1) Character Control (Karakterin hareket etmesi için)

2) Grab (Herhangi bir nesneyi tutmak için)

3) BlueprintPure (BP'ye akatarma yaparken kullanmak için)

4) BlueprintImplementableEvent (BP'ye aktarma yaparken kullanmak için)

5) Movable Platform (Herhangi bir nesneyi hareket ettirmek için ve bulmacada kullanmak için)

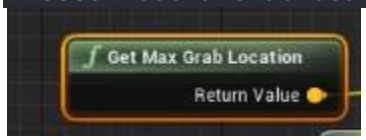
6) Spawner (Bir nesneyi belirli aralıkarla yaratmak için)

7) Project Tile (Tank mermisi gibi tek parça atılan mermiler için)

8) Gun (FPS oyunlarında olduğu gibi silah sistemini kullanmak için)

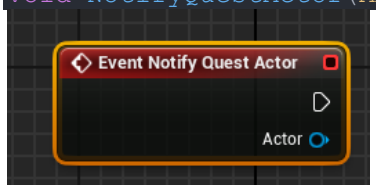
Blueprint pure: No node function in bp

```
UFUNCTION(BlueprintCallable, BlueprintPure)
FVector GetMaxGrabLocation() const;
```



BlueprintImplementableEvent: It create custom function.

```
UFUNCTION(BlueprintImplementableEvent)
void NotifyQuestActor(AActor* Actor);
```



Character Control

Character oluşturduktan sonra .h file dosyasına:

```
class UGrabber;
protected:
    UFUNCTION(BlueprintImplementableEvent, BlueprintPure)
    UGrabber* GetGrabber() const;
Public:
UGrabber* GetGrabber = nullptr;

private:
    void Forward(float AxisValue);
    void Right(float AxisValue);
    void Grab();
    void Release();
```

ekledikten sonra .cpp dosyasına:

```
#include "Components/InputComponent.h"
#include "Grabber.h"
#include "GameFramework/CharacterMovementComponent.h"

// Called to bind functionality to input
void AFirstPersonCharacter::SetupPlayerInputComponent(UInputComponent* PlayerInputComponent)
{
    Super::SetupPlayerInputComponent(PlayerInputComponent);
// key mapping all functions.
    PlayerInputComponent->BindAxis(TEXT("Forward"), this, &AFirstPersonCharacter::Forward);
    PlayerInputComponent->BindAxis(TEXT("Right"), this, &AFirstPersonCharacter::Right);
    PlayerInputComponent->BindAxis(TEXT("LookUp"), this, &APawn::AddControllerPitchInput);
    PlayerInputComponent->BindAxis(TEXT("LookRight"), this, &APawn::AddControllerYawInput);
```

```
    PlayerInputComponent->BindAction(TEXT("Jump"), EInputEvent::IE_Pressed, this, &ACharacter
::Jump);
    PlayerInputComponent->BindAction(TEXT("Grab"), EInputEvent::IE_Pressed, this, &AFirstPers
onCharacter::Grab);
    PlayerInputComponent->BindAction(TEXT("Grab"), EInputEvent::IE_Released, this, &AFirstPer
sonCharacter::Release);
}

void AFirstPersonCharacter::Forward(float AxisValue)
{
// movement for forward or backward.
    GetCharacterMovement()->AddInputVector(GetActorForwardVector() * AxisValue);
}

void AFirstPersonCharacter::Right(float AxisValue)
{
// movement for right or left.
    GetCharacterMovement()->AddInputVector(GetActorRightVector() * AxisValue);
}

void AFirstPersonCharacter::Grab()
{
// calling grab component in grab function.
    GetGrabber->Grab();
}

void AFirstPersonCharacter::Release()
{
// calling grab component in release function.
    GetGrabber->Release();
}
```

Grab

Scene Component oluşturuyoruz ve eğer bir objenin taşınabilir olmasını istiyorsak objeyi moveable, simulate physics true olarak işaretliyoruz.

Grabber.h:

```
#include "CoreMinimal.h"

#include "FirstPersonCharacter.h"
#include "Components/SceneComponent.h"
#include "PhysicsEngine/PhysicsHandleComponent.h"
#include "Grabber.generated.h"

public:
   // Sets default values for this component's properties
   UGrabber();

   // Called every frame
   virtual void TickComponent(float DeltaTime, ELevelTick TickType,
```

```
                                FActorComponentTickFunction* ThisTickFunction) override;

    void Grab();
    void Release();

private:
    void Grabbed();

    FVector GetMaxGrabLocation() const;
    FVector GetHoldLocation() const;

    UFUNCTION(BlueprintCallable, BlueprintPure)
    UPhysicsHandleComponent* GetPhysicsComponent() const;
    FHitResult GetFirstPhysicsBodyInReach() const;

    UPROPERTY(EditAnywhere, BlueprintReadOnly, meta = (AllowPrivateAccess = "true"))
    float MaxGrabDistance = 100;

    UPROPERTY(EditAnywhere, BlueprintReadOnly, meta = (AllowPrivateAccess = "true"))
    float HoldDistance = 100;

protected:
    // Called when the game starts
    virtual void BeginPlay() override;

    UFUNCTION(BlueprintCallable, BlueprintImplementableEvent)
    void NotifyQuestActor(AActor* Actor);

    AFirstPersonCharacter* FirstPersonCharacter = nullptr;
```

Grabber.cpp:

```
#include "Grabber.h"
#include "FirstPersonCharacter.h"
#include "Engine/World.h"
#include "GameFramework/Actor.h"

#define OUT

// Sets default values for this component's properties
UGrabber::UGrabber()
{
    // Set this component to be initialized when the game starts, and to be ticked every frame.
You can turn these features
    // off to improve performance if you don't need them.
    PrimaryComponentTick.bCanEverTick = true;
}

// Called when the game starts
void UGrabber::BeginPlay()
{
    Super::BeginPlay();

    FirstPersonCharacter = Cast<AFirstPersonCharacter>(GetOwner());
    if (!FirstPersonCharacter) { return; }
    FirstPersonCharacter->GetGrabber = this;
    GetPhysicsComponent();
}

// Called every frame
void UGrabber::TickComponent(float DeltaTime, ELevelTick TickType,
FActorComponentTickFunction* ThisTickFunction)
{
```

```
    Super::TickComponent(DeltaTime, TickType, ThisTickFunction);
    Grabbed();
}

FVector UGrabber::GetMaxGrabLocation() const
{
    FVector PlayerViewPointLocation;
    FRotator PlayerViewPointRotation;

    GetWorld()->GetFirstPlayerController()->GetPlayerViewPoint(
        OUT PlayerViewPointLocation,
        OUT PlayerViewPointRotation
    );

    return PlayerViewPointLocation + PlayerViewPointRotation.Vector() * MaxGrabDistance;
}

FVector UGrabber::GetHoldLocation() const
{
    FVector PlayerViewPointLocation;
    FRotator PlayerViewPointRotation;

    GetWorld()->GetFirstPlayerController()->GetPlayerViewPoint(
        OUT PlayerViewPointLocation,
        OUT PlayerViewPointRotation
    );

    return PlayerViewPointLocation + PlayerViewPointRotation.Vector() * HoldDistance;
}

UPhysicsHandleComponent* UGrabber::GetPhysicsComponent() const
{
    return GetOwner()->FindComponentByClass<UPhysicsHandleComponent>();
}

void UGrabber::Grab()
{
    FHitResult HitResult = GetFirstPhysicsBodyInReach();
    AActor* HitActor = HitResult.GetActor();
    UPrimitiveComponent* HitComponent = HitResult.GetComponent();
    if (HitActor && HitComponent)
    {
        if (!GetPhysicsComponent()) { return; }
        //HitComponent->SetSimulatePhysics(true);
        GetPhysicsComponent()->GrabComponentAtLocationWithRotation(
            HitComponent,
            NAME_None,
            HitComponent->GetCenterOfMass(),
            FRotator()
        );
        NotifyQuestActor(HitActor);
    }
}

void UGrabber::Grabbed()
{
    if (!GetPhysicsComponent()) { return; }
    if (GetPhysicsComponent()->GrabbedComponent)
    {
        GetPhysicsComponent()->SetTargetLocation(GetMaxGrabLocation());
    }
}
```

```cpp
void UGrabber::Release()
{
    if (!GetPhysicsComponent()) { return; }
    GetPhysicsComponent()->ReleaseComponent();
}

FHitResult UGrabber::GetFirstPhysicsBodyInReach() const
{
    FHitResult Hit;
    FCollisionQueryParams TraceParams(FName(TEXT("")), false, GetOwner());

    GetWorld()->LineTraceSingleByObjectType(
        OUT Hit,
        GetHoldLocation(),
        GetMaxGrabLocation(),
        FCollisionObjectQueryParams(ECollisionChannel::ECC_PhysicsBody),
        TraceParams
    );
    return Hit;
}
```

Movable Platform

İlk önce hangi nesnenin hareket edeceğini belirlemek için actor component oluşturup onu neseneye ekliyoruz. Hemen ardından nesnenin parenti olacak trigger volume ekliyoruz eğer platform harekete başladığında ses gelmesini istiyorsak, nesnenin detaylar panelinden add component diyerek audio component ekliyoruz. Audio component de detaylar kısmından auto active özelliğini kapatıyoruz (oyun başlar başlamaz çalmaması için).

Transfer.h:

```cpp
#include "Engine/TriggerVolume.h"
private:
    void FindPressPlate();
    void FindAudioComponent();
    void UpTransporter(float DeltaTime);
    void DownTransporter(float DeltaTime);
    void TransporterLogic(float DeltaTime);

    bool UpSound = false;
    bool DownSound = true;

    UPROPERTY(EditAnywhere)
    ATriggerVolume* PressPlate = nullptr;
    UPROPERTY(EditAnywhere)
    AActor* ActorThatOpen;

    UAudioComponent* AudioComponent = nullptr;

    UPROPERTY(EditAnywhere)
    float TransporterUpSpeed = 200.0f;
    float TransporterUpLast = 0.0f;
    UPROPERTY(EditAnywhere)
    float TransportDelay = 5.0f;
    float TransporterInitialZ;
    float TransporterCurrentZ;
    UPROPERTY(EditAnywhere)
    float TransporterTargetZ = 3000;
    float TransporterZ = -200;
```

Transfer.cpp:

```cpp
#include "Transfer.h"
#include "Components/AudioComponent.h"
#include "Engine/World.h"
#include "GameFramework/Actor.h"
#include "GameFramework/PlayerController.h"

#define OUT

UTransfer::UTransfer()
{
    PrimaryComponentTick.bCanEverTick = true;
}


// Called when the game starts
void UTransfer::BeginPlay()
{
    Super::BeginPlay();

    TransporterInitialZ = GetOwner()->GetActorLocation().Z;
    TransporterCurrentZ = TransporterInitialZ;
    TransporterTargetZ = TransporterInitialZ + TransporterTargetZ;
    // When started the game, it's finding null pointer.
    FindPressPlate();
    FindAudioComponent();
    // Selecting who is the player and who will start this action.
    ActorThatOpen = GetWorld()->GetFirstPlayerController()->GetPawn();
}


// Called every frame
void UTransfer::TickComponent(float DeltaTime, ELevelTick TickType,
FActorComponentTickFunction* ThisTickFunction)
{
    Super::TickComponent(DeltaTime, TickType, ThisTickFunction);
    // Checking this question: "Do is player overlapping ?"
    TransporterLogic(DeltaTime);
}


void UTransfer::TransporterLogic(float DeltaTime)
{
    if (PressPlate && PressPlate->IsOverlappingActor(ActorThatOpen))
    {
        if(TransporterCurrentZ != TransporterTargetZ)
        {
            // updating location and it was moving time.
            UpTransporter(DeltaTime);
            TransporterUpLast = GetWorld()->GetTimeSeconds();
        }
    }
    else if(PressPlate && !PressPlate->IsOverlappingActor(ActorThatOpen))
    {
        // Transport delay after going down.
        if (GetWorld()->GetTimeSeconds() - TransporterUpLast > TransportDelay)
        {
            DownTransporter(DeltaTime);
        }
    }
}
```

```cpp
void UTransfer::UpTransporter(float DeltaTime)
{
   // it goes up in transporter up speed and doing smooth camera transition.
   TransporterCurrentZ = FMath::FInterpConstantTo(TransporterCurrentZ, TransporterTargetZ,
DeltaTime,
                                                  TransporterUpSpeed);
   FVector Up = GetOwner()->GetActorLocation();
   // it makes the object move in Z coordinate.
   Up.Z = TransporterCurrentZ;
   GetOwner()->SetActorLocation(Up);

   DownSound = false;
   // when opened the door, sound is begining.
   if (!AudioComponent) { return; }
   if (!UpSound)
   {
      AudioComponent->Play();
      UpSound = true;
   }
}

void UTransfer::DownTransporter(float DeltaTime)
{
   TransporterCurrentZ = FMath::FInterpConstantTo(TransporterCurrentZ, TransporterInitialZ,
DeltaTime,
                                                  TransporterUpSpeed);
   FVector Down = GetOwner()->GetActorLocation();
   Down.Z = TransporterCurrentZ;
   GetOwner()->SetActorLocation(Down);

   UpSound= false;
   if (!AudioComponent) { return; }
   if (!DownSound)
   {
      AudioComponent->Play();
      DownSound = true;
   }
}


void UTransfer::FindAudioComponent()
{
   AudioComponent = GetOwner()->FindComponentByClass<UAudioComponent>();

   if (!AudioComponent)
   {
      UE_LOG(LogTemp, Warning, TEXT("%s Audio Component not found."),
*GetOwner()->GetName());
   }
}

void UTransfer::FindPressPlate()
{
   if (!PressPlate)
   {
   }
}
```

Spawner

Spawner adında bir actor oluşturuyoruz.

Spawner.h:

```
private:
   void Spawn();
   void CalculateSpawn();

   FTimerHandle SpawnTimer;

   UPROPERTY(EditAnywhere, BlueprintReadWrite, Category = "Spawn Settings", meta =
(AllowPrivateAccess = "true"))
   ;
   FVector SpawnerLocation;
   UPROPERTY(EditAnywhere, BlueprintReadWrite, Category = "Spawn Settings", meta =
(AllowPrivateAccess = "true"))
   ;
   FRotator SpawnerRotation;


   // Spawn Object
   UPROPERTY(EditAnywhere, Category = "Spawner Settings")
   TSubclassOf<AActor> ActorToSpawn;

   // Spawner Settings
   UPROPERTY(EditAnywhere, BlueprintReadOnly, Category = "Spawner Settings", meta =
(AllowPrivateAccess = "true"))
   float SpawnSpeed = 0.5f;
   UPROPERTY(EditAnywhere, BlueprintReadOnly, Category = "Spawner Settings", meta =
(AllowPrivateAccess = "true"))
   float SpawnRepeat = 1.0f;
   // Spawn Location and Rotation
   UPROPERTY(EditAnywhere, BlueprintReadOnly, Category = "Spawner Settings", meta =
(AllowPrivateAccess = "true"))
   float SpawnMinZ = -30.0f;
   UPROPERTY(EditAnywhere, BlueprintReadOnly, Category = "Spawner Settings", meta =
(AllowPrivateAccess = "true"))
   float SpawnMaxZ = 300.0f;
```

Spawner.cpp

```
#include "Engine/World.h"
#include "GameFramework/Actor.h"
#include "TimerManager.h"

void ASpawner::BeginPlay()
{
   Super::BeginPlay();
   // Settings for spawn time etc.
   GetWorldTimerManager().SetTimer(SpawnTimer, this, &ASpawner::Spawn, SpawnRepeat, true,
SpawnSpeed);
}

void ASpawner::Spawn()
{
   CalculateSpawn();
```

```
    /*
    if you want to spawn other cpp file and reach value use this:
    APipeActor* SpawnedActor = GetWorld()->SpawnActor<APipeActor>(ActorToSpawn,
SpawnerLocation, SpawnerRotation);
    if (SpawnedActor)
    {
        SpawnedActor->Spawner = this;
    }
    */
    GetWorld()->SpawnActor<AActor>(ActorToSpawn, SpawnerLocation, SpawnerRotation);
}

void ASpawner::CalculateSpawn()
{
    // it is spawning between minZ - maxZ value.
    UE_LOG(LogTemp, Warning, TEXT("Spawned"));
    SpawnerLocation = GetActorLocation();
    SpawnerLocation.Z = GetActorLocation().Z - FMath::RandRange(SpawnMinZ, SpawnMaxZ);
    SpawnerRotation = GetActorRotation();
}
```

Project Tile

Projecttile için ilk önce actor oluşturuyoruz.

ProjecttileBase.h

```
class UProjectileMovementComponent;
private:
    // COMPONENTS
    UPROPERTY(VisibleAnywhere, BlueprintReadOnly, Category = "Components", meta = (AllowPriva
teAccess = "true"))
    UProjectileMovementComponent* ProjectileMovement = nullptr;
    UPROPERTY(EditAnywhere, BlueprintReadWrite, Category = "Move", meta = (AllowPrivateAccess
 = "true"))
    float MovementSpeed = 1300.0f;

    UPROPERTY(VisibleAnywhere, BlueprintReadOnly, Category = "Components", meta = (AllowPriva
teAccess = "true"))
    UStaticMeshComponent* ProjectileMesh = nullptr;

    UPROPERTY(VisibleAnywhere, BlueprintReadOnly, Category = "Components", meta = (AllowPriva
teAccess = "true"))
    UParticleSystemComponent* ParticleTrail = nullptr;

    // VARIABLES
    UPROPERTY(EditDefaultsOnly, Category = "Damage")
    TSubclassOf<UDamageType> DamageType;
    UPROPERTY(EditAnywhere, BlueprintReadWrite, Category = "Damage", meta = (AllowPrivateAcce
ss = "true"))
    float Damage = 50.0f;
    // Projecttile effect(behind smoke)
    UPROPERTY(EditAnywhere, Category= "Effect")
    UParticleSystem* HitParticle = nullptr;
```

```
    // Audio
    UPROPERTY(EditAnywhere, Category = "Effect")
    USoundBase* HitSound;
    UPROPERTY(EditAnywhere, Category = "Effect")
    USoundBase* LaunchSound;
    UPROPERTY(EditAnywhere, Category = "Effects")
    TSubclassOf<UCameraShake> HitShake;

    // FUNCTION
    UFUNCTION()
    void OnHit(UPrimitiveComponent* HitComponent, AActor* OtherActor, UPrimitiveComponent* Ot
herComponent, FVector NormalImpulse, const FHitResult& Hit);
```

Projecttile.cpp

```
#include "ProjectileBase.h"
#include "Components/StaticMeshComponent.h"
#include "GameFramework/ProjectileMovementComponent.h"
#include "Kismet/GameplayStatics.h"
#include "Particles/ParticleSystemComponent.h"

// Sets default values
AProjectileBase::AProjectileBase()
{
    PrimaryActorTick.bCanEverTick = false;

    ProjectileMesh = CreateDefaultSubobject<UStaticMeshComponent>(TEXT("Projectile Mesh"));
    ProjectileMesh->OnComponentHit.AddDynamic(this, &AProjectileBase::OnHit);
    RootComponent = ProjectileMesh;

    ProjectileMovement = CreateDefaultSubobject<UProjectileMovementComponent>(TEXT("Projectil
e Movement"));
    ProjectileMovement->InitialSpeed = MovementSpeed;
    ProjectileMovement->MaxSpeed = MovementSpeed;

    ParticleTrail = CreateDefaultSubobject<UParticleSystemComponent>(TEXT("Particle Trail"));
    ParticleTrail->SetupAttachment(RootComponent);

    InitialLifeSpan = 3.0f;
}

void AProjectileBase::BeginPlay()
{
    Super::BeginPlay();

    UGameplayStatics::PlaySoundAtLocation(this,LaunchSound,GetActorLocation());

}
```

```
void AProjectileBase::OnHit(UPrimitiveComponent* HitComponent, AActor* OtherActor, UPrimitive
Component* OtherComponent, FVector NormalImpulse, const FHitResult& Hit)
{
    AActor* MyOwner = GetOwner();
    if (!MyOwner) { return; }

    if (OtherActor && OtherActor != this && OtherActor != MyOwner)
    {
        UGameplayStatics::ApplyDamage(
            OtherActor,
            Damage,
            MyOwner->GetInstigatorController(),
            this,
            DamageType
            );
        // When hitted object, It will create hitparticle and audio.
        UGameplayStatics::SpawnEmitterAtLocation(this, HitParticle, GetActorLocation());
        UGameplayStatics::PlaySoundAtLocation(this, HitSound, GetActorLocation());
        GetWorld()->GetFirstPlayerController()->ClientPlayCameraShake(HitShake);
        Destroy();
    }
}
```

Gun

İlk önce actor oluşturuyoruz ve bunu ana karakterimize ekliyoruz.

Gun.h

```
public:
    void PullTrigger();

    UPROPERTY(EditAnywhere, Category = "Attack", meta = (AllowPrivateAccess = "true"))
        int DefaultAmmo;
    int Ammo;
    UPROPERTY(EditAnywhere, Category = "Attack", meta = (AllowPrivateAccess = "true"))
        float FireRate = 0.5f;
    UPROPERTY(EditAnywhere, Category = "Attack", meta = (AllowPrivateAccess = "true"))
        float FireRepeat = 1.0f;

private:
    UPROPERTY(VisibleAnywhere)
        USceneComponent* Root;
    UPROPERTY(VisibleAnywhere)
        USkeletalMeshComponent* Mesh;
    UPROPERTY(EditAnywhere, Category = "Effect", meta = (AllowPrivateAccess = "true"))
        UParticleSystem* MuzzleFlash;
    UPROPERTY(EditAnywhere, Category = "Effect", meta = (AllowPrivateAccess = "true"))
        UParticleSystem* ImpactEffect;
```

```
    UPROPERTY(EditAnywhere, Category = "Effect", meta = (AllowPrivateAccess = "true"))
        USoundBase* MuzzleSound;
    UPROPERTY(EditAnywhere, Category = "Effect", meta = (AllowPrivateAccess = "true"))
        USoundBase* ImpactSound;
    UPROPERTY(EditAnywhere, Category = "Attack", meta = (AllowPrivateAccess = "true"))
        float MaxRange = 1000;
    UPROPERTY(EditAnywhere)
        float Damage = 10;

    bool GunTrace(FHitResult &Hit, FVector &ShotDirection);

    AController* GetOwnerController() const;
```

Gun.cpp

```
// Fill out your copyright notice in the Description page of Project Settings.


#include "Gun.h"
#include "Components/SkeletalMeshComponent.h"
#include "Kismet/GameplayStatics.h"
#include "DrawDebugHelpers.h"

// Sets default values
AGun::AGun()
{
    // Set this actor to call Tick() every frame.  You can turn this off to improve performan
ce if you don't need it.
    PrimaryActorTick.bCanEverTick = true;

    Root = CreateDefaultSubobject<USceneComponent>(TEXT("Root"));
    SetRootComponent(Root);

    Mesh = CreateDefaultSubobject<USkeletalMeshComponent>(TEXT("Mesh"));
    Mesh->SetupAttachment(Root);

}

void AGun::PullTrigger()
{
    // Effect Spawn
    UGameplayStatics::SpawnEmitterAttached(MuzzleFlash, Mesh, TEXT("MuzzleFlashSocket"));
    UGameplayStatics::SpawnSoundAttached(MuzzleSound, Mesh, TEXT("MuzzleFlashSocket"));

    FHitResult Hit;
    FVector ShotDirection;
    bool bSuccess = GunTrace(Hit, ShotDirection);
    // if distance possible create particle and LineTraceSingle at location
    if (bSuccess)
```

```
    {
        UGameplayStatics::SpawnEmitterAtLocation(
            GetWorld(),
            ImpactEffect,
            Hit.Location,
            ShotDirection.Rotation());
        UGameplayStatics::SpawnSoundAtLocation(
            GetWorld(),
            ImpactSound,
            Hit.Location,
            ShotDirection.Rotation()
        );

        AActor* HitActor = Hit.GetActor();
        if (HitActor != nullptr)
        {
            FPointDamageEvent DamageEvent(Damage, Hit, ShotDirection, nullptr);
            AController* OwnerController = GetOwnerController();
            HitActor->TakeDamage(Damage, DamageEvent, OwnerController, this);
        }
    }
}


bool AGun::GunTrace(FHitResult& Hit, FVector& ShotDirection)
{
    AController* OwnerController = GetOwnerController();
    if (!OwnerController) { return false; }

    FVector Location;
    FRotator Rotation;

    OwnerController->GetPlayerViewPoint(Location, Rotation);
    ShotDirection = -Rotation.Vector();
    // We are calculating PlayerViewPoint between Wall distance
    FVector End = Location + Rotation.Vector() * MaxRange;

    // We are ignoring own character
    FCollisionQueryParams Params;
    Params.AddIgnoredActor(this);
    Params.AddIgnoredActor(GetOwner());
    return GetWorld()->LineTraceSingleByChannel(
        Hit, Location,
        End,
        ECollisionChannel::ECC_GameTraceChannel1,
        Params);
}

AController* AGun::GetOwnerController() const
{
```

```
    APawn* OwnerPawn = Cast<APawn>(GetOwner());
    if (OwnerPawn == nullptr) { return nullptr; }

    return OwnerPawn->GetController();
}
```