



# **VI-Automotive 19.0 Release Notes**

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# VI-Automotive 19.0 Release Notes

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Printed: April 2019

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# 1 Release Notes

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Welcome to the release notes of VI-Automotive v19.0. The chapter contains information regarding new features, known issues and update history.

Please notice that VI-Automotive was formerly known as VI-SportsCar; as a consequence, those names will be used interchangeably in this document.

Please send your comments or support requests to [support@vi-grade.com](mailto:support@vi-grade.com).

**Notes:** All instruction in this guide applies to all supported Adams versions, see [Platform Support](#) for further info.

## 1.1 What's new

### What's new in version 2018.19.0:

- [What's new in VI-Automotive](#)

#### 1.1.1 What's new in VI-Automotive

VI-Automotive v19.0 introduces support for Adams 2018. This includes the new 'Assembly Variants' feature available in Adams 2017r2. An example of an assembly with variants is available in the shared database (mdids://sportscar\_shared/assemblies.tbl/VI\_GT\_Variant.asy). Please refer to Adams Car documentation for more information on creating/modifying assemblies and subsystems with variants.

The subsystem parameter 'adjustment\_length' in the adjustable force is now exposed in the Modify dialogbox. This enables users to set any desired value for the displacement function ("Design\_length - Adjustment\_length" instead of "Design\_length") in the point motion.

This release also addresses issues reported by the users community and expose new features added in the VI-Automotive toolchain like VI-Road and VI-Driver.

About VI-Driver, an improved version of the VI-Driver Human model is now available: the new operating mode couples the well proven stability and execution speed of the "robot" driver with the smoothness of the human driver. Different driving skills are supported in the new mode.

In addition VI-Driver now supports a new set of VDF file parameters to control the minimum delay between

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consecutive upshift or downshift operations for rpm based gearshifting model.

Please refer to the [revision history](#) table for a summary of the addressed issues.

## 1.2 Licenses

VI-Automotive v19.0 requires following set of license keys:

- VI\_Road\_Core
- VI\_Road\_Toolkit
- VI\_SportsCar\_ADAMS\_IFace
- VI\_SportsCar\_Core
- VI\_SportsCar\_PressManeuver
- VI\_Driver\_Core
- VI\_Driver\_EventBuilder
- VI\_Safety\_Adams\_IFace
- VI\_Tire\_Core
- VI\_Tire\_Toolkit
- VI\_Tire\_TireLimits

Please make sure that you are running VI-grade Licensing version 19.0 or newer (based on LMX server version 4.8.7 or newer).

As software prerequisite an Adams Car supported version installation is required (see [Platform Support](#) for further info) with the related license keys:

- ADAMS\_View
- ADAMS\_Solver
- ADAMS\_Car\_Plugin
- ADAMS\_Car\_Suspension
- ADAMS\_Vehicle\_Solver
- ADAMS\_TireHandling

This product is in part based on incorporated software libraries. Please refer to the [acknowledgments.pdf](#) document, included in the product documentation for a listing of the adopted components and the respective licenses.

## 1.3 3rd Party Compatibility

This table shows the compatibility of the VI-grade suite products with the main 3<sup>rd</sup> party software.

	VI-CarRealTime	VI-BikeRealTime	VI-DriveSim	VI-Driver/VI-Rider for Matlab	VI-Driver for FMI
Matlab®	from 2015b to 2018b	from 2015b to 2018b	from 2015b to 2018b*	from 2015b to 2018b	
Veristand™ (***)	2015sp1	2015sp1			
dSPACE® RCP & HIL (**)	2014b-2017a	2014b,2017a		2015b-2017a	
SimWorkBench®	2018.3 2017.3	2018.3	2018.3 2017.3		
xPC®	2012b				
Dymola®	2015				2015
CarSim™	8.1.1, 9.0				
Virtual Test Drive®	1.4				
Prescan®	7.3				
SCANeR®	1.7r37, 1.8r33		1.7r37, 1.8r33		
ETAS LABCAR-OPERATOR IP®	5.4.0				
SolidThinking Activate	2017.1				
TameTire	5.1		5.1		
CDTire	4.2		4.2		
adheRide thermoRide	1.2/1.4				

(\*): please refer to SimulationWorkBench documentation for Matlab version compatible with MLToolkit module.

(\*\*): for SCALEXIO targets, only firmware version 4.0.1 is supported.

3<sup>rd</sup> Party Software included in VI-grade products:

	VI-CarRealTime	VI-BikeRealTime	VI-DriveSim	VI-Driver/VI-Rider for Matlab	VI-Driver for FMI
FTire	2019-1		2019-1		
MF-Tyre/MF-Swift	6.2.0.3 7.3	6.2.0.3 7.3	6.2.0.3 7.3		

The following table shows the 3<sup>rd</sup> party compatibility for Adams-based VI-grade product:

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	VI-Motorcycle	VI-Automotive	VI-Rail	VI-Aircraft	VI-CarRealTime Plug-In	VI-Driver
MSC Adams™	2018.0	2018.0	2018.0	2018.0	2017, 2017.1, 2017.2, 2018.0	2017, 2017.1, 2017.2, 2018.0
Matlab®	*	*	*	*		

(\*): please refer to Adams documentation for compatibility version.

(\*\*\*) The NI-PXI integration requires Visual C++ 2010 / SDK 7.1 to complete the building procedure successfully. Please refer to the NI-VeriStand documentation for more detail.

The VI-Licensing LMX supported version is **4.8.7** both for Server and for Client.

## 1.4 Platform Support

VI-Automotive 19.0 is available for the following Adams versions:

Adams version	Platform	Installer Name
Adams 2018	windows x64	VI_Automotive_2018_19_0_x64_Setup.exe

## 1.5 Updating Models

### 1.5.1 Updating\_to\_v19.0

Starting from v19.0, the ac\_ms\_aforce UDE in the adv\_chassis Plugin has been enhanced with a Request. Models saved from v18.0 are automatically converted to v19.0 with no need to manual changes.

### 1.5.2 Updating from previous versions

#### Updating to v18.0

Models saved from v17.0 are automatically converted to v18 with no need to manual changes.

#### Updating to v17.0

Models saved from v16.0 are automatically converted to v17 with no need to manual changes.

Please note that according to FDB-4046, the parameterization of the steering column joints in template \_rack\_pinion\_steering\_advanced.tpl v16 may produce undesired movements of the rack body during the initial condition computation. The problem has been resolved in the v17 version of the template so we recommend users to use the new version of the template.

SDF event file type has been discontinued. Existing SDF can be migrated to the VDF format using the SDF import capability of VI-EventBuilder.

## Updating to v16.0

Models are automatically upgraded from version 15.0 to version v16.0 so no specific user actions are required excluding the following scenarios:

### 1. The `_powertrain.tpl` is used in a full vehicle assembly without subframe and the `sws_engine_mount_option` switch part is set to subframe

In previous sportscar version, the redundancy of communicator matching names, lead to connecting the engine block to the car body. With the current version, in order to improve the performances of the communicators assignment process, the set of checked matching names has been reduced. As a consequence, in the current scenario the powertrain is connected to ground and not to the body. In order to fix the model you simply need to properly change the switch part setting to body in your subsystem

### 2. Suspension analysis with rear assemblies based on `_double_wishbone_adj.tpl` template

In the condition specified above with v15 the tierod is wrongly connected to ground instead of being connected to the testrig body. Using the v16 version of the template, the connection is done properly.

Please note that with version 16.0 a new steering template (`_rack_pinion_steering_advanced.tpl`) is included in the sportscar shared database. this template offers more configuration option than the former `_rack_pinion_steering.tpl` like:

- steering column cardanic joints parametric orientation
- steering column compliance effect
- speed dependent servo assistance

the side effect of this extensions is that the new template is not directly replaceable to the former one. The assemblies included in the sportscar shared database have been updated to adopt the new template. The former `_rack_pinion_steering.tpl` is still provided for legacy reason, so if you are not interested in the new capabilities, no action are required on your side.

A more general model for antiroll bar is also included in the shared database (`_antirollbar.tpl`). The main differences respect to the former (`_antiroll_simple.tpl`, still provided for legacy reason) are:

- body/subframe connection defined using switch parts
- bushing elements can optionally be used to connect the droplink to the suspension and to the bar

## Updating to v15.0

Models are automatically upgraded to version 15.0 specs except for the powertrain and the wheel templates.

In order to properly support the C++ solver a few changes needs to be implemented in your powertrain template provided it has been derived from the VI-Automotive 13.0 shared one.

The following code snippets report the elements that should be modified. The statements marked in red are addition to the v13.0 formulation.

```
data element modify variable &
  variable name = . powertrain.clutch torque &
  function = "IF(VARVAL(. powertrain.analysis type):", &
    "(", &
    "    MAX(0,DIF(. powertrain.cis_sse_diff1_adams_id))/(. powertrain.pvs_final_drive*. powertrain.pvs_drop_gear*.
powertrain.pvs bevel gear)", &
    "    /AKISPL(MAX(1,MIN(VARVAL(. powertrain.cis_transmission_demand_adams_id),(. powertrain.
```

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```

pvs_max_gears)),0," &
    "    ._powertrain.gear_ratio_spline)", &
    ")", &
    ")", &
    ")", &
    "    MAX(0,DIF(.powertrain.cis_sse_diff1_adams_id))/(.powertrain.pvs_final_drive*.powertrain.pvs_drop_gear*.
    _powertrain.pvs_bevel_gear)", &
    "    /AKISPL(MAX(1,MIN(VARVAL(.powertrain.cis_transmission_demand_adams_id),(.powertrain.
pvs_max_gears)),0," &
    "    ._powertrain.gear_ratio_spline)", &
    ")", &
    ")", &
    "IF( VARVAL(.powertrain.cis_transmission_demand_adams_id):1,0,1)", &
    "    *STEP(VARVAL(.powertrain.cis_clutch_demand_adams_id)", &
    "        ._powertrain.pvs_clutch_close, 1.0," &
    "        ._powertrain.pvs_clutch_open, 0.0)", &
    "    *IF(MODE-5:MAX( -(.powertrain.pvs_clutch_capacity)", &
    "        MIN(.powertrain.pvs_clutch_capacity", &
    "        (.powertrain.pvs_clutch_stiffness*DIF(.powertrain.clutch_slip)", &
    "        +.powertrain.pvs_clutch_damping*DIF1(.powertrain.clutch_slip))),", &
    "        ._powertrain.pvs_clutch_stiffness*DIF(.powertrain.clutch_slip)", &
    "        ._powertrain.pvs_clutch_stiffness*DIF(.powertrain.clutch_slip))", &
    "    )"
)

data_element modify variable &
    variable_name = ._powertrain.total_axle_torque &
    function = "AKISPL(MIN(MAX(0,VARVAL(.powertrain.cis_transmission_demand_adams_id),(.powertrain.pvs_max_gears)),0," &
    "    ._powertrain.gear_ratio_spline)*(.powertrain.pvs_bevel_gear)", &
    "    **(.powertrain.pvs_drop_gear)*(.powertrain.pvs_final_drive)*", &
    "    VARVAL(.powertrain.clutch_torque)"

part modify equation differential_equation &
    differential_equation_name = ._powertrain.engine_omega &
    function = "IF(VARVAL(.powertrain.analysis_type):0,0," &
    "    ( VARVAL(.powertrain.engine_torque)", &
    "    - VARVAL(.powertrain.clutch_torque)", &
    "    )/(.powertrain.pvs_engine_inertia/.powertrain.ucf_gc)", &
    "    )"

part modify equation differential_equation &
    differential_equation_name = ._powertrain.clutch_slip &
    function = "IF(VARVAL(.powertrain.analysis_type):0,0," &
    "    ( STEP(VARVAL(.powertrain.cis_clutch_demand_adams_id),.powertrain.pvs_clutch_close, ", &
    "    1.0,.powertrain.pvs_clutch_open, 0.0)", &
    "    *(DIF(.powertrain.engine_omega)-VARVAL(.powertrain.transmission_input_omega))", &
    "    -STEP( VARVAL(.powertrain.cis_clutch_demand_adams_id)", &
    "        ._powertrain.pvs_clutch_open, 0.0, (.powertrain.pvs_clutch_open*(0.875/0.75)), 1.0)", &
    "    *DIF(.powertrain.clutch_slip)/(.powertrain.pvs_clutch_tau)", &
    "    )"
)
!

```

Please note that the v15.0 powertrain shared template comes already ready to support C++ solver

Limited to Adams 2013 and newer, the tire UDE has been redesigned to support the rigid ring tire model. this change will produce error messages loading pre v15 VI-SportsCar wheel templates because it is no more possible to create the force graphics used to show the tire forces at the hub level. The symptoms are error messages like the following occurring when the template is opened:

```

ERROR: The marker ._racing_tire.whl_wheel.tire_i is not the I or J marker of graphic force object .
ERROR: The marker ._racing_tire.whr_wheel.tire_i is not the I or J marker of graphic force object .
ERROR: -----
ERROR: Error detected on line number 2171, character 48 of C:/Users/rdeve/AppData/Local/Temp/avw2942
ERROR: No object was found because 'left_gforce' does not exist beneath '._racing_tire'.
ERROR: The command was not executed.
ERROR: &> objects_in_group = ._racing_tire.left_gforce, &
ERROR: -----
ERROR: -----
ERROR: Error detected on line number 2708, character 44 of C:/Users/rdeve/AppData/Local/Temp/avw2942
ERROR: No Force_Graphic was found because 'left_gforce' does not exist beneath '._racing_tire'.
ERROR: The command was not executed.
ERROR: &> force_name = ._racing_tire.left_gforce &

```

```

ERROR: -----
ERROR: -----
ERROR: Error detected on line number 2712, character 45 of C:/Users/rdeve/AppData/Local/Temp/avw294
ERROR: No Force_Graphic was found because 'right_gforce' does not exist beneath '._racing_tire'.
ERROR: The command was not executed.
ERROR: &> force_name = ._racing_tire.right_gforce &

```

Note that only the first 2 errors are reported when the template is stored in binary format.

No action are required to correct this errors apart saving the template from VI-SportsCar 15.0. Please note that in v15 for Adams 2013 a more general approach for displaying the tire contact patch forces has been introduced making the old approach obsolete.

Please note that C++ solver is selected as default by VI-Automotive 15.0. Please refer to Adams documentation on how to switch back to F77 flavour of Adams/Solver.

## Updating to v14.0

Migration from version 13.0 to version 14.0 is performed automatically.

## Updating to v13.0

Models compatible with VI-Automotive 2008r1.12.0 are compatible with VI-Automotive version 13 with no need for manual modification.

Starting from version 13.0 a more detailed aerodynamic UDE has been introduced offering the following improved capabilities:

- support for side forces and roll moments
- side slip, roll, pitch, steer angle coefficients dependency
- force projection in 3D road plane

The newer UDE (ac\_vsc\_aeroforce) belongs to the same class of the previously available ac\_vsc\_aeroforce\_std so it could be installed using the ude replace functionality (no need to make changes in the body template). Please also note that from this version the older aerodynamic implementation based on sfo1201 is deprecated and will print a deprecation warning.

Please note that the new UDE generates separate outputs for standard and saturated ride height.

## 1.6 Known Issues

The following limitations have been identified at the release time:

- The values for Tlimit, Alimit and Imbalance in the analysis flags are parameterized so that they remain consistent when changing model units. This produces WARNINGS when opening an assembly and subsequently breaks the parameterization. Below is a snippet from the Message window when an assembly is opened.

```

.....
Assignment of communicators completed.
Assembly of subsystems completed.
Suspension assembly ready.
WARNING: The object .VI_GT_Front_Susp.analysis_flags will lose parametric information due to
this modification.
WARNING: The object .VI_GT_Front_Susp.analysis_flags will lose parametric information due to
this modification.
WARNING: The object .VI_GT_Front_Susp.analysis_flags will lose parametric information due to
this modification.

```

It is therefore advisable to close any open assemblies in the session before changing the Units from

the 'Settings' menu.

- During the sevenpostrig setup, the activity of body\_stake inline joint is now consistent with the choice the user sets in the 'Simulate -> Full-Vehicle Analysis -> 7 Post Event -> Setup' dialogbox. This might produce results that differ from the older versions (earlier than VI-Automotive 19.0).
- the VI-Automotive plugin cannot be unloaded from the current Adams Car session. This depends on the huge changes to the environment required to enable the VI-Automotive features.
- The setup wheel feature supports only pac2002 tires

## 1.7 Revision History

### 1.7.1 Revision 2018.19.0

Version	Change ID	Change
2018.19.0	#4733	Assembly variant with FEM Requests 'ON' dumps request names on the Info window when switching to a new variant
	#4722	Setup GUI rise errors in case of more than 7 gears
	#3061	unable to switch variant after performing a 7-Post rig analysis
	#3041	set body_stake_active=static leaves the joint active also in dynamic in 7post
	#3032	Switching variants does not update function expressions in ac_*_actuator
	#2899	Dependent expressions in smart_driver_vehicle_parameters_array throws errors during variant switch
	#2890	Inconsistent results depending on the order of switching between variants
	#2836	wrong ride height after switching an assembly from front to rear suspension
	#2835	unable to switch variant after performing a full-vehicle analysis
	#2831	enhance step steer maneuver with variants (macro/dbox)
	#2830	add test cases for variants
	FDB-6032	Steering ratio calculation test fails though there are no regressions
	FDB-6026	Strange values in speedgen report in setup_gui mask and initial speed in .vdf
	FDB-5992	With VSC Plugin loaded, Suspension Analysis with external files fails
	FDB-5983	Modifications in solver settings in __TESTRIG.Analysis_flags are not inherited by the Assembly
	FDB-5856	port to adams 2018
	FDB-5774	Enhance adjustable force UDE with a request and expose the hidden 'adjustment_length' parameter to the user
	FDB-5656	add an example of composite road and documentation

### 1.7.2 Revision 2017.18.0

Version	Change ID	Change
2017.18.0	FDB-5597	Strange results with AMechatronics shared assembly in VI-Automotive

FDB-5564	Report not displayed in Full Vehicle Static Analysis
FDB-5557	Errors when performing GAA analysis with automotive plugin loaded
FDB-5438	Inconsistencies in Static Vehicle setup report
FDB-5348	PressManeuver solver crash after static analysis failure
FDB-5327	Sportscar_shared templates update to support VI-CarRealTime steering system export
FDB-5277	Solver crash when road license is not available
FDB-5264	port to Adams 2017.1
FDB-5165	macro errors when exporting custom differential template
FDB-4025	request file not written with a flex model
FDB-4012	vifemrequest: fem request not created when connection l-marker is on an interface part
FDB-4010	vifemrequest: plugin produce errors with TR_Front_susp.asy
FDB-3325	Export more vehicle dynamics channels from speedgen event

### 1.7.3 Revision 2015r1.17.0

Version	Change ID	Change
2015r1.17.0	FDB-4934	Simulation failure with CXX solver and empty fuel
	FDB-4825	Speedgen post processing may alter speed profile too much
	FDB-4774	Road model detection fails using MESH road with file version equal 16
	FDB-4743	Implement an entry in the start menu to directly run VI-Automotive
	FDB-4722	Working directory with spaces causes error when launching VI-Road
	FDB-4327	Not functional Aerolap button appears in Setup GUI
	FDB-4143	Springs are removed deactivating ride height from live axle template
	FDB-4141	Hardpoints are wrongly shifted opening a model after a testrig has been modified
	FDB-4111	Introduce new product name for VI-SportsCar
	FDB-4089	Implement press maneuvers event for Adams models
	FDB-4046	Initial rack position in advanced steering template depends on hooke joint orientation
	FDB-3986	Managing multiple fem_ref markers in vifemrequest module
	FDB-3856	Port to Adams 2015.1
	FDB-3810	Femrequest module does not work for new subsystems
	FDB-3736	Setup gui identifies wrong rear ride height target for double wishbone template
	FDB-3685	Adjustable diff UDE could not be deactivated from subsystem file

### 1.7.4 Revision 2013r2.16.0

Version	Change ID	Change
2013r2.16.0	FDB-3760	Support torque mode for wheel locking in 7post assemblies without wheels
	FDB-3689	Subsystem replace action may produce badly configured assemblies
	FDB-3690	Adopt RES as default output file format
	FDB-3500	Macro errors with full vehicle not using standard ac_tire UDE
	FDB-3499	Automatic load request generation
	FDB-3290	Damper length is not correctly computed in report file for live_axle template
	FDB-3202	Adjustable component panels does not support comments
	FDB-3150	Macro errors reported with Adams/Ride event from SportsCar
	FDB-3047	VI-SpeedGen event crash with malformed drd files
	FDB-3014	Tire forces visualization is broken
	FDB-2997	Extend shared database with additional adjustable templates
	FDB-2994	Support for Adams 2013.2
	FDB-2790	Need a simple method to disable specific adjustments from the standard interface
	FDB-2717	Starting VI-Road from SportsCar, current registered databases are not transferred to VI-Road

### 1.7.5 Revision 2013.15.0

Version	Change ID	Change
2013.15.0	FDB-2817	VI-SpeedGen neglects tire longitudinal slip
	FDB-2812	Expose lazy gear shift flag in VI-SpeedGen simulation
	FDB-2700	Added Tirelimits principle documentation
	FDB-2645	Implementaiton of Safety events module
	FDB-2503	Dynamic suspension analysis fails for sportscar models
	FDB-2380	_front_third_spring template does not support asymmetric ride height
	FDB-2376	Advanced aerodynamic reference system is not consistent
	FDB-2371	Path compensation procedure does not support request file
	FDB-2271	Default values for VI-SpeedGen driver settings are misleading
	FDB-2105	VI-SpeedGen speedprofile prediction may include discontinuities
	FDB-2062	Upgrade the VI-SpeedGen version included in SportsCar
	FDB-1887	vsc_adjcon could not detect modification of pattern array size when called multiple times
	FDB-1723	Driver settings panel for VI-SpeedGen does not update all parameters
	FDB-1650	Application crash using unrealistic values for throttle/brake rate saturation
	FDB-1617	Memory leak running VI-SpeedGen
	FDB-1611	VI-SpeedGen report file should include simulation results summary
	FDB-1610	Potential crash computing rideheight maps when a previously used drd file is removed
	FDB-1603	Could not update dynamic coast down results
	FDB-1592	Cross weight adjustment does not work for demo model
	FDB-1470	Drag arm and drag force activation flags are coupled
	FDB-1446	Missing xerces-c_2_8.dll running tirelimits plugin

	FDB-1292	VI-SpeedGen apex speed on highly banked road is not accurate
	FDB-1185	New VI-SpeedGen parameters
	FDB-848	Models with no adjustments does not support report file creation
	FDB-801	Failure in static coast down maneuver at high speed

### 1.7.6 Revision 2010r1.13.0

Version	Change ID	Change
2010r1.13.0	FDB-1415	Support for CXX solver
	FDB-1409	Fixed errors running CRC analysis with gearshifting option turned off
	FDB-1367	Pattern array for adjustable bumpstop/reboundstop are not updated according to subsystem settings
	FDB-1341	Using some combination of report phase activation, rep files may not be written properly
	FDB-1333	Add vehicle specific event files (VDF) for all shared assemblies
	FDB-1332	Reloading adjustable suspension template saved in ASCII format produce errors
	FDB-1331	Installation process does not stop when Adams installation is not found
	FDB-1329	Sevenpostrig frequency sweep analysis does not end at the specified final frequency
	FDB-1324	Changed sevenpostrig solver interface to support CXX solver
	FDB-1320	Improved VI-Road analytical model computational efficiency
	FDB-1287	included VI-Driver in VI-SportsCar distribution
	FDB-1278	improved installation process with better checks on VisualStudio runtime
	FDB-1127	Fixed support for left/right mu definition is VI-Road rdf files
	FDB-1183	Support for Adams 2010
	FDB-1090	Support 6 dof aeroforces
	FDB-971	Generate meaningful error messages when VI-Road could not be started
	FDB-908	vsc_adminforeq may return wrong values
	FDB-894	Full vehicle controller setup panel does not throw errors when VI-Driver plugin is loaded
	FDB-365	Aeroforces reference system should lay in the road plane
	FDB-133	Fixed cfg conflict with Adams/Driveline

### 1.7.7 Revision 2008r1.12.0

Version	Change ID	Change
2008r1.12.0	FDB-762	Reduced gyro mass to a small value to avoid effects on vehicle setup
	FDB-754	Added uninstall link in Windows Control Panel
	FDB-739	Resampled shared driver roads files to 1 meter to smooth static speed profile
	FDB-730	Fixed adjustment process when pattern arrays have different length
	FDB-729	Updated VI-GT model ARBs pickup parts (lca instead of upright)
	FDB-708	Fixed default values for shared adjustable double wishbone template
	FDB-571	Reworked shared templates documentation
	FDB-528	Improved error management in TCF creation
	FDB-506	Improved 7post controller sampling time estimation

FDB-505	Support steering angle input in 7post analyses based on spc files
FDB-499	Fixed deactivation of model aeroforces in 7post analyses when AERODYNAMICS='OFF'
FDB-495	Fixed 7post controller setup panel failing to set the controller parameters
FDB-489	Support speed definition in 7post simulation based on spc file
FDB-469	Fixed aerodynamics ride height calculation for 7post analyses
FDB-453	Support different Z coordinates for skidplate reference hardpoints
FDB-448	Symmetric adjustable force referencing the same (not single) goal variable
FDB-370	Stop analysis when setup phase fails during the final step
FDB-343	Shared ARB template keeps bushing active also in kinematic mode
FDB-279	Fixed units for Aerolap engine power request
FDB-264	SetupGUI does not recognize ac_ms_damper ude
FDB-258	Automatic steering ratio computation not stopped when suspension analysis fails
FDB-248	Added units specification to report files
FDB-85	Fixed report mass calculation for 7Post models with no tires
FDB-17	Fixed ASC file generation based on result file

### 1.7.8 Revision 2005r2.11.1

Version	Change ID	Change
2005r2.11.1	FDB-363	Fixed units conversion for aerodynamic offset
	FDB-354	Replaced chicane_test road and event files with a new chicane test case
	FDB-348	Fixed Support for cross weight adjustment in translational ride spring UDE
	FDB-327	Fixed standard interface connection to curve manager for bumpstop/reboundstop modify panels
	FDB-305	Sevenpostrig improvements: new spring length tracking capability, fully file driven event analysis mode, analytical input signal support.
	FDB-283	Fixed shared template _rear_third_sla.tpl referencing the proper left/right pin height goal variables
	FDB-282	Defining non 0 inertia for fuel cell
	FDB-280	Extended usage of adjustable force UDE to all the shared templates (including pushrods)
	FDB-277	Support GCOMP execution from working shell
	FDB-259	Fixed connection to create DRD panel in SDF dialog box

### 1.7.9 Revision 2005r2.11.0

Version	Change ID	Change
2005r2.11.0	-	New html/pdf documentation
	FDB-219	changed the ref part for the toe & camber adjustments to ground
	FDB-201	Implementation of cross weight adj based on varsub
	FDB-195	New Aerolap default version --> v4.4.102
	FDB-167	New Licensing version --> LMX v2.10
	FDB-131	Transmission efficiency slider available in Q-Static model both Q-Static & Dynamic models use the same shift/scale aerodynamic offsets

	FDB-126	Change the pattern array of the caster adj --> (0,0,1,1)
	FDB-124	Included automatic routine to calculate the steering_ratio
	FDB-123	New GT model in the sportscar_shared database

### 1.7.10 Revision 2005r2.10.0

Version	Change ID	Change
2005r2.10.0		<p>Added nascar templates</p> <p>New chassis template</p> <p>New UDE for aeroforce</p> <p>New UDE for skidplate</p> <p>New UDE for fuel</p> <p>Stint analysis for Fuel consumption</p> <p>Aerolap batch analysis</p> <p>Aerolap support for 4WD models</p> <p>Enhanced cross weight adjustment</p> <p>Improved Tire testrig.</p> <p>VI-Road utility to manage road and path files</p> <p>Fixed bug with tire J-marker in 7 post assemblies. Reaction forces incorrectly applied on ground and not on pad</p> <p>Revised tire testrig structure in order to apply "slip" instead of "steer"</p> <p>New parameter variable in shared tire tpl to define the ref part for toe/camber run time calc (chassis or gyro)</p> <p>Fixed bug for 7post with no wheels assemblies: hubs were not locked properly.</p> <p>7post testrig is now massless</p>

### 1.7.11 Revision 2005r2.2.2

Version	Change ID	Change
2005r2.2.2		<p>Changed package name to SportsCar</p> <p>Skip the visualization of the operative system console window when external tools are called</p> <p>Restructured the steering template in order to avoid redundant constraints when kinematic mode is selected</p> <p>Added missing units specification for clutch and engine requests</p> <p>Enabled the vehicle setup process in co-simulation mode</p> <p>Improved the AeroLap interface</p>

### 1.7.12 Revision 2005r2.2.1

Version	Change ID	Change
2005r2.1		<p>Enabled SDF based analyses</p> <p>Added report only analysis</p> <p>Chassis template</p> <ul style="list-style-type: none"> <li>body request based on std_tire_ref marker</li> <li>new communicator for aero data array (automatically created during conversion)</li> </ul> <p>Powertrain model</p> <ul style="list-style-type: none"> <li>new clutch and differential model</li> </ul> <p>Steering template</p> <ul style="list-style-type: none"> <li>reintroduced steering assist force</li> </ul>

		Created 2 new UDEs for adjustable bumpstop and reboundstop component Improved AeroLap interface New 7 poster testrig Extended aeroforces interface to support generic road models
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### 1.7.13 Revision 2003.2

Version	Change ID	Change
2003.2		Improved suspension setup strategy for ride height adjustment Fixed skid plate ground height calculation New UDE for sensing ride height Powertrain template <ul style="list-style-type: none"> <li>fixed powertrain acceleration scale factor for IPS units</li> <li>fixed conversion factor for engine power</li> <li>added units also to differential torque request</li> </ul> Body template instantaneous turning radius is now returned in current model units also in non MMKS unit system Rear suspension template <ul style="list-style-type: none"> <li>fixed units in anti roll bar request</li> </ul> Front suspension template <ul style="list-style-type: none"> <li>added request for anti roll bar data</li> </ul>

### 1.7.14 Revision 2003.1

Version	Change ID	Change
2003.1		Fixed bug in skidplate offset calculation Fixed activation/deactivation of ARB slider option for shared rear suspension template Using a road reference frame instead of global origo for mass data calculation in report files Fixed minor issues with non MMKS units Restored adjustment phase also for quasi static analyses AeroLap settings stored into assembly file Added support for torsional spring in Setup GUI Support for Aerolap v4

### 1.7.15 Revision 12.0

Version	Change ID	Change
12.0		New Driver model called SmartDriver: <ul style="list-style-type: none"> <li>based on an innovative approach for vehicle control</li> <li>more stable and accurate full vehicle analyses</li> </ul> AeroLap Enhancement (v3.6.8): Faster and more accurate in the longitudinal behaviors Road Builder Enhancements: <ul style="list-style-type: none"> <li>Converting of a road data file into commonly used file formats (shl, drd, dco) with a dedicated panel</li> <li>Creating and importing into a full vehicle assembly the desired road graphic</li> <li>Accessing the RB executable through a user defined command line</li> </ul>

### 1.7.16 Revision 11.06

Version	Change ID	Change
11.06		<p>New Automatic Installation Scripts</p> <p>AeroLap Enhancement (v3.3.7):</p> <ul style="list-style-type: none"><li>• keep into account the camber gain during the simulation</li><li>• new suspension file generator (ASC files)</li></ul> <p>Aerolap GUI embedded into the setup_gui</p> <p>Road Builder Enhancements:</p> <ul style="list-style-type: none"><li>• Read an analytic road data file</li><li>• Create a multi steering pad road</li><li>• Optionally generate a Dcd file</li></ul> <p>Adjustable Reboundstop UDE:</p> <ul style="list-style-type: none"><li>• it allows the replace function of a standard reboundstop component.</li></ul> <p>MS Damper UDE:</p> <ul style="list-style-type: none"><li>• it uses 2 different scaling factors for bump and rebound travel within Insight Analysis</li><li>• it allows the replace function of a standard damper component.</li></ul>

### 1.7.17 Revision 11.0

Version	Change ID	Change
11.0		Base Package



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