Randomation Vehicle Physics 2.0 Changelog

For questions or concerns, contact justincouch@randomationmedia.com with your invoice number.

Manual: http://randomationmedia.com/documents/RVP_2.0_Manual.pdf

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2.0

Initial release.

2.01

Added support for moving suspension parts with the *SuspensionPart* script.

Added “pivot offset” variable to *Suspension* to offset wheels from their steering pivots.

Fixed *Suspension*'s steering range gizmos.

AI cars can now reset if they get stuck with “reset reverse count” and “roll reset time” variables.

Added auto steer drifting to *VehicleAssist*.

Added ability to do burnouts by holding the gas and brake simultaneously with new burnout variables on *VehicleParent*.

Replaced hardcoded layer numbers with NameToLayer().

Fixed caster and camber angle inaccuracies in *Wheel*.

Minor improvement to *VehicleBalance* to prevent sliding.

New scripts *MobileInput* and *MobileInputGet* for mobile input, with buttons and accelerometer steering.

New *PerformanceStats* script that shows the framerate.

New scene with mobile controls and prefabs.

Added F1 car and kart prefabs.

2.02

Added support for damage with the *VehicleDamage*, *DetachablePart*, and *ShatterPart* scripts.

Added damageable muscle car.

Wheels can now detach.

New “Tires Bumped” shader.

Loose objects are deleted when vehicles are deleted.

Raycasts hit triggers set to false so that vehicles can't drive on triggers.

Car Body physic material is slightly bouncier.

New Detachable Part layer.

The compressor effect on the master audio mixer has been moved to the SFX mixer.

Gravity on inputs in the input manager have been adjusted.

Refactored some repeat GetComponent calls into one.

Tweaked performance of most vehicles to accommodate bug fixes in *Suspension* and transmissions.

VehicleParent – Burnouts have been smoothed a bit with the new burnout smoothness variable.

Wheel – Added Deflate(), FixTire(), Detach(), and Reattach() functions. Added damage variables. Added rim glow variable for making rims glow while scraping. Various improvements to burnouts. GetRawRPM() constant changed from 300 to Pi * 100.

Suspension – Added damage variables. Fixed bug in how suspension forces were applied. To keep legacy behavior, set the new variable "Apply force at ground contact" to false. The bug manifested itself as vehicles leaning forward at high speed.

SuspensionPart – New invert rotation variable to invert the local z-rotation of solid axles.

VehicleDebug – Damaged vehicles repair on reset and WaitForFixedUpdate coroutines with resetting.

TireMarkCreate – Smoke/debris particles.

TireScreech – Fixed bug in the volume of sounds, where integers were being divided instead of floats.

SteeringControl – Added support for rotating an actual steering wheel.

HoverSteer – Added support for rotating an actual steering wheel.

Transmission – Damage variables. Fixed bug with torque output, set the new "Legacy Torque Multiplier" variable to true to maintain old behavior. The bug prevented vehicles from reaching their maximum engine RPM at top speed.

GearboxTransmission – Added GetFirstGear() function and damage logic.

ContinuousTransmission – Damage.

Motor – Damage variables. Smoke particles to represent damage.

GasMotor – Damage and changes to burnout logic. New GetMaxRPM() function.

HoverMotor – Damage.

HoverWheel – Damage variables. Added Detach() and Reattach() functions.

VehicleMenu – Limit how quickly chase cars can be spawned. New button for spawning damageable chase car.

GlobalControl – New layermask for objects that can inflict damage.

GroundSurfaceMaster – Added leave sparks property to surface types.

CameraControl – Initialize() doesn't leak objects anymore.

MobileInputGet – New delta factor variable for how much the input's rate of change is added to the input.

FollowAI – New InitializeTarget() function and WaitForFixedUpdate coroutines with resetting.

2.03

Improved performance for the *VehicleDamage* script plus new "Damage Factor" variable. Script execution order of *VehicleDamage* set to be after default time.

CameraControl has been modified to not follow the rotation of airborne vehicles as much.

Suspension – Suspension distance can be zero and target compression is forced to be 1 in play mode. New "Hard Contact Sensitivity" variable for changing how sensitive hard contacts are to the traveling velocity of the suspension.

Normals are no longer recalculated in *TireMarkCreate*.

Changes to torque output in *GasMotor* to allow vehicles to roll past their top speed and not slow down when the throttle is engaged.

Motor – Boost power replaced with boost power curve allowing for more control over boost power based on the speed of vehicles.

New "Disable During Crash" variable in *FlipControl* disables flipping control when a vehicle crashes while airborne.

Changes to *DetachablePart* for Unity 5.1 compatibility where minBounce and maxBounce are replaced with bounciness for joints.

2.04

VehicleParent – New "engine" variable, burnouts can no longer be performed when engine is fully damaged.

Wheel – Added condition to see if shader on tires has deform properties before trying to apply deformation.

Suspension – New variable "leaning force" to make suspension forces be applied along the local up-direction of the vehicle rather than the ground normal.

VehicleBalance – Removed steer assist stuff.

GlobalControl – The "damage mask" layermask has been adjusted to include objects on the "Detachable Part" layer. This fixes the issue of vehicles sometimes not damaging each other upon collision.

The scene now has a bumpy terrain area past the figure 8 track.

2.05

Wheel – New “feedback RPM bias” variable for finer control over the feedback RPM.

New “RPM bias curve” variable for finer control over output RPM.

Null check for tire before trying to deactivate it upon popping.

Opposing friction forces are now applied to rigidbodies the vehicle sits on.

Suspension – Opposing suspension forces are now applied to rigidbodies the vehicle sits on.

VehicleAssist – New “fall speed limit” and “apply fall limit upwards” variables for limiting fall speed.

FlipControl – New “ground check distance” and “ground steepness limit” variables for rotation correction based on ground normal.

2.06

Replaced instances of F.PowNatural() with Mathf.Pow() as it was discovered to be slower.

Transmission – Changes to feedback RPM to fix issue with lack of torque when vehicle is rolling quickly one direction while trying to drive opposite way.

GasMotor – Changes to feedback RPM interpretation because of changes to *Transmission*.

Wheel – New “axle friction” variable for slowing down coasting vehicles.

Removed *new RaycastHit()* declaration from GetWheelContact() function for reduced garbage collection.

Changed case of first letter of “rpmBiasCurve” to lowercase to match other variables. Curves on vehicles may be reset to default because of this.

New “RPM bias curve limit” variable for finer control over output RPM based on the RPM bias curve.

2.07

Support for variable fixed timesteps.

Disallowed multiple instances of certain components on same object.

Added component menus for all MonoBehaviours.

Motor and *Transmission* classes are abstract in C#.

New *TerrainSurface* script for configuring ground surfaces on terrains.

The wheels array on the Wheeled Tank prefab now contains all of its wheels.

F – New static *GetTopMostParentComponent()* function for getting the topmost parent of a transform with a certain component. Vehicles can now be children of other objects during *Awake()* and *Start()*.

VehicleParent – New *WheelCheckGroup* class.

New “wheel groups” array for distributing wheel raycasts across multiple fixed steps.

New “Get Engine” and “Get Wheel” inspector buttons.

VehicleDamage – “Collision ignore height” gizmo is now drawn with correct local rotation.

HoverWheel – Improved hovering force with new “buffer distance” and “buffer float force” variables.

Improved braking force.

Changes to work with *VehicleParent*'s wheel groups.

Used *GetTopmostParentComponent()* function.

New “Get Visual Wheel” inspector button.

HoverSteer – Used *GetTopmostParentComponent()* function.

HoverMotor – New “Get Wheels” inspector button.

GroundSurfaceMaster – *GroundSurface* class now has “name” variable. Set this to work with new inspectors on *GroundSurfaceInstance* and *TerrainSurface*.

GroundSurfaceInstance – Surface types can be identified by their name.

TimeMaster – New static “fixedTimeFactor” variable for working with variable fixed timesteps.

New static “inverseTimeFactor” variable, equals 1 / fixedTimeFactor.

GlobalControl – Time.fixedDeltaTime is reset to initial value with quick restart.

DetachablePart – Used *GetTopmostParentComponent()* function.

Handles for moving and rotating hinge anchors and axes of part joints.

FollowAI – Used *GetTopmostParentComponent()* function.

Motor – Used *GetTopmostParentComponent()* function.

Estimated vehicle top speed is displayed at top of inspector.

Boost burn rate is independent of fixed time.

SteeringControl – Steering rate is independent of fixed time.

Used *GetTopmostParentComponent()* function.

Suspension – Hard contact force works properly with different fixed timesteps.

Used *GetTopmostParentComponent()* function.

Checks if wheel exists before drawing gizmos.

New “Get Wheel” and “Get Opposite Wheel” inspector buttons.

SuspensionPart – Handles for moving the connect point.

TireScreech – Used *GetTopmostParentComponent()* function.

TireMarkCreate –Removed private *curSurfaceInstance* variable as it seemed redundant since the wheel's contact point already contains surface type info.

Fixed issue where tire marks would be left instead of rim marks if tires were popped while skidding.

Transmission – Used *GetTopmostParentComponent()* function.

ContinuousTransmission – Improved automatic shifting and proper ratio multiplication with feedback RPM, fixed issue where ratios didn't change top speed.

GearboxTransmission – Changes to work with variable fixed timesteps.

New “Calculate RPM Ranges” inspector button.

Refactored *CalculateRpmRanges()* function.

Wheel – Used *GetTopmostParentComponent()* function.

Changes to detect *TerrainSurface* dynamic friction.

Changes to work with *VehicleParent*'s wheel groups.

Air leak rate works with different fixed timesteps.

New *GetWheelDimensions()* function for getting the dimensions of the rim/tire meshes.

New “Get Wheel Dimensions” inspector button.

MobileInputGet – New “use accelerometer” variable.

VehicleAssist – “Angular drag on jump” timer works with variable fixed timesteps.

VehicleBalance – Smooth leaning works with variable fixed timesteps.

PropertyToggleSetter – New “Get Variables” inspector button.

CameraControl – Changes to work with variable fixed timesteps.

StuntDetect – Changes to work with variable fixed timesteps.

2.07.1

Fixed some errors in the following scripts when adding them to objects:

TerrainSurface – Would throw error if no terrain data was assigned.

GasMotor – Because of null array check in editor script.

HoverMotor – Because of null array check in editor script.

DetachablePart – Because of null array check in editor script.

2.08

New “Car Damage” and “Hover Car Damage” prefabs to serve as simpler examples of damageable vehicles.

Tires on the mobile muscle car prefab have been given a simpler material that doesn't deform, since the original material doesn't show up on certain platforms.

Motor – Audio's target pitch is set to zero when ignition is false.

GasMotor – Output torque/RPM and feedback RPM are set to zero when ignition is false.

Moved setting of targetDrive.curve to outside of ignition branch.

Wheel – New “forward slip dependence” and “sideways slip dependence” variables for finer tuning of friction behavior.

Vehicle's name is part of detached wheel's name.

HoverWheel – Vehicle's name is part of detached wheel's name.

VehicleDamage – Refactoring of damage system and new *ApplyDamage()* function.

Suspension – “Detached compression” limited between 0 and 1.

2.08.1

NOTE: The “legacy torque multiplier” variable of the ***Transmission*** script is obsolete and will be removed in a future update. The *PowNatural()* function of the ***F*** script will also be removed.

Inverted spring target position on trunk of muscle car due to changes to hinge joints in Unity 5.3.

VehicleParent – Set inertia tensor of rigidbody to be equal to itself due to decoupling of center of mass and inertia tensor in Unity 5.3.

VehicleMenu – Fixed implicit downcast warnings.

Wheel – Feedback RPM is set to zero when wheel is jammed or detached.

Removed redundant *IsChildOf()* check from *GetWheelContact()*.

Fixed bug where detached wheel's tire material was not set correctly if “deform amount” is set to zero.

VehicleDamage – Slight refactoring to avoid redundant mesh vertex assignments.

GlobalControl – Level restarting uses new *SceneManager* class in Unity 5.3.

PerformanceStats – Level restarting uses new *SceneManager* class in Unity 5.3.

Motor – Refactored setting of particle emission rates for Unity 5.3.

TireMarkCreate – Refactored setting of particle emission rates for Unity 5.3.

2.08.2

Increased feedback RPM bias of Drift Car's wheels and recalculated RPM ranges on transmission to fix issue where the car would not be able to stop through normal braking.

F – Removed *PowNatural()* function.

Transmission – Removed “legacy torque multiplier” Boolean variable.

GearboxTransmission – Changes to work with absence of legacy torque multiplier.

ContinuousTransmission – Changes to work with absence of legacy torque multiplier.

2.08.3

Wheel – New “friction smoothness” variable to adjust how smoothly the applied friction forces change. Increasing this can reduce vehicle jitter/shaking.

GasMotor – Boost properly increases top speed.

HoverMotor – Boost properly increases top speed.