

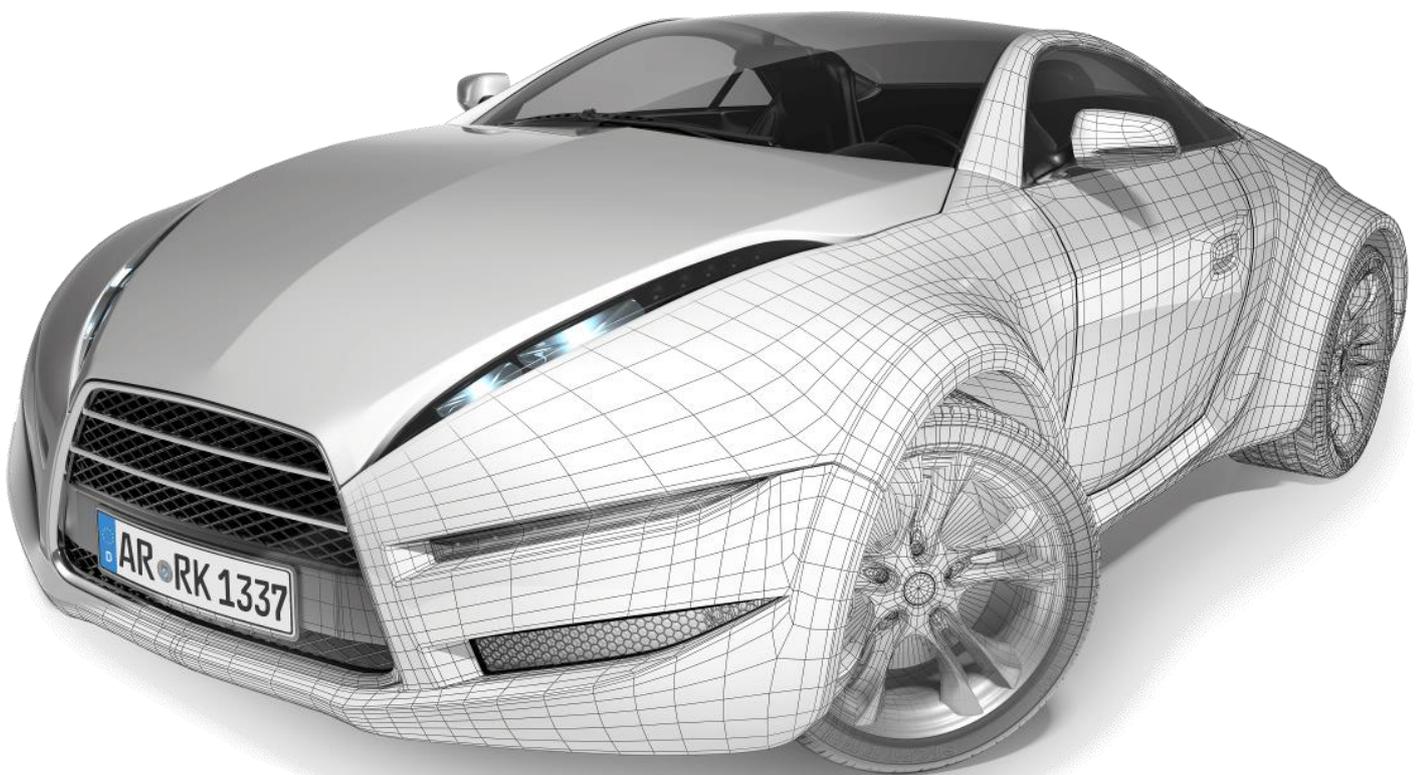


THESEUS FE

THESEUS-FE 6.0

major version 6.0 arrives with numerous improvements on board

- improved manikin FIALA2 for more flexibility in thermal comfort simulations
- new GUI mapper to transfer temperature results from one mesh to another
- many new features for the GUI
- completely revised manuals
- redesigned homepage: www.theseus-fe.com



Arrival of major release version 6.0

In September 2016 our latest major release 6 arrived with plenty of new features on board. Some major new additions are introduced in this newsletter.

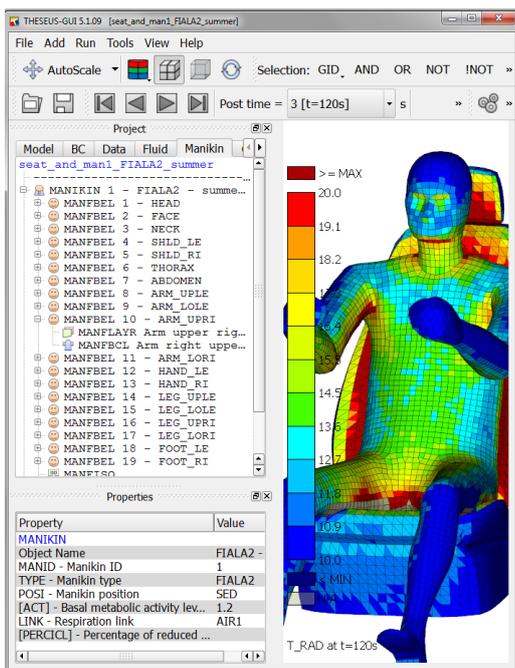
Improved thermal manikin FIALA2

Nine years after introducing our thermal manikin FIALA-FE we now come up with a generally improved manikin: **FIALA2**. Many of the ideas came from our customers (e.g. Renault, VW) that helped us to create a more flexible manikin that enables thermal comfort simulations in a more user-friendly way.

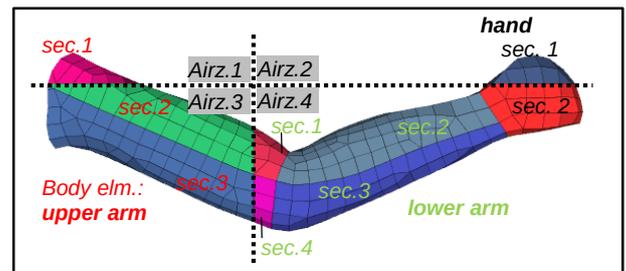
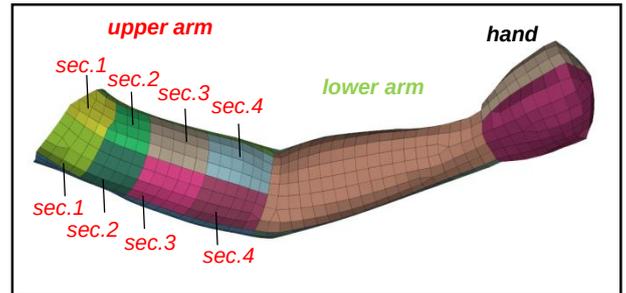
The big challenge for the developers was to fulfil the needs of our customers and to ensure the same result quality as known from our standard manikin FIALA-FE (that will be still available).

The new manikin **FIALA2**:

- makes set-point files obsolete
- uses 19 body elements (15 before)
- makes the definition of clothing easier
- uses automatic sector division from shell groups
- add new sectors simply via new shell groups
- sector division via MANFSEC keywords is obsolete
- faster convergence and larger time steps possible
- convective boundary condition BC-FC is now available for manikins as well



New manikin FIALA2 and new post-processing field results (T_RAD: equivalent radiation background temperature)

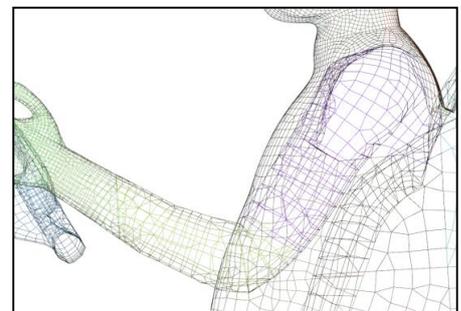


Examples of new FIALA2 (arm): arbitrary sector division from shell groups

As shown in the figures above:

- the user can now create new shell groups on manikin body elements and the solver will create additional sector degrees of freedom automatically.
- This new technology works because setpoint temperatures are created internally (by the solver) and the keyword MANFSEC is obsolete now.
- This new way of defining sectors on manikins helps in building multi-airzone models
- Local thermal comfort prediction is no longer restricted to a fixed sector division.

In cases where the contact region (e.g. the back) is not represented by a mesh it is possible to create an additional adiabatic sector internally:



Property	Value
MANFBEL	
Object Name	THORAX
MANID - Manikin id	1
BE_ID - Body element id	6
NAME - Body element name	THORAX
TYPE	CYLINDR
PHI_TOTAL	360.
L - Length of body element in [m]	0.306
H_X - CCX coefficient in [W/K]	0.
[PBECO] - Percentage [0-100%] of body element not represented by mesh	30

New dialog-driven result mapping tool

Since 2008 we had the mapping technology as one major feature of the THESEUS-FE Transformer. Now we fully integrated this technology in our graphical user interface (GUI). The great advantage comes now from the visible feedback of the algorithm:

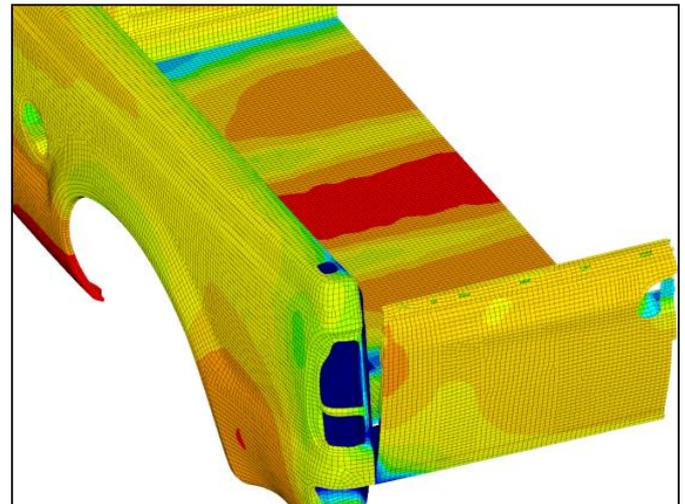
- Check the distance between source & target meshes
- Check field results on both: source & target meshes
- Automatic & manual positioning (e.g. best fit algo.)

Advantage for THESEUS-FE Oven users:

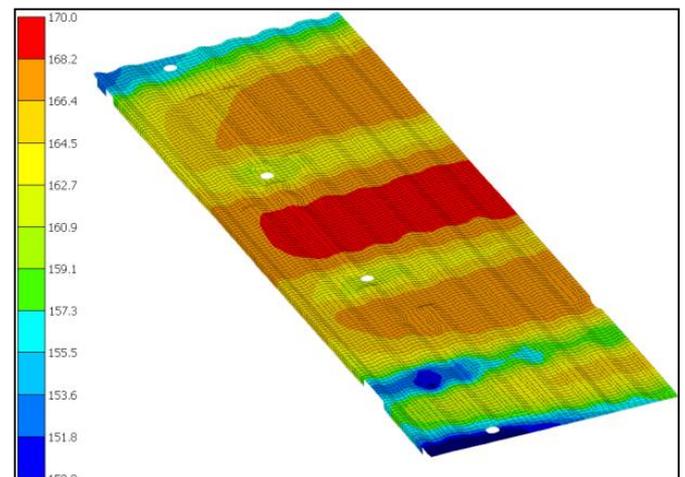
The new GUI mapper was specially developed for our Oven users. Future work with geometrically non-linear sub-models in structural mechanics simulation is now simplified without the need to recalculate temperature fields after each small model change. After mapping the temperatures onto the target (sub-model) mesh the results can be stored to file..

Future developments:

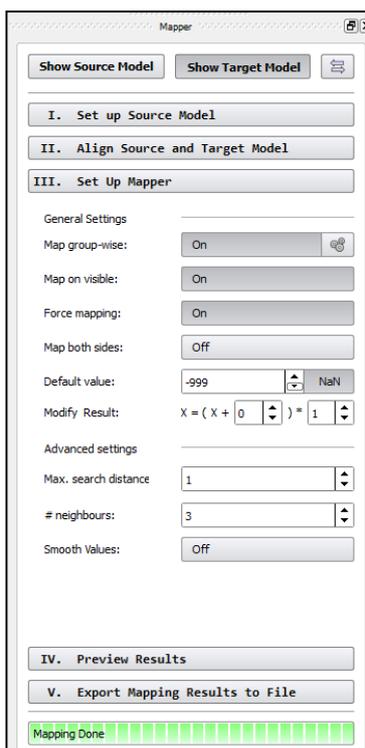
The need for mapping algorithms is often driven by a coupled simulation process where each solver has its own model and mesh. That's why the next step in our GUI development will focus on CFD data mapping to support the THESEUS-FE Coupler process.



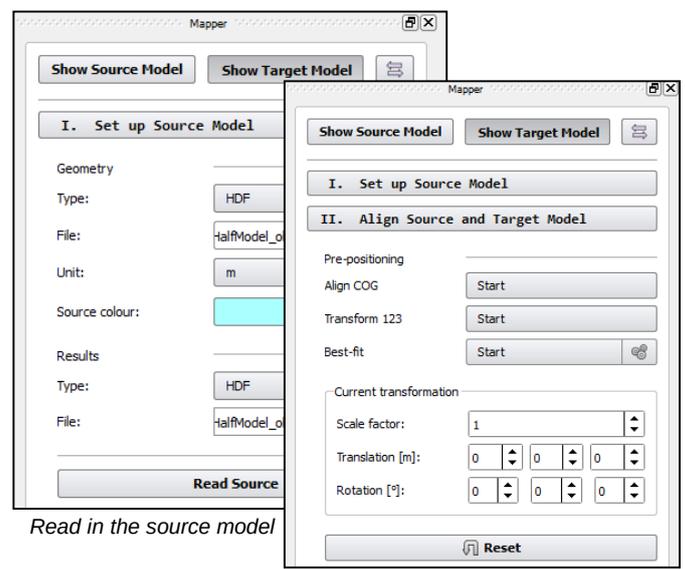
Symmetric **source** model temperature fields (flat floor plate)



Target model temperature fields (corrugated floor plate)



Settings dialog for mapping algorithm



Read in the source model

Automatic & manual positioning

New GUI features

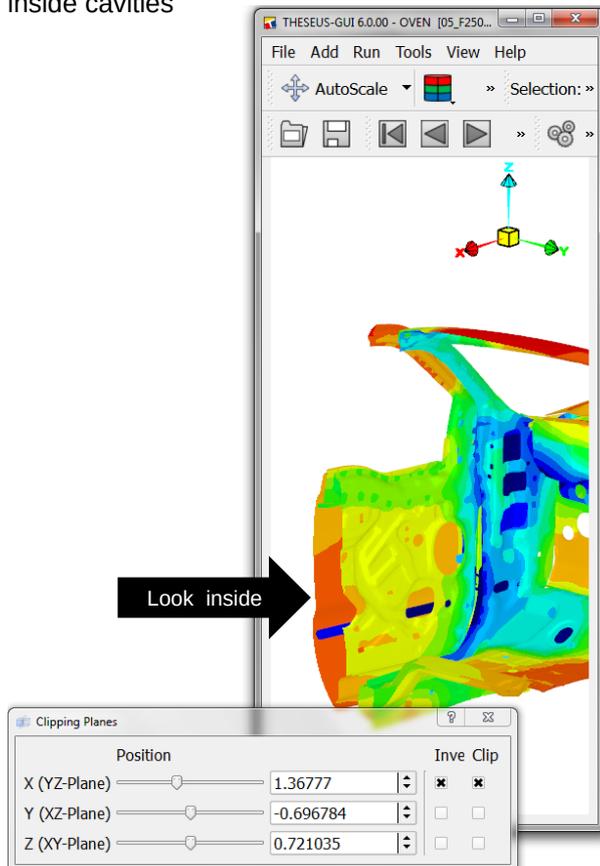
Clipping Planes:

Objects closer than the clipping plane are invisible to the camera.

Clipping planes are useful for rendering selected portions of a scene that has a lot of complex geometry.

Typical usage:

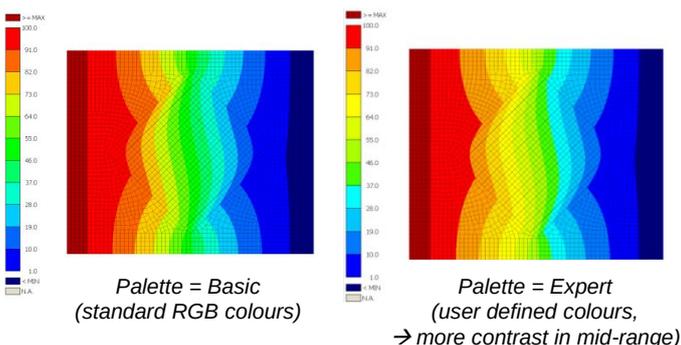
- THESEUS-FE E-Coating: to check the paint thickness inside cavities
- THESEUS-FE Oven: to check the temperatures inside cavities



Look inside

View ⇒ 3D Plot ⇒ Clipping Planes

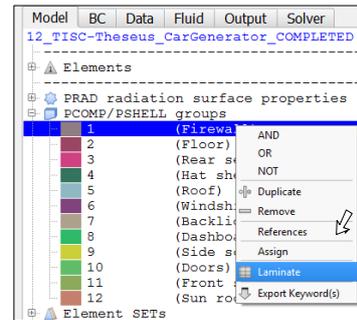
User-Defined result colour palettes



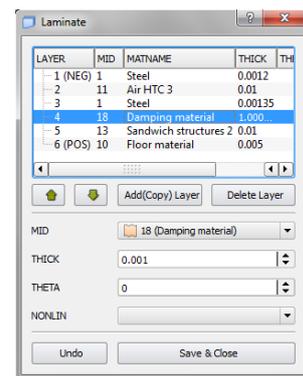
Laminate tool:

For composites the new Laminate tool helps to

- add new material layers
- delete existing material layers
- move existing material layers from one position to another
- change the thickness and the material name



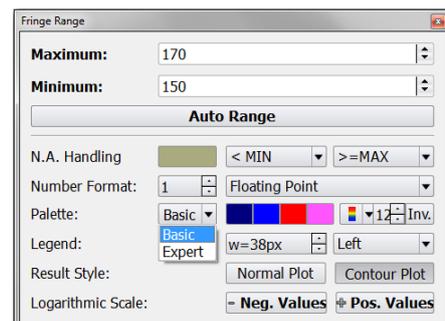
Activate the new Laminate tool by right-clicking on PCOMP groups.



PCOMP ⇒ Laminate

Improved Control over Fringe Bar

Click on  in the toolbar or double-click on the legend and the following new menu appears which allows for detailed control over the fringe bar appearance:



Fringe Range settings

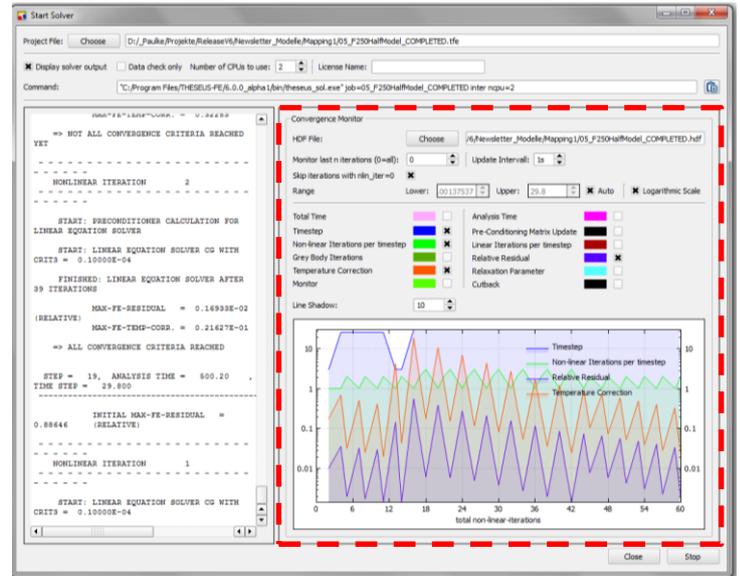
New GUI features (cont.)

Convergence Monitor:

The *Start Solver* dialog box now contains the new *Convergence Monitor*.

This is a helpful tool to check the behaviour of your numerical solver during the simulation. Permanent visible checks of the following parameters are available now

- the time step size
- number of iterations
- max. corrections
- max. residuals
- cut backs
- an extra MONITOR variable (individually defined by the user)



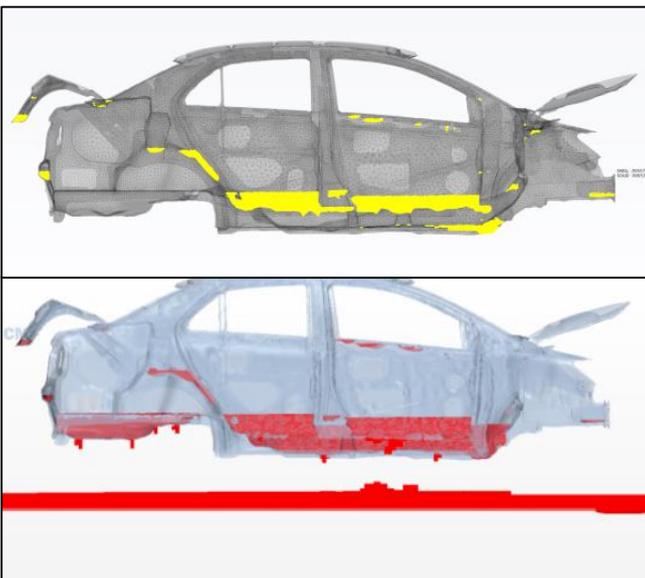
Run - Start Solver: *Convergence Monitor*

THESEUS-FE E-Coating: Prediction of bubbles and puddles

In the last few years THESEUS-FE has implemented growing support for automotive Digital Factory applications. A highly desirable feature to complement the Digital Factory product development process is the simulation of air bubbles and paint puddles that arise as undesired effects in the cathodic electrodeposition (E-Coating) paint bath.

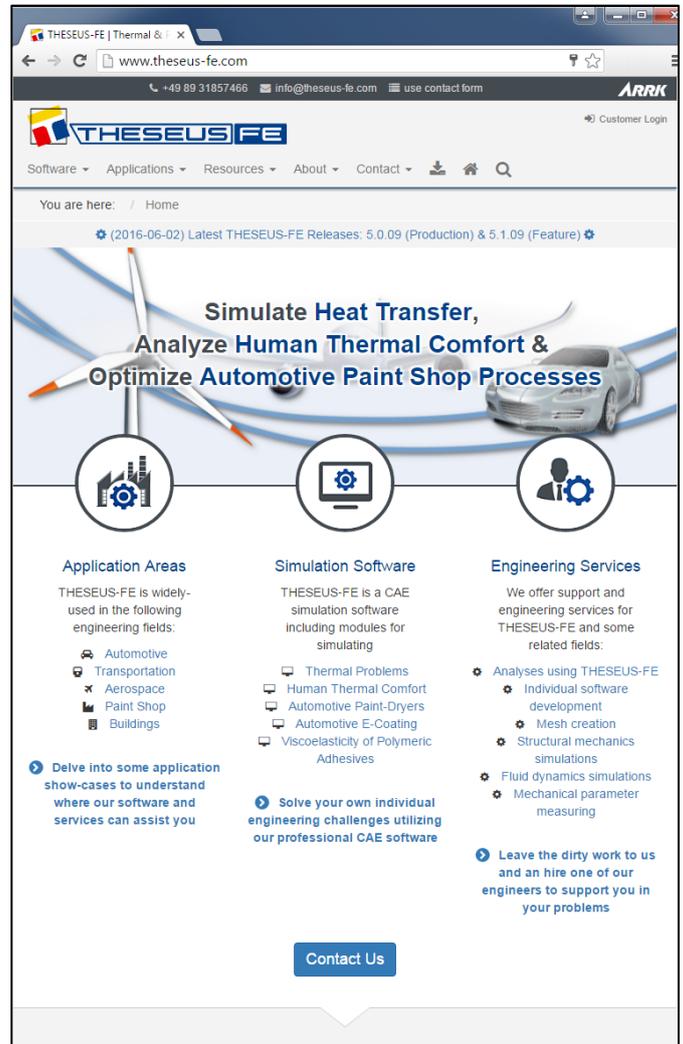
During the E-Coating process the body-in-white is dipped into the paint liquid. Since the body consists of numerous cavities, air bubbles may remain trapped in the body. The liquid cannot reach these locations. Thus paint defects typically occur at these locations. Correspondingly, when the body is pulled out of the bath, paint puddles may remain in the body and pollute the factory floor or cause more paint defects.

Our group is currently developing the new simulation tool **THESEUS-FE BP** to predict the formation and dynamics of air bubbles and paint puddles. By using innovative geometric simplification algorithms and flow network-based modelling for the two-phase flow problem we expect to reach solution times up to 1000 times faster than possible using classical VoF (volume-of-fluid) CFD approaches. The new tool will be available beginning of 2017 as part of our E-Coating module.



Paint puddles remaining after an E-Coating dipping process: upper picture shows results from THESEUS-FE BP, lower picture shows results from a commercial CFD solver.

Redesigned Homepage: www.theseus-fe.com



The THESEUS-FE web presence www.theseus-fe.com has been modernized and relaunched with a new design this June. It shines with a clean and well-structured design. The layout follows the trend for so-called responsive web design and can perfectly be viewed even on mobile devices like cell phones and tablets.

Existing customer logins have been carried over and should still work. New registrations will be prompted for a secret passphrase when filling out the registration form. If you need to register a new account, just request the passphrase at support@theseus-fe.com.

The download section has been improved as well. We hope that is now easier to find the downloads that you need. We have started a FAQ page where we present answers to questions that come up frequently.

Upgrade of FlexNet Licensing

THESEUS-FE 6.0 used an updated version of FlexNet Licensing, namely version 11.13.1.3. Please keep this in mind when using existing license servers to serve licenses for THESEUS-FE 6.0. It will be necessary to upgrade your license server "lmgrd", maintenance tools like "lmutil" and our vendor daemon "puzld". Suitable versions of all programs are included in the installation packages or can be downloaded from our website separately. Be sure to stop a running license server first, especially on Windows systems such that existing files can be overridden during the installation.

Using Intel MPI for Linux

Starting with THESEUS-FE 6.0, we use Intel MPI for running Optimization jobs in parallel on Linux systems. The Linux installation packages comes with a fully working MPI distribution which should work out-of-the-box for most use cases. This eliminates the previous tedious process of compiling OpenMPI for your local system. Nevertheless, for special needs and custom cluster configuration it is still possible to use a package of Intel MPI tuned for your local system.

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Silent Installation on Windows

The Windows installation packages now support non-interactive installations. With this, THESEUS-FE can easily be distributed remotely and can be embedded in tools for automatic software deployment.

The Windows installer supports the following options:

- /S ... use silent install mode instead of dialogue-based wizard
- /NODESKTOPLINKS ... do not create shortcut links on the desktop
- /NOMENUENTRY ... do not create an entry in the start menu
- /NOFLEXLM ... do not install FlexNet licensing tools
- /NOMODELS ... do not install Tutorial cases and Validation models
- /LICVAR= ... provide value for environment variable PUZLD_LICENSE_FILE which is set by installer; default: "localhost"
- /D=<install-path> ... use <install-path> as the root installation directory.

ATTENTION: option "/D" must be the last parameter used in the command line and must not contain any quotes, even if the path contains spaces. Only absolute paths are supported.