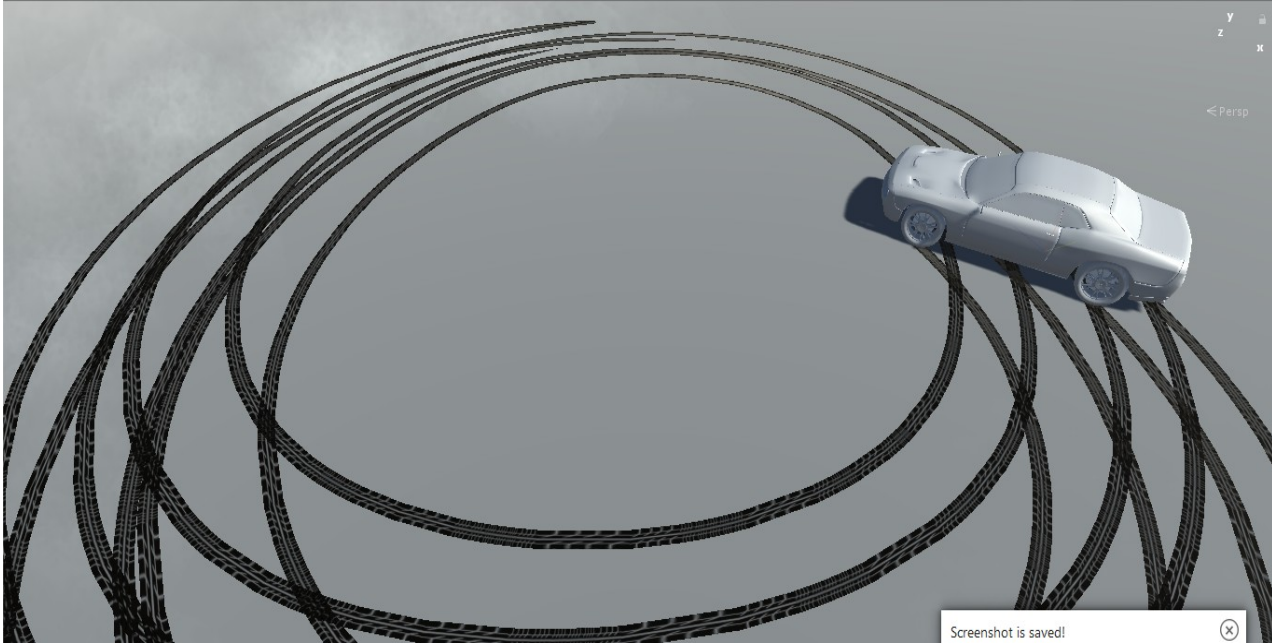# EASY VEHICLE SYSTEM

INTRODUCTION

The vehicle controller package has been designed to work with wide range of vehicles such as monster truck, tuk tuk, heavy vehicle like(trucks, container ,tractors), sportcar, buses so on.

The Package is also AI ready, so it supports auto pilot,with sensors to detect obstacles or barrier,the AI/Auto pillot system has been design to be flexible such that user can tweak values to fit in their game.Ai uses waypoint nodes to find its part.

HOW TO USE

1. Drag and drop the car engine prefab into your scene, there are predefined values in the inspector and defualt sport car model ,you could always edit inspector values to your choice or what suits the current vechicle you working on.

2. Delete the current model and child your preffered model to the car engine.

3. Tweak inspector values to suit your current vechicle.

4. add tags "SkidTrashHolder","Obstacles","Terrain" if they don't exsist,note that they are case sensitive.

5. Test run .

Brief talk on to how relate with components and values in the inspector

ESVehicleController
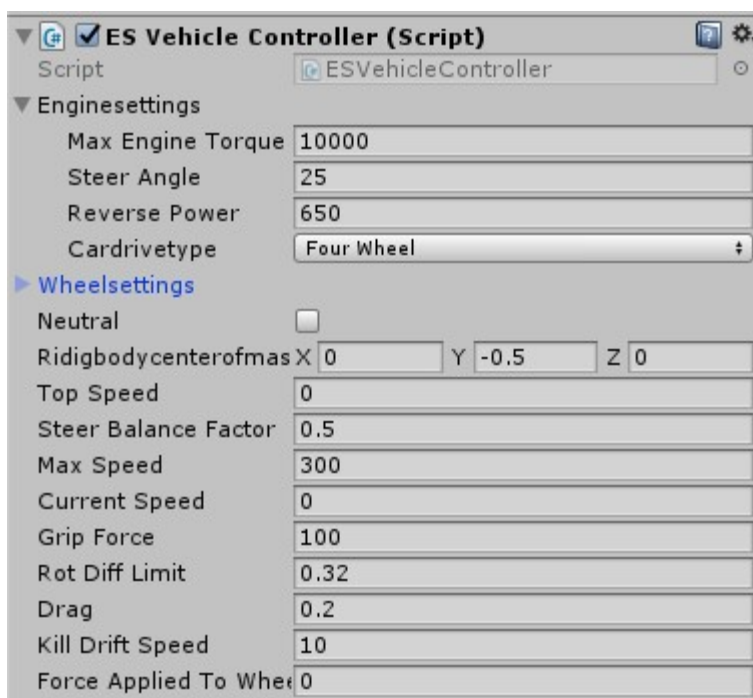
This is script component attached to car engine prefab. It enables the user control the vehicle at will,this contains the major controls for your vehicle,

VARIABLES

-Max Engine Torque : this is the overall engine force.

-Steer Angle : this is the max angle your vehicle's steer wheels can attain.

-Reverse Power: this is force applied to wheels when vehicle is reversing.

-Neutral: the current engine status, if the box is checked true the vehicle goes into its neutral state that is off gear, no force applied to its engine.

-RigidBodyCenterOfMass:this is where the mass of the vehicle is centered,for sport cars i recomend that your vehicle's center of mass be placed in the center, and a little bit lower in its Y-axis lets say a value of (-0.65f), but for more heavier vehicles like monster trucks, tractors so on. the value should be decreased more.

-MaxSpeed: this is the maximum speed your vehicle can attain,once the engine speed gets to the specified value it clamps its speed.

-SteerBalanceFactor: this is another pretty cool variable that gives more control to your vehicle steering, i recomend values less than 1, for more grip while drifting.

-GripForce: this is a downward force applied to the vehicle to give more grip,increase the value if your vehicle flips the way you don't want.

-Rot Diff Limit(rotation difference limit): this is the difference limit of the vehicle's rotation while it is drifting.

-KillDriftSpeed: once vehicle's currentspeed reaches the specified value it stops the vehicle from drifting.

-ForceAppliedToWheel : there is no need to specify this variable, It is being exposed in the inspector,so that user can monitor the current force applied to wheel based on the traction.

ESGearShift

This is a script component attached to the car engine prefab. It suppports automatic and manual geartransmission.
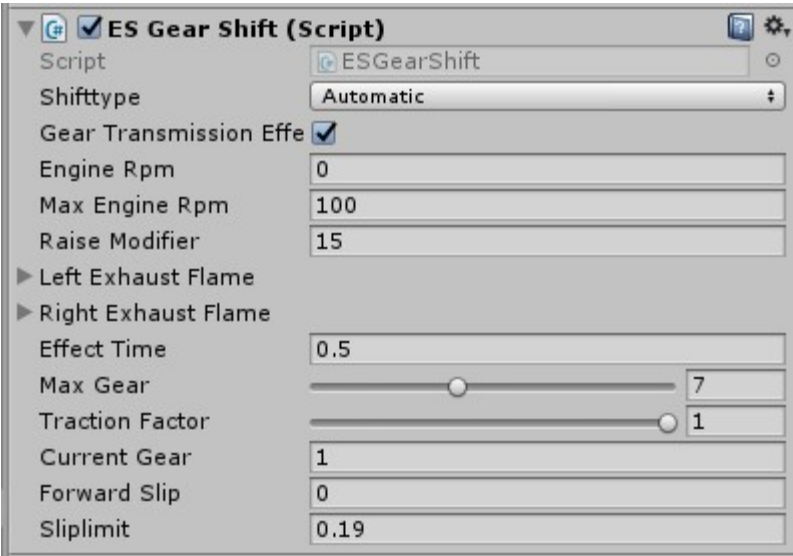
VARIABLES

-ShiftType: this is the type of gear transmission for the vehicle, it could be manual or automatic.
for automatic ,gear transmission is done automatically by the vehicle,while manual is done by holding the clutch and shift up and shift down.

-GearTransmissionEffect: check this option,if you want the vehicle to emit flame particles each time gear shifts up.

inorder for this to work drag and drop flame particle into the required slot.

-EngineRpm: this calculates the current EngineRpm.

-MaxEngineRpm: this is the maximum rpm of the vehicle's engine i recommend a value of (100f),you could set it higher than that, but higher values make engine unstable.

-MaxGear: this is the maximum amount of gear for current vehicle.

-ForwardSlip: this is an exposed variable so need to specify it,it is there for the user to monitor current foward slip of the vehicle wheels.

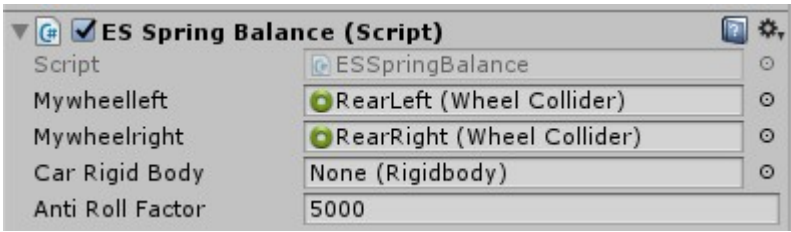-SlipLimit: this is the limit where traction starts to affect the wheels of the vehicle.

ESAudioSystem

This is a script component attached to the car engine prefab,It is responsible for producing realistic engine sound for your vechile.

It has a pitch modifier and pitch multiplier.

ESSpringBalance

This is a script component attached to the car engine prefab,It keeps the wheels balanced and stable inorder to aviod unneccesary flip.
Note: the amount of spring balance component added to your vehicle depends on how many wheels your vehicle has like if it's a four wheel you need to add two spring balance components, if it's eight wheel you four spring balance,if 16 wheels add 8 spring balance components. this uses an anti roll factor to balance the wheels on both side to aviod rolling over in high speed turn and drifting.
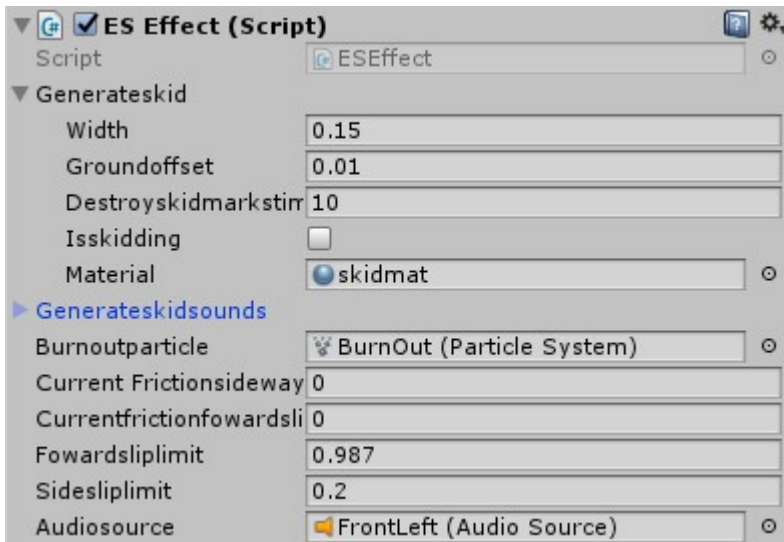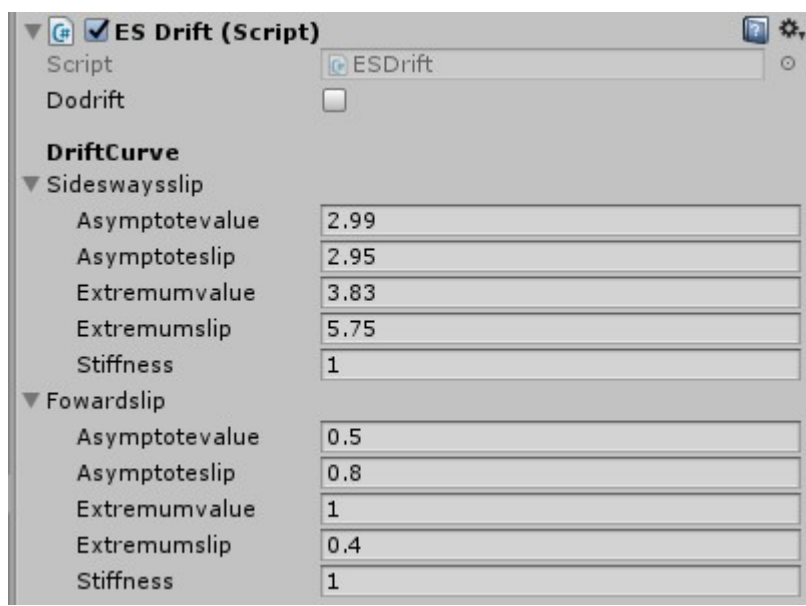
This is a script component attached to wheelcollider of your vehcile,it generates realistic skidmark, realistic skid sounds and burnout smoke.

VARIABLES

-width: this is the width of the skid mark.

-GroundOffset: this is the position of the skid above i recommend a value of(0.01f)

-Material: the current skid mark material.

-burnoutparticle: this holds the burnout particle that emits when friction acts on wheels

-ForwardSliplimit/SideSlipLimit: this limit is where you start experiencing wheel effect.

ESDrift

ES Drift (Script)	
Script	ESDrift
Dodrift	☐

DriftCurve

▼ Sideswaysslip

Asymptotevalue	2.99
Asymptoteslip	2.95
Extremumvalue	3.83
Extremumslip	5.75
Stiffness	1

▼ Fowardslip

Asymptotevalue	0.5
Asymptoteslip	0.8
Extremumvalue	1
Extremumslip	0.4
Stiffness	1

This is a script component attached to wheelcollder of your vechile,it enables the vehicle perform realistic drift.

ESFuelManager
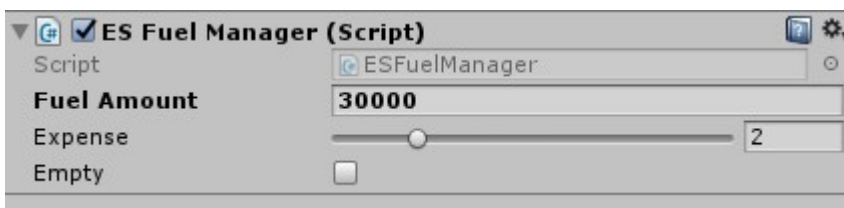
This is script component attached to car engine prefab, it manages feul for your vehicle,fue consumption is based on engine capacity,if you want your vehicle to drive and not worry about fuel consumption just do so removing this component.

VARIABLE

-Fuel Amount: Increase this value and vehicle will last longer

-Expense: this is the current engine capacity,higher value will consume fuel as fast as it can.
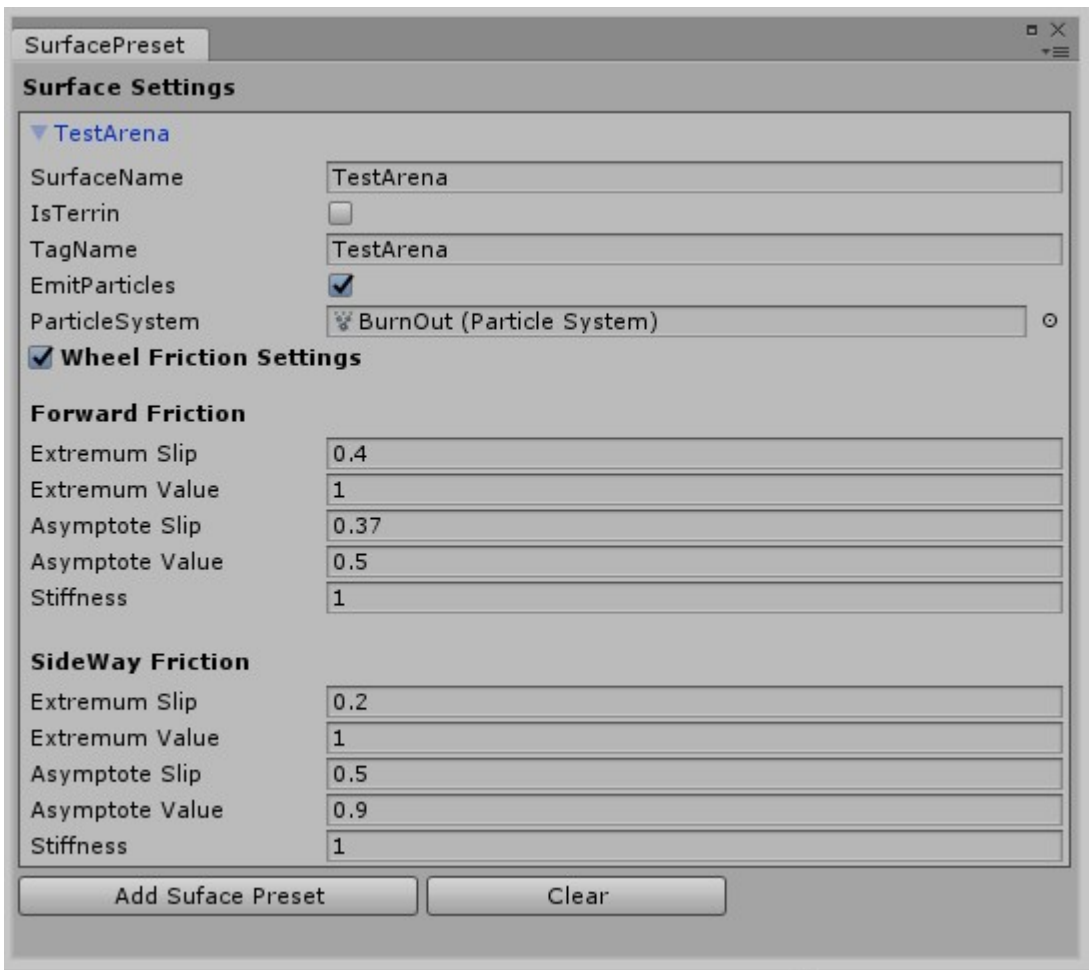
Setting Up TimeScale
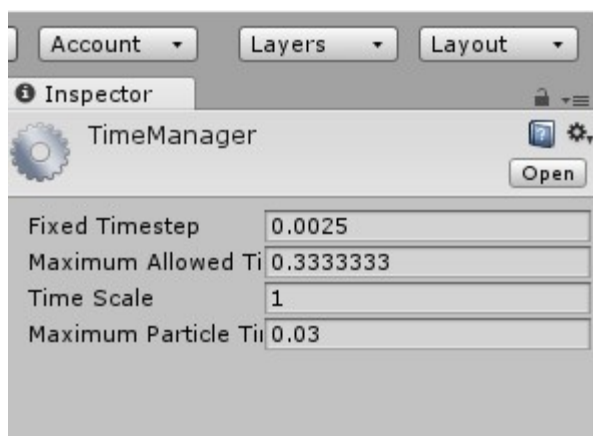
It is very important that you change the fixed Timestep to value above, unless your vehicle wont give you the realism you want.
to loacte this click on Edit/ProjectSettings/Time

Fixed TimeStep = 0.0025

Maximum Allowed Time = 0.3333333

TimeScale = 1

Maximum Particle =0.3

The surface preset system enables users to create different surface settings for their vehicle wheel, with this tool you could specify the behaviour of your wheels on different surfaces.that is the type of particles to emit or how slippery or solidify a surface is.

To locate this tool click on EasyVehicleSystem/Surface/SurfacePreset

-SurfaceName: this is the name of current surface preset.

-IsTerrain: checked this true if you are using the unity terrain,it uses the index
 of textures on the terrain surface to determine which surface your vehicle is currently on

-EmitParticles: this enables the vehicle wheel emit particles based on surfaces.

-WheelFrictionSettings: this governs the behaivour of vehicle wheels due to the surface
   it is on.

-AddSurfacePreset:this button adds more surface preset.

-Clear: deletes all surface preset

TUTORIALS

1   https://youtu.be/RWPhWOTodfU