Discussion Note

TRANSlators

Material Modelling: Translators Needs and Specifications

Please state whether you agree with the following statements

The development of new materials and their optimal use across industries is a significant innovation driver and a key factor for the success and sustainability of the industry and European society in general.

Manufacturing companies across Europe (SME's and large corporations alike) recognise the potential of materials modelling to drive a radical change in speed of product design for and cost of manufacturability and in-use performance.

However, modelling is not always on the critical path of commercial development because modelling tools are often seen as too difficult in use, not accurate enough, or unable to get answers to very specific questions.

It is well acknowledged that there remain a number of technical challenges for the development of modelling methods, tools and software for materials modelling to allow them to be routinely used in manufacturing industry. On the other hand, there is plenty of evidence that important and impactful topics can be addressed with already existing materials modelling technology. There is, however, a gap in awareness, knowledge and skills that hampers industry to unlock the potential benefit of current modelling technology. Manufacturing "end-users", in particular SMEs, quite often have a lack of expertise that prevents them from integrating the materials modelling into their development and production workflows. There is hence a need for new players who have the ability to 'translate' industrial problems into cases to be simulated.

This document is based on input that has been provided by service companies and research institutes who are actively using materials simulation in their collaboration with industry , and who have therefore have an operational experince in 'translation'.

The discussion should establish

- Define how translators can meet the needs of industry (definition of their role)
- How to gather the key representatives from the research organisations, technology transfer providers, service providers etc to discuss, prioritize and communicate the requests Translators are supposed to fulfill.
- How to support operators running modelling software at industrial sites.
- How to develop and implement best practice methodologies for translators,
- How to develop and implement a training guide for translators using these methodologies The landscape of industrial sectors and topics that could most benefit
- How should Translators deal with gaps in the software landscape, recognized during the translation of an industrial problem?

In a subsequent meeting in January the EMMC will consolidate a Road Map with industrial context and drive. And this discussion should lead to a first lay out for that Road Map.

1) Manufacturers requirements

Manufacturers are the most important stakeholders for Translators. In order for faciliate the application of modelling and simulation to solve industrial problems,the following needs arise (to be detailed in the manufacturers discussion):

- Credible case studies are necessary to convince end-users of the performance of the models. There is an industrial need for the development of case studies and examples of successful application of modelling and simulation to solve real problems.
- A compendium of skilled translators is needed.
- Training of end user management is required to achieve the relevant understanding of the issues and the opportunities of applying modelling.
- A code of conduct and best practice is needed to establish trust.
- Expectation management is key, but also matching methods and topics.
- ….

Since Business Decision Support Systems (BDSS) are one major requirement of the manufacturer stackeholders, so this topic needs to be addressed carefully. Since 'translation' starts from an industrial problem and ends in something to be simulated, support for a 'back-translation' of the simulation results to BDSS might be necessary.

2) Research organisation participation and requirements

- Organisations that have the necessary breadth and depth of skills should be identified
- Research organizations should have the ability to identify existing model software gaps recognized during their translation efforts (and sometimes they may have the ability to close that gap)
- Outreaching is probably under developed within research organizations. Skills need to be communicated in a way that industry recognises the potentials.
- Training should be developed for Research Organisations on how to use/subcontract materials modelling.

3) Consultants and commercial service providers participation and requirements

- Organisations that have the necessary breadth and depth of skills should be identified
- Commercial providers have necessarily an interest in promoting their particular expertise on the one hand. The level of professionalism in service provision for translation efforts is expected to be higher than in research organizations.

4) Interaction with software and workflow/methods development

Translators are in an exceptional position to gain insight into models, software and real life applications. How can this knowledge best be utilised for the development of improved software tools, i.e. once gaps in the existing landscape of software tools show up?

5) Best Practice Case studies

What would case studies have to look like to convince manufacturers to use materials modelling in their business processes?

6) Modelling Market Place, Outreaching

The MMP envisions a web front end, which acts as a marketplace linking various activities, communities, data, models and information throughout the material modelling landscape in Europe. As such, it is expected that other EMMC activities will also benefit from the MMP IT platform and infrastructure. It would be therefore important to discuss both the translator's and MMP's needs and requirements so that maximum benefit and impact can be achieved.

The MMP web front-end can offer the following resources for, among others, the translators:

- Resources:
  - Channels for education,
  - Communication platform with MAN
  - Repositories of best modelling case studies, white papers and best modelling approaches/standards
  - databases of actors
  - Expertise resource
- Databases of
  - models, and data
  - expertise and actors
  - coupling and linking libraries (wrappers), including Multiscale Materials Modelling interfaces
  - software solutions
  - open Simulations and wrappers
  - requests for model extensions

The following are some of the questions and issues that could be addressed in the discussion:

How to introduce materials modelling into Europa's SME landscape at the MMP website?

What would a translator want to find at such a website? Data repositories? Would a translator be allowed by their industrial clients to share data? Code repositories? Expertise repositories? What would requirements of translators be? Are you be willing to share requirements for databases with MMP?

Do you see how the MMP platform can provide another channel for translation? How can the MMP platform assist in the workflow of the translation process?

Should MMP also add a “database of translators”, or add another option to tag actors (users) of MMP as translators? Who shall be responsible for this(MMP, TRANS, both and/or EMMC?

How can the above resources be of use to enhance the translation process? What needs to be further done in MMP and TRANS to ensure that the above resources are indeed helpful for translators?

What needs to be done so that the TRANS can use the MMP to obtain information on the state of the art modelling activities and competencies in Europe? How will it help identify knowledge gaps that translators will help to close?