



Latest Developments in versions v14.x

June 2013
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Customers Service
Post-Processing Applications



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THE MET HOTEL
Thessaloniki, Greece

Areas of Development

User Interface GUI

Results handling & Visualization

Query tools

2D plot

Image & Video Handling

Reporting tools & Automation

Decks

Crash & Safety

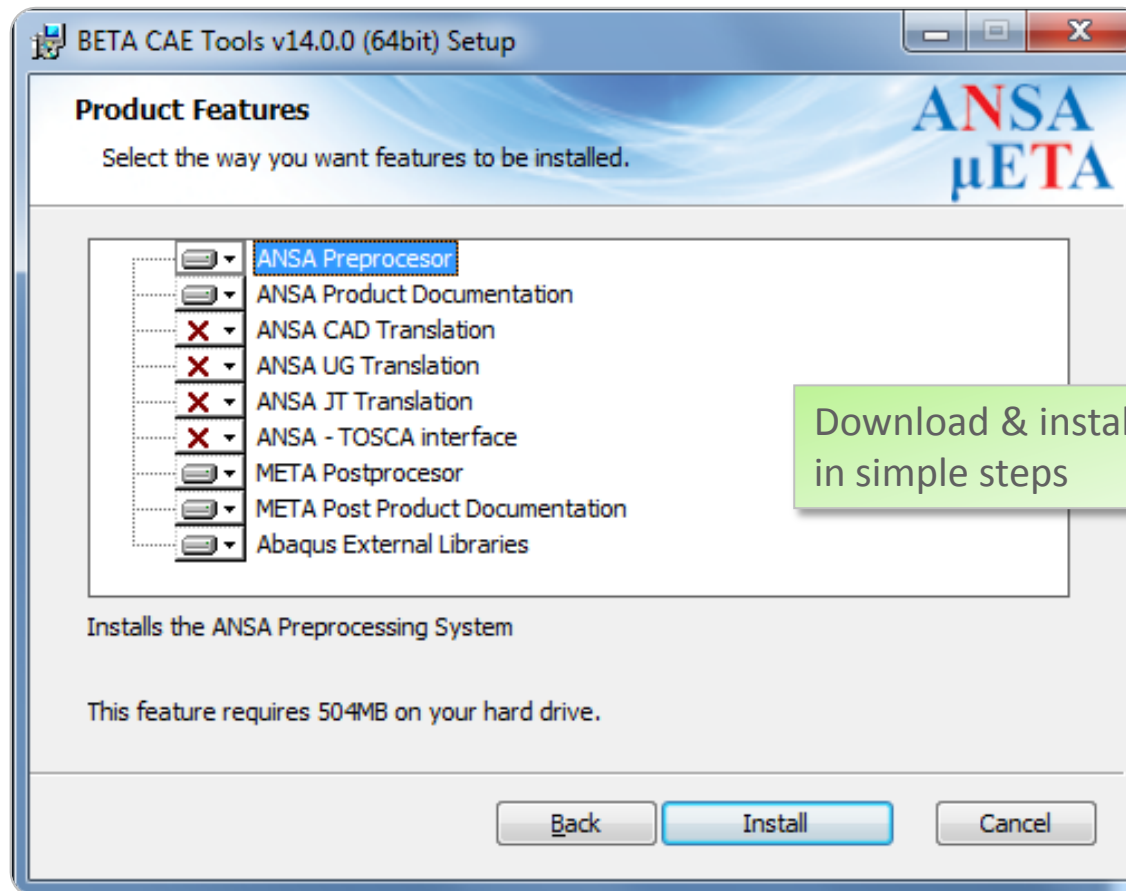
Durability

Composites

NVH

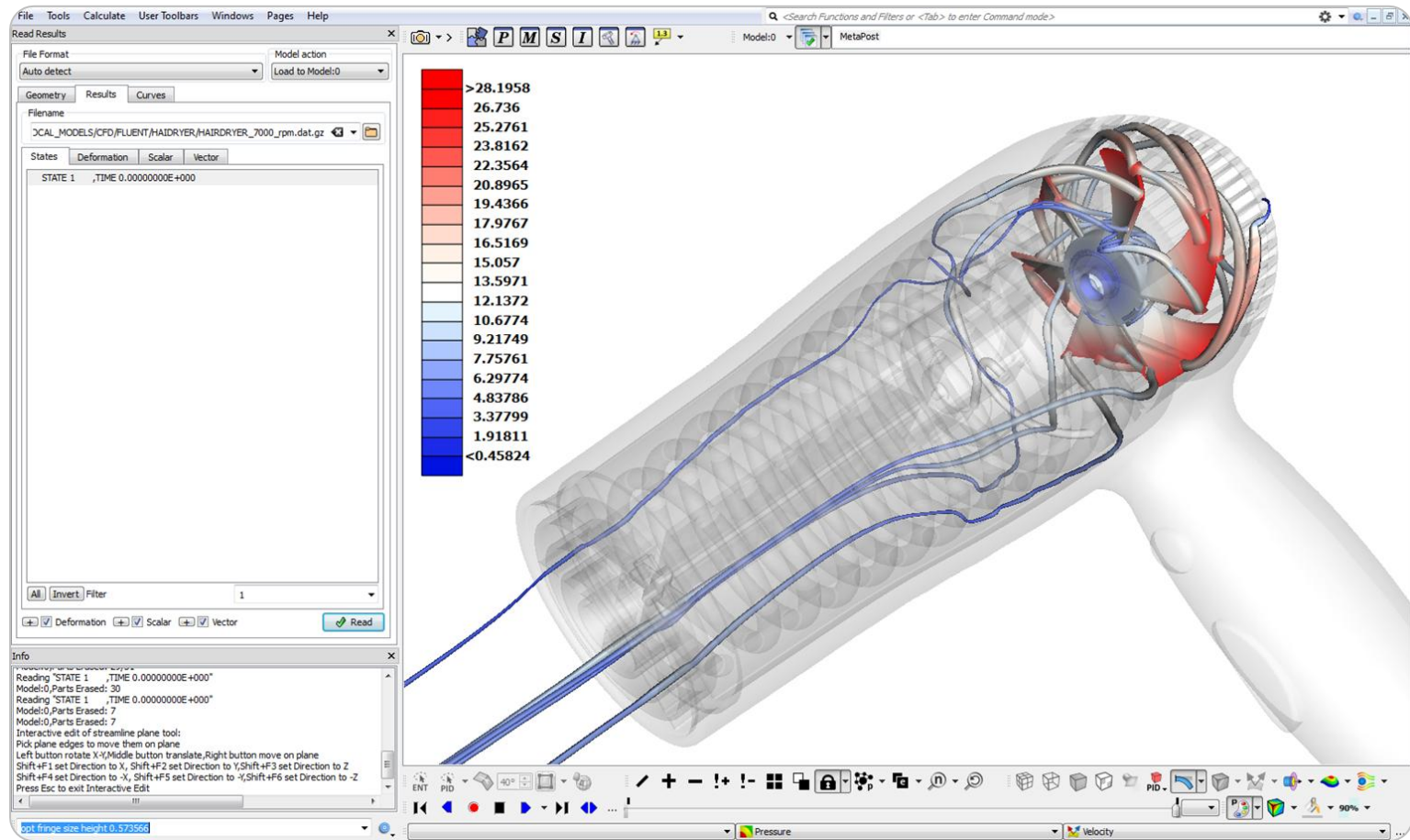
CFD

Installation process, μ ETA execution

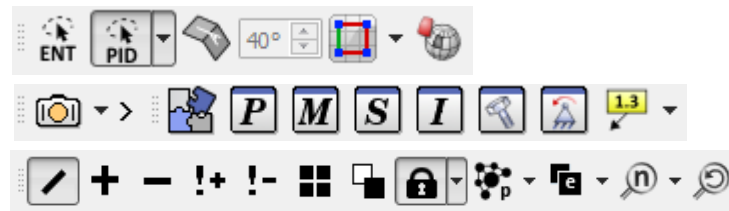


- Libraries, Viewer plugin, etc. installed automatically
- New option to run μ ETA with Virtual X Server **v14.2.0**

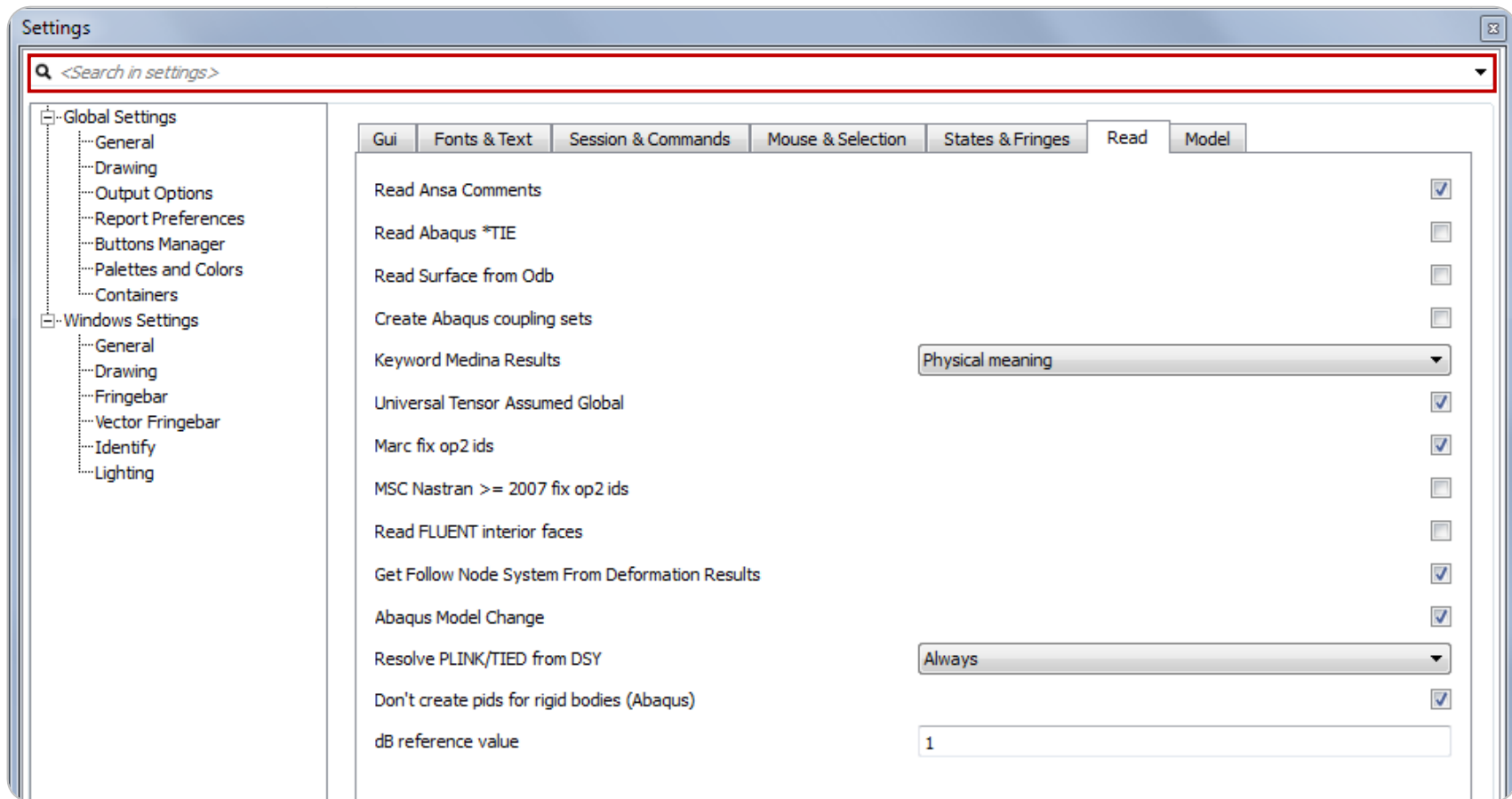
User Interface in v14.x.x



Common icons with ANSA

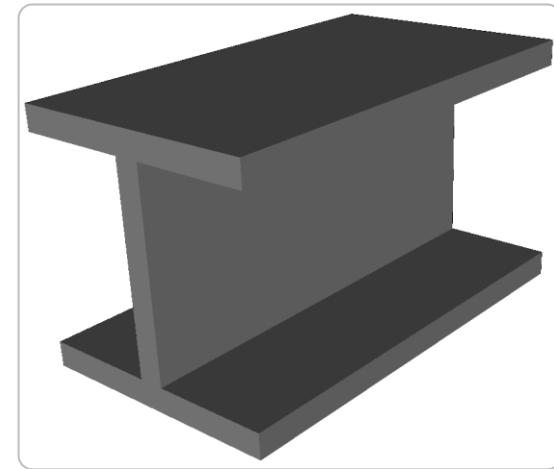
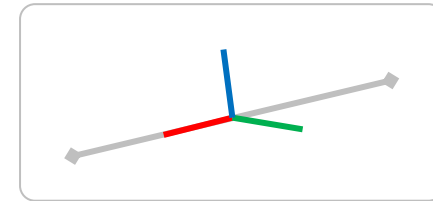
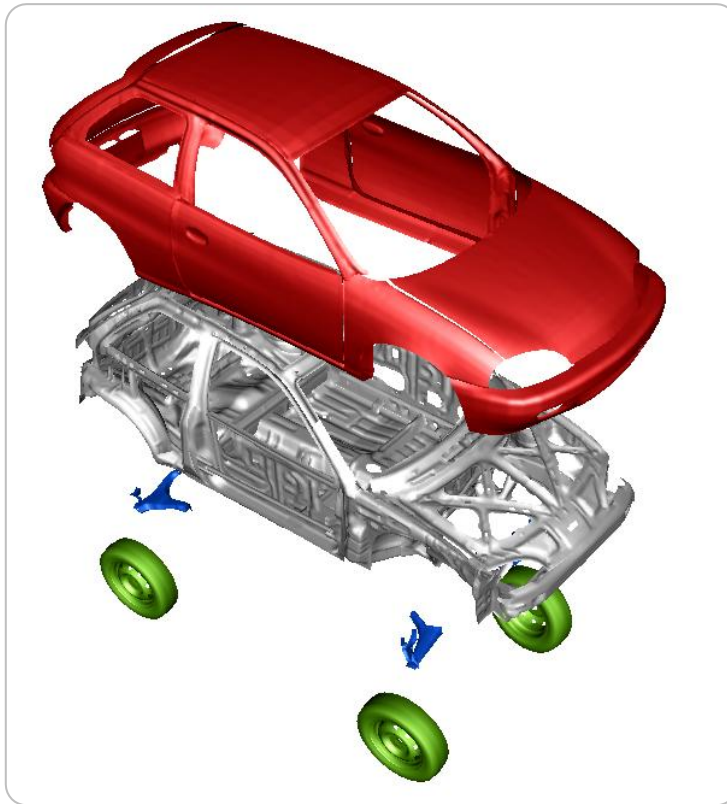


User Interface (GUI) enhancements



- Settings organized in Tabs
- Quick search of settings

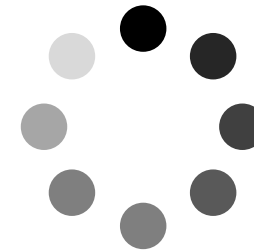
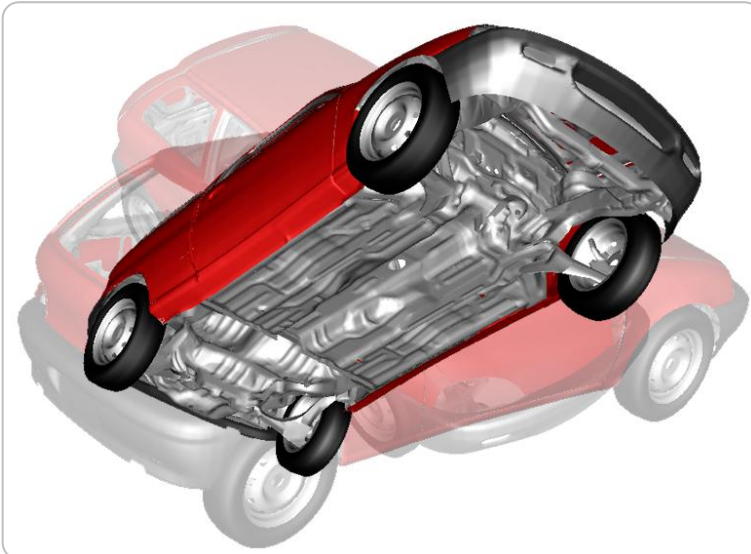
Display styles



- New coloring modes (per Include / ANSA part)
- Line element orientation & cross-section display
- Arbitrary cross-section display (PBMSECT) **v14.2.0**

Results handling

```
Meta Info
Detected LsDyna file.
Reading "STATE 1" ,TIME 0.00000000E+000"
Reading "STATE 2" ,TIME 9.99999233E-003"
Reading "STATE 3" ,TIME 1.99999847E-002"
Reading "STATE 4" ,TIME 2.99999770E-002"
Reading "STATE 5" ,TIME 3.99999693E-002"
Reading "STATE 6" ,TIME 4.99999635E-002"
Reading "STATE 7" ,TIME 5.99999540E-002"
Reading "STATE 8" ,TIME 6.99999481E-002"
Reading "STATE 9" ,TIME 7.99999386E-002"
Reading "STATE 10" ,TIME 8.00009444E-002"
Reading "STATE 1" ,TIME 0.00000000E+000"
Reading "STATE 2" ,TIME 9.99999233E-003"
Reading "STATE 3" ,TIME 1.99999847E-002"
...
```

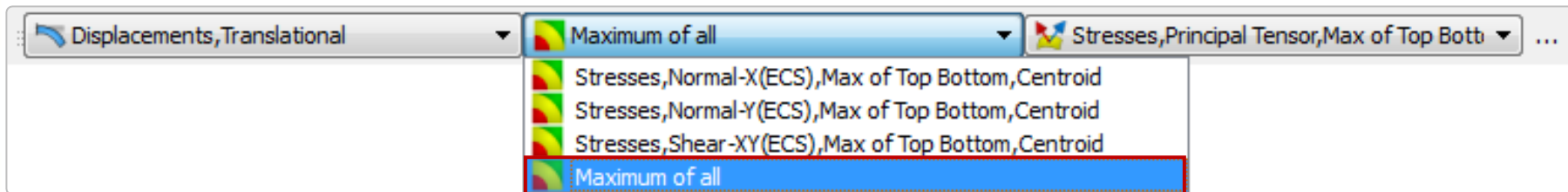
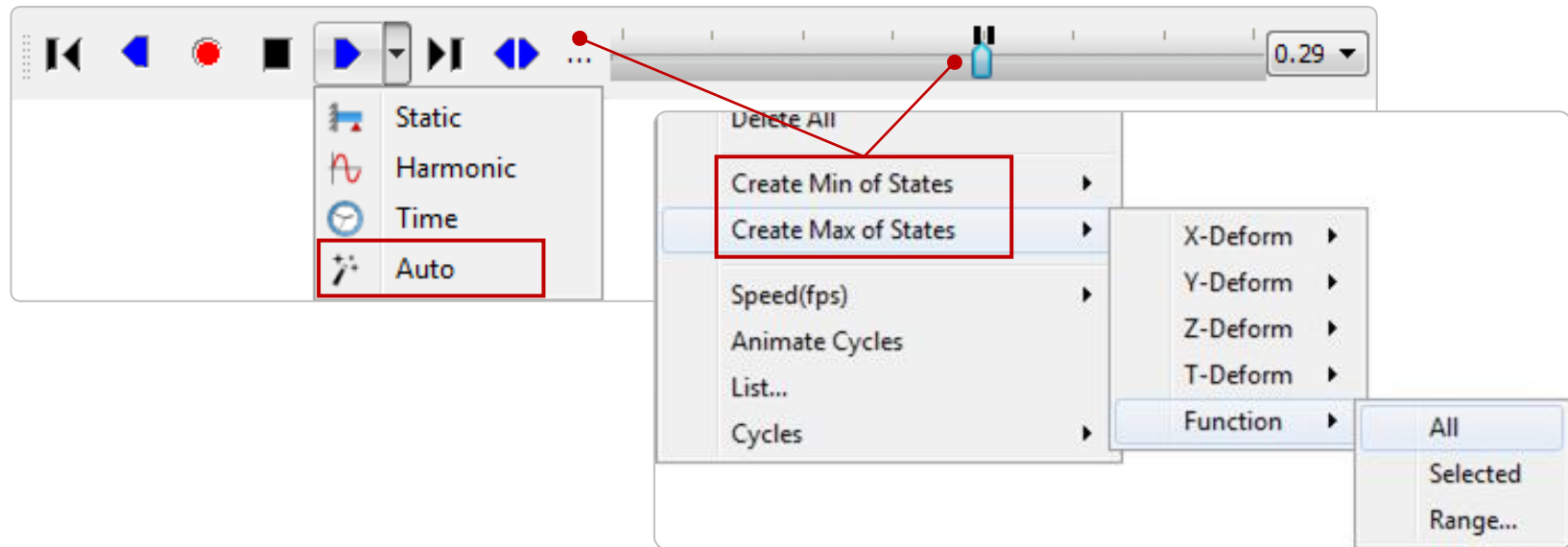


Loading...

Asynchronous reading of results:

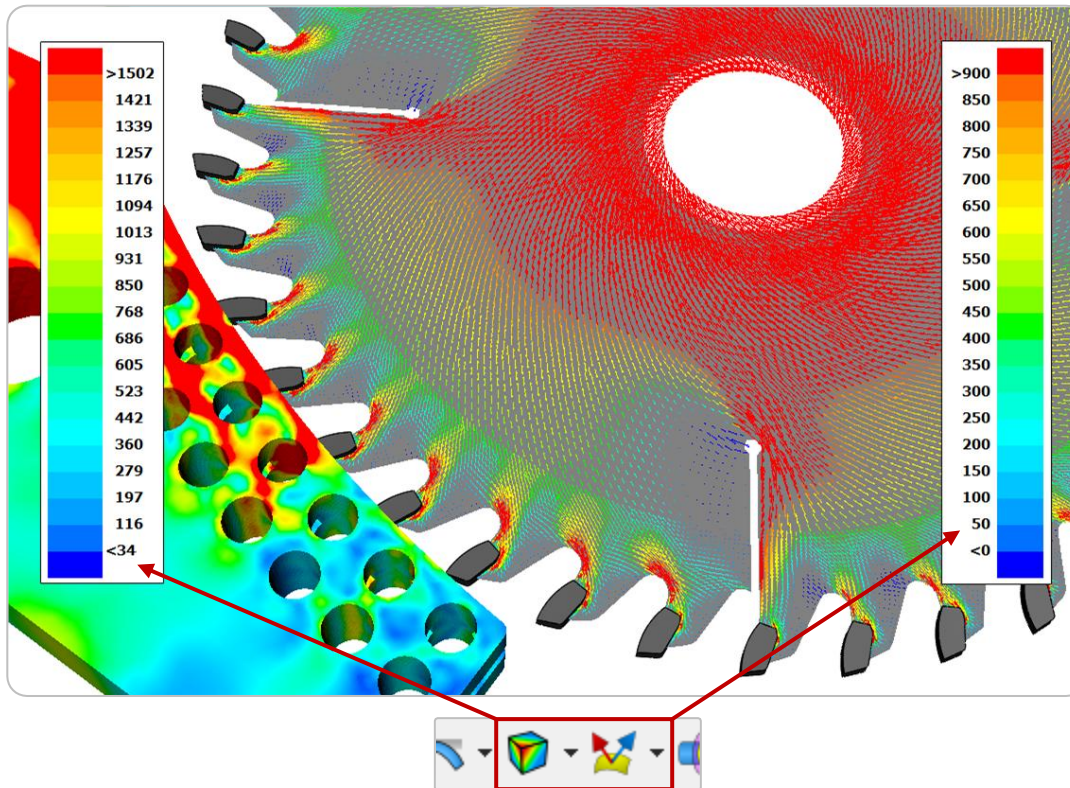
- Ability to interact with model while reading results (no freeze)
- Ability to cancel reading anytime

Results handling



- New Animation Mode “Auto”
- Create Max/Min of States from bar
- Calculate Max/Min of Labels

Results handling – Fringebar Enhancements

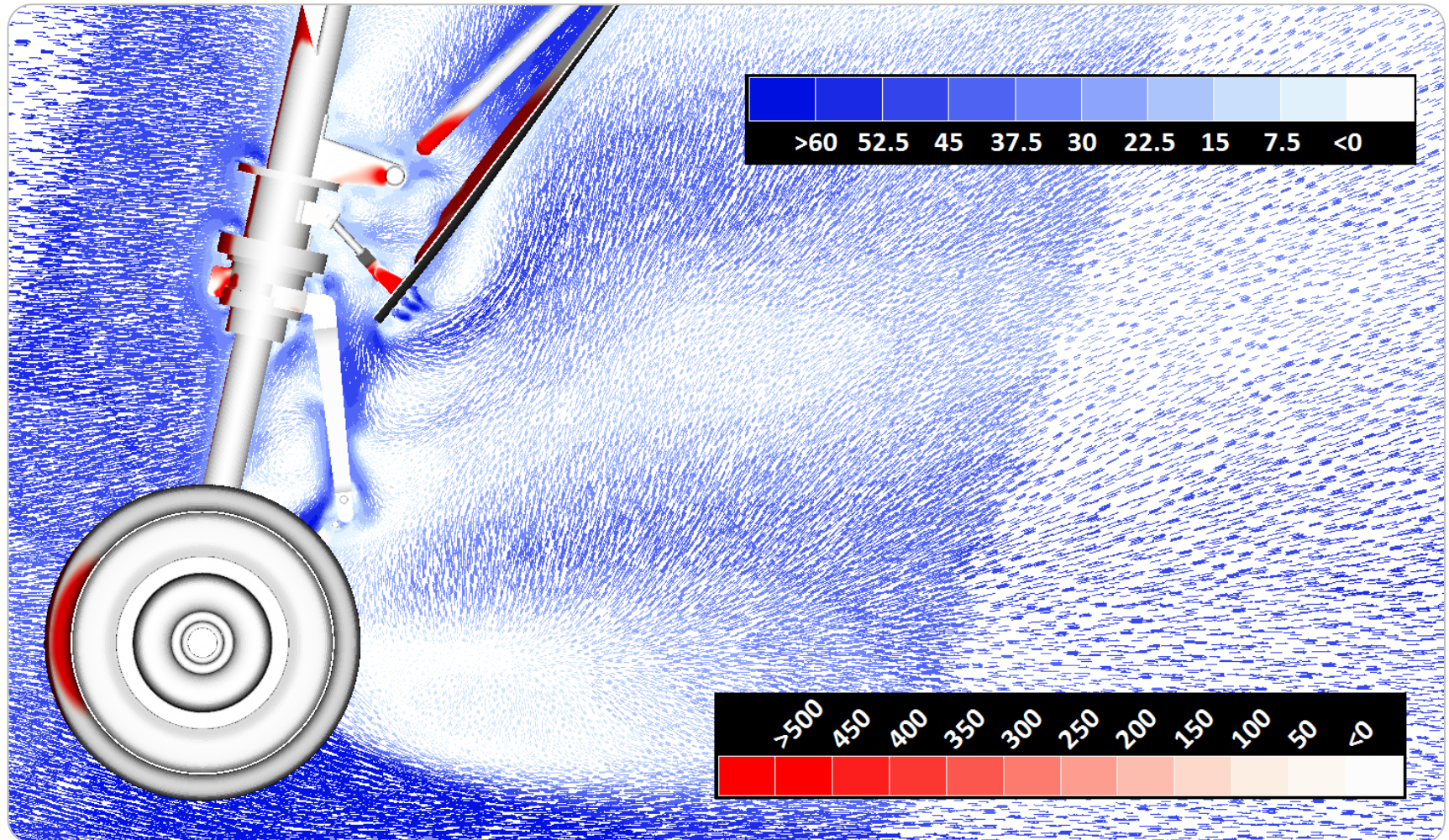


Easy identification of different resultsets displayed simultaneously

Displacements Stress components, Von Mises, Max of In Out/All Layers, Centroid Stress components, Major Principal, Max of In Out/All Layers ...

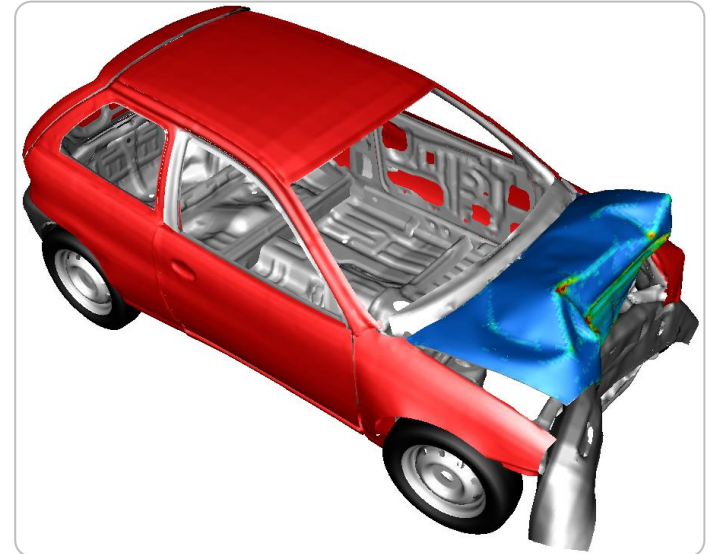
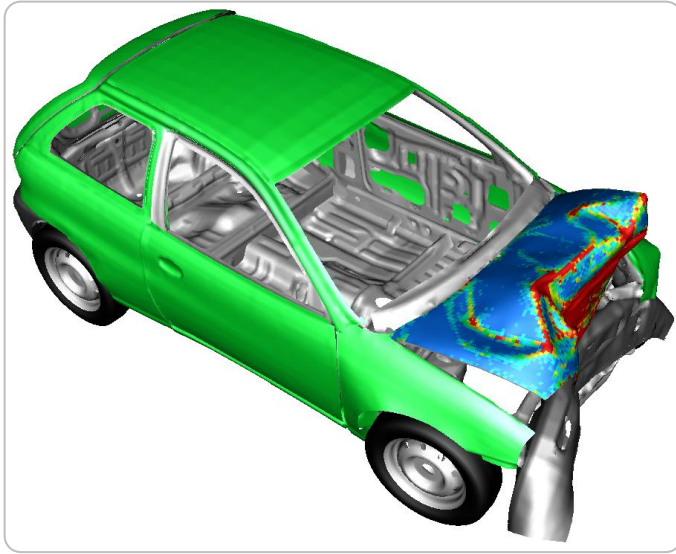
- Different fringebars for scalar & vector results
- Different label category for scalar & vector results
- x15 times faster Scalar & Vector simultaneous visualization

Results handling – Fringebar Enhancements



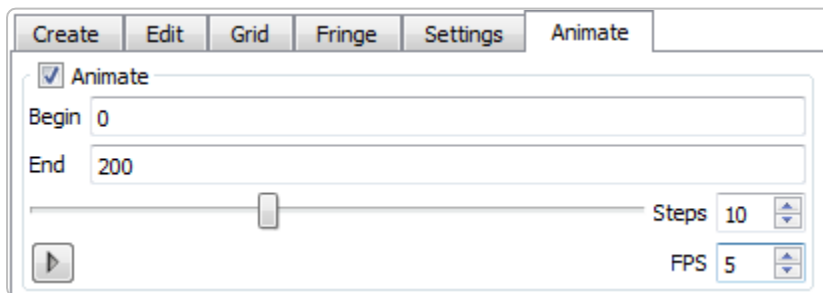
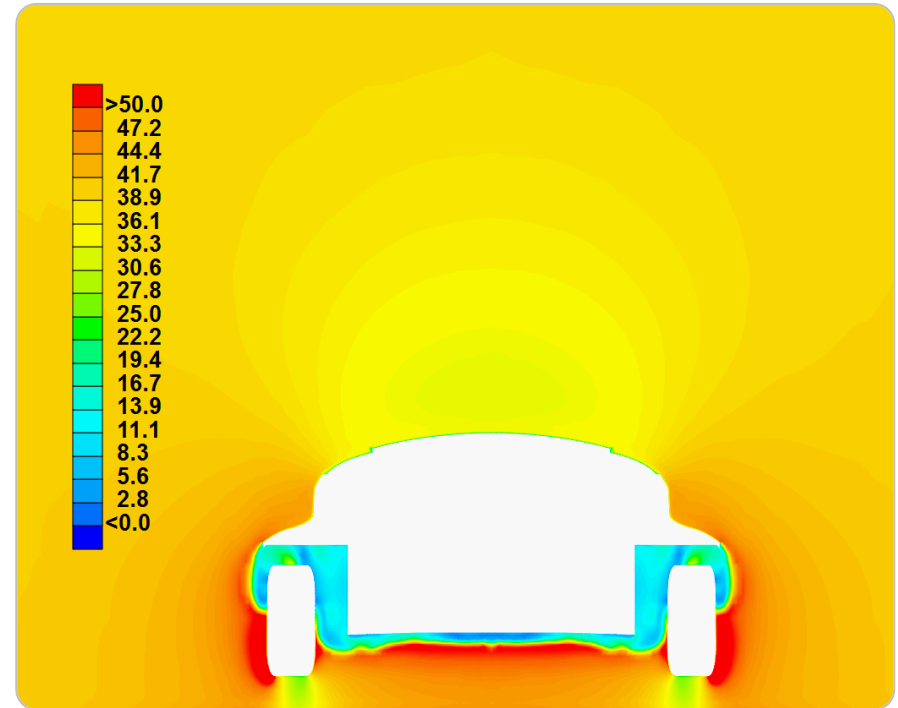
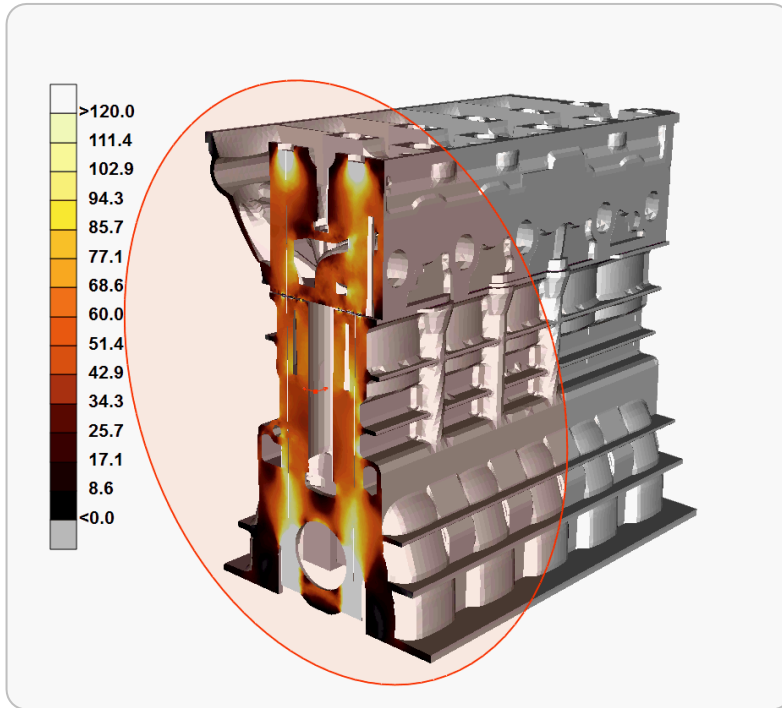
■ Horizontal fringebars

Results handling - User calculations



- Create Field results (e.g. % difference) between different models

Results visualization tools - Cut Planes

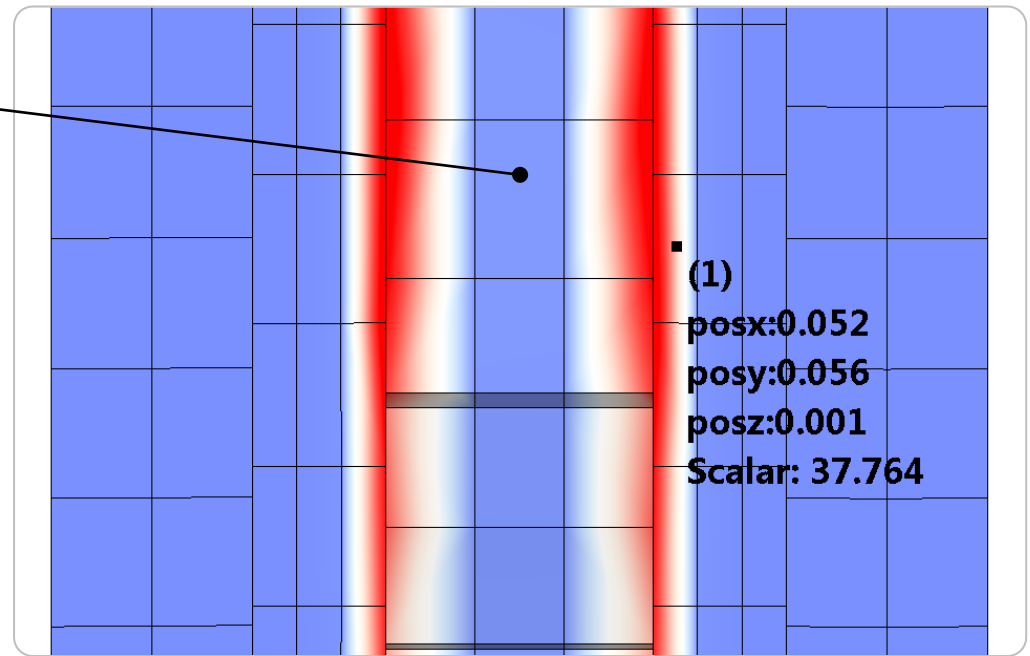
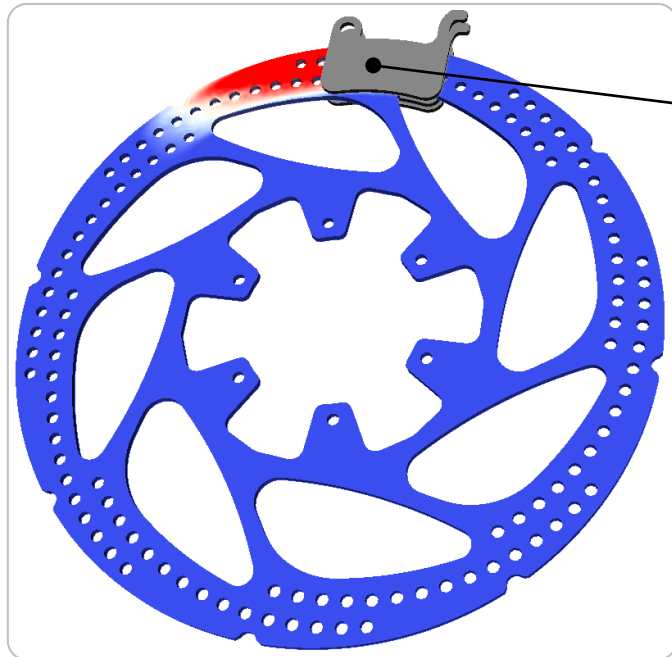


■ Animate Cut Planes

Easily record videos of
Cut Planes moving along path



Query tools - Parametric Points

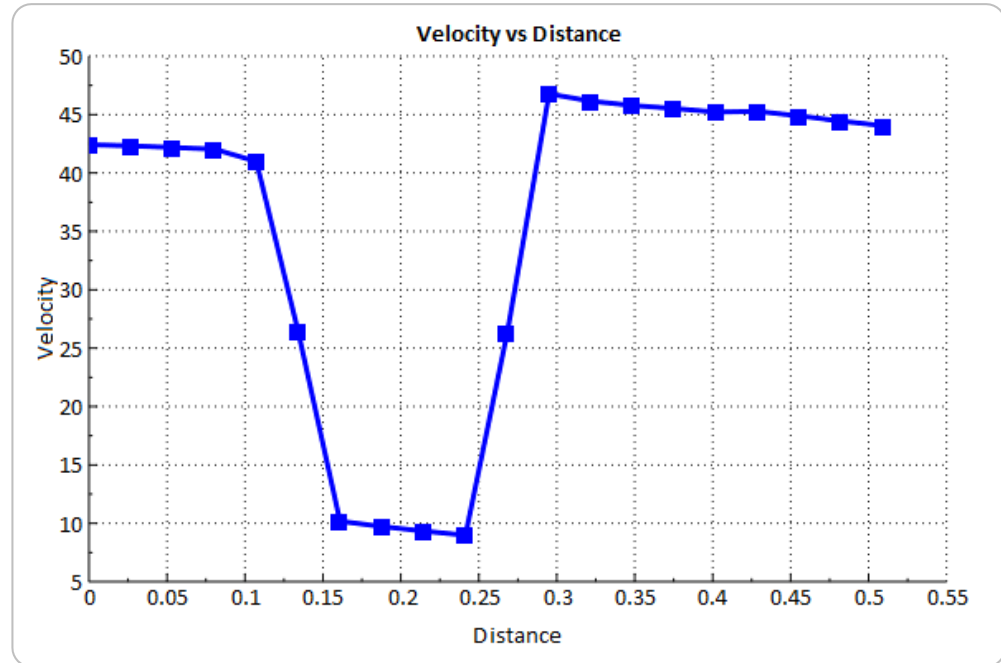
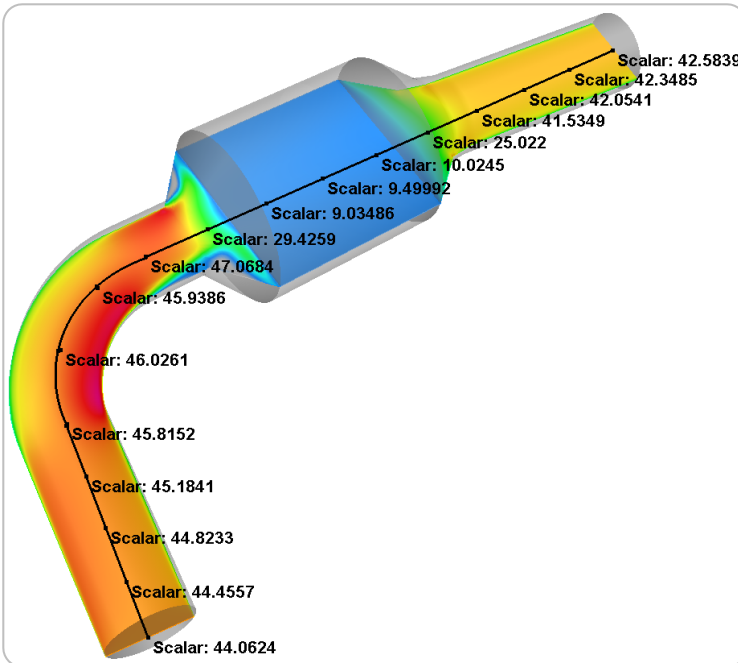


- Identify points in arbitrary positions, On or Off the model.

Identify critical areas not coinciding with model's entities.

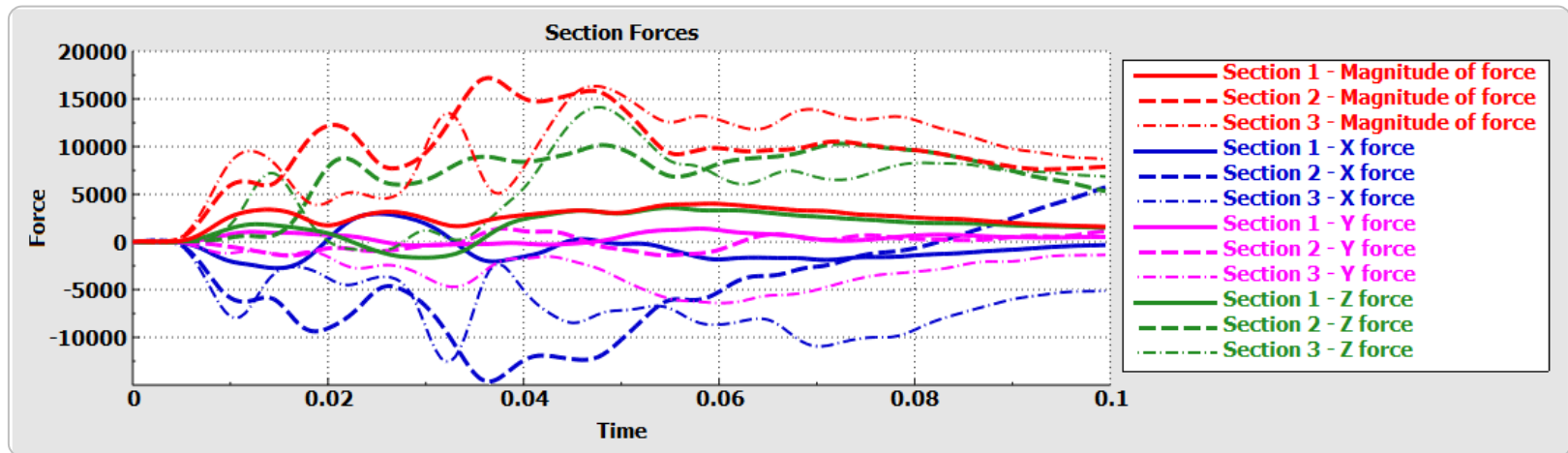


Query tools - Parametric Points



- Identify points on linear-circular paths.
- Create path plots

2D plot enhancements



Name	Value
Abbreviation	xf
Abscissa	Time
Axes	X0-Y0
Dyna File	secforc
Id	2
Statistics	
average	-462.99410506825654
magn_max	5732.1787109375
magn_max_x	0.0995005
magn_min	-14660.8447265625
magn_min_x	0.0365002
x_max	0.0995005
x_min	1.0008E-6
Title/name	X force
Type	Section
Type info	X force (xf)

Curves	Statistics::magn max	Statistics::magn min	Title/name
0: Plot			
64 Section 1 - Magnitude of force	4002.396	2.976	Magnitude of force
65 Section 2 - Magnitude of force	17211.539	4.798	Magnitude of force
66 Section 3 - Magnitude of force	16332.497	-91.523	Magnitude of force
1 Section 1 - X force	2953.332	-2755.641	X force
2 Section 2 - X force	5732.179	-14660.845	X force
3 Section 3 - X force	211.096	-12558.858	X force
22 Section 1 - Y force	1388.915	-363.559	Y force
23 Section 2 - Y force	1404.553	-1447.627	Y force
24 Section 3 - Y force	39.955	-6411.457	Y force
43 Section 1 - Z force	3572.299	-1654.100	Z force
44 Section 2 - Z force	10299.872	-43.662	Z force
45 Section 3 - Z force	14124.471	-921.698	Z force

- Curve carry information through attributes
- View attributes in Curve List
- Renumber/Re-arrange curves

Drawing speed improvement **v14.2.0**

2D plot enhancements

Geometry Results Curves

Filename:

Results Settings Files List

Type: Structure Modal Participation Factors

X axis: Frequency

States: 1

Cycles: 0

Resp DOF: 4183

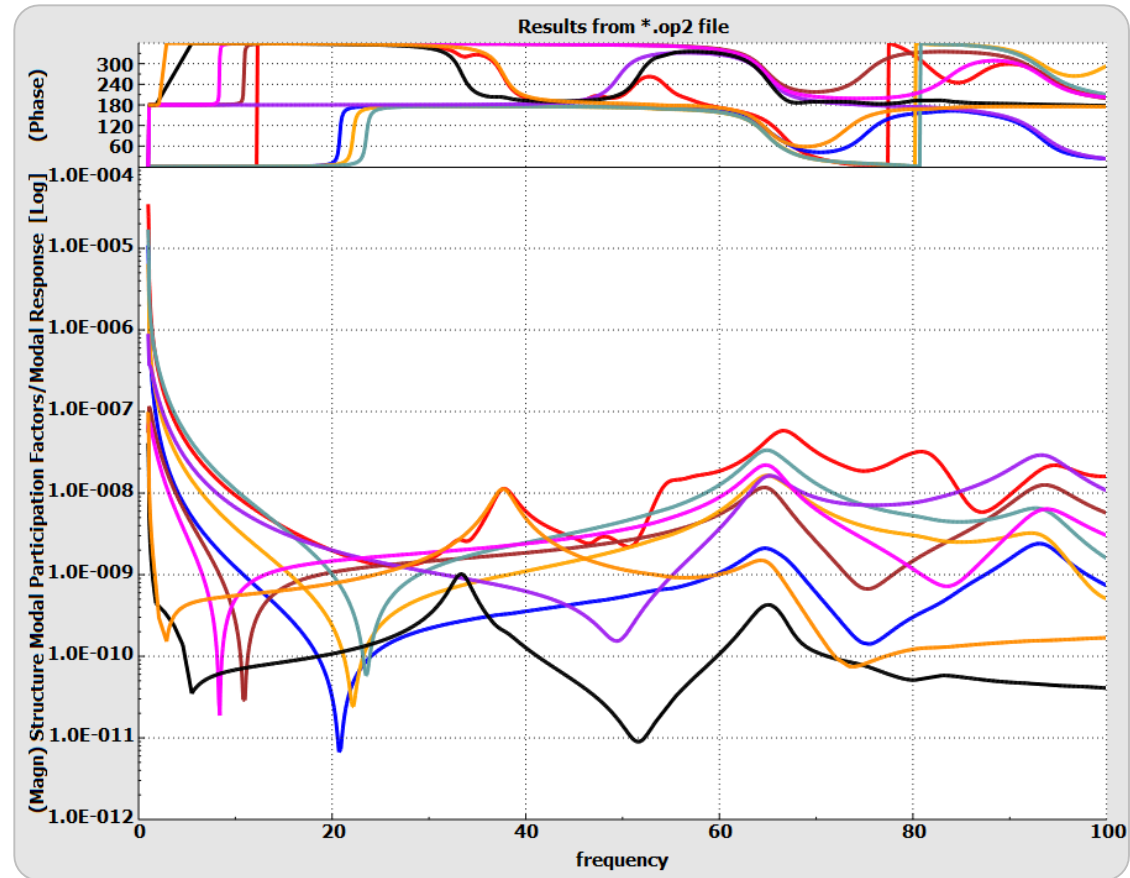
Total
Mode 1
Mode 2
Mode 3
Mode 4
Mode 5
Mode 6
Mode 7
Mode 8

Filter: all inv vis

Modal Response (response)
Projection Magnitude (magnitude)
Projection Fraction (fraction)

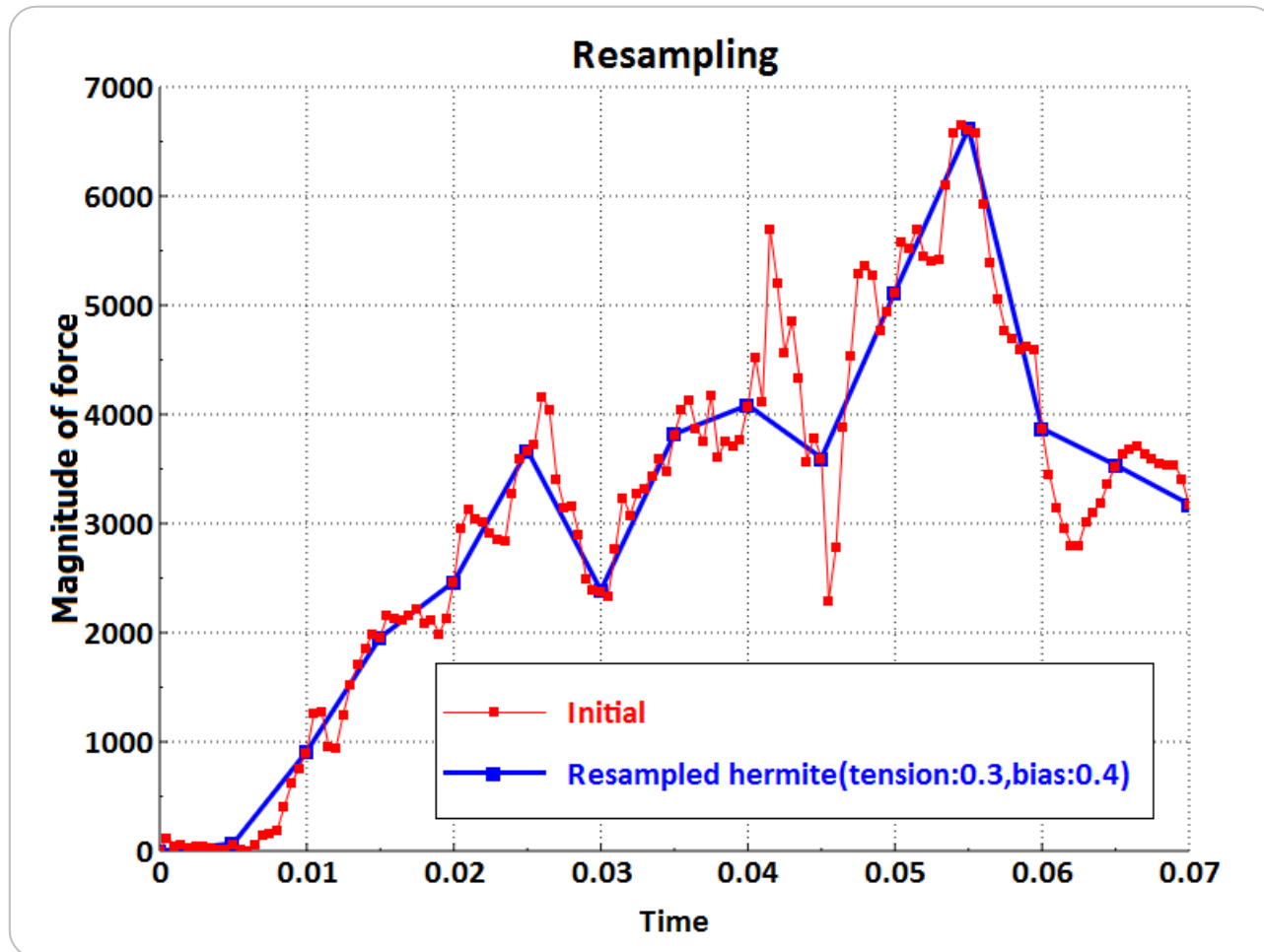
Filter: all inv

Window1



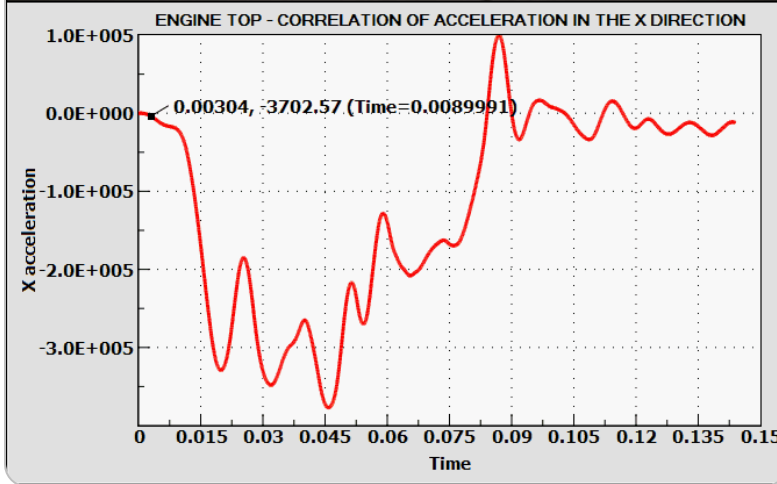
- Plot curves directly from Nastran *.op2 files (FEMZIP support)

2D plot enhancements



- Resample with linear/cosine/cubic/hermite interpolation

Image & Video Handling



Video Synchronization

- Synchronize...
 - Video with curve data
 - Video with Video



Correlate test data from lab
(even without the existence
of a 3d model)

Feature Tracking

- Improved tracking capabilities
(hidden features, higher accuracy)
- Reduce light sensitivity
(normalize frames)

Image & Video Handling



Distortion Correction Parameters

Use Distortion Correction Parameters

Focal Length: 7.16

Sensor Width/Height: 640 480

Pixel Distance x/y: 0.012 0.012

Distortion Unit: mm

Principal Point x/y: 26.5 5.27

A1/A2/A3: -3.4e-7 8.5e-13 0

R0: 255.889

B1/B2: 1.0241e-6 -4.554e-6

C1/C2: -0.00178123 -0.000215658

Load Save

- ISO 13499: Video & Image lens distortion correction

Reporting tools - Save Images tool

Export Location

Output Directory:

File Type

Output File Type:

Quality:

File Naming

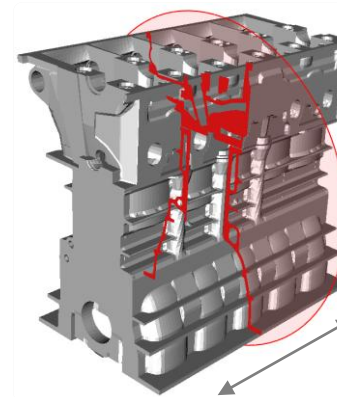
Template:

Custom Name:

Start Number: Sequence Digits:

Example: Stress components,Von Mises,Corner_1.jpeg

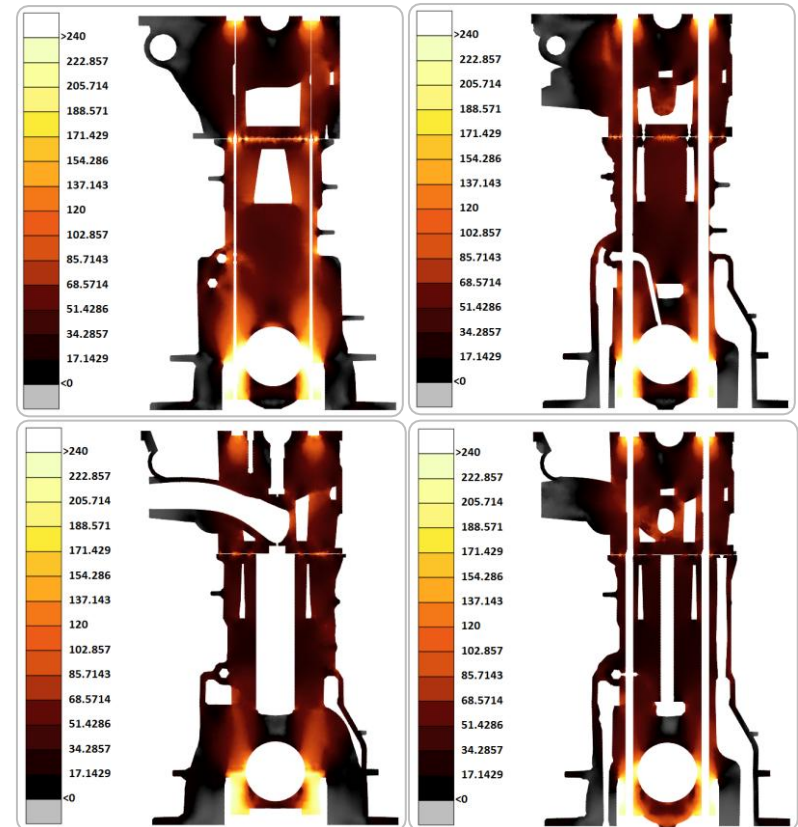
On duplicates:



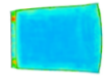
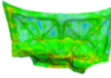

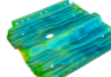
Courtesy of
Volkswagen &
Forschungsvereinigung
Automobiltechnik

- Fast capturing of images

Massive production of images
in short time



Reporting tools

Energy %			
PID: 2 NAME: ROOF	Max Node: 2546 Max Element: 5145	10%	
PID: 15 NAME: BONNET	Max Node: 3542 Max Element: 5417	40%	
PID: 23 NAME: R. DOOR	Max Node: 6885 Max Element: 7532	20%	
PID: 45 NAME: FLOOR	Max Node: 1254 Max Element: 2566	30%	

Spreadsheet Editor

MS Shell Dlg 2 | 12 | A A

File | Font | Alignment | Style

fx 77.7783

	A	B	E	F	G	H	I
1	Id	Max	Thickness				
2	198	1.21E+002	0.7				
3	207	8.23E+001	0.7				
4	199	7.78E+001	1.9				
5	197	7.28E+001	0.7				
6	206	5.24E+001	1.4				
7	205	4.96E+001	0.7				
8	202	2.70E+001	1.5				
9	209	1.88E+001	1.5				
10	208	1.52E+001	0.8				
11	204	9.19E+000	1.5				
12							

meta_post

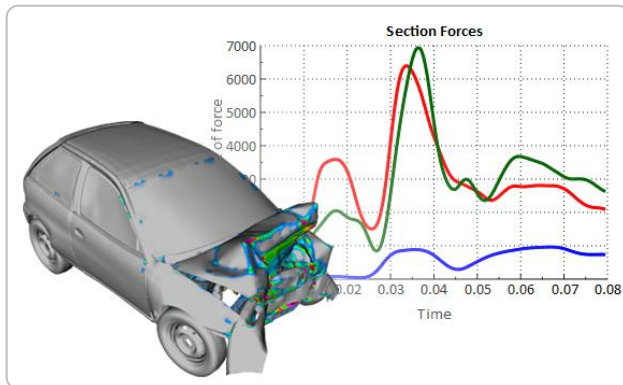
Category: | Format:

General	1.23E+003
Number	1.23E+03
Scientific	1.23E+003
Fraction	
Percentage	
Text	
Custom	

Id	Max	Thickness	Name	MID
4	1.21E+002	0.7	Door	100
5	7.78E+001	1.9	Floor	109
6	3.42E+002	0.5	Left Rail	105
7	4.03E+002	0.5	Right Rail	105

- Add links to images
- PDF export with navigation links, searchable text, external links
- Format values of cells
- Easily create/edit simple tables in report

Automation tools enhancements

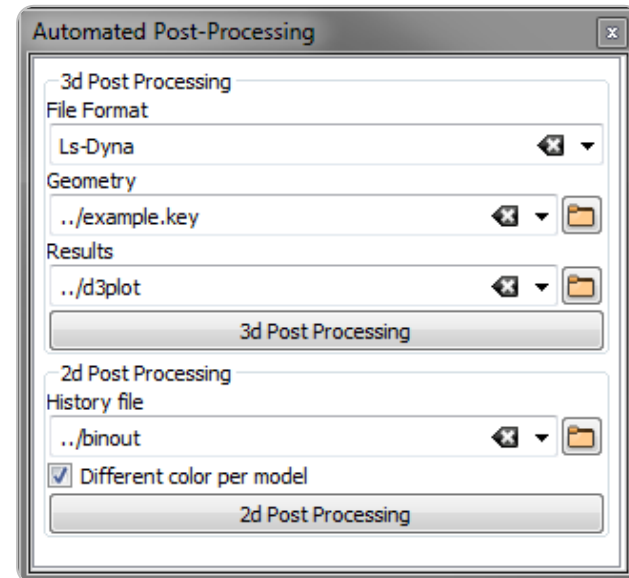


```

1 $ Session File written by META_post version:14.2.0
2 read session metro.ses
3 grstyle scalarfringe enable
4 srangle window "MetaPost" set 0,0.05
5 view scale in 0.536401,0.591284
6 view scale in 0.536401,0.591284
7 read session 2d_secforc.ses
8 window shownormal "Window1"
9 window size 400,300
10 xyplot axisoptions yaxis active "Window1" 0 0
    
```

```

1 // BETA script
2 #include "meta_structs"
3
4 def main()
5 {
6     filename = MetaGetVariable("toolb
7
8     window w;
9     w = ActiveWindow();
10    if(IsValidWindow(w)) {
11        window_name = w.name;
12    }
13
14    MetaCommand("read session " + fil
15    MetaCommand("grstyle scalarfringe
16
17    MetaCommand("srangle window " + wi
18 }
    
```



- New Inherent Variables
- New Script Functions
- New Toolbar items

Automation tools : Scripting

```
# PYTHON script
import meta

from meta import models
from meta import elements
from meta import nodes
from meta import parts
from meta import windows
from meta import groups
from meta import results
from meta import utils

class my_p:
    def __init__(self, id2, name2):
        self.id3 = id2
        self.name3 = name2

def main():
    # type your code here
    model_id = 0
    l_parts = parts.VisibleParts(model_id)
    l_myp = []
    for p in l_parts:
        print(p.id, p.name)
        mypx = my_p(p.id, p.name)
        l_myp.append(mypx)
    print(20*"---")
    for mypx in l_myp:
        print(mypx.id3, mypx.name3)
main()
```

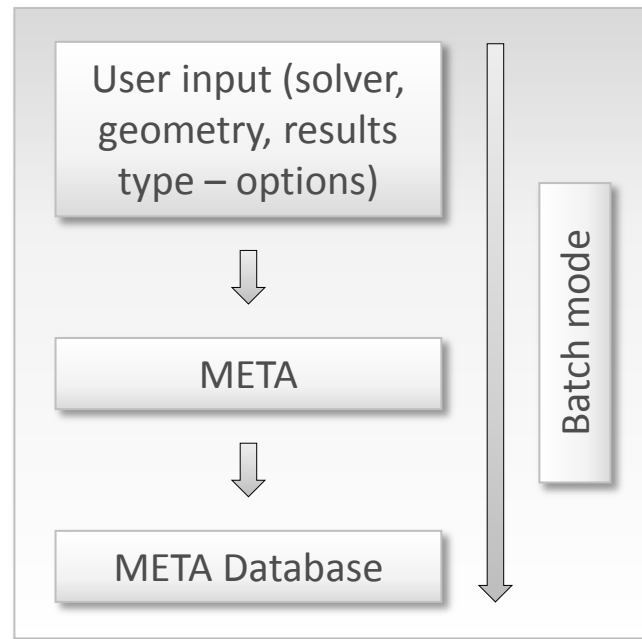


- Python programming in μ ETA

Broaden the
automation capabilities



METADB Translator



- Specific parts of results saved in METADB
- Runs silently
- Can be integrated in automated solving process

Decks

Nastran

- Shock Response Spectrum (SRS) Results
- DMIG

Abaqus

- Output geometry in *.inp file

LS-DYNA

- Composite results

Radioss

- FEMZIP support

Ansys

- V14.5 results support

Permas / Medina

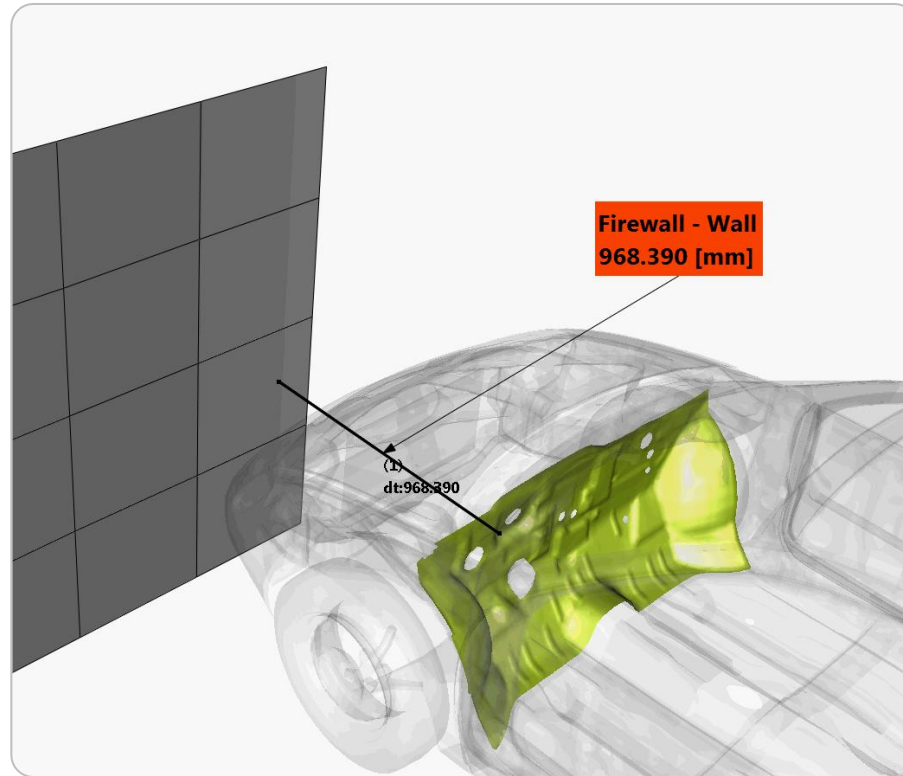
- Linear combination of Permas/Medina files
- 2d plot support **v14.2.0**

Other...

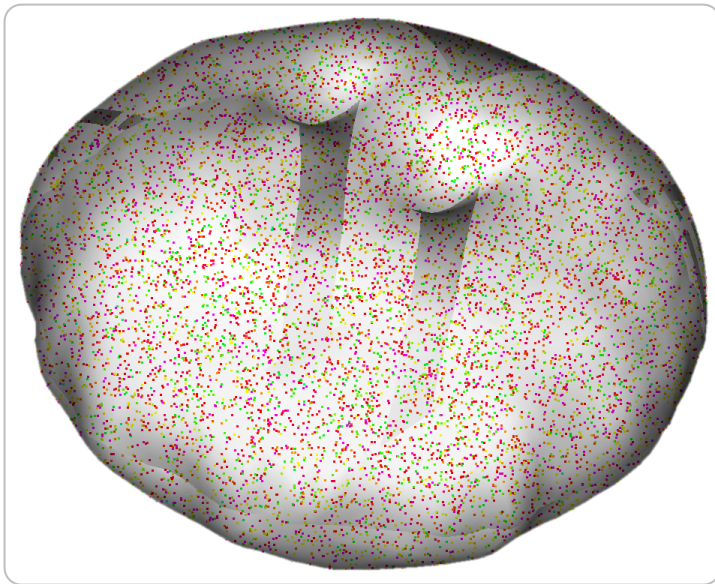
- Hyperworks *.h3d files
- MotionSolve FlexBody results **v14.2.0**
- Import/Export *.jt files
- Import/Export model's hierarchy (Pids , Parts, Includes, Sets) in JT & 3DXML files

Areas of Development

Crash & Safety



Crash & Safety

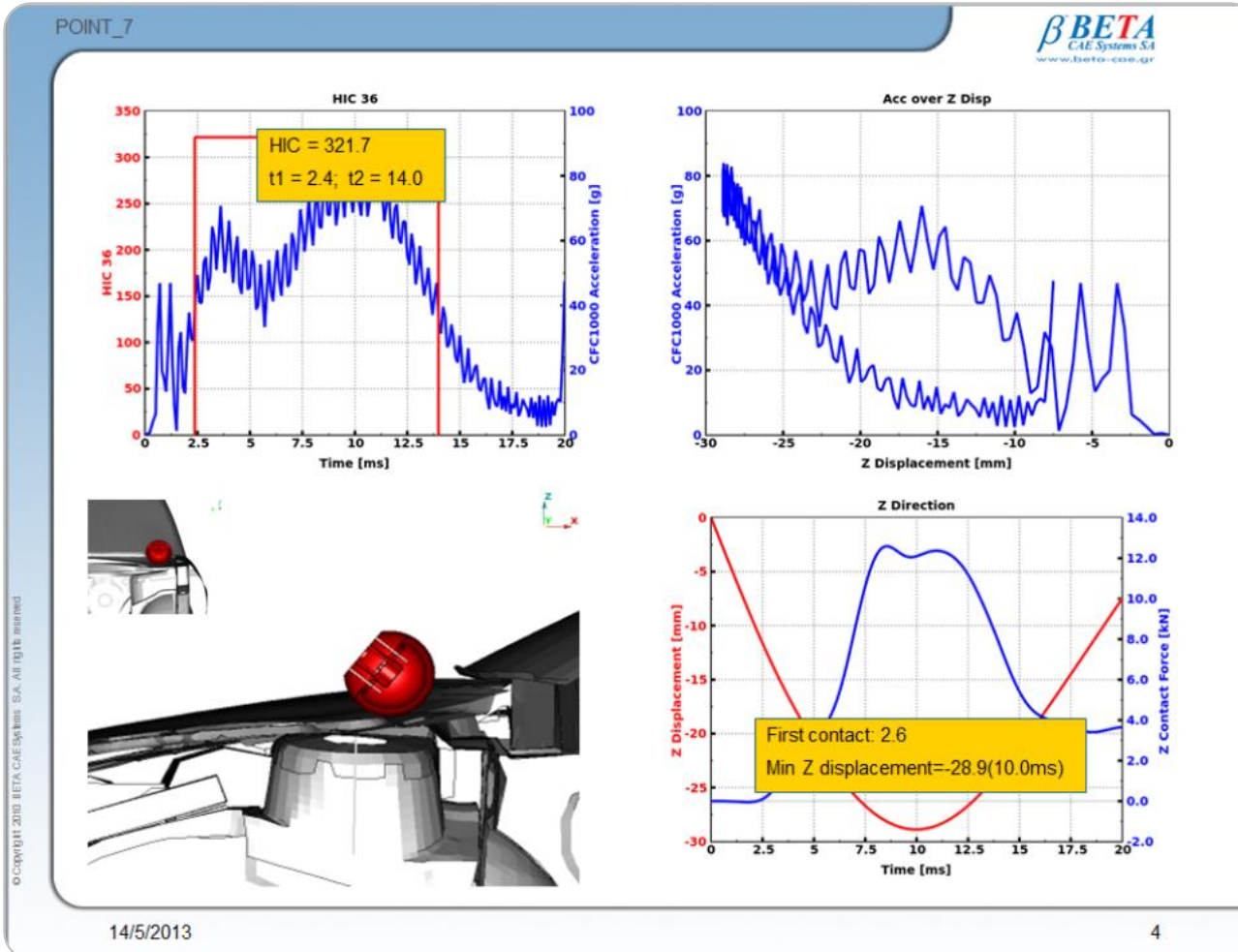


Airbag Particles

- Gas
- Chamber
- Leakage flag
- Mass, Radius
- Spinning Energy
- Transactional Energy
- Distance from Nearest Segment

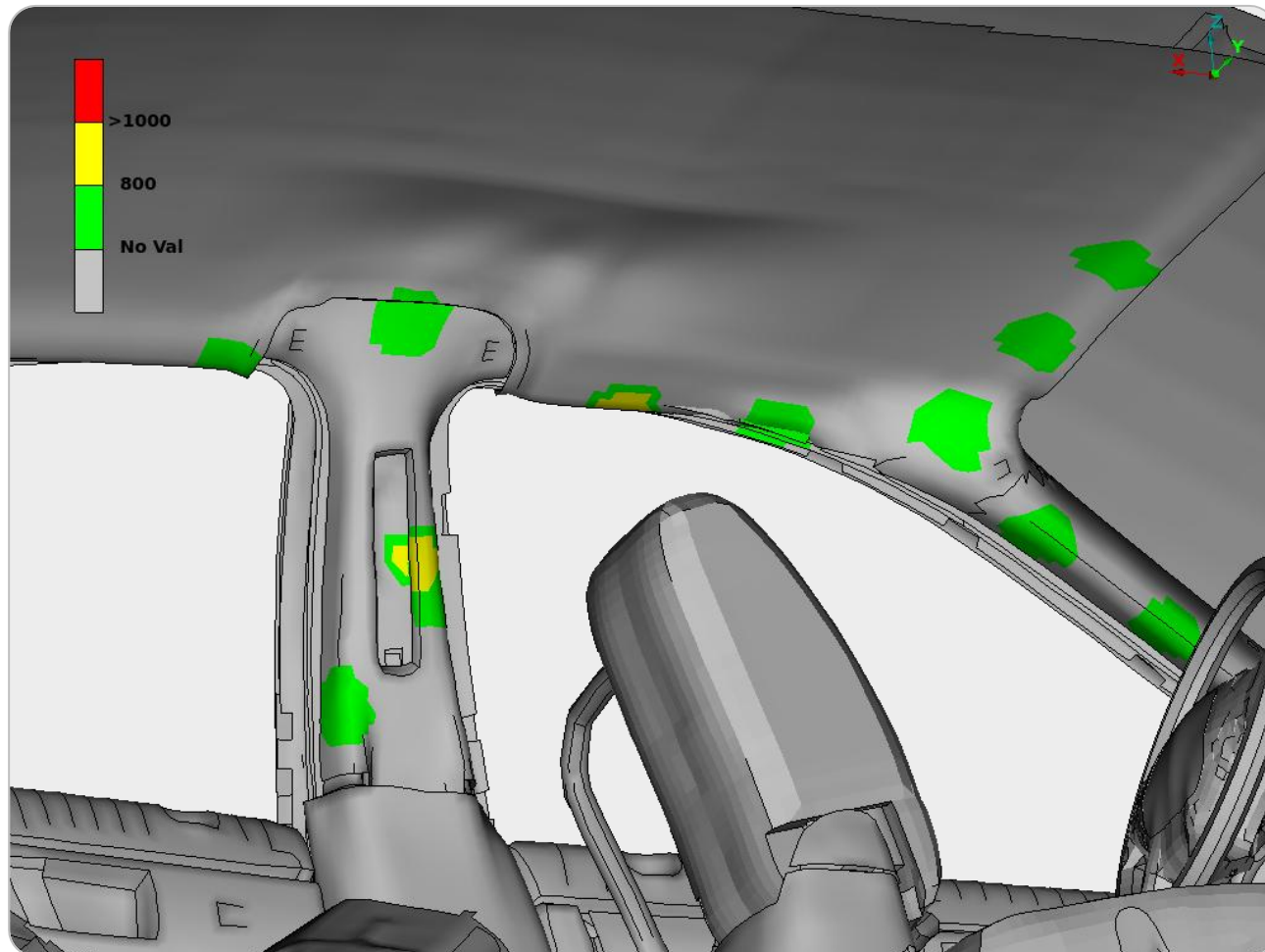
Airbag	Gas/Chamber	Leakage Flag
Airbag 1000001		All
Gas 1		All
Chamber 1		All
Chamber 2		All
Chamber 3		All
Gas 2		All
Chamber 1		All
Chamber 2		All
Chamber 3		All

Crash & Safety – Toolbars enhancements - Pedestrian



- One slide with plots and images/videos for each simulation

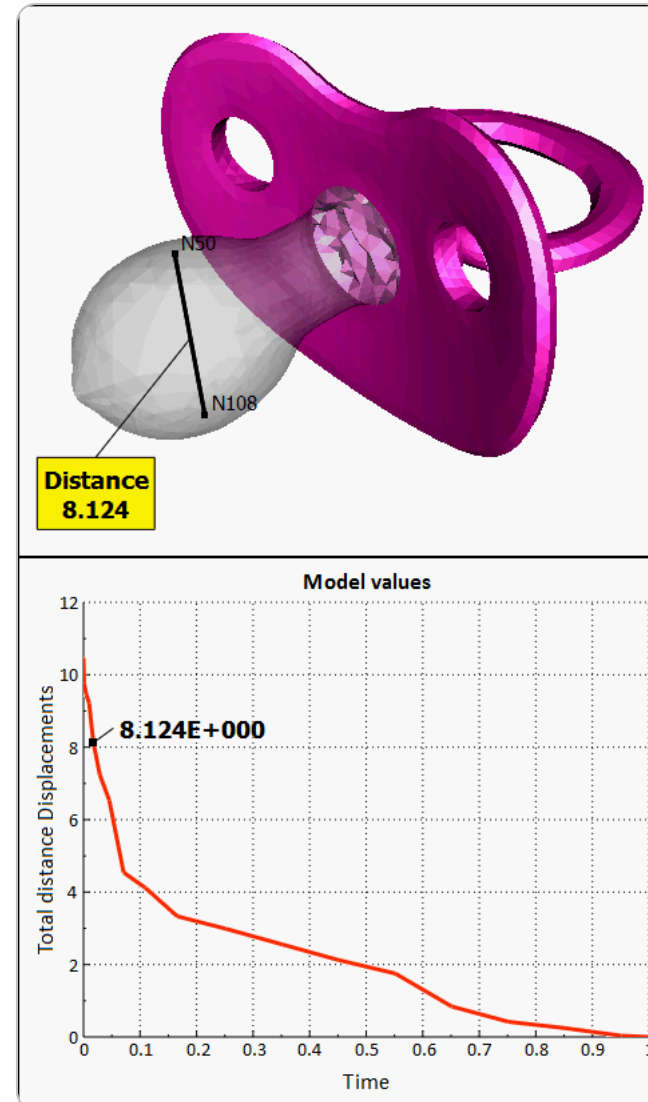
Crash & Safety – Toolbars enhancements - FMVSS



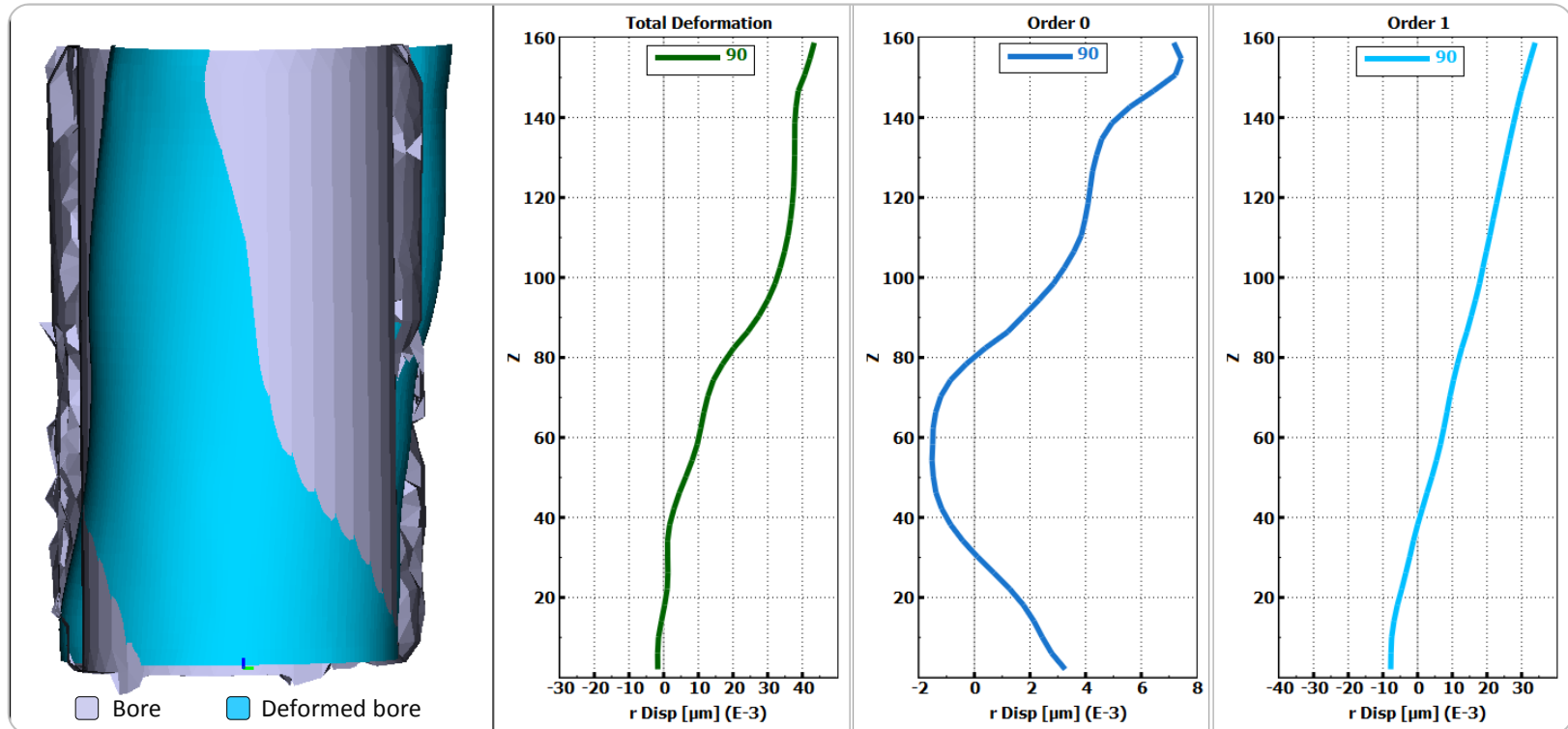
- New option to map results from all simulations on model

Areas of Development

Durability & Composites

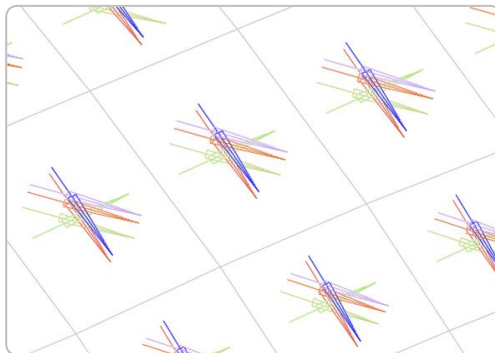
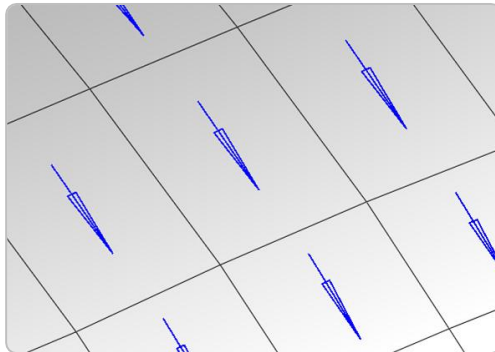


Durability – Bore distortion toolbar

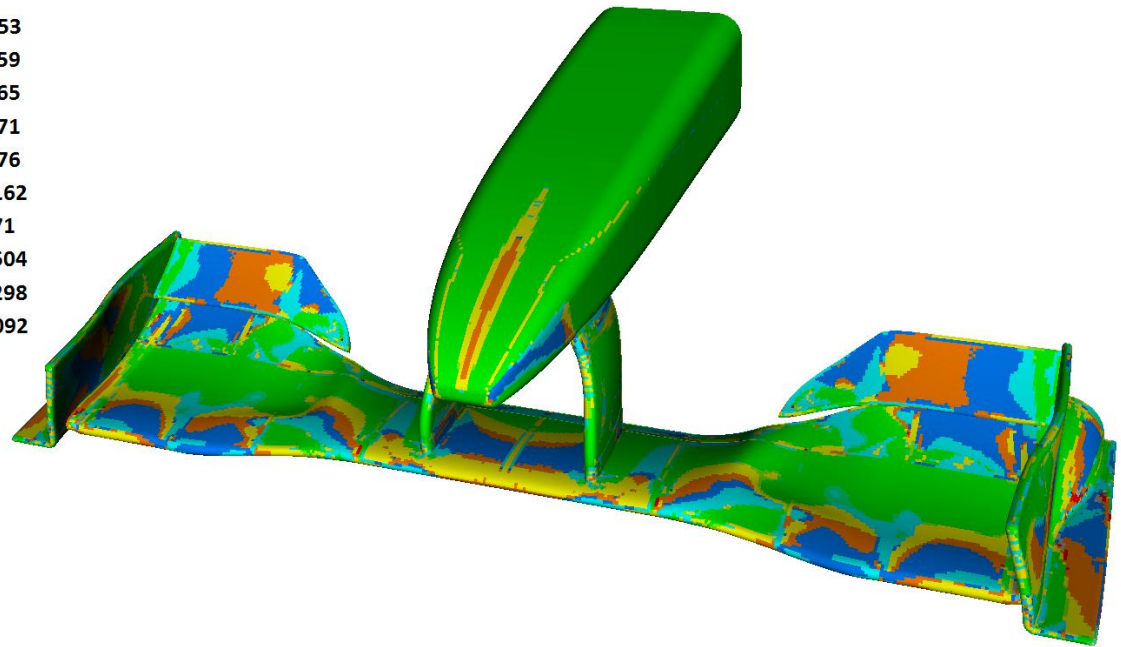
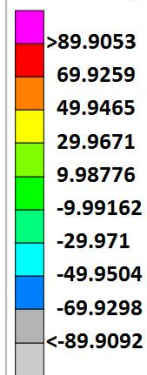


- Plots of deformations along bore z coord for specific angles
- Create best fit circles from plotted positions

Composites



Fracture Angle



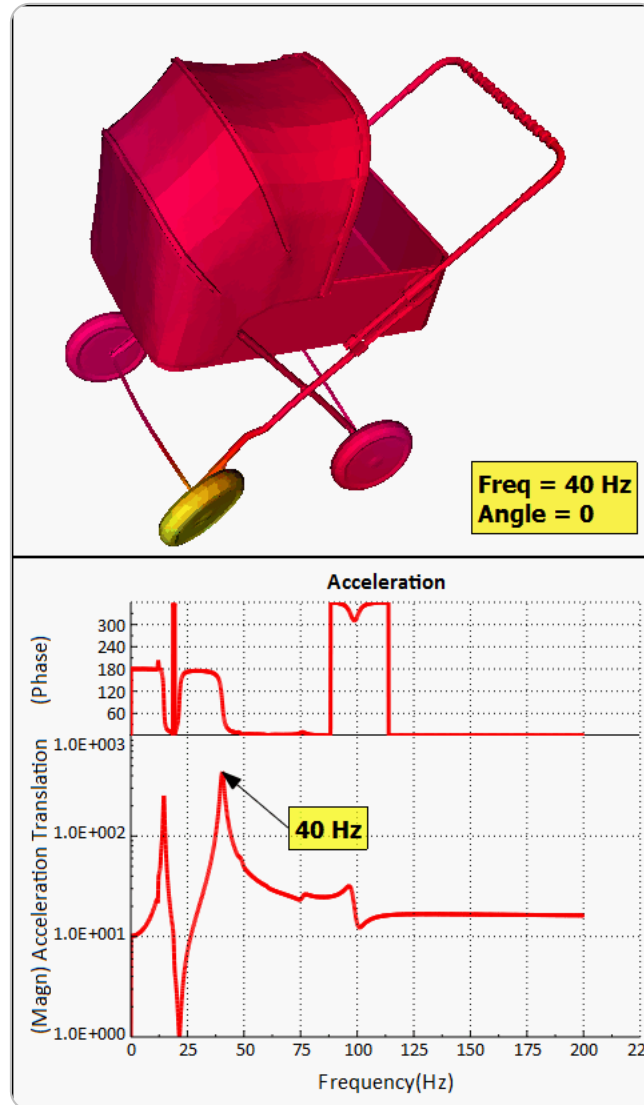
- Visualization of material & fiber orientation (similar to ANSA)
- Read All Layers option:
Improved loading performance
- Support of LS-DYNA composite results

New criteria:

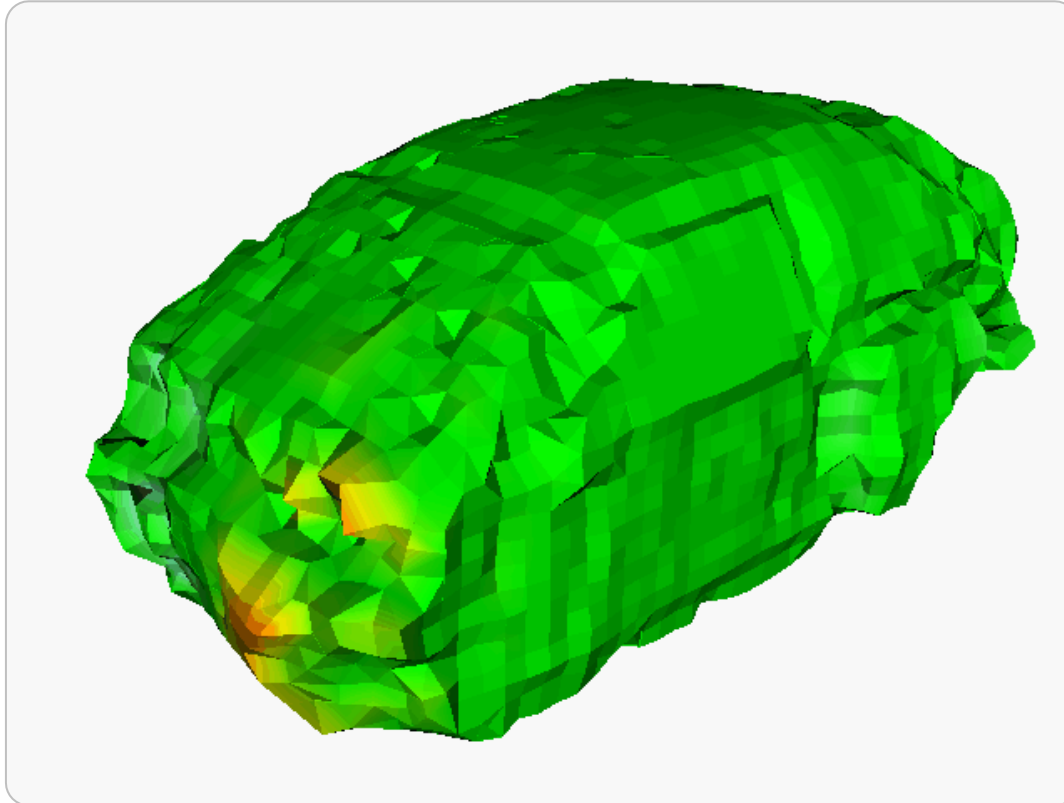
- VDI 2014 PART 3:
Fibre-reinforced plastics analysis in μ ETA
- Hashin Fiber & Matrix failure
- Puck Matrix failure

Areas of Development

NVH

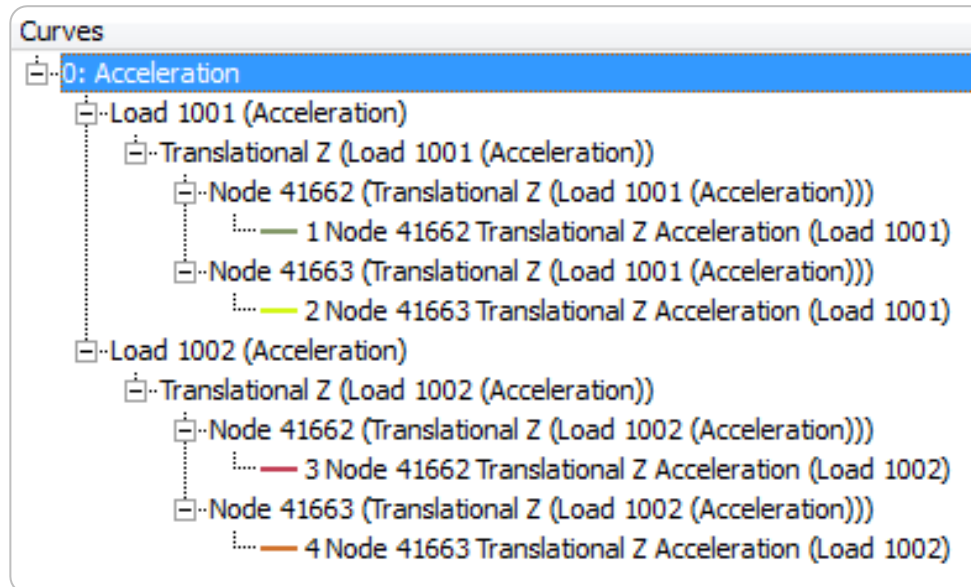


NVH: Enhancements



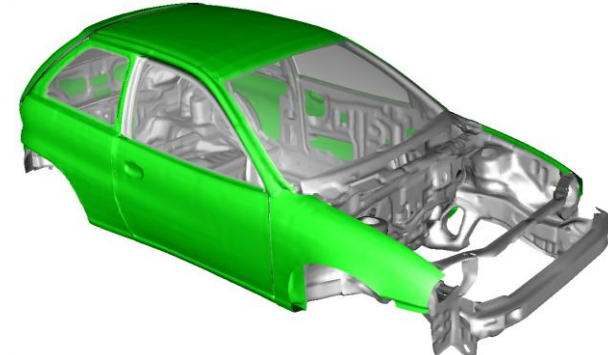
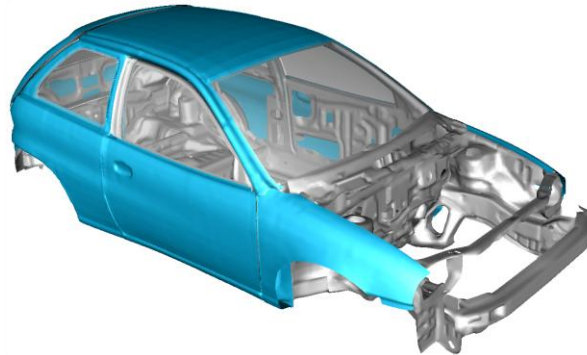
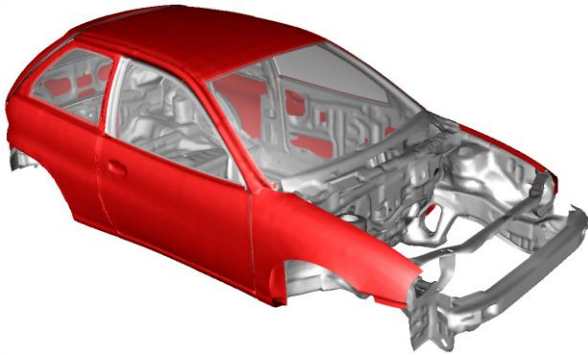
- Animation of fluid in Normal direction (Nastran)
- ANSYS results support in NVH tools

NVH: Enhancements in NVH tools



- Modal Response & FRF assembly output curves grouped by loadcase & by response DOFs (Modal Response, FRF Assembly)
- Calculate responses with respect to local coordinate system of nodes (Modal Response)

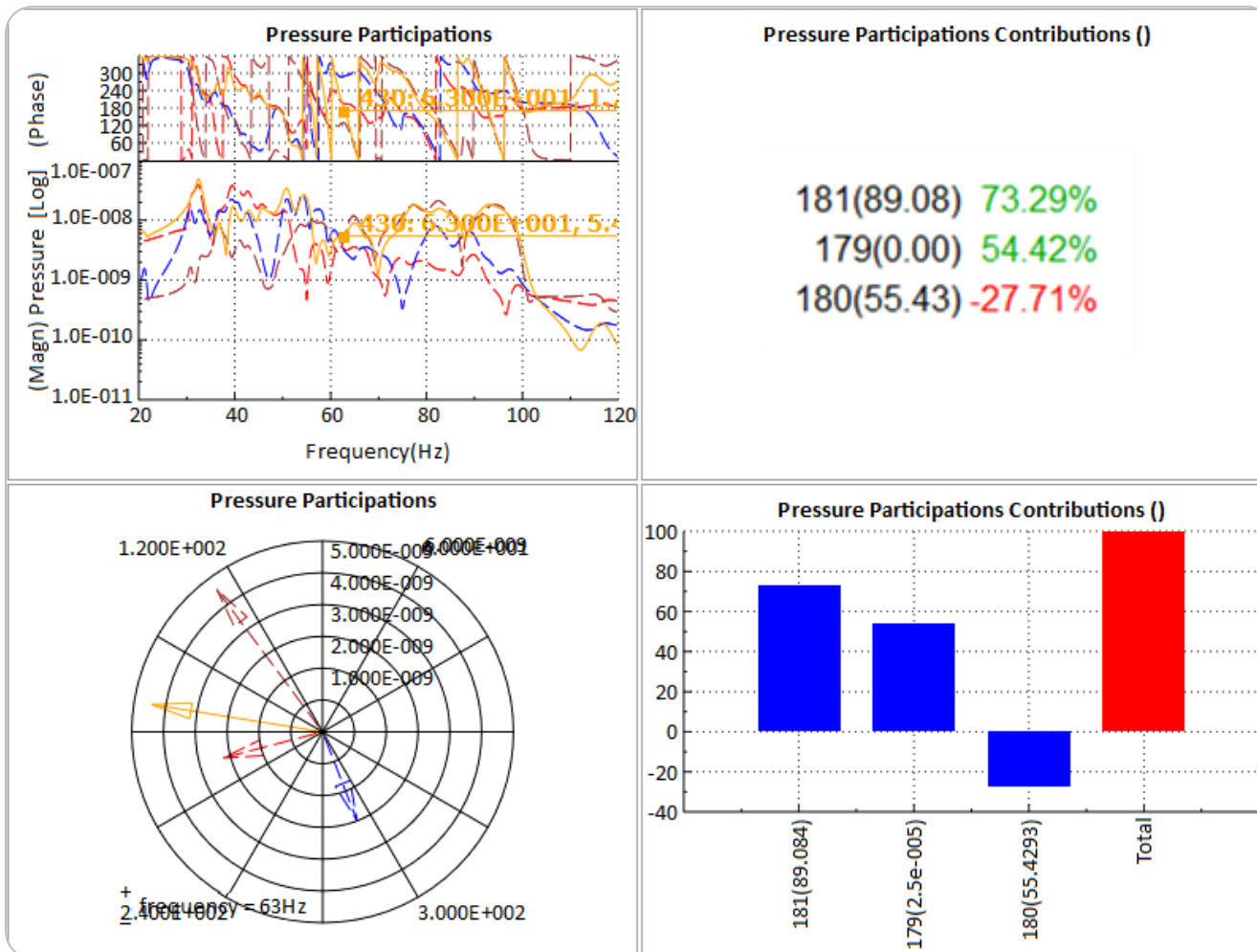
NVH: Enhancements in NVH tools



Flexibility in model setup

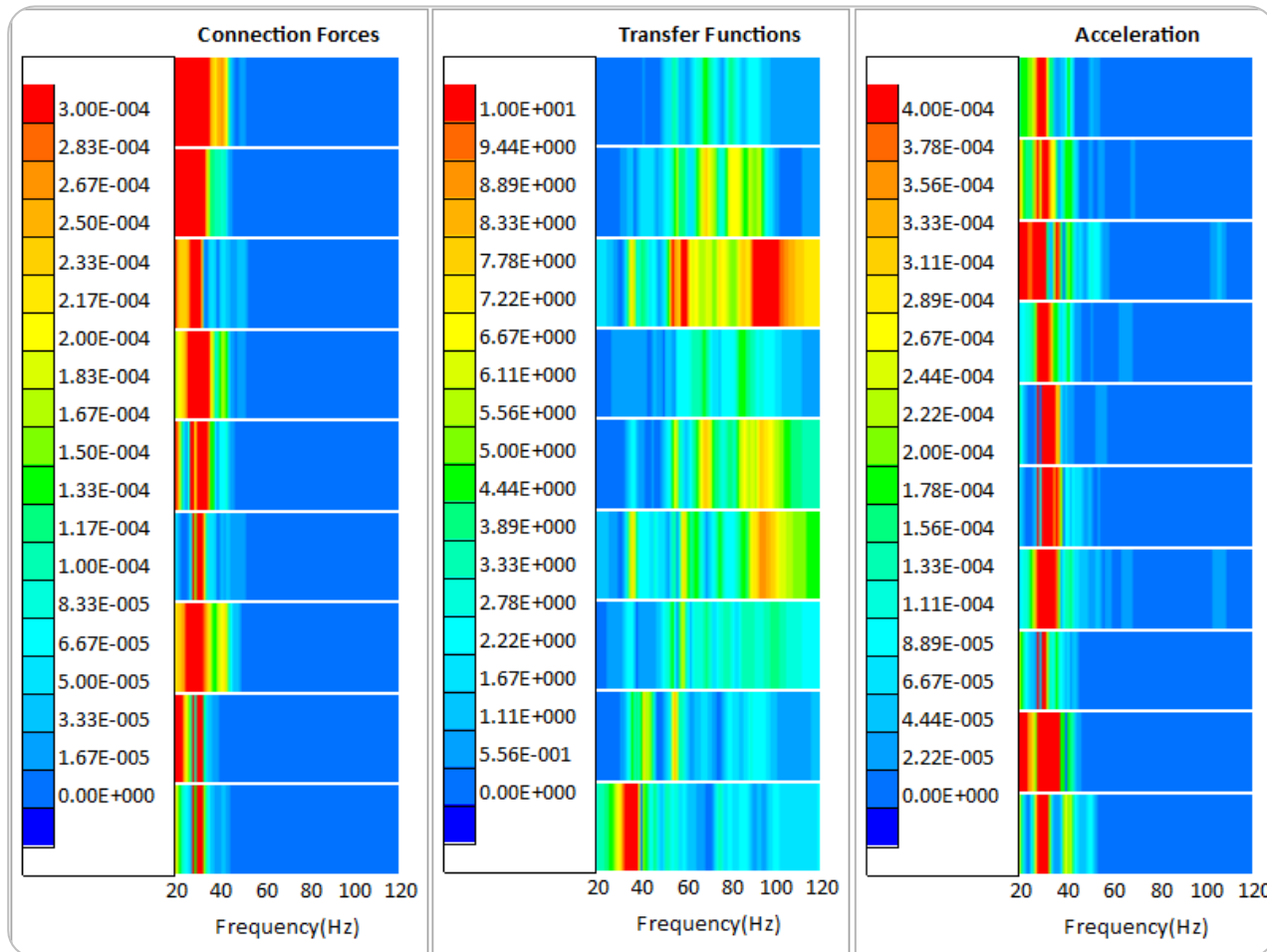
- Numerous structure models, but only one fluid model
- Load fluid modal results from separate *.op2 files (Modal Response)

NVH: Enhancements in NVH tools



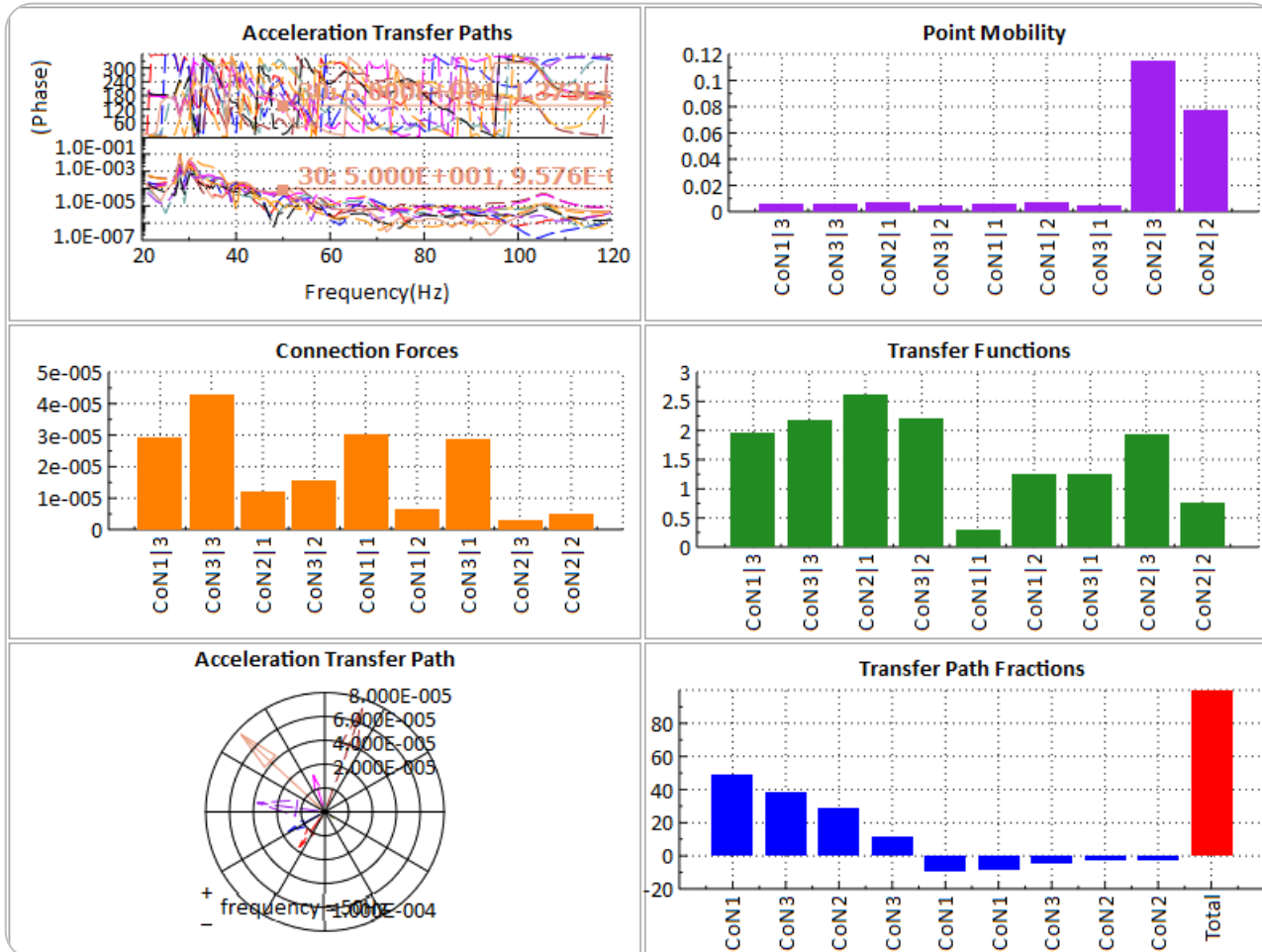
- Contribution analysis of Participations (Modal Response & FRF Assembly) **v14.2.0**
- New interface to navigate fast through frequencies, peaks

NVH: Enhancements in NVH tools



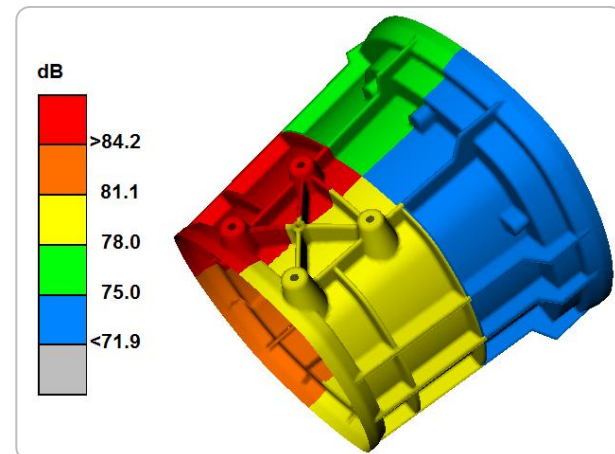
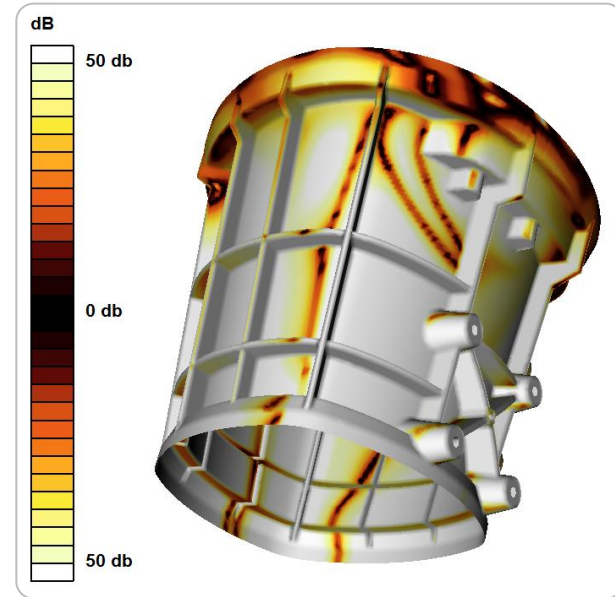
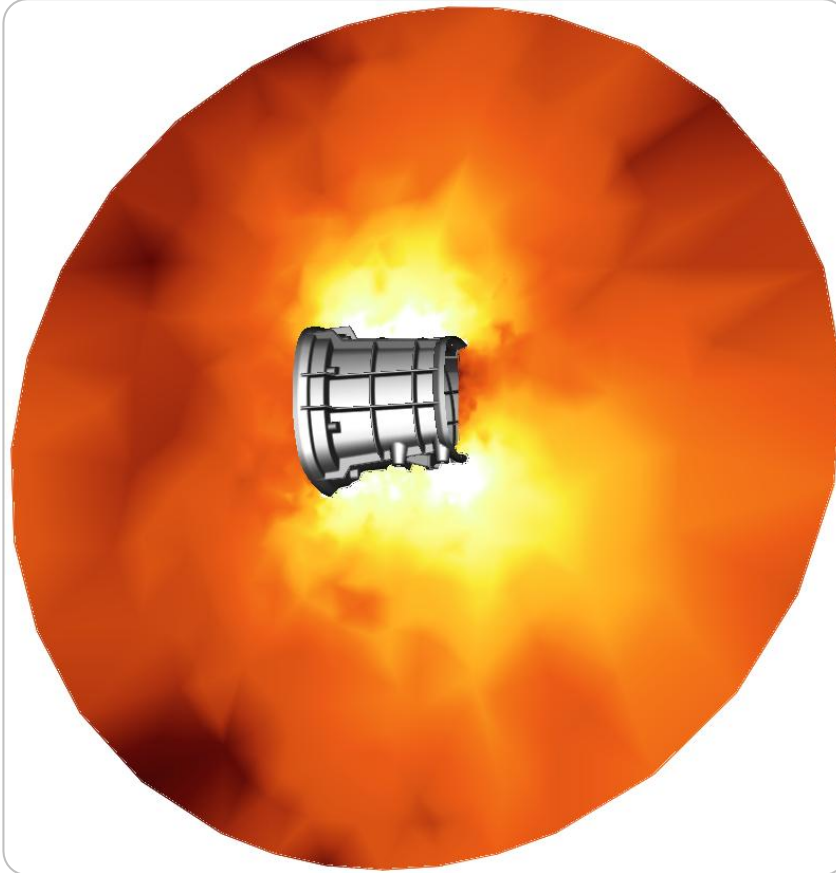
- Connection Forces & Transfer Functions in TPA DNA plots (FRF Assembly) **v14.2.0**

NVH: Enhancements in NVH tools



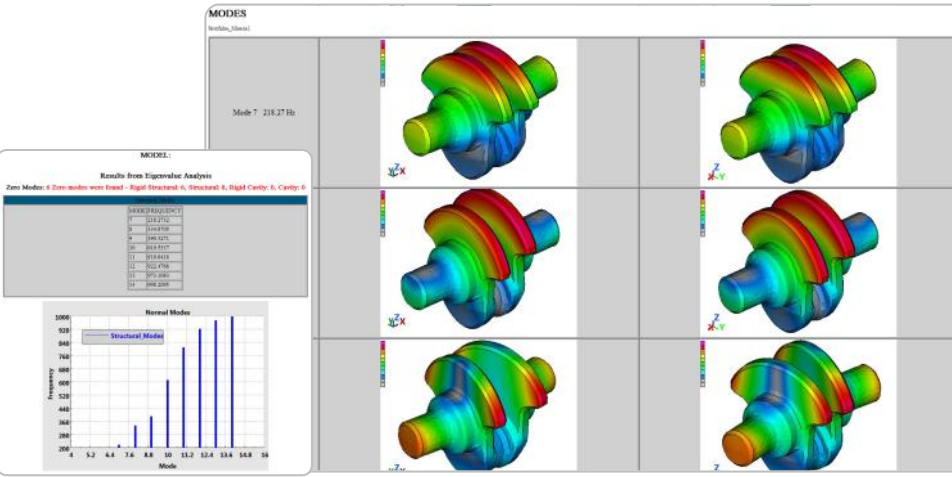
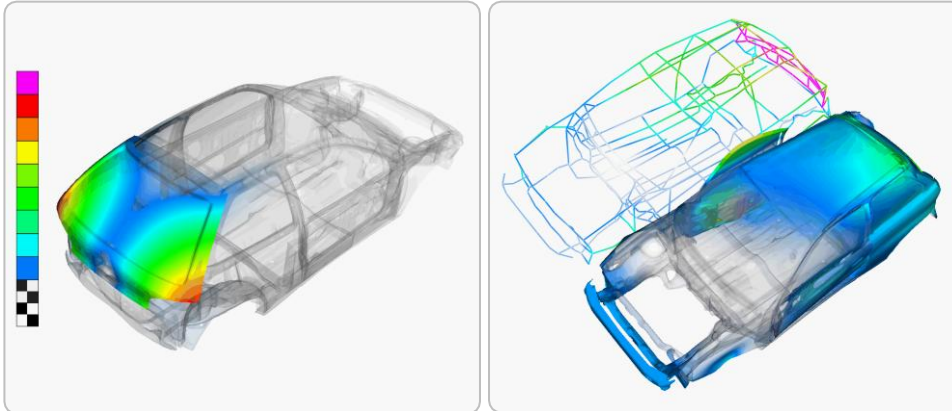
■ Contribution analysis in TPA (FRF Assembly) **v14.2.0**

NVH: Exterior Acoustics



- Exterior Acoustics (Nastran, Actran)
- New toolbar for calculation of Equivalent Radiated Power (ERP) in μ ETA

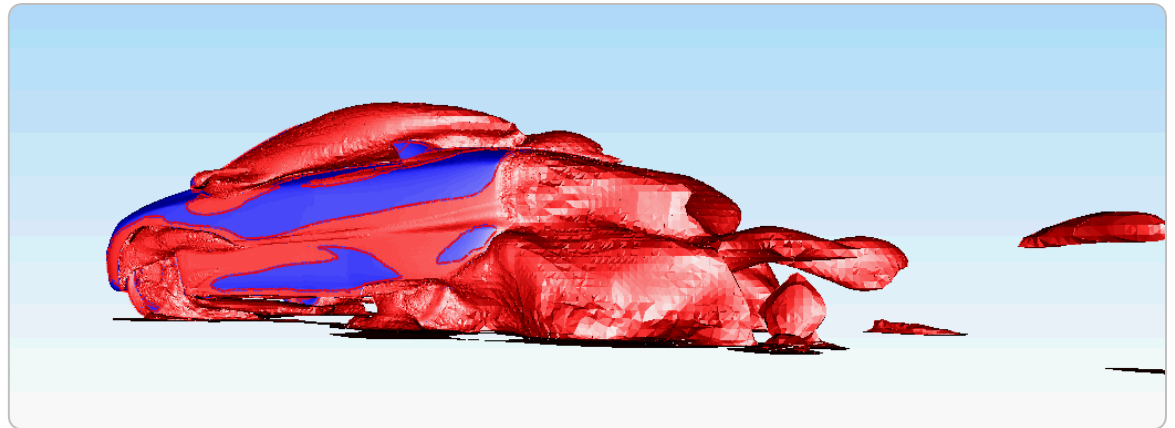
NVH Toolbars



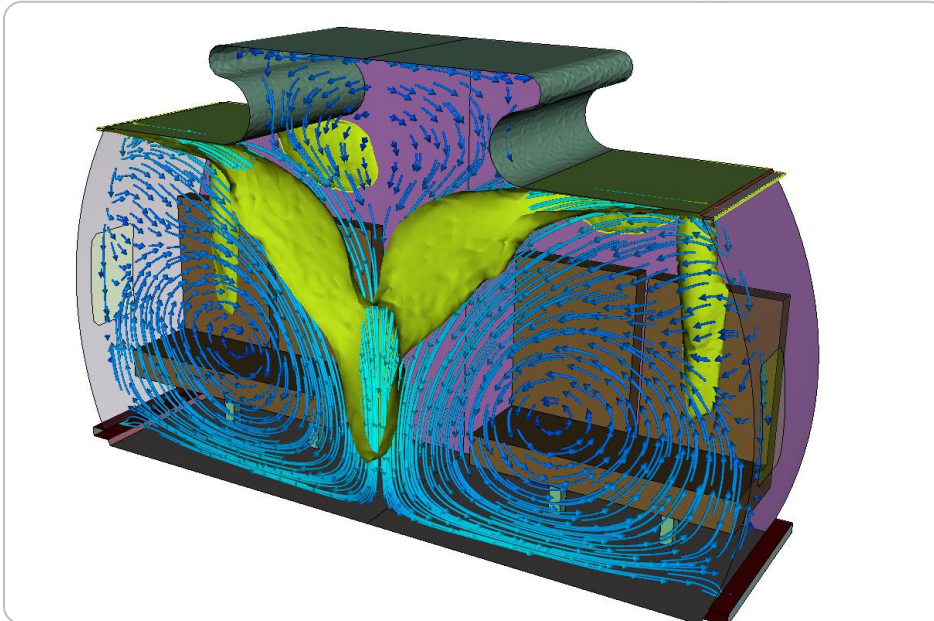
- PPTX report from NVH toolbars
- Strain Energy results supported (Eigenmodes report)
- Kinetic Energy results supported (Strain Energy Bar Chart)

Areas of Development

CFD



CFD - Decks



No need to translate to
intermediate file



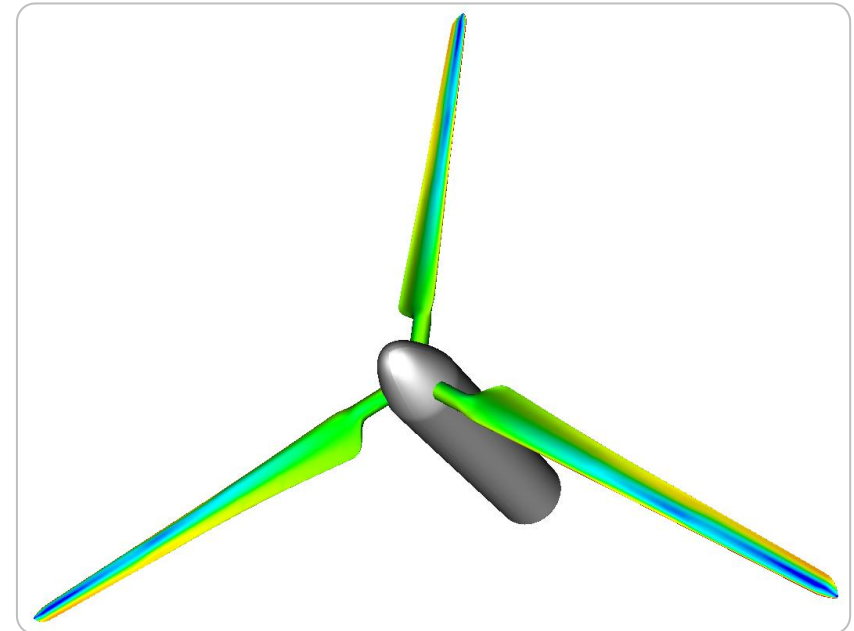
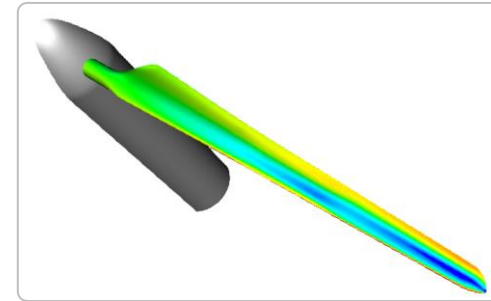
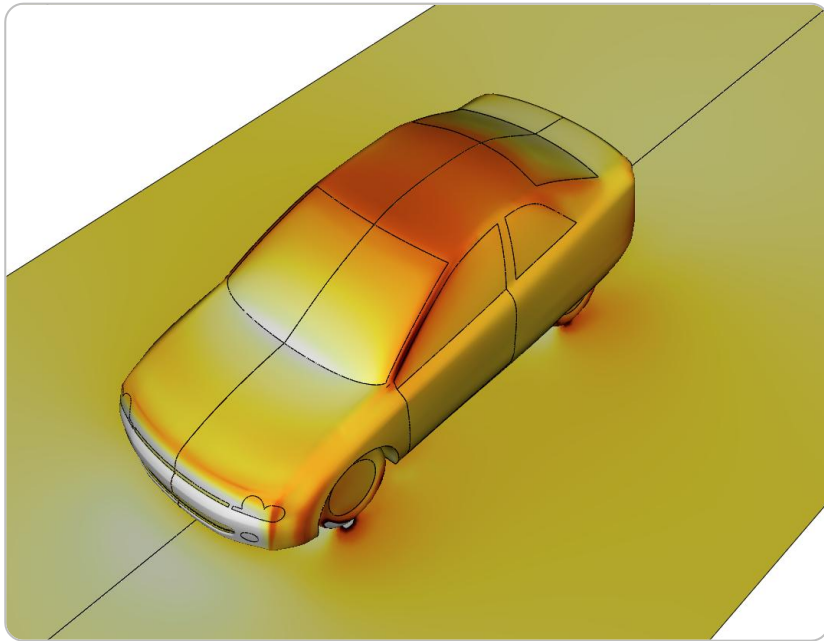
New Supported Decks / Results

- CFD++ support
- SC/Tetra support
- Star-CCM+ : Binary *.sim support
- Fluent *.cdat results files **v14.2.0**

Fluent

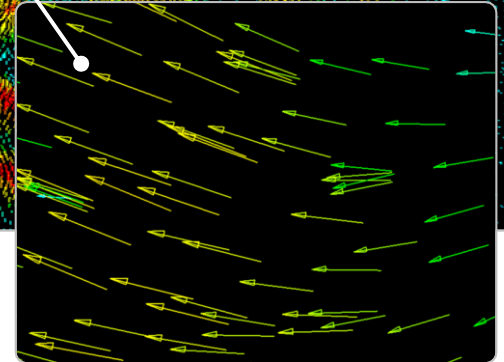
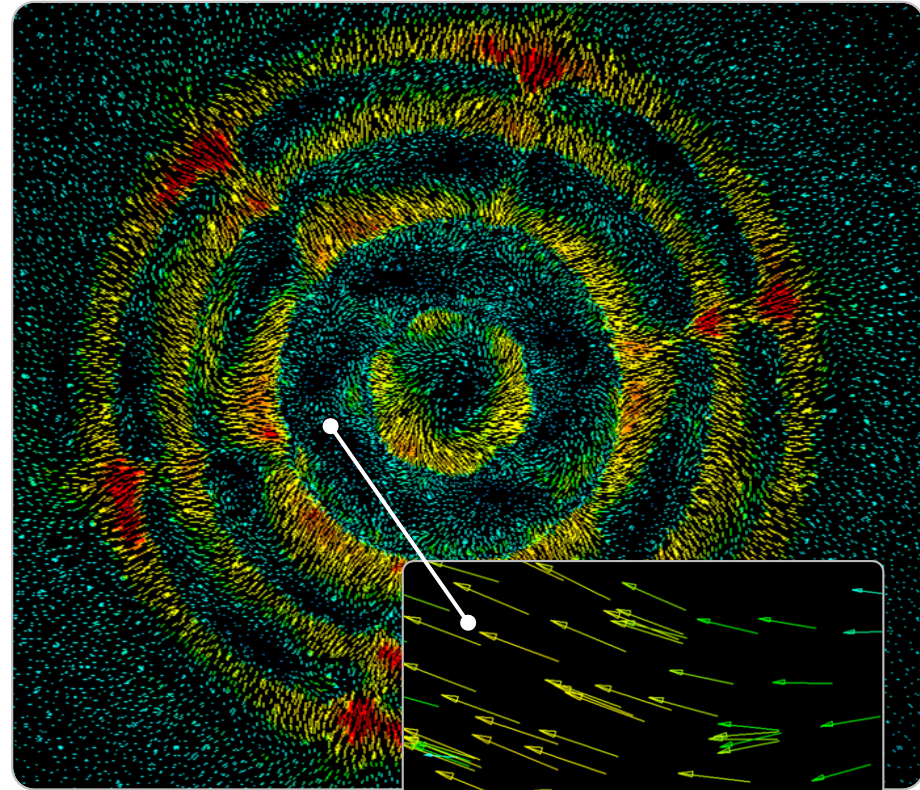
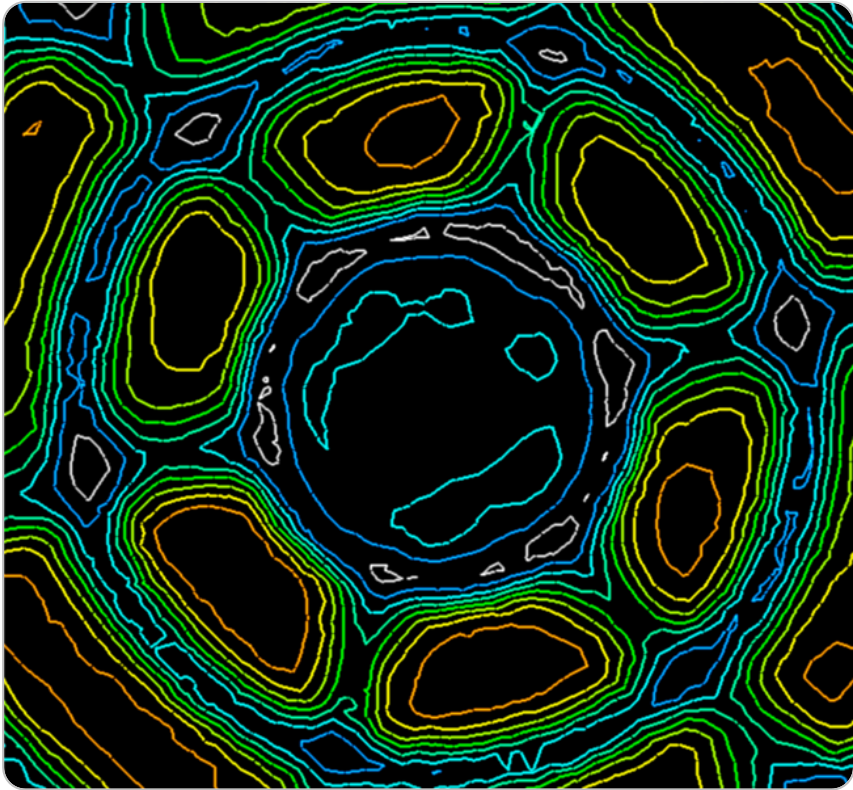
- Hanging nodes **v14.2.0**
- User Defined Memory (UDM) **v14.2.0**

CFD – Results Visualization



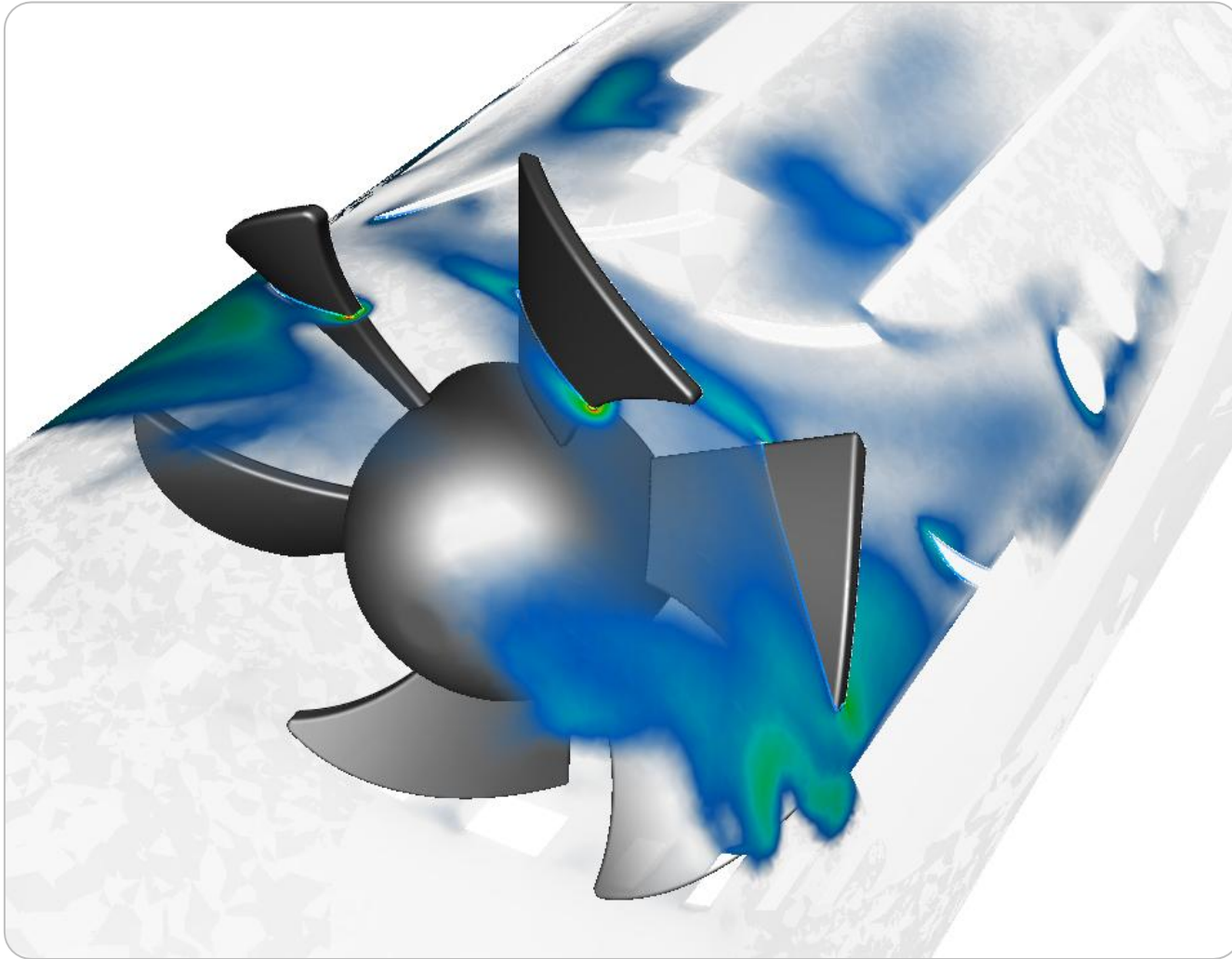
- Full domain representation for symmetrical or periodic simulations
- Periodic cyclic symmetry

CFD – Cut Planes



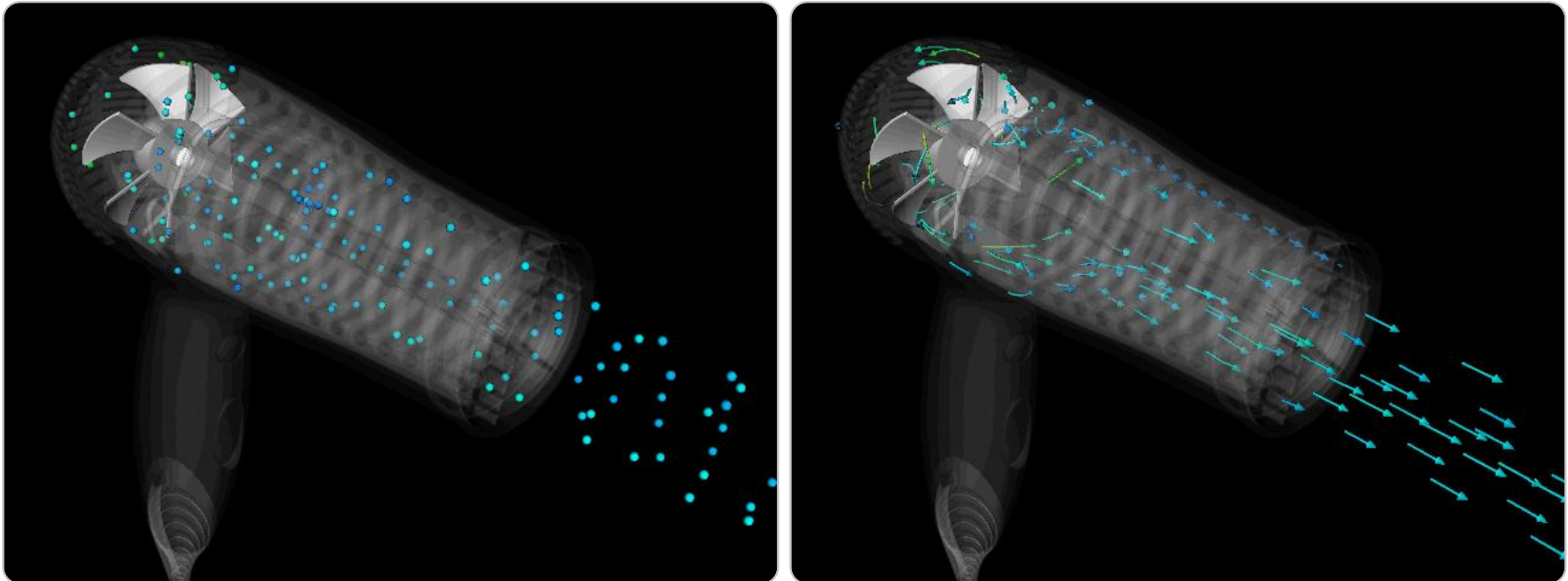
- Contour line plot
- Tangent vector plot

CFD - Isofunctions



- Cylindrical isofunctions (cut-planes) **v14.2.0**

CFD- Streamlines



- Animated Streamlines with:
 - Particle Visualization
 - Streamlines arrows visualization

Contact details

Thank you

Stay connected

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social media

