TruckSim Model and License Options

This memo summarizes model and license options for TruckSim 2022.1. Unless otherwise noted, all optional features are supported on all operating systems and in combination with all other features.

TruckSim for Windows

The basic TruckSim installer provides a database and browser with a user interface, plotter, animator, both 32-bit and 64-bit math model solver programs, extensive documentation, and many example vehicles, procedures, and simulations. Two versions of the browser, math model libraries, visualizer, and other tools are provided to work with 32-bit and 64-bit environments.

The TruckSim math model supports single-unit and combination vehicles. The TruckSim GUI supports a lead motor vehicle unit with up to five axles, semitrailers with up to four axles, and dollies with up to three axles. Suspensions can be generic/independent or solid axle. Advanced users can simulate more complex vehicles by using generic GUI screens: TruckSim supports up to 64 units, each with any number of axles in groups of 1, 2 (tandems), or 3 (tridems). The maximum number of axles allowed on a vehicle is 128.

The model works as-is and can optionally be extended with the built-in scripting language (VS Commands), embedded Python, Simulink, and LabVIEW. The math model can also be extended using external programs written in MATLAB, Visual Basic, C/C++, Python, and other languages that can interact with Windows DLLs. Up to 200 built-in moving objects can be controlled to simulate traffic and safety-related scenarios.

The 32-bit and 64-bit versions of the TruckSim math models run at the same speed, with the two versions being provided to support compatibility with third-party software. When TruckSim is used alone, there is a choice between 32- and 64-bit browsers (`TruckSim.exe` and `TruckSim_64.exe`); when used with third-party 64-bit software (e.g., 64-bit Simulink), the appropriate solver plugin library must be used.

The basic TruckSim for Windows package includes two licenses:

1. The TruckSim Solver for Windows License is needed to make a new simulation run with a math model.

2. The TruckSim Browser and Graphical User Interface License is needed to run the main GUI, manage the database, control runs, view animations, etc.

It is rare for one of the basic licenses to be provided alone; both are needed for normal operation of the software, and both are provided as part of the basic package. (The option for obtaining just one Solver license is to support custom automation capabilities for sites with many TruckSim installations.)

The TruckSim Solver for Windows License supports all TruckSim vehicle configurations based rigid sprung masses (no frame torsional flexibility).

TruckSim for Linux

TruckSim for Linux is identical to TruckSim for Windows with two major differences; it does not include the TruckSim browser, and the math model is 64-bit only.

TruckSim for Linux includes a database, visualizer (plotting and animation), math model solver library, extensive documentation, and many example vehicles, procedures, and simulations.

TruckSim for Linux is mostly used for automation for sites with many TruckSim installations.

ADAS Sensors

The optional TruckSim Sensor License allows activation of up to 99 built-in range and tracking sensors to sense moving objects (up to 200). Calculated sensor detection variables can be sent to external controller models in Simulink, LabVIEW, or other environments.

Multiple Vehicles

The optional TruckSim Multiple Vehicle License allows up to 3 additional lead unit vehicles to be used in a single solver instance. The option to configure multiple vehicles is supported via the TruckSim Browser.

Frame Twist and Suspended Cab

The optional TruckSim Frame Twist License allows use of models with frame twist degrees of freedom (DOF) that represent the distribution of torsional compliance along the length of the Sprung Mass body and therefore affect the load transfer to the tires. When enabled, the Frame Twist option affects the motor vehicle and a trailer, if linked.

The lead unit with frame twist also has a suspended cab with three additional DOF.

3rd Party Tire Models (Siemens and COSIN)

The TruckSim Windows installation includes DLLs for tire models from Siemens (MF-Tyre/MF-Swift v2021.1) and COSIN (FTire v2021-1). Example datasets are included for each of these tire model options. The three license options are:

1. Siemens MF-Tyre v2021.1 runs under any TruckSim license together with all options - except the **Enveloping contact**, **Rigid-ring**, **Turnslip** and **Temperature Model** options that run under Windows OS.

2. Siemens MF-Swift v2021.1 (including **Enveloping contact**, **Rigid-ring**, **Turnslip** and **Temperature Model** option) requires an optional paid license from Siemens in addition to a basic TruckSim license. With this license the MF-Tyre/MF-Swift model will work together with all options that run under Windows OS.

3. COSIN FTire v2021-1 requires an optional paid license from COSIN in addition to a basic TruckSim license. With this license the FTire model will work together with all

options that run under Windows OS. FTire 2020-4 and older versions are not supported with the TruckSim 2021.1 release.

These external tire models support 32-bit and 64-bit versions of their respective solvers.

Parallel Solver

This optional counted license allows additional process instances to simultaneously run TruckSim simulations on the targeted machine (process-level parallelism). This is useful for simulations involving multiple vehicle interactions orchestrated by external software such as MATLAB / Simulink, or for custom server deployments of TruckSim expected to be running many TruckSim simulations.

HPC Licenses

Like the Parallel Solver license, the HPC license is an optional counted license allowing additional process instances to simultaneously run TruckSim simulations on a targeted machine (process-level parallelism). Where the HPC license differs is how license deployment is organized and deployed. The HPC license scales to many thousands of parallel instances. The Parallel Solver license does not support this level of scalability. HPC Licensing is best suited for large scale deployments where no single external simulation master is in control and when many thousands of simultaneous simulations are needed.

TruckSim Real Time

RT Platforms

The TruckSim installer for Windows includes support for six RT platforms:

1. dSPACE DS1006/DS6001 and SCALEXIO

2. National Instruments LabVIEW RT/VeriStand (ETS OS and Linux RT OS)

3. ETAS LabCar RTPC

4. Opal RT-LAB (QNX RT OS and Linux RT OS)

5. Concurrent Real Time System

6. A&D Technology

An optional TruckSim RT license is needed to run on any of these RT systems. The same set of optional licensed features that are available for the TruckSim Windows installation are also available for TruckSim RT: ADAS Sensors and Frame Twist with Suspended Cab.

The TruckSim RT solvers do not work with the external component models from Siemens, COSIN, or AVL.

Extra Live Animations

TruckSim RT supports a live animation license that supports a single connection between the math model and VS Visualizer, which in turn supports up to three monitors. If more connected

computers running VS Visualizer are needed, additional live animation licenses can be purchased for all systems except dSPACE.

Windows DS for TruckSim

The optional TruckSim DS License is available to support a Windows-based desktop driving simulator. Driving hardware is either a Logitech G29 or G920 steering wheel, shifter, and pedal set. Although no longer produced by Logitech, Mechanical Simulation maintains legacy support for the G27.

The DS example datasets include software to support a single live connection between a vehicle math model and the VS Visualizer, which in turn supports up to three monitors. Additional live animation licenses can be purchased if more connected computers are needed to run more VS Visualizer instances.