

SuspensionSim 2021.0: New Features

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The last release of SuspensionSim was version 2020.0. This document lists the notable new features in SuspensionSim version 2021.0, organized into sections based on the main components of the software package.

The SuspensionSim Installer

The SuspensionSim installer has been reconfigured to package some of the installation files separately from the executable. The executable has the same appearance as previous versions:

`Setup_SuspensionSim_2021.0_rrev.exe`

where *rev* is a revision number. As before, the installer may later be used multiple times to create new, clean `SuspensionSim_Data` folders. With the new installer format, rather than saving just the executable for this purpose, you should retain the ZIP or ISO file which contains the executable and the additional installation files.

Architecture Changes

A revision to the scaling of animator shapes was made so that the supporting code is now shared across all Mechanical Simulation products. This change requires action to use some old datasets or databases. See the SuspensionSim 2021.0 Backward Compatibility document for more information.

Model Features

Minor improvements have been made to the parsing of VS Commands. These should be transparent to most users.

VS Browser: Graphical User Interface (GUI)

- A new option **Find All Unreferenced Datasets** has been added to the VS Browser under the **Tools** menu. This produces a list of every dataset in the current database that has no dataset referencing it. This option can be helpful in maintaining the database and identifying currently unused datasets.
- A new option **Find All Deprecated Assets** has been added to the VS Browser under the **Tools** menu. This will produce a list of every dataset in the current database that has a reference to a deprecated animator asset. (Mechanical Simulation routinely deprecates and then retires 3D shapes used in VehicleSim products such as CarSim. As of SuspensionSim 2021.0, no SuspensionSim animator assets have been deprecated or retired by Mechanical Simulation, so none are expected to be found.)
- A new option **Re-Write every 'All Parsfile' sent to the Solver or VS Visualizer** has been added to the **Tools** menu. This creates the Run_all.pars which are found in the Results folders, but does not make the runs, useful for updating run data when controlling the run itself from outside of the VS Browser.

VS Visualizer

VS Visualizer can now reload/refresh simulation data without the need to be closed and then relaunched. If the simulation results have changed (i.e., the simulation was modified and rerun) but VS Visualizer is still open, the user may press the hotkey Ctrl+F5 or select **Reload data** from the VS Visualizer's **File** menu. This will load the new data to the currently active VS Visualizer window.

New and Updated Examples

Several new examples are included in the 2021 database:

- 1) The category “* SuspensionSim 2021.0 - Whole Car” shows how an entire car, consisting of a sprung mass and front and rear independent suspensions, can be modeled. Four test cases are included:
 - a. Static equilibrium. The sprung mass is allowed to settle into an at-rest condition.
 - b. Heave. The sprung mass is moved vertically, exercising the jounce DOFs of the suspensions.
 - c. Roll. The sprung mass has a roll moment applied about its X-axis, producing a roll of the sprung mass relative to the ground plane.
 - d. Steer. A static steer test produced by translating the steering rack body.
- 2) The category “* SuspensionSim 2021.0 - 4 Link w/ Track Bar” contains the example “Compliance Test”. This can be used to generate compliance coefficients for a CarSim or TruckSim solid axle suspension.

- 3) The category “* SuspensionSim 2021.0 - RWD Performance” contains eight examples to characterize both suspensions for a sports car. These examples were used to generate the K&C data for the CarSim 2020.1 (and up) virtual steering axis B-class sports car.
 - a. Front Susp. (1) Design Configuration
 - b. Front Susp. (2) Jounce
 - c. Front Susp. (3) Steer
 - d. Front Susp. (4) Jounce & Steer
 - e. Front Susp. (5) Compliance
 - f. Rear Susp. (1) Design Configuration
 - g. Rear Susp. (2) Jounce
 - h. Rear Susp. (3) Compliance

Documentation

The following help files have been updated:

- Run Control Screen (Home)
- Generic Data Screens
- Model Screens
- Output Variables
- Procedures and Events
- Preferences
- Quick Start Guide

The following reference manuals have been updated:

- System Parameters in VS Math Models, renamed from System Parameters in VS Solvers, including SuspensionSim-specific improvements to better identify system parameters and commands which are applicable to other VehicleSim products but not available in SuspensionSim.
- VS Commands Reference Manual, including a few SuspensionSim-specific notes about VS Commands not applicable to SuspensionSim.
- VS API
- VS Browser
- VS Visualizer
- VS Math Models (former title: VS Solver Programs)

The following document has been added to the **Help** menu in the **Reference Manuals** category:

- VS Commands Summary, a two-page quick reference sheet for VS Commands

The following technical memos have been updated:

- Automating Runs with VS API

The following release notes have been updated (excluding this document):

- SuspensionSim Backward Compatibility
- System Requirements