Car Airbag System

By: Skril Studio

Thank you for purchasing Car Airbag System!

I hope that your project is going to be a huge success!

Let me know if you have any questions that cannot be answered with this documentation. Contact details can be found at the end of this document.

If you like this asset, please write a review for it on the Unity Asset Store. A review can significantly help the development of this asset and its visibility in the store. Thanks.

- Attila Sz.

Contents

Package Includes:

- Car Airbag System controller scripts
- Demo scene controller scripts
- 5 demo scenes (from these 2 are poly styled scenes)
- 32 airbag meshes (16 regular and 16 poly styled meshes)
- 48 airbag prefabs (24 regular and 24 poly styled prefabs)
- 2 smoke praticle prefabs
- 20 airbag pop sound clips
- 36 airbag textures (from these 24 are normal maps)
- 1 smoke texture
- 13 materials (12 for airbags and 1 for smoke particle)
- 6 quick start setup prefabs (made from already exist prefabs)
- 6 poly styled quick start setup prefabs (made from already exist prefabs)

Brief Explanation of How It Works

Import **TextMesh Pro** to avoid having any issues with the demo scenes.

For URP you need to update all materials with the Render Pipeline Converter. It can be found here: Window/Rendering/Render Pipeline Converter

There are multiple airbag types, each of these contain one airbag mesh, a sound clips and a smoke particle.

When you drop one of the airbag types into your scene, it displays its inflated state. Its current scale represents its size immediately after deployment. If you resize them now, that will be their size upon deployment. During deployment, they also play a one-shot sound clip and activate the smoke particle effect. After this, the deployed airbag(s) will slowly shrink to the size preset in the Inspector editor.

If you don't want any sound effects simply set them to „None" in the Inspector for the desired airbag type.

However to make airbag types work you also need an Airbag System Main controller!

Airbag System Main controller is dropped into a vehicle, then you drop each airbag type into this Main controller. During scene start *Airbag System Main* controller will try to get the **vehicles Rigidbody**, and it will add one **Airbag System Collision Sensor** controller script beside the vehicle's Rigidbody. This „Sensor" will tell the Main controller when the vehicle have collided with something and the Main controller will decide if it is needed to deploy any airbags based on it's settings.

Don't worry about that the airbags are visible in your scene during editing, they will disappear as soon as you start playing your Unity game. Also, you can disable each Airbag Type gameObjects if seeing them constantly during editing bothers you, just make sure you don't disable the Airbag Main Controller because that will turn off the entire Airbag System.

The simplicity of the Airbag System Main makes it compatible with any vehicle physics controller Unity asset, with no programming required to make it work. Its modularity also makes it possible to use it in many different ways in many different scenarios.

Scripting samples:

You can deploy or reset each deployed airbag one-by-one with their **Airbag Type** script:

```
using SkrilStudio.CAS;
…
AirbagType.ResetAirbag();
// you can also deploy them with:
AirbagType.DeployAirbag();
```

With the **Airbag Main** controller you can reset all airbags the following way:

```
using SkrilStudio.CAS;
…
CarAirbagSystem.ResetAllAirbags();
```

Quick Start Setup With Presets

Youtube video tutorial: https://youtu.be/KOKwr9d-LLc

You can use quick start setup prefabs to kick-start the usage of Car Airbag System in your Unity projects.

There are two styled quick start setups: regular and poly styled.

You can find the regular style here: \CarAirbagSystem\Assets\Prefabs\Quick Start Setups

You can find the poly styled ones here: \CarAirbagSystem\Assets\Prefabs\Quick Start Setups – Poly

Each quick start setup contains one Airbag System Main Controller, which is the parent GameObject, and several airbag type GameObjects, which are the child GameObjects. Each airbag type displays its inflated state, and its current scale represents its size immediately after deployment. Don't worry, they will disappear as soon as you start playing your Unity game. Also, you can disable each Airbag Type gameObject if seeing them constantly during editing bothers you, just make sure you don't disable the Airbag Main Controller!

If you resize them now, that will be their size upon deployment. During deployment, they also play a one-shot sound clip and activate a smoke particle effect. After this, the deployed airbag(s) will slowly shrink to the size preset in the Inspector editor. If you don't want sound effects simply set them to „None" in the Inspector for the desired airbag type.

How to use the quick start prefabs:

- drag and drop one quick start setup into your vehicle
- position and resize each airbag to make them fit into your vehicle design, just make sure you selected only one airbag and not the entire main controller. For steeringwheel airbag it is enought if you just position it correctly to your vehicles steeringwheel.
  For the most basic quick start these two steps should be enought.

- (optional) add your vehicle's Rigidbody to the Airbag Main Controller (the parent gameobject of the preset prefab) **by default it should get your vehicle's rigidbody automatically by itself, but you can also add it by hand if it can't find it.**
- (optional) attach the steeringwheel airbag to your vehicle's steeringwheel, so it can follow the steeringwheel's rotation. To achieve this, you need to break the prefab, drag and drop the steeringwheel airbag into the steeringwheel gameobject. After this step inside the **Airbag Main Controller** (the parent gameobject of the qucik setup prefab) you need add each airbag manually, because now it can't find the steeringwheel airbag by itself.
  Under „Connecting to Airbags" pannel change „Adding Airbags" to Manually mode and add as many airbag types as you need, now drag and drop each airbag type prefabs into the manually added airbag type fields: (see image on the next page)
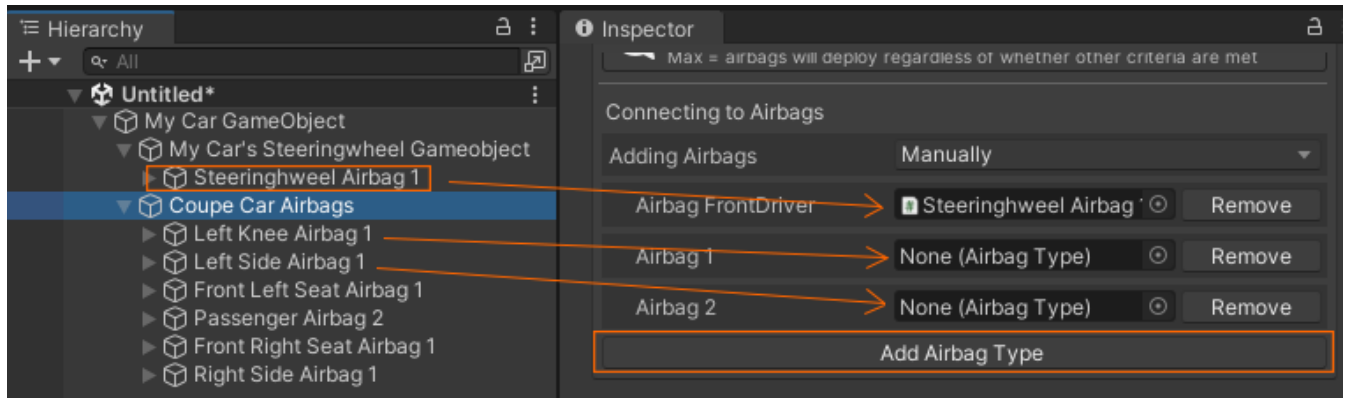
As you can see, I have added three airbag types and have already placed the steering wheel airbag into one of them. I am about to add the others as well. I also need to add more airbag types to the Main Controller for the remaining four airbags.

Quick Start Setup Without Presets

Youtube video tutorial: https://youtu.be/4KJHQvL_VNM

There are two styled airbag prefabs: regular and poly styled.

You can find the regular style here: \CarAirbagSystem\Assets\Prefabs\ Airbags

You can find the poly styled ones here: \CarAirbagSystem\Assets\Prefabs\Poly Airbags

Both of these contain one prefab for the **Main controller**, which is the first one in the list. It is named as

„Airbag System Main - Drop airbags into this prefab" (highlighted with orange color in the picture below):
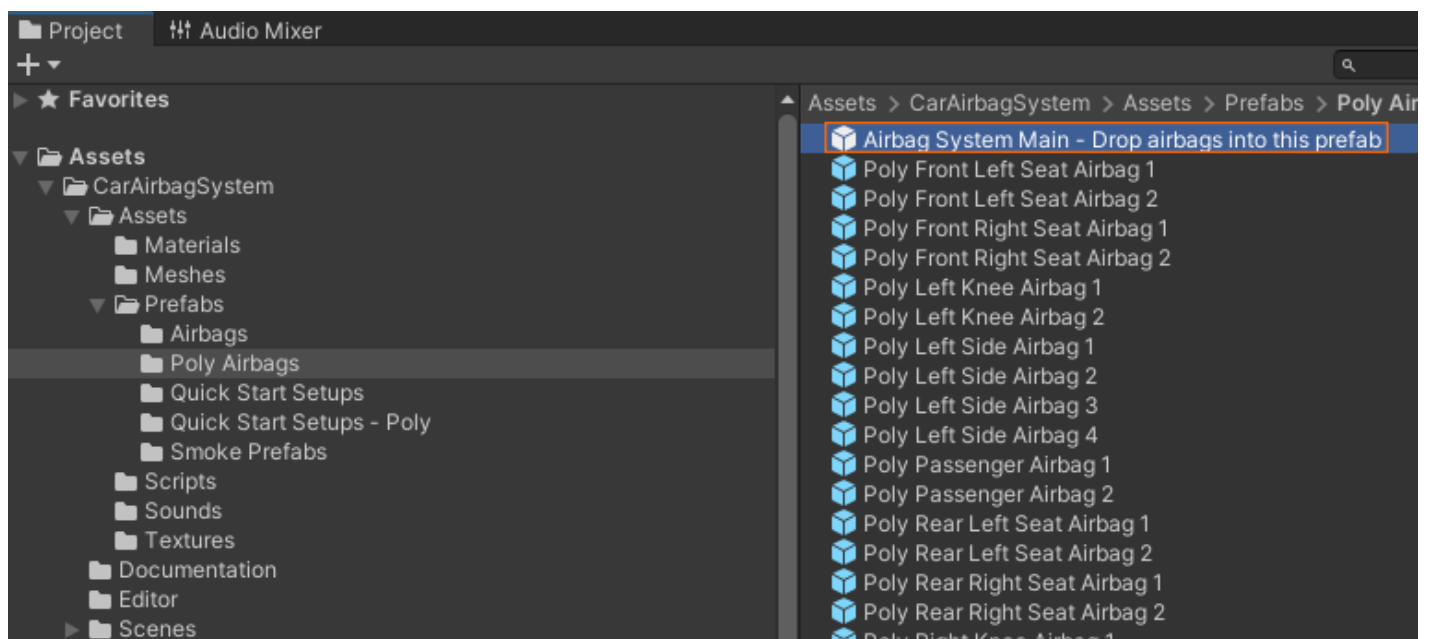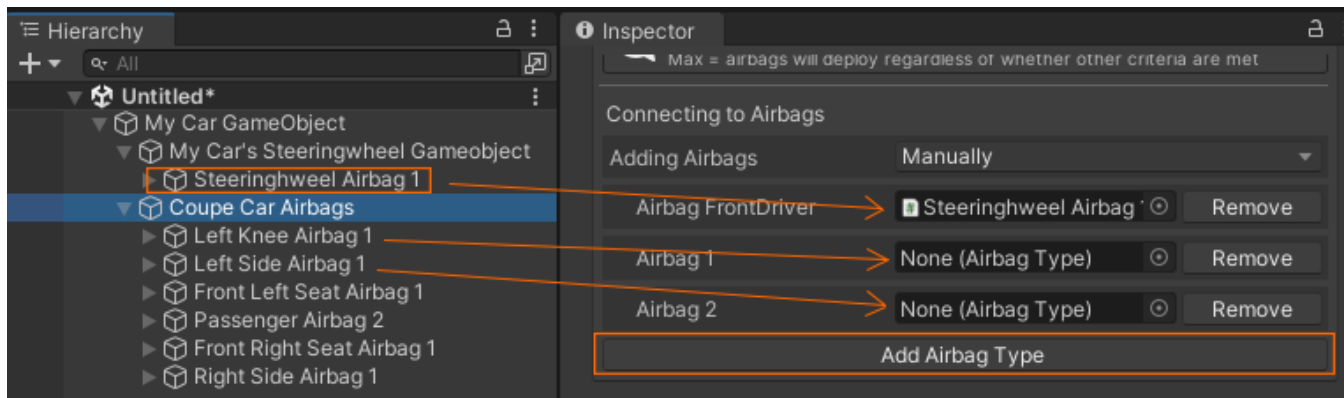

Drop one above mentoned „Airbag System Main" prefab into your vehicle, now drag and drop as many airbag types into the *Airbag System Main* as you need.

Now follow the next steps:

- position and resize each airbag to make them fit into your vehicle design, just make sure you selected only one airbag and not the entire main controller. For steeringwheel airbag it is enought if you just position it correctly to your vehicles steeringwheel. The Airbag Main Controller will automatically grab each Airbag Type if they are child GameObjects of it.
For the most basic setup, these steps should be enough. You can already play your scene to test it!

- (optional) add your vehicle's Rigidbody to the Airbag Main Controller. **By default it should get your vehicle's rigidbody automatically by itself, but you can also add it by hand if it can't find it.**
- (optional) attach the steeringwheel airbag to your vehicle's steeringwheel, so it can follow the steeringwheel's rotation. To achieve this, you need to drag and drop the steeringwheel airbag into the steeringwheel gameobject. After this step inside the **Airbag Main Controller** (the parent gameobject of

the qucik setup prefab) you need add each airbag manually, because now it can't find the steeringwheel airbag by itself.

Under „*Connecting to Airbags*" pannel change „*Adding Airbags*" to *Manually* mode and add as many airbag types as you need, now drag and drop each airbag type prefabs into the manually added airbag type fields:


As you can see, I have added three airbag types and have already placed the steering wheel airbag into one of them. I am about to add the others as well. I also need to add more airbag types to the Main Controller for the remaining four airbags.

Airbag Main Controller

The Main Controller manages everything altogether. This is where all components connect to the vehicle.

It will automatically detect all airbag-type prefabs if they are child objects of the Main Controller. If they are not child objects of the Main Controller (e.g., if the airbags are placed inside car part gameObjects), you will need to add them manually in the Main Controller's "Connecting to Airbags" tab.
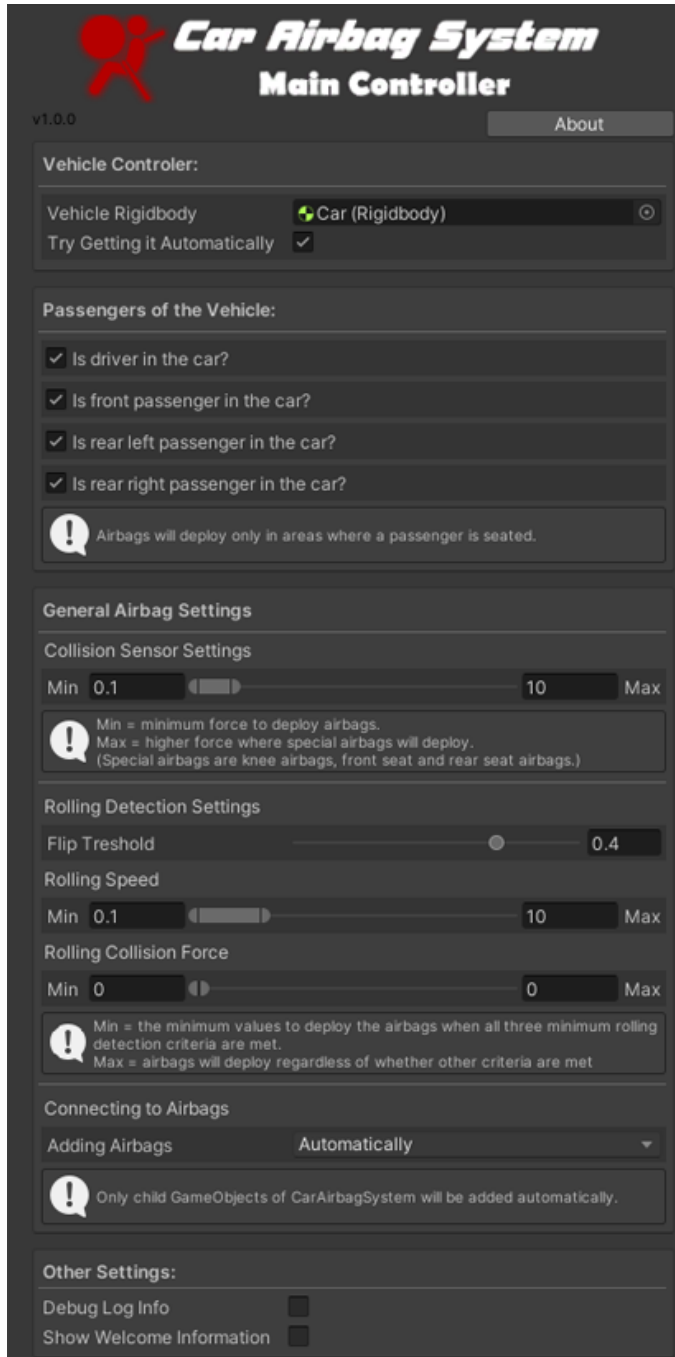
Vehicle Controler: Here, you need to connect the Main Controller to your vehicle's Rigidbody. It will also attempt to detect the Rigidbody automatically if *„Try Getting it Automatically"* is enabled. However, in some cases, a vehicle may have multiple Rigidbodies. In such situations, you may need to manually assign the correct one.

I encountered this issue when a truck's cabin had its own Rigidbody, while the rest of the body had another. In my case, the airbags only functioned correctly when the Main Controller was connected to the cabin's Rigidbody (this was experienced with NWH2's truck).

Try Getting it Automatically: It will try to get the vehicle's rigidbody automatically at the start of scene.

The simplicity of this makes it compatible with any vehicle physics controller Unity asset, with no programming required to make it work.

Passengers of the Vehicle: Enable these passengers if they are sitting inside the vehicle. This ensures that the correct airbag deploys for them (if an airbag is added to their side).

Airbags will deploy only in areas where a passenger is seated.

For realism, enable or disable the appropriate passenger position when they enter or exit the vehicle in your game. Alternatively, you can leave all of them enabled if you prefer not to manage this manually. In this case all airbags can be deployed if a collision is detected on their side.

Is driver in the car: It will deploy driver side airbags if the collision is big enought.

Is front passenger in the car: It will deploy front passenger airbags if the collision is big enought.

Is rear left passenger in the car: It will deploy rear left passenger airbags if the collision is big enought.

Is rear right passenger in the car: It will deploy rear right passenger airbags if the collision is big enought.

General Airbag Settings: Here you can edit general settings of all airbags.

Collision Sensor Settings: The minimum value defines the threshold at which airbags can start deploying, while the maximum value represents a severe collision where special airbags, such as knee airbags, front seat airbags, and rear seat airbags will deploy.

Rolling Detection Settings: Various settings are used to detect vehicle rolling downhill, triggering the deployment of side and seat airbags. Rolling is detected when all minimum criteria are met, or if any of the maximum criteria for the two values with min-max settings are met, along with the *Flip Threshold* value below.

Flip Threshold: Sets the minimum threshold for the rotated car. 1 = The car is fully on its wheels, 0 = The car is sideways, -1 = The car is upside down.

Rolling Speed: The minimum and maximum rolling speeds required to deploy airbags. If the maximum rolling speed is reached, the airbags will deploy regardless of whether other criteria are met.

Rolling Collision Force: The minimum and maximum collision forces required to deploy airbags. If the maximum collision force is reached, the airbags will deploy regardless of whether other criteria are met.

Connecting to Airbags: Airbags can be added automatically if they are child GameObjects of this GameObject, or you can add them manually. In automatic mode, only the airbags that are child GameObjects of the CarAirbagSystem will be added. If they are not child objects of the Main Controller (e.g., if the airbags are placed inside car part gameObjects), you will need to add them manually in the Main Controller's "Connecting to Airbags" tab.
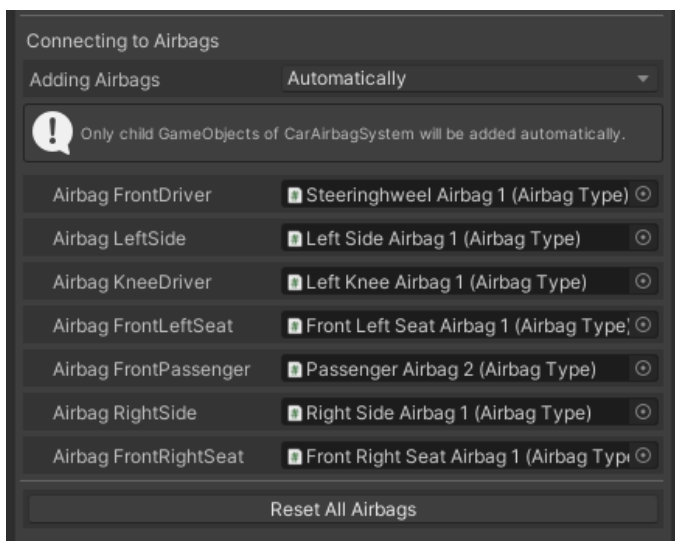
Only child GameObjects of the CarAirbagSystem will be added automatically. Otherwise, use manual adding mode. (see page 6 or 8.)

Reset All Airbags (appears only during PlayMode): It will reset all airbags if any of them have been deployed.

Other Settings: Other custom inspector related settings.

Debug Log Info: It will display detailed debug messages with values in the Console.

Show Welcome Information: It will show the welcome information in the Inspector when the user is using the asset for the first time. This can be disabled, and the setting is saved globally for all Unity projects using this asset.

Airbag Type Controller

Airbag Type Controllers define the airbag's type and position inside the car. They also contain the airbag mesh, airbag pop sound clip, smoke particle, and bump maps. There are separate bump maps for inflated and deflated states.

Here you can edit various settings of the selected airbag gameobject.

Airbag Type: Airbag type can be chosen here for the currently selected prefab.

Airbag Type contain the following types:

- **FrontDriver:** deployed during front collisions
- **FrontPassenger:** deployed during front collisions
- **KneeDriver:** deployed during serious front collisions
- **KneePassenger:** deployed during serious front collisions
- **LeftSide:** deployed during left side collisions, acceptable for curtain front door and seat airbags
- **RightSide:** deployed during right side collisions, acceptable for curtain front door and seat airbags
- **FrontLeftSeat:** airbag built into the front seat side is designed to protect the front passenger's torso, primarily during serious side collisions
- **FrontRightSeat:** airbag built into the front seat side is designed to protect the front passenger's torso, primarily during serious side collisions
- **RearLeftSeat:** airbags built into front seats to protect rear seat passengers mostly from serious front collisions
- **RearRightSeat:** airbags built into front seats to protect rear seat passengers mostly from serious front collisions

Deflation Scale: The target scale of this GameObject when the airbag is fully deflated. The deployed scale is obtained from the GameObject containing the mesh: *"Airbag Mesh GameObject"*.

Prevent Oversized Deflation: It helps prevent deflated airbags from having a larger scale than inflated airbags. This can happen when the original mesh GameObject is scaled smaller than its original size, and the **Deflation Scale** mentioned above tries to scale it to its predefined value, which may be larger than the current scale. Enabling this prevents that from happening.

Gameobject of Airbag Mesh: The GameObject that contains the mesh for the airbag. It allows mesh placement at a custom location without breaking the connection to the Main Controller. It also retrieves the deployed scale from this GameObject. This adds another level of modularity and customization.

Airbag Sound Clip: This sound clip is played once when the selected airbag is deployed. The AudioSource is created by the Airbag System Main controller.

Audio Volume: Sets the loudness of the explosion sound for the selected airbag.

Deflation Replace Normal: It will replace the normal map during deflation when enabled.

Replacement Delay: It will replace the normal map after THIS seconds have passed.

Inflated Normal Map: Texture used for inflated state.

Deflated Normal Map: Texture used for deflated state.

Enable Smoke: A smoke particle will be activated during airbag deployment when enabled.

Airbag Smoke Particle: The smoke particle that is activated during airbag deployment.

Deploy This Airbag: only visible during play mode when the airbag is undeployed. Pressing this button will deploy this airbag if it is undeployed.

Reset This Airbag: only visible during play mode when the airbag is deployed. Pressing this button will reset this airbag if it is deployed.

Airbag Collision Sensor

This script is automatically added by the Airbag Main Controller to the vehicle's Rigidbody. It does not have any settings, it simply sends collision values to the Airbag Main Controller.

License

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One license per seat for personal and commercial use.

<u>You can't resell or redistribute the package or any single file from the package on any store!</u>

Credits

Youtube Playlist:
https://www.youtube.com/playlist?list=PLYFtdNoo8S3gVfhXBmjYfNtkJJFsrZCu0

Please write a review for this asset in the Unity Asset Store. Thank you!

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Add-On packs for Realistic Engine Sounds 2: https://bit.ly/2QYutD3

Realistic Car Shaders: http://bit.ly/39mVLXX

UI SFX Mega Pack (2682 wav files): https://bit.ly/40oKeCd

Everything else: http://bit.ly/2TBgK2z

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Speaking: English, Hungarian and Serbian.
May not be available to respond to messages during weekends and holidays.