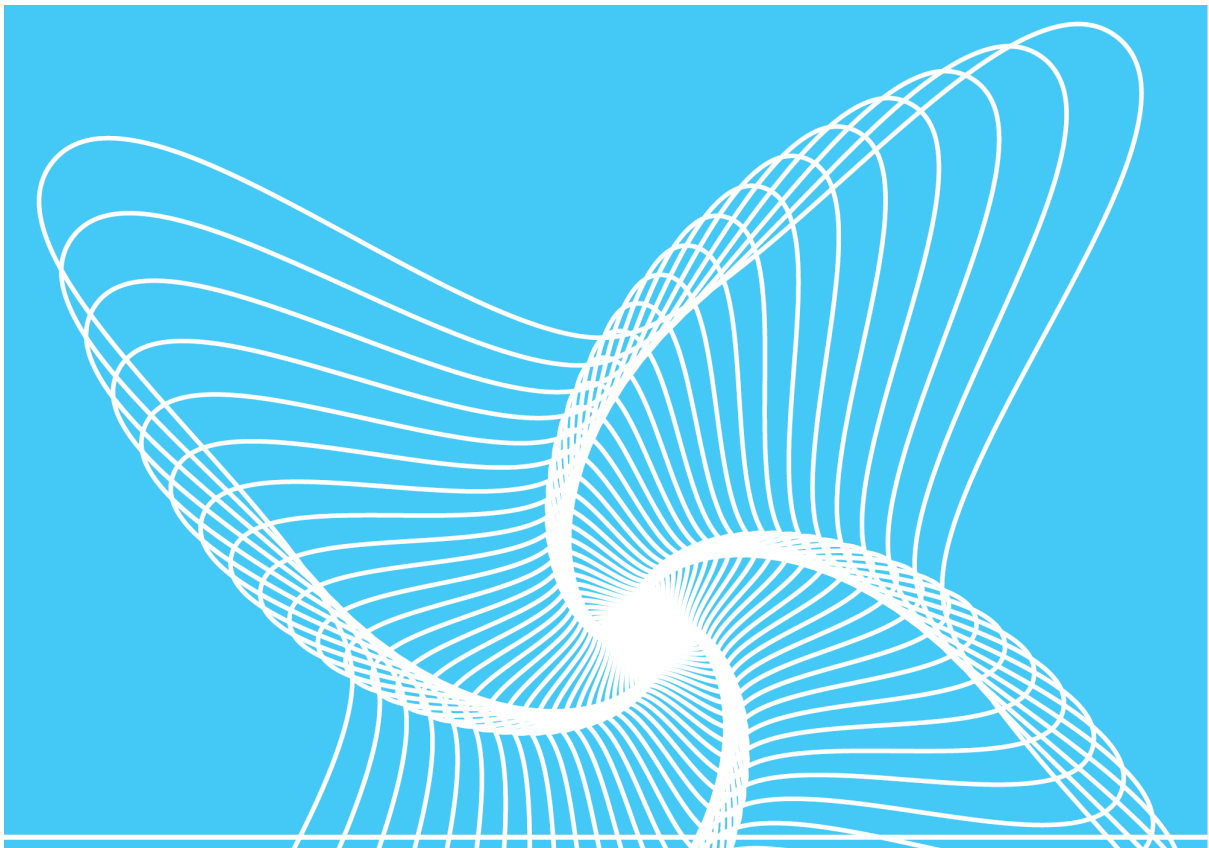


SESAM RELEASE NOTE

SIMA

Sima is a simulation and analysis tool for marine operations and floating systems — from modelling to post-processing of results.

Valid from program version 4.2.0



SAFER, SMARTER, GREENER



Sesam Release Note

Sima

Date: 11 Mar 2022

Valid from Sima version 4.2.0

Prepared by DNV - Digital Solutions

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DOCUMENTATION

Installation instructions

Required:

- 64 bit Windows 7/8/10
- 4 GB RAM available for SIMA (e.g. 8 GB RAM total in total on the computer)
- 1 GB free disk space
- Updated drivers for graphics card

Note that Windows Server (all versions), Windows XP, Windows Vista, and any 32-bit Windows are not supported.

Recommended:

- 64-bit Windows 10
- 16 GB RAM
- Fast quad core processor (e.g. Intel i7)
- High-resolution screen (1920 × 1200 / 1080p)
- Graphics card: DirectX 10.1 or 11.X compatible; 512 MB or higher
- Fast SSD disk, as large as possible (capacity requirements depends heavily on simulation settings, e.g. 500 GB is a good start)
- 3-button mouse

High disk speed is important if running more than 2 simultaneous simulations in parallel. Example: If the user has enough SIMO-licenses and has configured SIMA to run 4 SIMO-calculations in parallel, then the simulations will probably be disk-speed-bound, and not CPU bound (with the above recommended hardware). Note that this is heavily dependent on the simulation parameters, so the result may vary. The default license type should now allow for unlimited parallel runs on one PC, workstation or cluster.


Updated Drivers for Graphics Card

The driver of the graphics card should be upgraded to the latest version. This is especially important if you experience problems with the 3D graphics. Note that the version provided by Windows update is not necessarily up to date - download directly from your hardware vendors web-site.

Installing graphics drivers may require elevated access privileges. Your IT support staff should be able to help you with this.

SIMA should work with at least one graphics-mode (OpenGL, OpenGL2, DirectX 9 or DirectX 11) for all graphics cards that can run Windows 7 or 8. However, graphics cards can contain defects in their lower-level drivers, firmware and/or hardware. SIMA use the software "HOOPS" from the vendor "Tech Soft 3D" to draw 3D-graphics. For advanced users that would like more information on what graphics cards and drivers that does not work with SIMA (and an indication on what probably will work), please see the web page <http://developer.techsoft3d.com/hoops/hoops-visualize/graphics-cards/>.

Before reading the compatibility table you may want to figure out which version of HOOPS SIMA



is using. To do this open Help > About > Installation Details, locate the Plug-ins tab and look for the plug-in provider TechSoft 3D (click the Provider column title twice for a more suitable sort order). The version number is listed in the Version column. Also remember that all modes (OpenGL, OpenGL2, DirectX 9, DirectX 11) are available in SIMA.

Upgrading from Earlier Versions

After upgrading to a newer version of SIMA, your workspaces may also require an update. This will be done automatically as soon as you open a workspace not created with the new version. You may not be able to open this workspace again using an older version of SIMA.

Preference settings should normally be retained after upgrading, however you may want to open the preference dialog (Tools > Preferences) in order to verify this.

Verify Correct Installation

To verify a correct installation of SIMA, perform the following steps:

1. Start SIMA (by the shortcut created when installing, or by running the SIMA executable)
 - a. If you are prompted for a valid license, specify a license file or license server. (If you need advanced information on license options, see “License configuration”).
 - b. SIMA auto-validates upon startup: A successful installation should not display any errors or warnings when SIMA is started.
2. Create a new, empty workspace:
 - a. You will be prompted to Open SIMA Workspace: Create a new workspace by clicking New, select a different folder/filename if you wish, and click Finish.
3. Import a SIMO example, run a SIMO simulation, and show 3D graphics:
 - a. Click the menu Help > Examples > SIMO > Heavy lifting operation
 - b. Expand the node Condition in the Navigator in the upper left corner
 - c. Right-click Initial, and select Run dynamic analysis. After a few seconds, you will see the message Dynamic calculation done. No errors should occur.
 - d. Right-click HeavyLifting in the Navigator in the upper left corner, and select Open 3D View. 3D-graphics should be displayed, showing a platform and a crane.
4. If there were no errors when doing the above steps, then SIMA can be assumed to be correctly installed.

Changing Default Workspace Path Configuration

When creating a new workspace SIMA will normally propose a folder named Workspace_xx where xx is an incrementing number; placed in the users home directory under SIMA Workspaces.

The proposed root folder can be changed by creating a file named .simarc and place it in the users home directory or in the application installation directory (next to the SIMA executable). The file must contain a property sima.workspace.root and a value. For example:

```
sima.workspace.root=c:/SIMA Workspaces/
```

A special case is when you want the workspace root folder to be sibling of the SIMA executable. This can be achieved by setting the property as follows:

```
sima.workspace.root=.
```



License Configuration

SIMA will attempt to automatically use the license files it finds in this order:

1. Use path specified in the file “.simarc” if present. See details below.
2. Use the path specified in the license wizard.
3. Use the system property SIMA_LICENSE_FILE.
4. Use the environment variable SIMA_LICENSE_FILE.
5. Use all “*.lic” files found in C:/flexlm/ if on Windows.
6. Use all “*.lic” files found in the user home directory.

If any of the above matches, the search for more license files will not continue. If there are no matches, SIMA will present a license configuration dialog.

The license path can consist of several segments separated by an ampersand character. Note that a license segment value does not have to point to a particular file – it could also point to a license server. For example:

```
c:/licenses/sima.lic&1234@my.license.server&@another.license.server
```

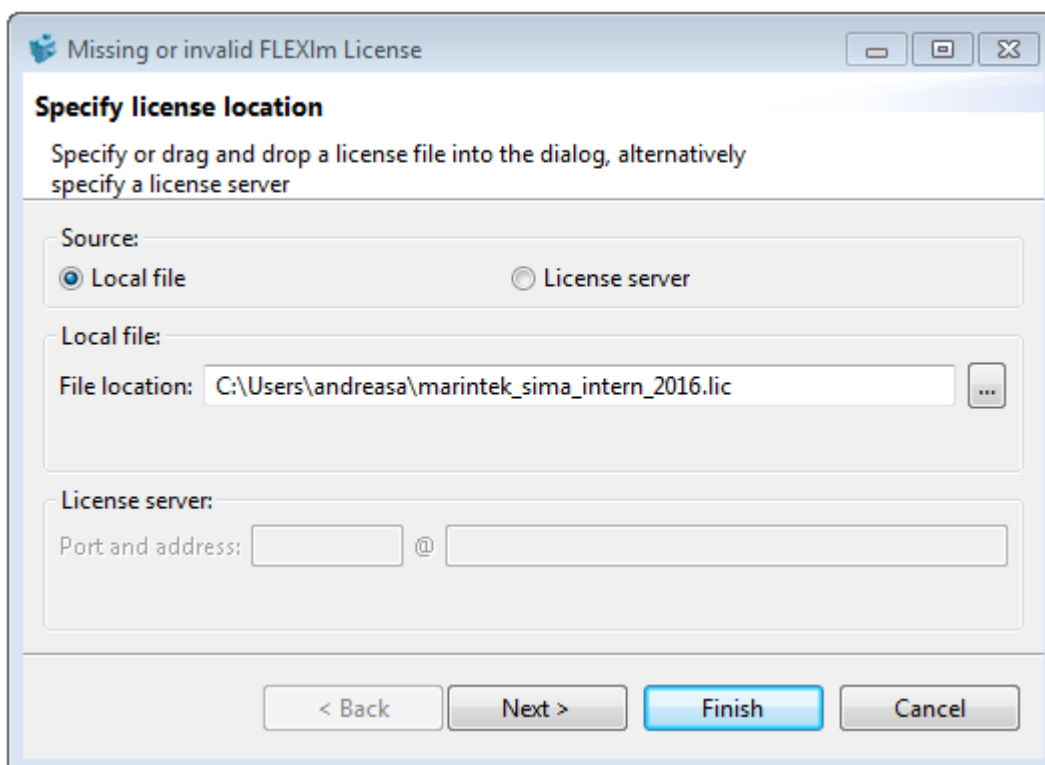
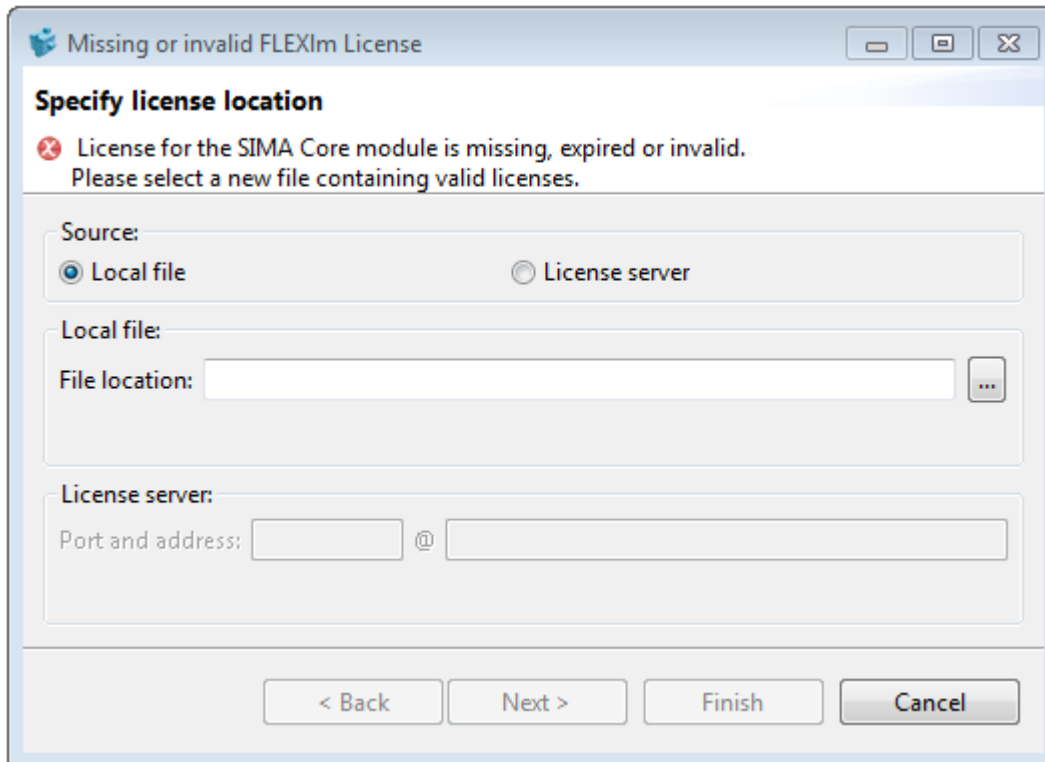
In this case the path is composed on one absolute reference to a file. Followed by the license server at port 1234 and another license server using the default port number.

RIFLEX and SIMO License

When starting SIMO and RIFLEX from SIMA the environment variable MARINTEK_LICENSE_FILE will be set to the home directory of the user. This means that a license file can be placed in this directory and automatically picked up.

Specifying a License path

When starting SIMA without a license the dialog below will pop up before the workbench is shown. If you have a license file; you can simply drag and drop it into the dialog and the path to this file will be used. You may also use the browse button if you want to locate the file by means of the file navigator. If you want to use a license server; use the radio button and select License server then continue to fill in the details. The port number is optional. A host must be specified, however. Note that the host name must be in the form of a DNS or IP-address.



You can now press Finish or if you want to add more path segments; you can press Next, this will bring up the second page of the license specification wizard. The page will allow you to add and remove licence path segments and rearrange their individual order.

Modifying a License Path

If the license path must be modified it can be done using the dialog found in the main menu; Window > Preferences > License. This preference page works the same as the second page of the wizard.

Specifying License Path in .simarc

The mechanism described here works much like specifying the environment variable, however it will also lock down the SIMA license configuration pages, thus denying the user the ability to change the license path. This is often the better choice when installing SIMA in an environment where the IT-department handles both installation and license configuration.

The license path can be forced by creating a file named .simarc and place it in the users home directory or in the application installation directory (next to sima.exe). The latter is probably the better choice as the file can be owned by the system and the user can be denied write access. The license path must be specified using the sima.license.path key and a path in the FLEXlm Java format. The license path can consist of several segments separated by an ampersand character. For instance:

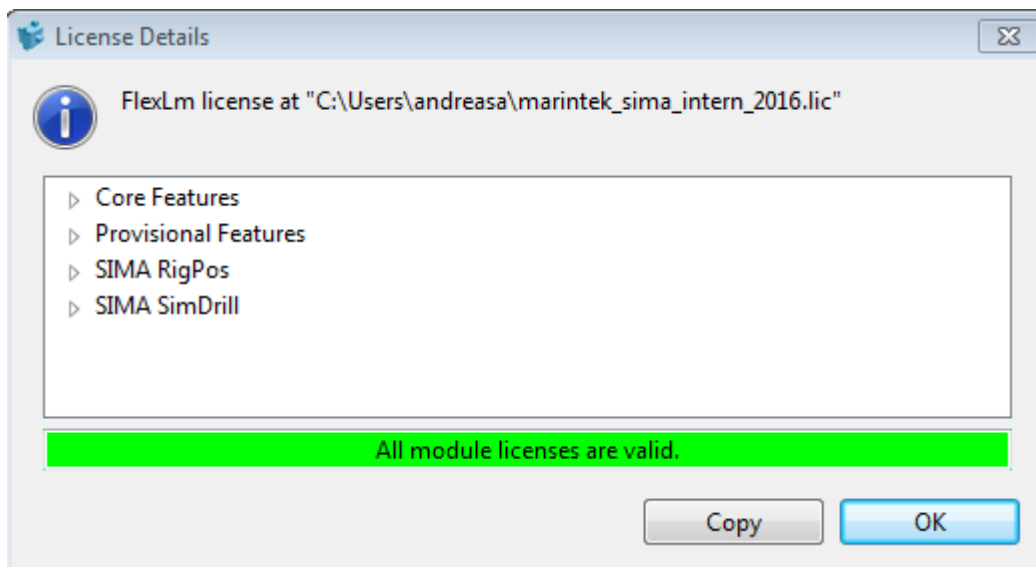
```
sima.license.path=c:/licenses/sima.lic&1234@my.license.server&@another.license.server
```

Note that the version of FLEXlm used in SIMA does not support using Windows registry variables. It also requires the path to be entered in the FLEXlm Java format which is different from the normal FLEXlm format. Using this mechanism one can also specify the license path for physics engines such as SIMO and RIFLEX started from SIMA. This is done by specifying the key marintek.license.path followed by the path in normal FLEXlm format. For example:

```
marintek.license.path=c:/licenses/ sima.lic:1234@my.license.server:@another.license.server
```

Viewing License Details

If you would like to view license details, such as expiration dates and locations you will find this in the main menu Help > License.



NEW FEATURES

New Features - SIMO

Release Note	Reference
Option to calculate retardation function from added mass and damping added to plot editor	SIMA-9812
Fluctuating 3-comp wind, IECWind format (DTUMann) The default value for number of slices in core has been increased from 10 to 800. This is expected to increase the CPU efficiency when the IECWind (DTUMann) format is used in the analysis.	SRV-1688
When using parametric wind spectra in coupled analysis the wind velocity time series is now reported for the hub position. Previously the wind velocity time series were reported for the reference height of the wind coefficients. Wind velocity for turbine blades will now be computed by taking the blade element vertical position into account. Previously the wind velocity at wind coefficients reference height was used for all blade elements. This means that results will change slightly compared to older versions. The new behavior is consistent with how other calculations are made with other wind types, i.e. Stationary Uniform, Fluctuating two and three component wind types.	SRV-1749
The Constant Tension Control in Simple Wire Coupling now has input to specify activation time and deactivation time.	SRV-1685

New Features - RIFLEX

Release Note	Reference
Combined blade pitch, electrical power and yaw control system The external wind turbine control system may now also include Nacelle yaw control. Currently only one wind turbine can have an external control system.	SRV-1768
A hydrostatic/hydrodynamic load model that accounts for partially submerged cross section has been made available for thin-walled pipe cross sections (CRS0), axis-symmetric cross sections (CRS1) and double symmetric cross sections (CRS2) as a new hydrodynamic load type. This load model is available for both beam and bar elements and may be used in dynamic analyses with regular or irregular waves. Both lumped and consistent formulations are available. The new load model will give similar results to the existing partly submerged cross sections (CRS3 and CRS4) which could not be combined with irregular waves.	SRV-1706
Several options for controlling MatrixPlot storage has been added to static calculation parameters in RIFLEX	SIMA-9552

Release Note	Reference
Eigen value analysis can be performed for cross section with MacCamy & Fuchs wave loads	SRV-1729
Add TD VIV load for CRS0 cross-sections	SRV-1758
<p>Storage of dynamic results for seafloor and soil contact elements</p> <p>An option has been added to toggle storage of results for seafloor and soil layer profile (SLP) contact elements.</p> <p>These results are available from nonlinear simulations only. If storage is specified, they will be stored for all seafloor / soil contact elements attached to beam or bar elements for which force storage is specified.</p> <p>The results were previously exported if force storage on an additional file was specified; i.e. if IFORFM was nonzero. The results will now be exported if the new option IBOTFM is nonzero.</p> <p>The default is no storage of seafloor / soil contact results, so the input file must be changed if these results are wanted.</p>	SRV-1713
<p>Fluctuating 3-comp wind, IECWind format (DTUMann)</p> <p>The default value for number of slices in core has been increased from 10 to 800. This is expected to increase the CPU efficiency when the IECWind (DTUMann) format is used in the analysis.</p>	SRV-1688
An option have been added to allow the added mass and damping to be given in non-dimensional format for the MacCamy & Fuchs wave loads.	SRV-1728
<p>Improve error message using tabulated spectrum and too large time step.</p> <p>Too large time step gives a Nyquist frequency smaller then the largest frequency in the tabulated spectrum. The error message is improved.</p>	SRV-1440
<p>Time domain VIV load for stress joint (Restricted functionality)</p> <p>Time domain VIV load model is available for stress joints.</p>	SRV-1787
<p>Option for calculation of arclength for result presentation</p> <p>The user may now choose whether the arclength is accumulated throughout the whole system or starts at zero for each line. The arclength was previously always accumulated over all lines.</p> <p>In SIMA the default is to start at zero for each line. In standalone RIFLEX the default</p> <p>is to accumulated the arclength throughout the system.</p> <p>The arclength is mainly used for results on the MatrixPlot files.</p>	SRV-1417

Release Note	Reference
<p>Hydrodynamic load model for loads acting on nets</p> <p>A hydrostatic/hydrodynamic load model that accounts for loads acting on a net panel has been made available for axisymmetric cross sections (CRS1). This load model is available for bar elements only. Both lumped and consistent formulations are available, and the load type may be used in dynamic analyses with regular or irregular waves.</p> <p>The load formulation is based on the Fish net cross section (CRS6) and can now be used with irregular waves.</p>	SRV-1755
<p>Include hydrostatic stiffness in eigenvalue analysis</p> <p>The hydrostatic stiffness of beam and bar elements crossing the surface is now included in eigenvalue analysis.</p>	SRV-1824
<p>If there is a wind turbine and there is a turbulent wind field, a warning is printed to the <code><*.lis /<*.res</code> files if the rotor is not within the turbulent wind field.</p>	SRV-1626
<p>Added support for RIFLEX internal flow from file</p>	SIMA-9660

New Features - Other

Release Note	Reference
<p>New Help system</p> <p>The SIMA help system has been replaced. The help will now open in an external web browser</p>	SIMA-9340
<p>A batch version of SIMA (SIMA Runtime Engine) is now delivered together with the official version of SIMA with UI. This is made available on both Linux and Windows.</p> <p>This makes it possible to run SIMA on environments without a user interface such as clusters and in cloud environments.</p> <p>Start the sre executable with <code>--help</code> to get an overview of commands available</p>	SIMA-9828
<p>SIMA Python library</p> <p>A SIMA Python library (SIMAPY) has been developed to enable creation of model elements using script. This library will create json-files that in turn can be imported into SIMA. It is also possible to export json from SIMA which in turn can be used to initialize Python objects for further manipulation.</p> <p><code>pip install simapy</code></p>	SIMA-9799

BUG FIXES

Fixed bugs - SIMO

Release Note	Reference
<p>When using Slender Elements and Fixed Body Elements with the option "Gravity and buoyancy NOT included", added mass was not computed for these and potentially other elements on that body.</p> <p>This error has now been resolved and added mass is now computed for all Slender Elements and Fixed Body Elements regardless of this option.</p> <p>Longstanding error.</p>	SRV-1793
<p>An error message have been added in SIMO preventing field points to have only diffracted wave elevation, without the associated diffracted wave particle velocity. In previous versions, having only wave elevation was allowed, but caused erroneous diffracted wave elevation.</p>	SRV-1803
<p>The grid coordinates are now consistent with Turbsim when the grid height is larger than the grid width.</p>	SRV-1786
<p>Using a Numerically Defined Wave Spectrum and the Cosine Wave Method would previously not give any wave realization. This has now been resolved.</p> <p>Longstanding error.</p>	SRV-1725
<p>If an external control system returned feedback values very close to zero (absolute value less than approximately $1.0e-308$), Riflex would incorrectly interpret these values as invalid. This has now been resolved.</p> <p>Error since Sima 4.1.0.</p>	SRV-1721
<p>Bladed style controllers for wind turbines did previously not work with the Simo wind turbine. This has now been resolved.</p>	SRV-1797
<p>Fixed issue where SIMA read two hydrodynamic couplings for each pair of bodies from SIF file</p>	SIMA-9677

Fixed bugs - RIFLEX

Release Note	Reference
<p>The grid coordinates are now consistent with Turbsim when the grid height is larger than the grid width.</p>	SRV-1786
<p>Using the SIMO feature Generic External Control System would previously cause RIFLEX to terminate with an error. This has now been resolved.</p>	SRV-1735
<p>Visualization using regular waves in coupled analysis did not work. This is fixed.</p>	SRV-1722
<p>Fixed error related to the stored forces and displacement time series which caused the DNC OS F-201 capacity check to fail</p>	SIMA-9814

Release Note	Reference
Error in printing diffracted kinematics points to Dynmod result file is corrected. The incorrect points was listed. The error is related to the print only.	SRV-1772
Fixed import and export of diffracted wave input in RIFLEX	SIMA-9741
Wind turbine static analysis. If a wind profile was defined and the wind load group is not activated in the static loading, the static parameter variation failed. This is corrected.	SRV-1724
Wind turbine blade response storage Corrected an error that could occur for multiple wind turbines. If more blade elements were specified for blade storage than the number of blade elements in the last specified wind turbine, the simulation could fail. Corrected an error in some results for the last, i. e. outermost, element of a blade: - Annulus average axial induced wind in rotor system - Annulus average tangential induced wind in rotor system - Annulus average axial force in rotor system - Annulus average tangential force in rotor system These results are only stored if medium or maximum blade storage is specified.	SRV-1771
Wasim export did previously cause an error when combined with VTF visualization. This has now been resolved.	SIMA-9693
Nodal body added mass contribution to Rayleigh damping If additional mass for a nodal component attached to a bar element was specified in global system, the added mass contribution to Rayleigh damping was not included. This has been corrected. Note that mass proportional damping will dampen rigid body motions and is therefore normally not used.	SRV-1745
Multiple wind turbines with and without nacelle yaw control A possible error in analyses in which some turbines had nacelle yaw control and some did not has been corrected. A wind turbine without nacelle yaw control could turn off yaw control for subsequent wind turbines.	SRV-1799

Fixed bugs - Other

Release Note	Reference
Fixed error when zooming in plotting library	SIMA-9708
Fixed issue when changing name of master super node in table from clipboard	SIMA-9679

Release Note	Reference
<p>Internal nacelle yaw control</p> <p>Corrected the scaling of the input yaw threshold for the internal yaw controller. User input is given in (deg² s) and was scaled with pi/180 instead of with (pi/180)**2.</p>	SRV-1807
<p>Incorrect pointer caused error in eigen value analysis with multiple bodies (coupled analysis).</p> <p>Longstanding error.</p>	SRV-1820
<p>Fixed issue where error free condition was blocked to run when other conditions had validation errors</p>	SIMA-9675
<p>Error in visualization of line segments with offset and twist has been fixed.</p>	SIMA-9787
<p>Fixed selection of external jar controller for wind turbines</p>	SIMA-9768

REMAINING KNOWN ISSUES

Unresolved Issues - SIMO

Release Note	Reference
The Nonlinear Buoyancy Correction feature is deprecated and will be removed in the next release. Please use Nonlinear Hydrostatic Stiffness instead.	SRV-1609

Unresolved Issues - RIFLEX

Release Note	Reference
Local axes for wind turbine blades without twist or bend The default local axes method for wind turbine blades is not followed if the blade line is not pre-bent or pre-twisted. Long-standing error. Workaround: use local element axes for the wind turbine blades or define a negligible, but non-zero twist or bend for the blade line type.	SRV-1583

Unresolved Issues - Other

Release Note	Reference
Some users have experienced font issues in the report and/or the plots after a windows 10 update. A workaround is to change the font for the plots.	SIMA-8668
SIMA crashes in some cases when screen-saver starts or an external screen is connected and SIMA window is opened. If this occurs the user should test alternative graphics drivers in settings and turn of screen-saver.	SIMA-7090



ABOUT DNV

Driven by our purpose of safeguarding life, property and the environment, DNV enables organizations to advance the safety and sustainability of their business. We provide classification and technical assurance along with software and independent expert advisory services to the maritime, oil and gas, and energy industries. We also provide certification services to customers across a wide range of industries. Operating in more than 100 countries, our 16,000 professionals are dedicated to helping our customers make the world safer, smarter and greener.

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