



VIRTUALDYNAMICS™

# **Release Notes**

# **Virtual Dynamics**

# **Version 2018.1**



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Dear reader,

Virtual Dynamics, formerly called FEV Virtual Engine, has been in the market since 1998 as a commercial MBS software. Over the years, its fields of application have been extended from IC Engines through gearboxes to driveline systems and their components.

This release of Virtual Dynamics 2018.1 supports the Adams 2018.1.0 release. If you are reading these Release Notes as hardcopy (PDF document), please be aware that actually the same document is also part of the Virtual Dynamics online documentation ("help"):  
In the online version the Release Notes contain hyperlinks to the relevant help topics - which is usually very helpful to locate and learn about new functionality.

Unless otherwise indicated, all statements made within this document regarding product changes refer to the previous release 2018.0.

The following icons imply:



Virtual Dynamics versions running on Windows® operating systems



Virtual Dynamics versions running on Linux® based operating systems

If no icon is depicted the text refers to both versions.

This document is grouped into the following sections:

- [Supported Operating Systems](#)
- [Licensing and Hardware Requirements](#)
- [Functional Changes and Major Enhancements](#)
- [Corrections and Minor Enhancements](#)
- [Known Issues](#)

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## Supported Operating Systems

### Following operating systems are currently supported:



Windows® 7 (x64), 10 (x64)



Red Hat® Enterprise Linux® (RHEL) 7.1 (x64), 7.3 (x64)  
SUSE® Linux® Enterprise Server (SLES) 11 SP4 (x64), 12 SP1 (x64)

### Following Adams® versions are currently supported:



Adams® 2018.1.0

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You can work with either a version of Virtual Dynamics which installs on top of a supported Adams® base installation (the Virtual Dynamics for Adams variant), or use the stand alone version of Virtual Dynamics which incorporates an installation of the Adams Framework as well (the Virtual Dynamics including Adams variant).

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Your operating system must be set up / configured properly and working. This also applies to your access to your local network (LAN) when using a floating license.



## Licensing and Hardware Requirements

### Licensing Requirements

The product - Virtual Dynamics 2018.1 for Adams - requires as license server application:

- FEV Licensing 4.21.

The product - Virtual Dynamics 2018.1 including Adams - requires as license server applications:

- FEV Licensing 4.21 as well as
- MSC Licensing 11.13.3

### Hardware Requirements

The requirements regarding hardware basically are those of Adams®, on top of which Virtual Dynamics is running as vertical application:

- up-to-date CPU, multi-core CPUs are recommended
- at least 2 GB of memory (RAM), recommended: 4 GB or more
- a graphics adapter which supports OpenGL 1.2 or later (see below for recommended models and drivers)
- enough free space on your harddisk: at least 8 GB for installation and operation
- network adapter, when using a floating license



## Graphics adapter cards and drivers

The recommended graphics adapter cards and drivers are these:



NVIDIA Quadro FX 580: NVIDIA Version 340.66 (avoid 310.19)



RHEL: NVIDIA Quadro FX 580: NVIDIA Version 331.67

SLES: NVIDIA Quadro FX 580: NVIDIA Version 331.79

## Display(s)

One or (recommended:) two larger displays  $\geq 19$ " are usually helpful when working with Virtual Dynamics. The displays must have a resolution of at least 900 px in height.



## Functional Changes and Enhancements

### New eMotor-Generator UDE

A new UDE is available that allows the creation of an eMotor-Generator that consist of stator and rotor. It can be used to study dynamics of hybrid and electric powertrain topologies. The components of the UDE are parametric internal 3D geometries each of which can be replaced by flexible bodies to study NVH and durability. The new UDE supports shaft or hub driven options and provides the possibility to import electromagnetic forces from commercially available electromagnetic software.

### Geartrain Wizard

A new functionality is available that allows the user to intuitively input all relevant data to build and set-up gearbox or geartrain models. Given the general input parameters including geometries, the locations in 3D space, number of shafts, bearings and gear pairs, the wizard builds the geartrain model automatically as template. Based on this template the user can input detailed data and create assemblies to run simulations in the time domain.

### Gear enhancements

The gear geometry generation now supports the individual fine tuning of each tooth regarding its macro and micro geometry. This allows the user to modify a gear to incorporate detailed profile corrections that result from wear or run-in shape corrections.

### New flexible guide UDE

A new UDE is available that allows the simulation of flexible chain guides. This allows more accurate calculations of the elastic deformations of the plastic guides and their effects on the chain dynamics.

### New flexible shaft UDE

A new UDE is available that allows replacing the parametric shaft UDE with the flexible bodies. The effects of bending - and torsion stiffness can now be analyzed.

### Single Valvetrain Kinematics

The Single Valvetrain Kinematics analysis has been extended to more easily support simulations in the time domain. The kinematic SVT subsystems can now be used to generate on the fly the corresponding assemblies from the new tab Dynamics. The user can here specify the model contents regarding type of



spring, HLA, and contacts. The results obtained from time domain simulations can be compared with those obtained from the kinematic model.

## Enhanced Animation Control

The Enhance Animation Control dialog box has been reworked, i.e., that now also generic models are supported.

## Virtual Dynamics Help

The help / end-user documentation has been updated where appropriate to reflect the latest changes in functionality (please see the above list of functional changes and enhancements) and also to resolve known issues with the help.

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*Note: Whenever you feel that a link is missing, you notice a "lost topic" or stumble upon unclear (or faulty or incomplete) descriptions - let us know. Please provide a reference to the relevant help page and send an email to: [virtualdynamics@fev.com](mailto:virtualdynamics@fev.com)*

*We welcome your feedback and any hint regarding the improvement of the Virtual Dynamics help.*

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## Corrections and Minor Enhancements

[CR2249] The input of a force and torque pre-load on the engine mounts has been implemented.

[CR2248] Roller Bearing Geometrical: Set shoulder diameters for inner and outer ring automatically.

[CR2241] In the Enhanced Animation Control DBox the deformation support has failed, as well as the display of the firing of more than one cylinder.

[CR2237] The generation of the shell file(s) for the graphical display of the gears was not correct if the gear had a helical angle.

[CR2233] During the modification of the tensioner element an error occurred.

[CR2231] The initial color of a flexbody similar to its initial pendant for subsystems and assemblies has been implemented.

[CR2230] The displayed size of the engine mounts, that used to be hard coded to 40 mm, is now editable by the user in template builder mode.

[CR2228] When the Reference Frame in the Engine Global Data was exchanged, not all Construction Frames were updated.

[CR2227] Sometimes during opening a model that contains a flexible crankshaft the message: "Crankshaft Section Node 0 is used twice" occurred.

[CR2226] In the 'Inspect Part Geometry' Dialog box the 'Geometry' option was not displayed if the part was a chain link part.

[CR2222] The conventional gears geometry generation didn't consider the delta tooth thickness influence.

[CR2221] Replacing 3D gears to conventional gears and vice versa used non-compatible data (did not inherit the data).

[CR2216] Activation/Deactivation of engine mounts was not saved correctly.

[CR2215] Changing the time units (on LINUX) caused warnings.



[CR2214] It was not possible to close a subsystem if certain dialog boxes were displayed.

[CR2210] Sometimes errors occurred after closing the 'Set Data for Crankshaft Inertias' dialog box.

[CR2209] Rotation direction setting was not forwarded from engine global data setup to the simulation dialog box.

[CR2206] Roller Bearing Analytical/Geometrical: Read-macro had wrong unit scaling for contact angle.

[CR2191] The expected sub-folders under the main menu on windows 10 were not created properly during the installation.

[CR2190] If the user opens an assembly for which the integrator was set to HHT and then starts an analysis an solver error message occurred.

[CR2185] Upon replacement of Roller Bearing Analytical and Roller Bearing Geometrical instances (and vice versa) the new instance now inherits its data.

[CR2164] For some cases an incorrect warning occurred while checking the test-rig attachment for flexible flywheels.

[CR2056] It was not possible to replace a gear element if the gear force modify dialog box was opened and the apply button was pressed.



## Known Issues

### Partial loss of 3D model display

For Single Valvetrain models, the 3D display in Standard Interface gets partially lost when accessing plots in the PostProcessor. A work around is to switch from Standard Interface to Template builder mode and back to Standard Interface. (press Shift F9, and then F9).

### Full vehicle analysis, ACAR solver

For a vehicle analysis the Adams/Car solver must be used. To this end make sure you first start Adams/Car or Adams /Driveline, then load Virtual Dynamics as plug-in.

### Maximum name length of MTX files, EHD bearings

The automatically created (and named) MTX files may have file names consisting of more than 70 characters including the .mtx suffix (i.e. 66 characters for the file base name).

The automatic naming of MTX files is as follows:

`subsystem-name_instance-name.mtx`

If a new MTX file is created it will be created with the same name (i.e. an existing MTX file will be overwritten). But if the 70 characters limit is exceeded Adams automatically switches to a new naming scheme. In this scheme MTX files are named `flex_n.mtx` where `n` is a counter which is incremented for any new created MTX file.

This sort of naming will lead to significantly longer calculation time when using EHD bearings, in that case please check the MTX file naming. To avoid this problem you must make sure that the MTX file base name does not exceed 66 characters - adjust the `subsystem-name` and the `instance-name`.



VIRTUALDYNAMICS™

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## Contact and Support for Virtual Dynamics

General information about Virtual Dynamics can be found on FEV's global web site: [Virtual Dynamics](#) or can be obtained by sending your inquiry per email to: [virtualdynamics@fev.com](mailto:virtualdynamics@fev.com).

### Support

The Virtual Dynamics support is provided through FEV and its partners. Your local reseller can supply you with all necessary local customer support contact information. Virtual Dynamics customers having a valid Maintenance Agreement may direct their support inquiries via email or phone to our support hotline:

e-mail: [virtualdynamics@fev.com](mailto:virtualdynamics@fev.com)

phone: +49 241 5689 - 838

### Download

In order to download Virtual Dynamics you need to register. After a successful registration you are granted access to the download site, and you will obtain the agreed upon Virtual Dynamics license keys. The installation files needed for **Virtual Dynamics** and the corresponding license management **FEV Licensing** are available from the FEV download site or from the [VI-GRADE](#) reseller site. Here current versions, updates and patches can be obtained.

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