THESEUS FE

Customer Survey 2009

In August and September our THESEUS-FE Customer Survey took place. In fact it was time because the last poll was five years ago. We were pleased about the big customer's response of 67% in total. Let's take the opportunity here to thank all of you who answered the questionnaire!

Your interesting feedback was very helpful and enlightened to us. Furthermore it gives us a clear vision of your future demands, which of course will influence our upcoming product roadmap (see next pages).

Following some key results of the survey to your further information:

■ Topic A – Field of Application

The section "Field of Application" gave us a clear view of your THESEUS-FE usage. Almost all of the respondents still use THESEUS-FE only in the field of "General Cabin Air Conditioning" and "Thermal Comfort Evaluation". Surprising for us was the fact that 78% of all users still prefer Windows 32-bit as their operating system. 20% already changed or will change to a Windows 64-bit platform. Linux takes the remaining 2% and is obviously not the preferred choice of our THESEUS-FE users. Also interesting for us was the question A4 "How often do you use THESEUS-FE?". Figure 1 displays the answers to A4 in a diagram.
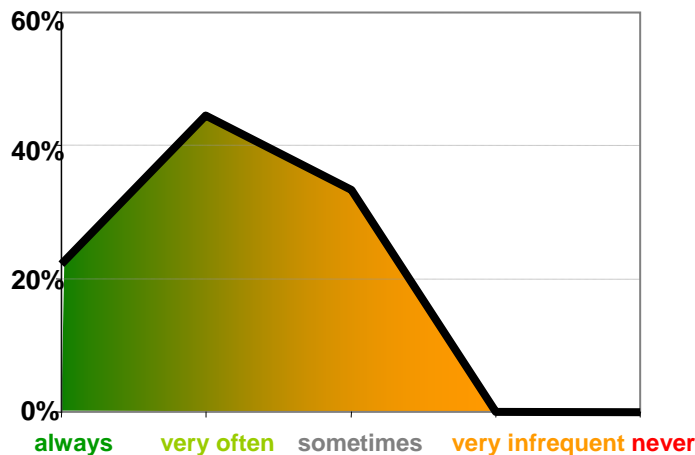
We are pleased to see that 50% of all respondents use THESEUS-FE very often in their day-to-day work and even 20% more or less daily.
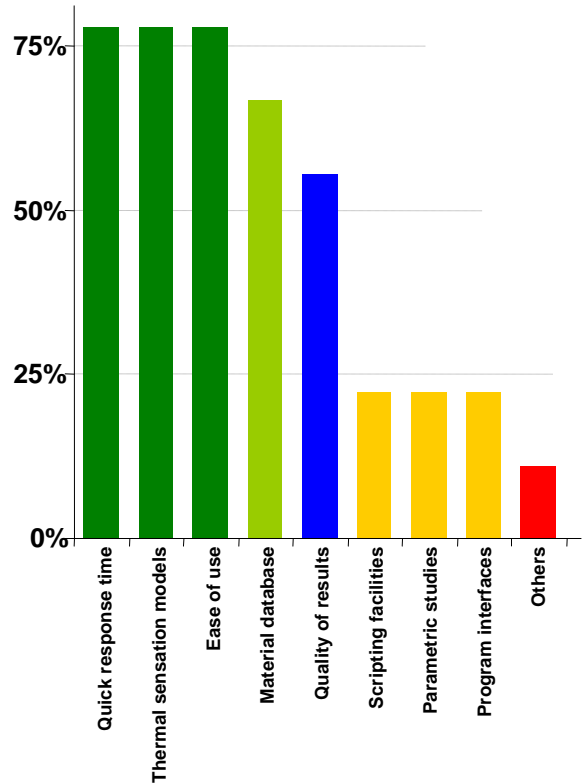

Figure 2: Customer's usage rate of THESEUS-FE

Question A10 "Which CFD tool is used at your company?" was again astonishing and shows at the same time the actual drive in the CFD market (multiple choices were possible).
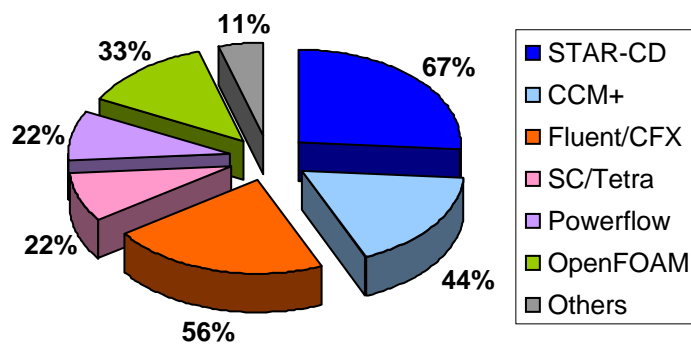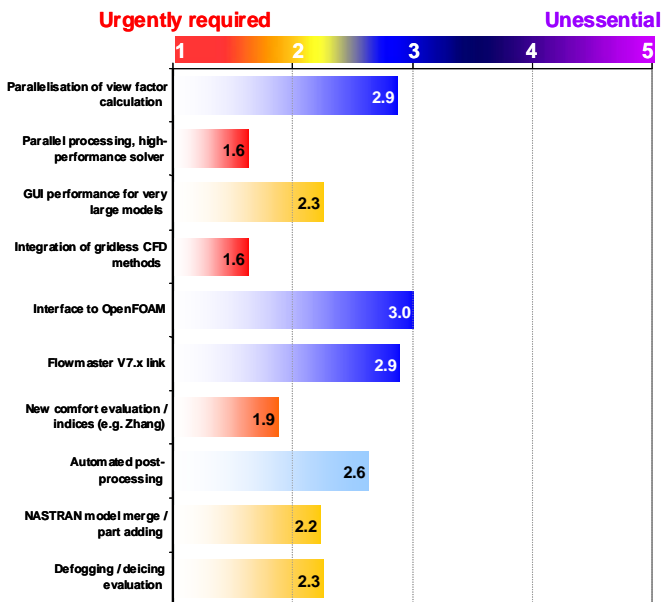

Figure 1: Customer's usage rate of THESEUS-FE

Figure 3: Customer's CFD software distribution

By Figure 3 the full dilemma becomes aware. There are too many tools to define any CFD standards, although we recently recognize a trend towards CCM+ and the freeware package OpenFOAM. Nevertheless from our point of view as a developer it becomes quite impossible to create THESEUS-FE interfaces to all of these CFD applications.

Topic B – Product Development

This fact directly will lead us to the next key item "future product developments".

Urgently required   **Unessential**

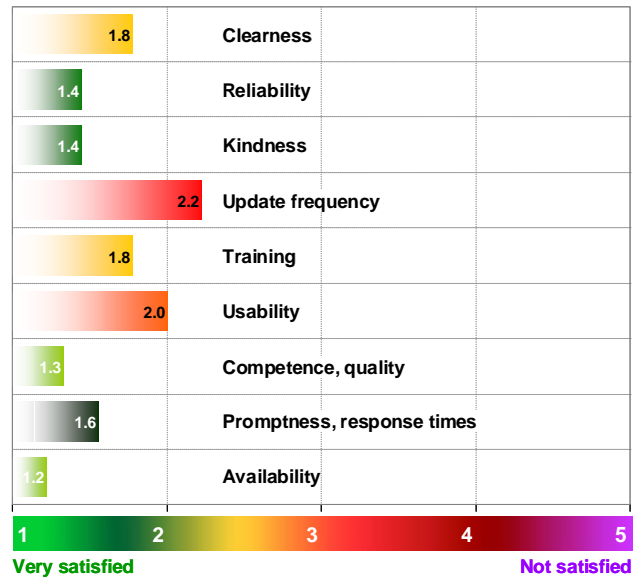|	Value
Parallelisation of view factor calculation	2.9
Parallel processing, high-performance solver	1.6
GUI performance for very large models	2.3
Integration of gridless CFD methods	1.6
Interface to OpenFOAM	3.0
Flowmaster V7.x link	2.9
New comfort evaluation / indices (e.g. Zhang)	1.9
Automated post-processing	2.6
NASTRAN model merge / part adding	2.2
Defogging / deicing evaluation	2.3

Figure 4: Customer's rating of future features

Obviously an integrated CFD solution is more attractive to our customers than any CFD interface even to a cost-free tool like OpenFOAM. Due to constantly rising model sizes and cheap powerful CPUs as well as available memory, of course the topic of parallelisation arises. Apparently our view factor calculation is yet fast enough. But anyway if we parallelise THESEUS-FE next, then we will certainly also introduce multi-processing for the view factors. As a third item with high priority new local comfort evaluation came up, which was not surprising for us because this topic was already announced by our team about one year ago.

Topic C – Support and Maintenance

The last section of the survey covered your opinion to our support service. Figure 4 displays the very positive results. We really would like to thank all for this very nice feedback.

	Value
Clearness	1.8
Reliability	1.4
Kindness	1.4
Update frequency	2.2
Training	1.8
Usability	2.0
Competence, quality	1.3
Promptness, response times	1.6
Availability	1.2

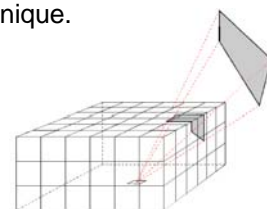**Very satisfied**   **Not satisfied**

Figure 5: Customer's rating of support quality

Well, beside our update policy we do not see high potential for improvements of our support services.

New Service Release 3.1 at Start

Following your wishes, we will introduce gridless CFD, parallelisation, CCM+ interface and Zhang's comfort evaluation into THESEUS-FE within 2010. But before this next generation of THESEUS-FE v4.0 will be available, first a new service version 3.1 will be released soon. This service release is mainly focusing on customer related bug fixes, but also introduces Hemicube method as an alternative view factor calculation technique.

Figure 6: Principle of Hemicube method

Knowing that Hemicube is an old but established method and not a real innovation, we nevertheless decided to implement it too, because of the impressive benefits of this technique, which are:

- increased result accuracy compared to patching
- enormous calculation speed increase
- reduction from quadratic $O(n^2)$ to linear $O(n)$ dependency on model size
- hemicube resolution is adjustable to the machine's memory size limit
- perfect view factor sums for closed cavities
- especially suited for very fine models with hundreds of thousands elements
- inherent handling of obstructions

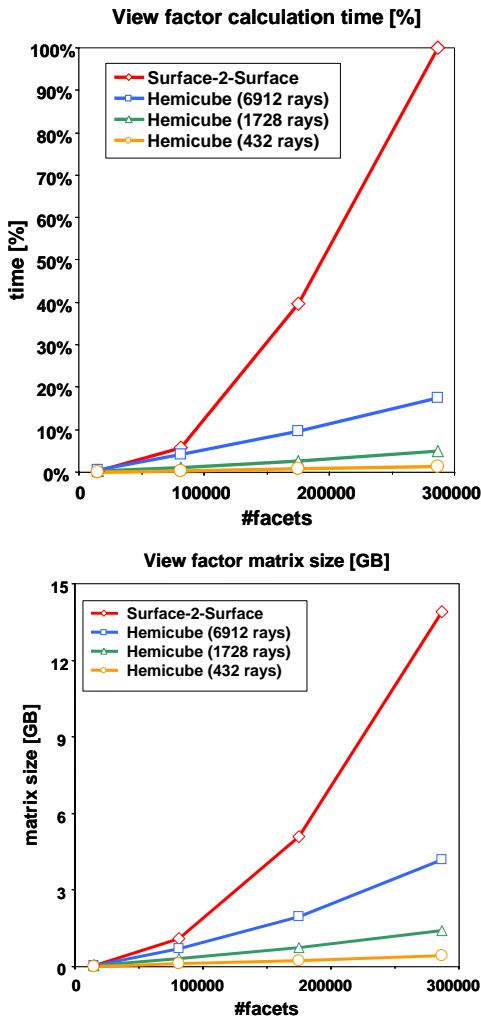The following benchmark figures emphasize these facts:

Figure 7: Speed-up and memory effects of Hemicube

High-performance GUI

Another development task we are currently working on is a completely new graphical user interface (GUI) for THESEUS-FE. This was necessary, because we recognized a performance gap of our existing GUI for very large models with over one million shell elements or for the case of a model with many solid elements. A first beta version with post-processing facilities is already finished and looks very promising (see Figure 8).
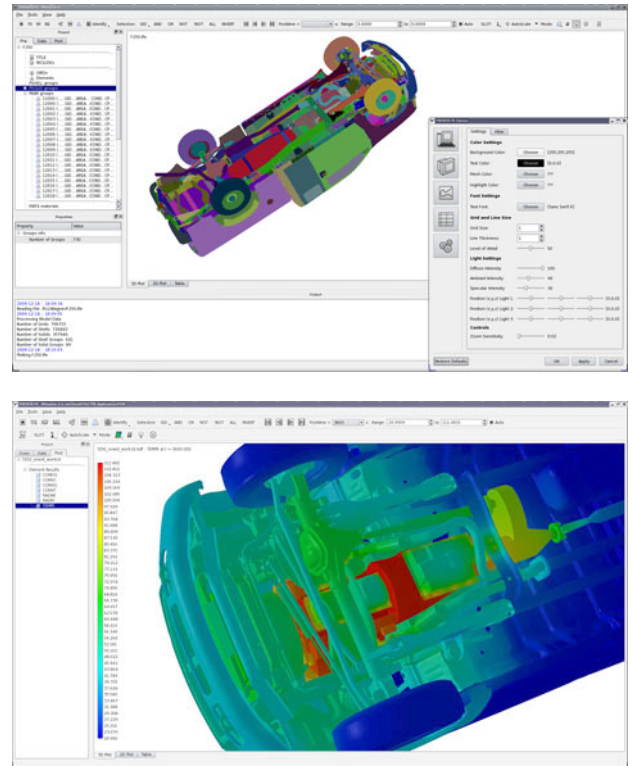

Figure 8: A first look to the next GUI

Special graphic algorithm and data structures allow for an easily handling of models with up to many million elements. The most interesting thing however will be the possibility to read in *.tfe- files directly.
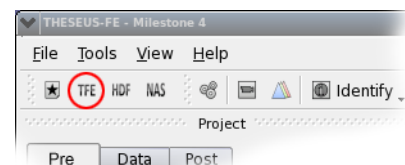

Figure 9: TFE-File format input

THESEUS-FE v3.x and Windows7™

By the release of Windows7 we have had a couple of support requests about the compatibility of THESEUS-FE with this new WINDOWS™ version.

Our trials of THESEUS-FE in combination with Windows7 show that THESEUS-FE is fully compatible and running well on this new OS both 32-bit and 64-bit.

Anyhow it is recommended to install THESEUS-FE <u>not</u> into the default directory "Program Files (x86)" proposed from the system, because the THESEUS-FE GUI starting script as well as the Python console do not like space characters in path names very much. Also be aware of the fact that the directory "Programme" of the German Windows7 version is just a directory link to the international directory "Program Files", so the space character problem remains.

Instead we recommend to use an individual install directory without any space or special letters.

EASC 2009 Review

P+Z attended the European Automotive Simulation Conference (EASC) in Munich this summer on 6-7 July.

EASC 2009, was organised by ANSYS as the one-stop Automotive Simulation Conference for Road, Rail, Racetrack and Off-Highway Vehicle Engineering.

EASC brought together innovative presentations from the automotive industry, universities and partners and provided a forum for vehicle specialists to exchange and experience information about the latest trends.

In cooperation with Flowmaster Group P+Z presented a paper titled "An Optimised Thermal Design and Development Process" at the conference, which demonstrates Virtual Product Development (VPD) to yield large benefits at low cost. The full proceedings can be purchased from ANSYS. Our common paper is ready for download at our product web page.

(http://www.theseus-fe.com/downloads/downloads.html)

Review "PKW-Klimatisierung VI"

A second event in 2009 with P+Z's participation was the German air-conditioning conference of vehicles at the end of November in Munich. This conference was arranged by the "Haus der Technik" in cooperation with Dr. Hofhaus from BMW and is a bi-annual obligation for all German engineers, who are involved in this field of application.

Beside informative presentations from Porsche and BMW many suppliers introduced the latest innovations of their products and applications. Always against the background of fuel and CO_2 reduction. In addition this year the main focus of this conference was on future development challenges like air-conditioning of hybrid, electrical and fuel-cell driven vehicles including the related topics of battery technology.

In this context P+Z showcased a new calculation method called "V5-Method" to determine the temperature stratification in vehicle compartments whilst parked in the sun without the the use of time-consuming CFD simulations. Again the paper and some basic slides of the presentation can be downloaded from our THESEUS-FE web page. Unfortunately they are only available in German language.

Holidays

Finally. we would like to announce our winter vacation dates. P+Z Engineering closes from December, 23, 2009 until January, 11, 2010.

Please notice that our hotline support will not be available in this period and at the same time excuse any inconvenience this may cause.

See you again in 2010!