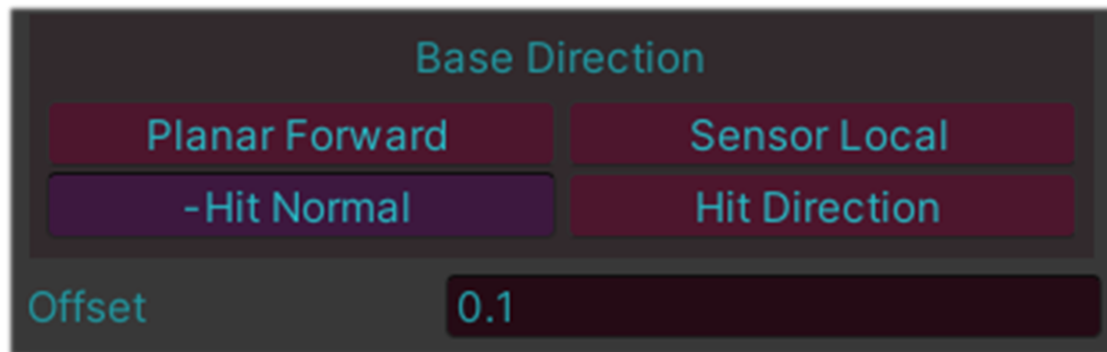
ClonePerformed: Use this Property when you need the Clone detection condition. Also, in if, it causes Error missing Reference to be solved.

CloneHit: This Property returns the clone RaycastHit, use it for access clone hit data.

LastClone: This Property returns the last CloneRay itself.

BASE DIRECTION:

It is to produce Clone Ray, which can be based on the following formulas. Please be careful when using this option because it seems a bit complicated.



LENGTH CONTROLL:

Continues: This option is the most common possible mode you can see, the Ray takes its remaining length out of the planar, which is normal.

Constant: As it is known, certain length of Ray is out of planar.

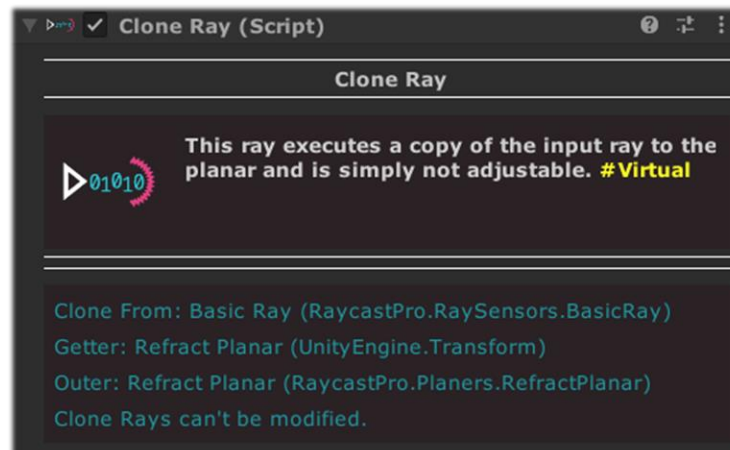
Sync: The same length of input Ray comes out of the Planar.

OUTER TYPE:

This option specifies the type of Ray output, in the case of single-model Rays such as Box and Pipe, the output can be a Reference like themselves, but **PathRays** must be cloned due to their different structure. It is better to keep this option on Auto for now.

CLONE RAY:

CloneRay is an array copy of ray points that carries information about its parent ray. You can access its information from the **CloneHit** & **LastClone** property.



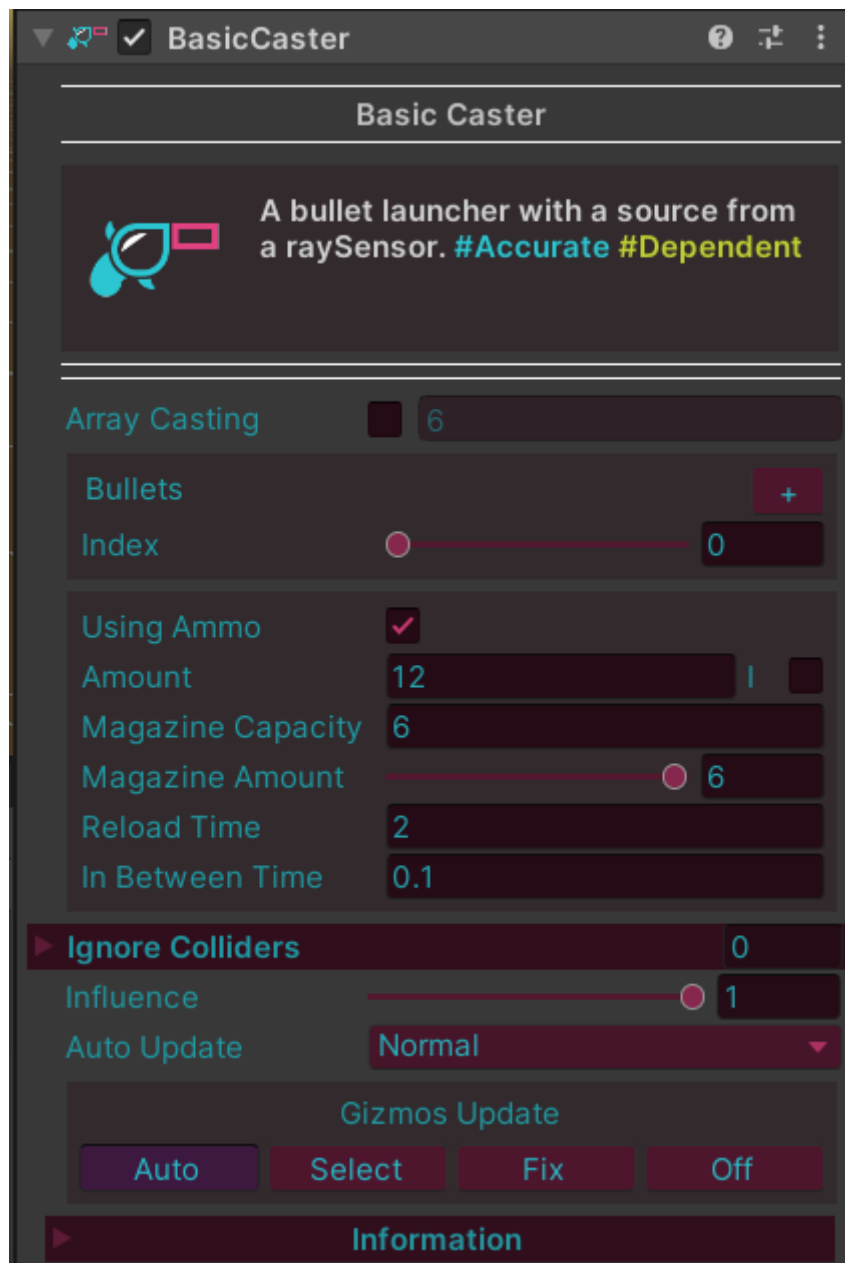
The **CloneHit** property returns the resulting Hit from the planar and **LastClone** for Get final clone information.

CASTERS:

Casters have the task of sending a bullet along a ray by taking a source, so they are dependent on a **RaySensor** and work with **Bullets**, before making them, make sure you have prepared the bullets in prefab and RaySensor that you need.

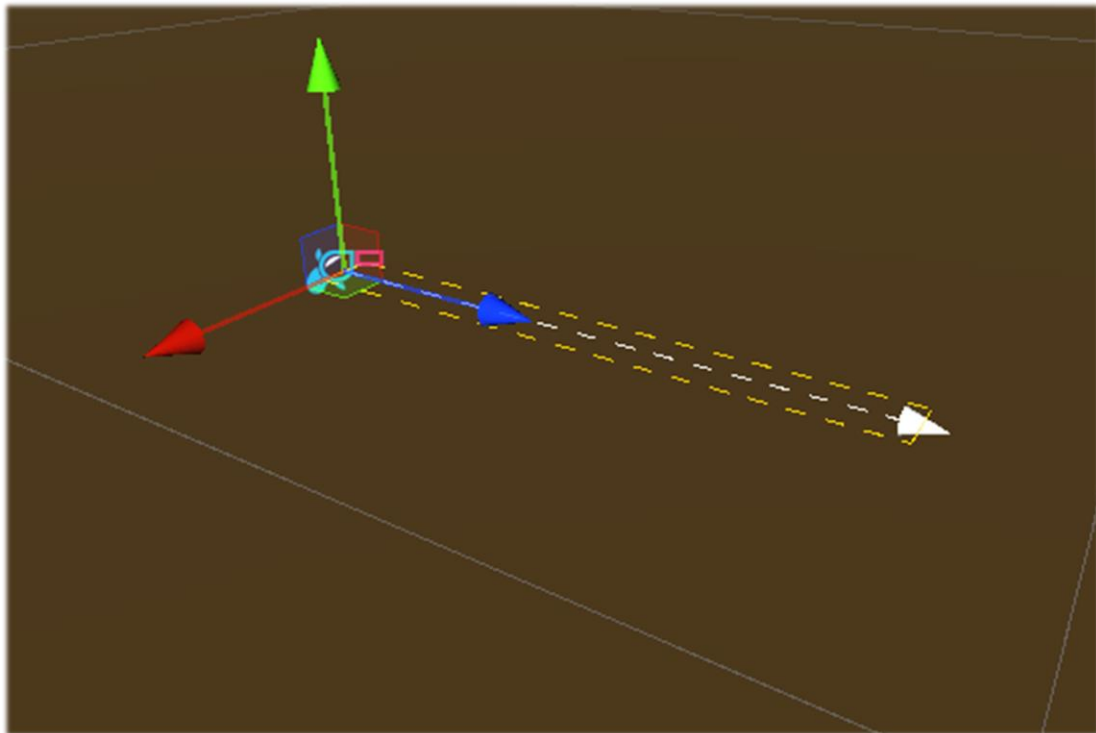
BASIC CASTER:

This Caster model is only used for simple tasks and quick Bullet Casting, in any case, it can only mount Basic Bullet and fortunately, it does not need RaySensor, and it shoots in its **forward** direction in 3D and to the **right** in 2D.



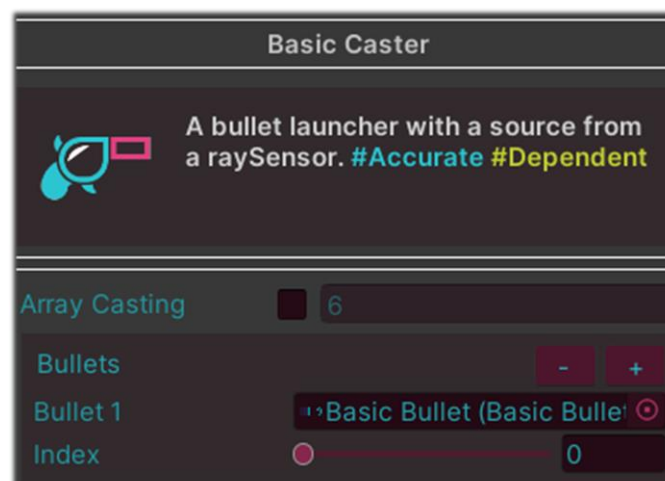
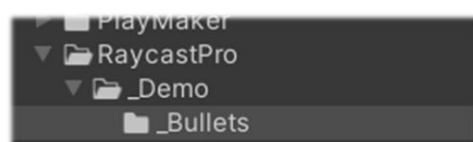
HOW TO SETUP BASIC CASTER:

1. First, make a simple Caster from the RaycastPro panel.

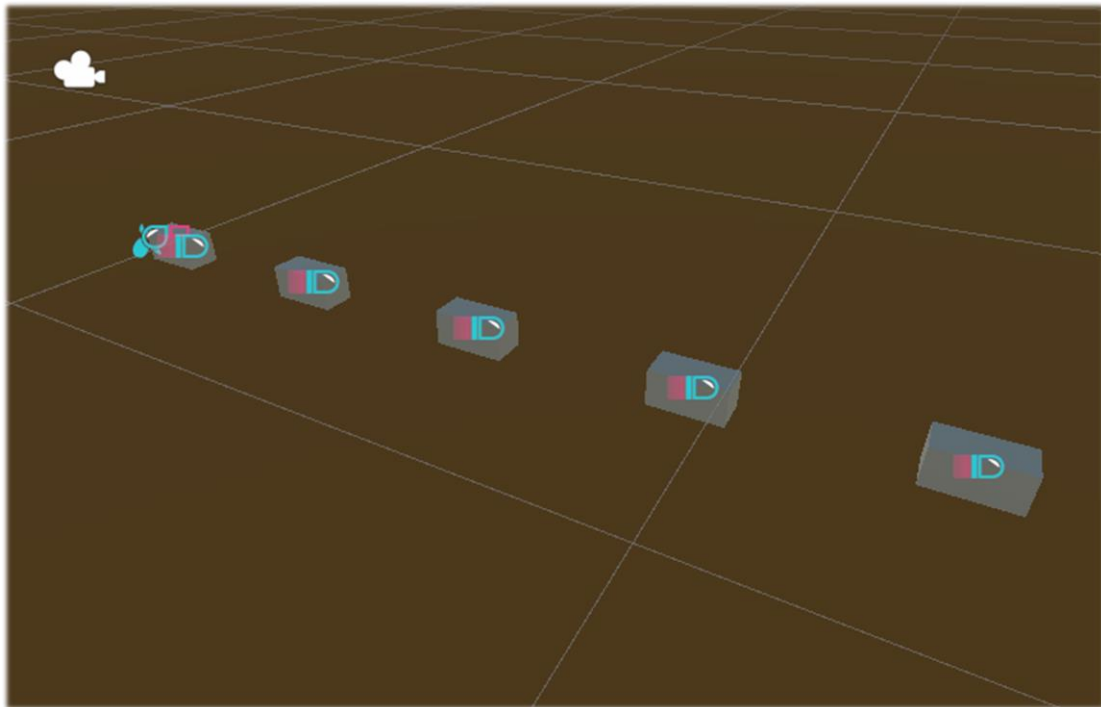


2. Now that's enough, put a bullet on it. You can use Panel to make bullets, but it is better to make Prefab bullets.

For the simplicity of the test, I put a Folder called **Bullets** in the plugin. Use it and add Basic Bullet to Caster.



3. Now, by pressing the Play key, the shooting starts.



4. But you need to be able to use it whenever needed inside the code. This is also very simple. Disable the Caster component, which causes it to stop processing forever.

5. Create a simple script and get the BasicCaster and call it whenever needed with the Cast method. Pay attention that the `_index` parameter refers to the bullet number, which is the first zero.

```
public BasicCaster basicCaster; 🔄 Unchanged  
  
Eventfunction  
void Update()  
{  
    if (Input.GetKeyDown(KeyCode.Space))  
    {  
        basicCaster.Cast(_index: 0);  
    }  
}
```

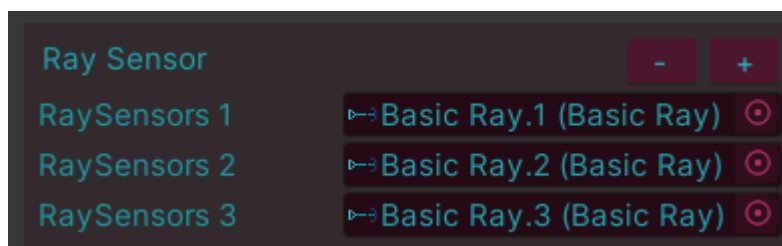
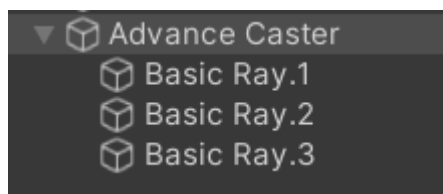
6. Press the space key, so easily the bullet you set will be fired.

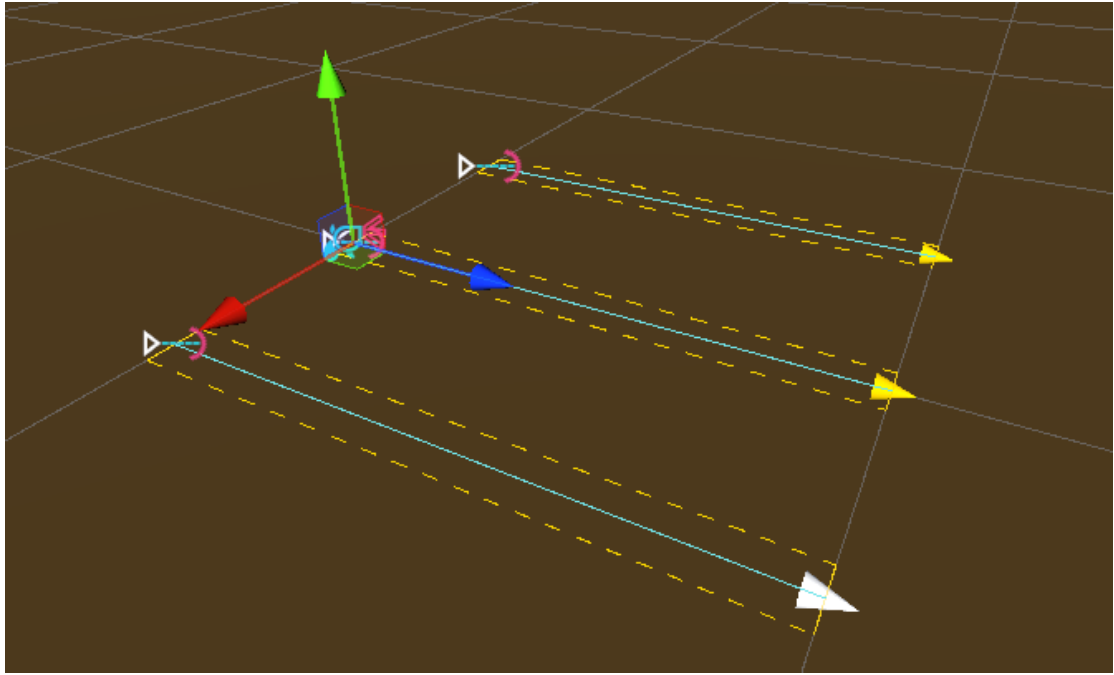
ADVANCE CASTER:

If you have understood the above tutorial well, now you can use **AdvanceCaster** to make complex weapons, which will make your work very fast and accurate and still with the **ArrayCasting** standard. I will explain further.

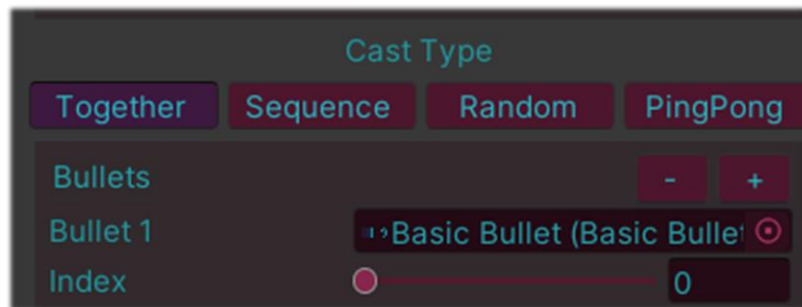
SETUP ADVANCE CASTER:

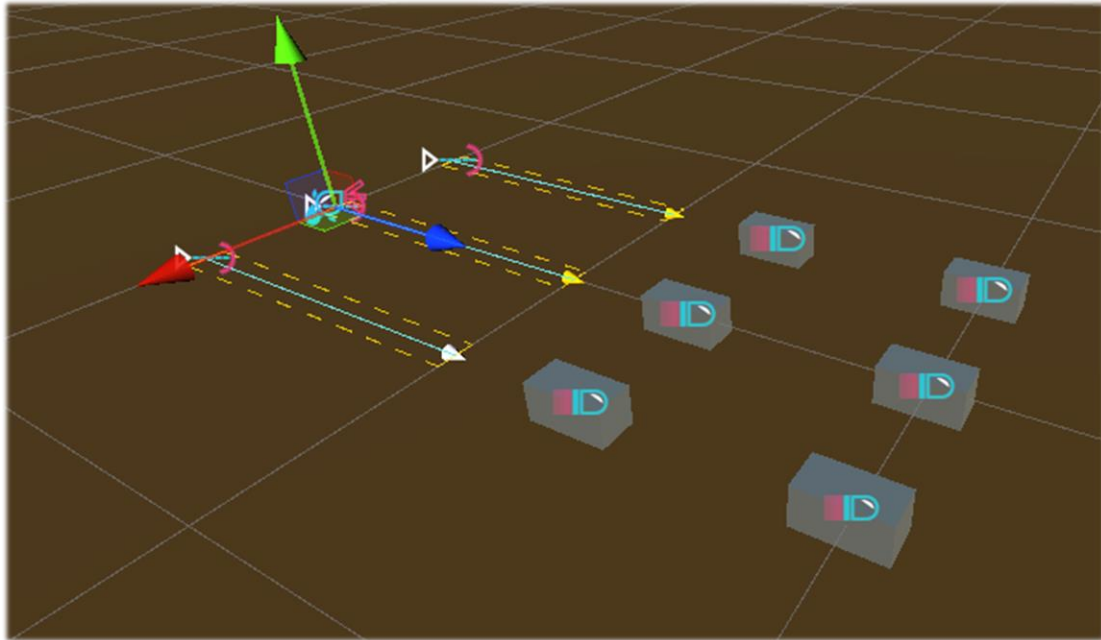
1. To start, make an Advance Caster like the one below with 3 simples BasicRays that each one in its own place. Also insert RaySensors into Caster to see a gizmo like below.



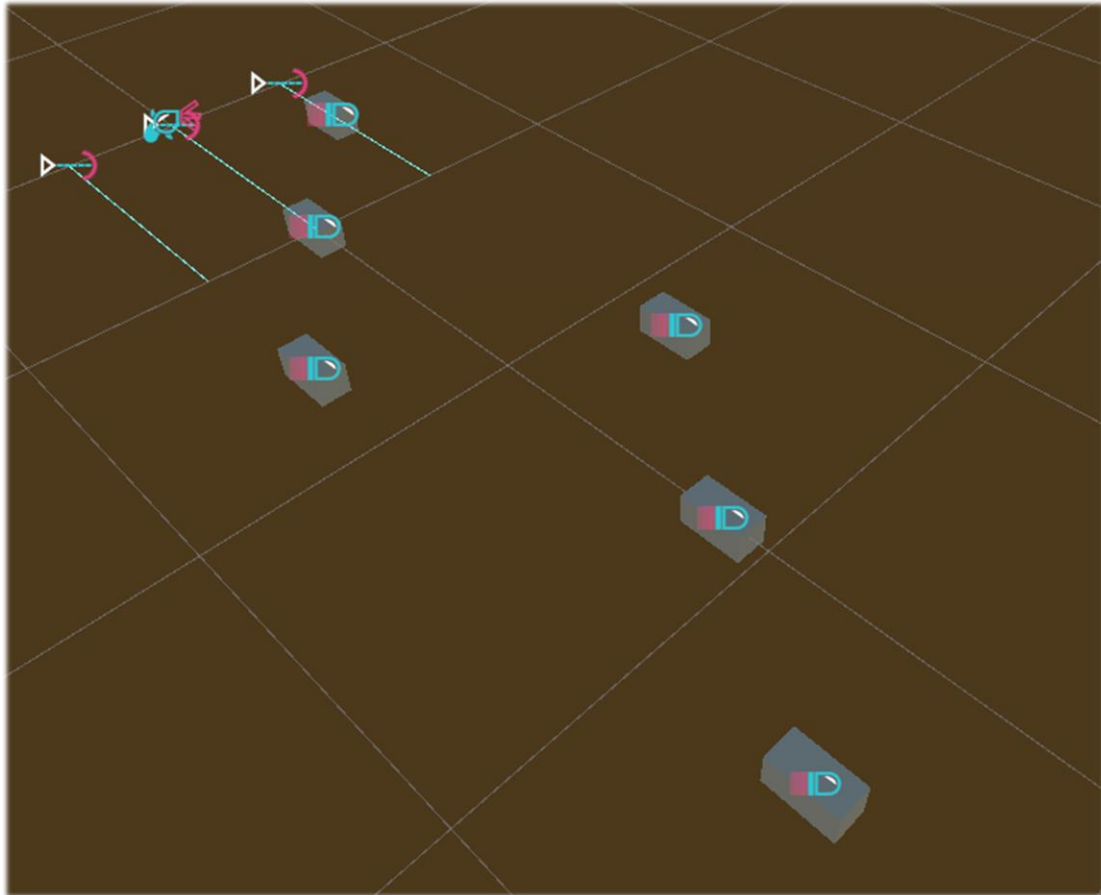


2. Now put a **BasicBullet** in the magazine as in the previous example and set the **CastType** to **Together**. By pressing the play key, the triple shot starts, and six bullets are fired from the caster each period of time.

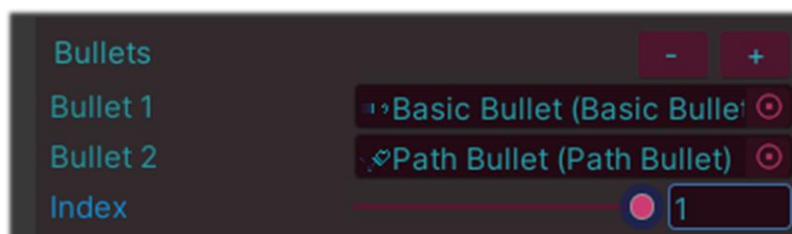


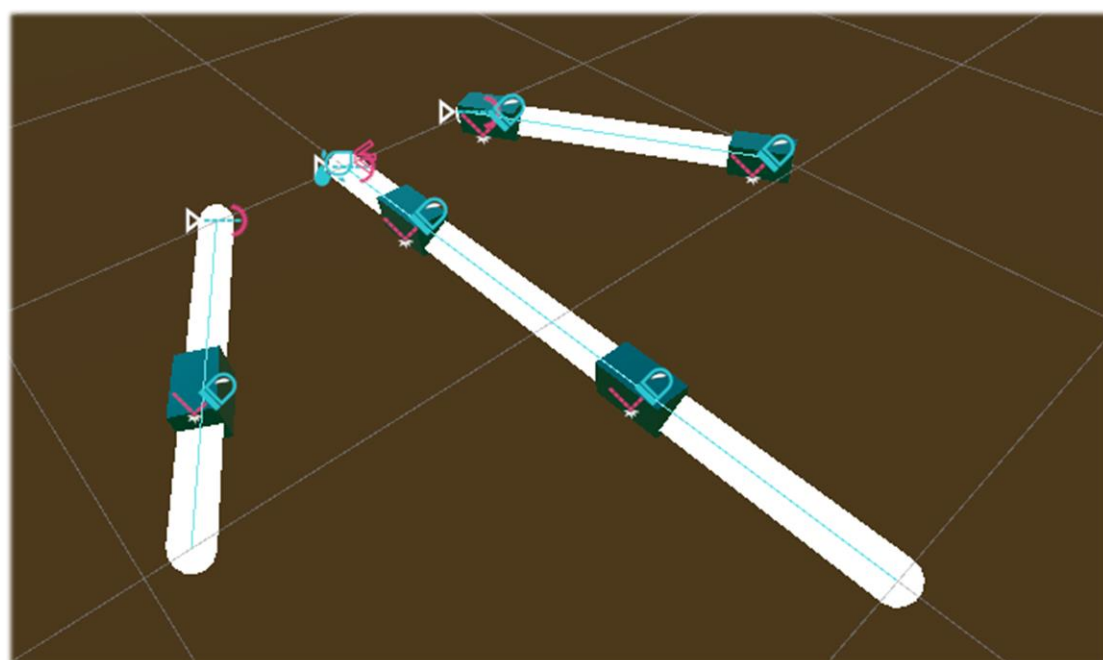
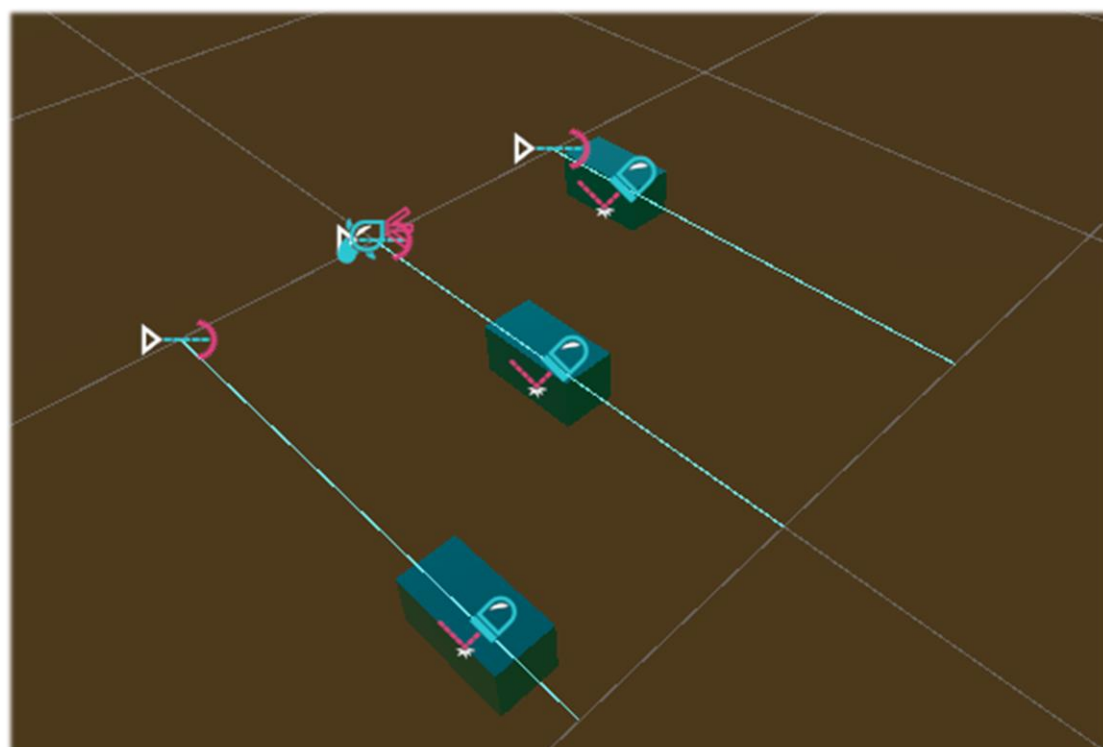


3. With the success of the first test, change the **CastType** mode and you can see that the Sequence works as follows. It is clear how the other modes work, but we will go further and try with different bullet models and RaySensor.

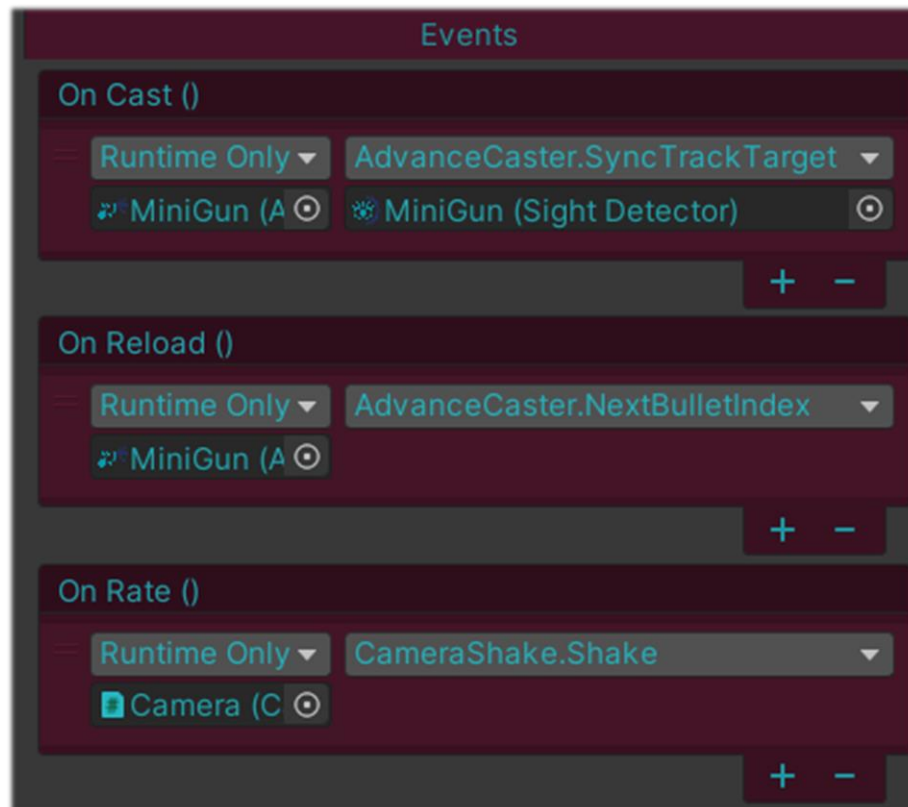


5. Now add the **PathBullet** to the magazine and change the index to 1 to fire this bullet model. If the **Render Pipeline** is standard, the color of the shooting bullet should be Cyan, but if you pay attention, these bullets do not go out of the path of the Ray. The reason is that the **PathBullet** always moves along the path of Ray no matter what type of that. Now change the size and direction of Ray, randomly and see the result.





Hint: Don't forget that the best way to add modifiers like particles or camera shake. Changing bullets or... is the use of events.



AMMO:

This method has been optimized by deactivating the instantiated bullets and reusing them to reduce garbage.



Using Ammo: If you tick Ammo, the projectile firing system will work in the normal way of the gun. Otherwise, it works unconditionally, and you can code manually.

Amount: Obviously, this value shows the number of all the beams. Option 1 in front of this parameter is the infinite number of bullets.

Magazine Capacity: The amount of magazine that is available in each firing period until Reload Time.

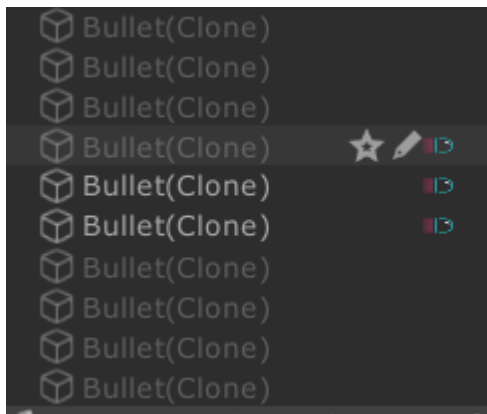
Magazine Amount: The current volume and the initial amount of the magazine, which cannot exceed the total volume of the magazine.

Reload Time: The pause time between each magazine filling cycle.

Rate Time: The time between firing each shot.

ARRAY CASTING (POOL MANAGER):

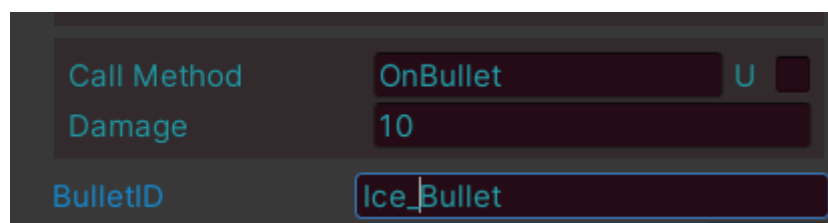
This method has been optimized by deactivating the instantiated bullets and reusing them to reduce garbage production. If your game uses a lot of bullets, use this option.

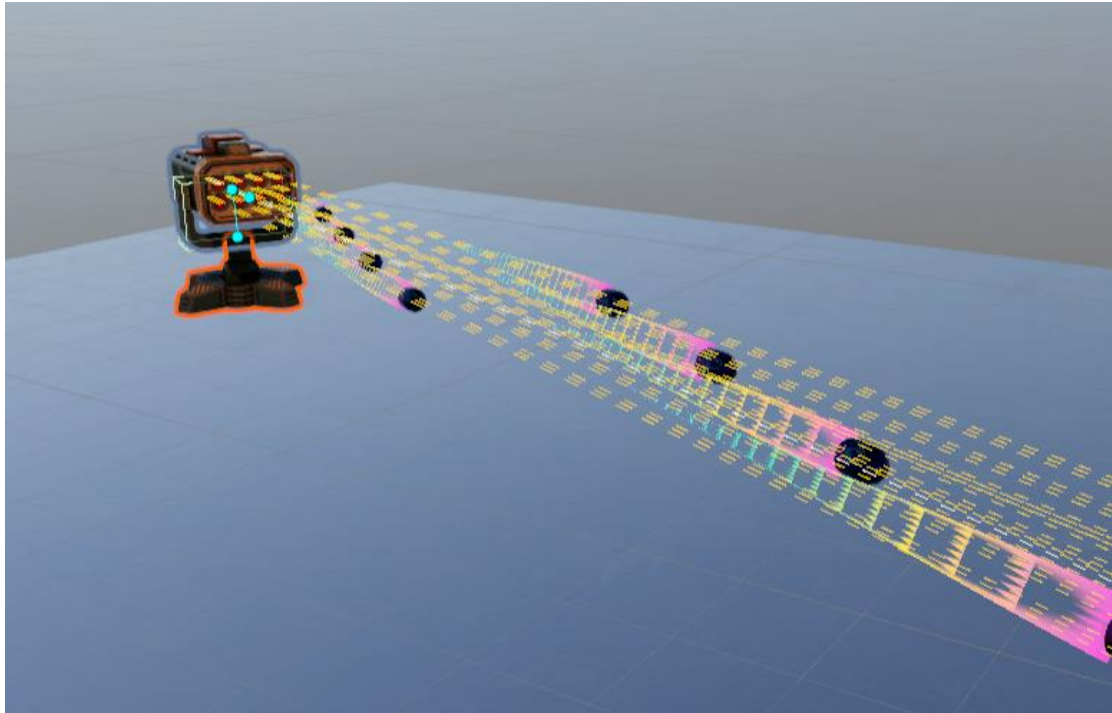


production. If your game uses a lot of bullets, use this option.

Hints To Use:

1. Array Casting is currently not modifiable in-game, so make sure the Array range is as large as you want.
2. In order to be able to change different bullets when shooting in the same way, you must use different Bullet ID.





BULLETS:

Currently, five bullet models, both in 3D and 3D, are supported in this package, which makes almost 99% of the shooting system workable. After a brief description of the general parameters, we will examine each bullet separately.

Speed	6
Life Time	10
End Delay	0
Time Mode	
DT	SDT
FDT	UDT
UFDT	
Has Collision	<input checked="" type="checkbox"/>
Detect Layer	Default
Length	0.5
Radius	0.2
Offset	0
Planar Sensitive	<input checked="" type="checkbox"/>
Call Method	OnBullet U
Damage	10

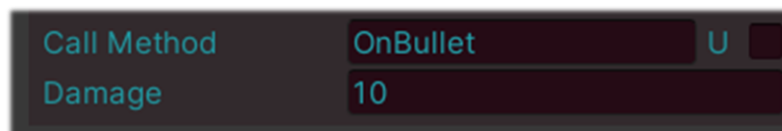
Speed: This parameter is very clear, whatever value determines the speed; it travels the same unit per second.

LifeTime: Bullet life is in seconds, which triggers OnEnd when it runs out.

End Delay: This option is a pause before disabling or destroying the bullet, its use is when you want it to remain stable for a few seconds before death.

Collision Ray: By inserting a Ray Sensor into the body of the bullet, you can use it as a Collision. Keep in mind that this Ray should be a Child so that you can take advantage of its Planar Sensitive.

Call Method: This is the easiest way for you to pass an object-oriented script inside the target object with enough bullet information. Just write the desired method name on hit target object.



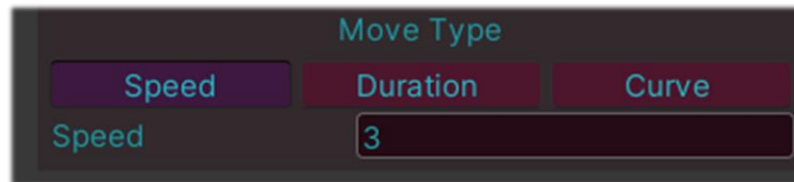
```
public float myCharacterHealth = 100; Unchanged
void OnBullet(Bullet _bullet)
{
    myCharacterHealth -= _bullet.damage;
}
```

INSTANT BULLET:

As its name suggests, this bullet hits the target as soon as it is fired.

PATH BULLET:

PathBullet has an automatic system that always follows the path of the Ray, and it doesn't matter if your Ray is PathRay or not. In addition to the speed, there are two other ways to control the movement of the bullet.



Local: In the Local parameter, when the bullet is casted, it bakes the ray path at the beginning of the cast, and you will no longer see the path of the bullet being disturbed by the movement of the caster. But if this tick is not present, the bullet will always move on the Path, even if the Path itself is moving.

RigidBody: If you add a *RigidBody* to the bullet prefab, the bullet will use ***RigidBody.SetPosition*** instead of the **transform.Translate** algorithm, which will have a physical effect on the Colliders, but it can continue its way without affect by them.

PHYSICAL BULLET:

This bullet itself has a RigidBody, which is thrown with the initial force when fired.

TRACKER BULLET:

Tracker Bullet is a bullet that can follow its Caster **Track Target** based on two different algorithms.

Position Lerp: the first algorithm is based on the location that will always reach the destination after a certain period, for example, I can use the Projection type of ranged heroes in Dota2 or other strategy games.

Rotation Lerp: The second algorithm, which is based on rotation, acts like a ballistic missile and tries to change direction towards the target, but there is no guarantee that it will always hit it.

The image shows two panels from a game engine's interface. The top panel, titled 'Track Type', has two tabs: 'Position Lerp' and 'Rotation Lerp'. The 'Rotation Lerp' tab is selected. It contains three input fields: 'Force' with a value of 10.96, 'Turn Sharpness' with a value of 33.67, and 'Drag' with a value of 0.5. Below these is a 'Sync Axis' section with a grid of checkboxes for X, Y, Z, and F. The bottom panel shows 'Bullets' with minus and plus buttons, 'Bullet 1' set to 'Tracker Bullet (Tracker E)', 'Index' set to 1, and 'Track Target' set to 'None (Transform)'.

Track Type	
Position Lerp	Rotation Lerp
Force	10.96
Turn Sharpness	33.67
Drag	0.5
Sync Axis	
	X Y Z F

Bullets	-	+
Bullet 1	Tracker Bullet (Tracker E)	
Index	1	
Track Target	None (Transform)	

Force: Initial throwing power.

Turn Sharpness: The power to change the curvature of the following direction.

Drag: The amount of friction that decrease bullet force to zero.