Translation and the Virtual Materials Marketplace

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EMMC Workshop
Industrial Views and Needs for Translation

In collaboration with Pietro Asinari, Luca Bergamasco, Welchly Leite Cavalcanti, Gerhard Goldbeck, and Ignacio Pagonabarraga
Virtual Materials Marketplace: VIMMP (Horizon 2020)

**VIMMP Marketplace** concept: To serve its participants and facilitate exchange, e.g., between materials **model providers**, industrial & academic client **end users**, and **translators**.

The **VIMMP Marketplace** will provide end-user interfaces to information resources, discussion forums, databases and repositories, translation and training services, validated models and modelling software, and the ability to utilise open simulation platforms to build and deploy workflows via cloud-based computing resources.
Virtual Materials Marketplace: VIMMP (Horizon 2020)

Coordination: Fraunhofer IFAM, Bremen

- Goldbeck Consulting, Cambridge
- Politecnico di Torino
- UKRI Science and Technology Facilities Council
- University of Manchester
- Centre Européen de Calcul Atomique et Moléculaire, EPFL Lausanne
- Institute of Chemical Process Fundamentals, Prague
- Electricité de France, Paris
- Osthus, Aachen
- Continental Reifen Deutschland, Hanover
- Unilever, Vlaardingen
- INRIA Sophia Antipolis Méditerranée
- Università degli Studi di Napoli Federico II
- Straetmans High TAC, Hamburg
- CULGI BV, Leiden
- IBM United Kingdom, Portsmouth
- IBM Research, Rueschlikon
- IBM
VIMMP will provide a genuine *two-sided virtual marketplace* comprising service providers and service consumers, serving all stakeholders from materials development, and supporting market deployment of new materials.

VIMMP participates in the creation of a single open and interoperable *European Virtual Marketplace Framework* on the basis of jointly agreed and managed semantic assets.
Translation environment on the VIMMP Marketplace

Development goals for the translation environment:

- Matchmaking between end users and model providers
- Translation services following the EMMC Translators Guide
- Registered translators will reach out to a wider audience and facilitate contacts to potential stakeholders who are not registered on the VIMMP Marketplace
- Integration of translation with training, provision of training services to translators (e.g., by academics) and by translators (e.g., to industrial engineers)
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Training resources for future translators and courses offered by translators will be integrated into the CECAM programme and publicized accordingly.
Modelling and simulation standardization

Time line of EMMC-governed standardization efforts

RoMM VI  MODA  CWA 17284  Ontologies

Semi-formalized terminology or vocabulary

Graph language & formalized terminology
CEN European standard
EMMO and EVMPO

(Ontology development is work in progress at present.)

(1) User Case
(2) Model
(3) Solver
(4) Processing

MODA (graph language)
Modelling and simulation standardization

MODA – Modelling Workflow Graph Language (CEN standard by CWA 17284)

(1) User Case
(2) Model
(3) Solver
(4) Processing
Translation workflows and ontology

VIMMP Translation Ontology
vto version 0.3.2

Disclaimer: Displayed ontology sketches represent an early stage of development.
Translation workflows and ontology

End user or translator:
Problem statement

Model provider or translator:
Solution statement
Validation, trust, and model assessment

The certifier “:LONDON” believes that the solution “:SOL” will obtain the speed of sound of pure siloxane D4 with an (average) expected error of 5%.

:SOL_ACCURACY a :solution_validation_certificate;
:has_certifier :LONDON;
:refers_to_solution :SOL;
:states :SOL_ACCURACY_PROP.

:SOL_ACCURACY_PROP a :validation_proposition;
:has_confidence :STATEMENT_OF_BELIEF;
:has_qualification :EXPECTATION;
:has_content :SOL_ACCURACY_CONT.

:SOL_ACCURACY_CONT a :relative_deviation_validation_content;
:asserts_magnitude 0.05;
:refers_to_material :D4PURE;
:refers_to_property :SPEED_OF_SOUND.
Educating future translators

Lecturers: E. Chiavazzo, L. Bergamasco, D. Marchisio, and G. Raos

Digitalizing, democratizing and empowering materials development via artificial intelligence

1) LEARN: tools & current vision of the European Commission for industrial innovation

2) PROPOSE: listen to EU industries and propose your ideas for innovative solutions

3) ANALYZE (I): assess technological feasibility & artificial intelligence integration for your ideas

4) ANALYZE (II): assess the investment costs vs economic value and returns of your project

5) CONVINCE: disseminate your ideas using social media, EMMC website, final workshop

Industrial partners

Academic partners

Is T1000 just science fiction?
Educating future translators: 2018/19 programme at ASP

Lecturers: E. Chiavazzo, L. Bergamasco, D. Marchisio, and G. Raos

“iMAT” Programme

Technical training – methodological overview (RoMM), interoperability, workflows (MODA)
Economical training – IP protection, impact of modelling, value engineering, BDSS
Additional concepts – EMMC, related infrastructure, conventions, and projects

The participating students in 2018/19 cover the desired broad spectrum of backgrounds, including Chemical Engineering, Mechanical Engineering, Integrated Product Design, Civil/Structural Engineering, Physics of Complex Systems, and Mathematical Engineering
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- Cambridge – Gerhard Goldbeck
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- Lausanne – Ignacio Pagonabarraga
- Torino – Pietro Asinari, Luca Bergamasco

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