



DELIVERABLE

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D8.4 – Thesaurus usable

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1 Introduction

The thinkMOTION project¹ has the ambition to make the DMG-Lib portal² the major digital library of machines and mechanisms at the world level. The work package WP8 is focused on translating all the contents in various languages in order to bring them to a large audience.

Deliverable D8.1 allowed defining an improved workflow summarized below: the targeted languages were defined to be German, French, Italian, Spanish and Romanian, which are the languages of the partners. All the contents must also be translated in English, which is the de facto language for exchange in science. Priority is set on translating the titles and keywords.

For deliverable D8.2, the DMG-Lib portal as well as the internal database ProDB were translated in six languages. Finally, deliverable D8.3 allowed translating the main metadata (titles and keywords) of all the items in the database.

The last step for completing this linguistic work was to integrate in this database an interactive thesaurus where all the main concepts of the science of machine motion (kinematics) are listed, ordered, illustrated and translated.

2 Objectives

Task 8.4 was the creation and maintenance of a suitable thesaurus, based on existing semantic networks. Two existing references were used:

- The IFToMM terminology [1], created by the permanent commission of IFToMM on “Standardization of Terminology” [2].
- The micro-thesaurus developed by A. Lovasz at Timisoara University during her PHD [3].

These resources were used to build a high quality thesaurus workbench covering terms in the field of motion systems. Each term was translated in several languages, merged in so called “concept” items and was provided with several links to relative media in the thesaurus, particularly illustrative pictures and relevant documents. The considered languages are those of the thinkMOTION project (English, German, French, Italian, Romanian, Spanish) and partially overlap with the four languages (English, French, German, Russian) provided by IFToMM terminology [1] and by the micro-thesaurus [3] (Romanian, English, German, French).

thinkMOTION Deliverable D2.4 – “DMG-Lib thesaurus via SKOS-format” – [4] describes in detail the DMG-Lib thesaurus as semantic information resource, its structure and its “SKOSification” to support interactive browsing in Europeana’s semantic network.

3 Main results on Task 8.4

The **first result** was a **reorganized concept list** combining all the terms from [1] and [3], suppressing the duplicates and harmonizing the terms, particularly typography and special letters. This list was first generated in the form of a spreadsheet, before being imported in the ProDB database. At the date of this report (31st May 2013), the thesaurus includes 1717 concepts comprising 7386 multilingual terms. Ilmenau has also added a search functionality that can be seen in Figure 1.

¹ thinkMOTION Project website, <http://www.thinkmotion.eu>

² DMG-Lib Portal, <http://www.dmg-lib.org>

The **second result** was the translation of all the terms of the thesaurus in the six languages of the project (English, German, French, Italian, Romanian, Spanish) plus the additional Russian language coming from IFToMM terminology [1], that was kept for reference but not completed because no partner in the project speaks Russian. A sample can be seen in Figure 1. This systematic translation of all the terms of the thesaurus was performed by all the partners during the third period of the thinkMOTION project. Each partner translated the 1717 concepts such as words or word groups, ranging from basic vocabulary up to higher-level technical terms and notions.

The **third result** is the illustration of a selection of representative concepts with a main picture, that appears as a thumbnail (Figure 1, top-left), and also additional interesting illustrative documents already present in the database, that can be other images or interesting texts relevant to the term. Figure 2 shows an example of a search showing all the documents providing an occurrence of the concept “hypoid gear”. Figure 3 shows examples of typical main illustrations for the concepts “machine”, “pulley”, “prosthesis” and “exo-skeleton”. A selection of 256 concepts was made for illustration from media of the database. The remaining concepts may be illustrated in the future, although certain concepts are either theoretical (“vector field”, “human like intelligence”, “coupled modes”) or too general (“limb”, “cell”, “bias”).

The screenshot shows a web-based application for managing a thesaurus. At the top, there's a navigation bar with links for various categories like 'Doc', 'Per.', 'Mec.', etc., and some administrative links like 'Logout'. Below the navigation is a search bar with the URL 'www.dmg-lib.org/dmglib/prodb/inpTh.jsp?id=18056'. The main content area has a title 'Thesaurus workbench (ID:0018056)' with a close button. On the left, there's a sidebar with tabs for 'Main', 'Search', 'Names', 'Defin.', 'Occu.', 'Data prov.', 'SKOS', 'IFToMM', 'DMG-thes', 'raw data', and 'Logs'. The 'Names' tab is currently selected. The main panel displays a search result for the concept 'barre de couplage'. It shows a small thumbnail image of a mechanical coupling link. Below the image, the concept name is listed as 'barre de couplage' with its English translation 'coupler'. Other details shown include the concept ID 'concept_18056_coupler | 1.1.9', the current state 'hidden', and a fast search input field. Below this, there's a table titled 'found thesaurus concepts' with three rows of results, each showing a concept ID, name, definition, and detailed description. The first row is for 'bras articule | arm | porteur | Arm | рука | Roboterarm', the second for 'bras de levier | moment arm | Hebelarm einer Kraft | плечо силы', and the third for 'bras superieur | upper arm | Oberarm | плечо'.

	name of concept:	Expert mode	Search
found thesaurus concepts	preferred name		
1 723056 bras articule	arm	5.2.4	bras articule arm porteur Ensemble des membres interconnectés par des articulations motorisées 2013-02-27 Arm рука Roboterarm qui supporte, positionne et déplace l'[a][iftomm:5.2.9]effetuer[/a] du... 04:03:50
2 298056 bras de levier	moment arm	3.2.36	bras de levier moment arm Plus courte distance de la [a][iftomm:3.2.2]ligne d'action d'une force[/a] à 2013-02-27 Hebelarm einer Kraft плечо силы un point donné. 04:03:39
3 724056 bras superieur	upper arm	5.2.5	bras supérieur upper arm Oberarm плечо Membre du [a][iftomm:5.2.4]bras articulé[/a] qui est relié à 2013-02-27 Oberarm плечо l'[a][iftomm:5.2.3]épaule[/a]. 04:03:50

Figure 1. Example of a “term” search in the thesaurus (!Thes > Search tab): the term “barre de couplage” (FR) can be translated into “coupler” (EN) or “koppel” (DE). A thumbnail in the top-left gives a representative picture.

Screenshot of the DMG LIB Thesaurus workbench interface (ID:0049056). The search results for the term "engrenage hypoïde" (hypoid gear) are displayed. The results table shows four items: 1. A document titled "Proceedings of Twelfth World Congress in Mechanism and Machine Science: A Regularization Method for Hypoid Gear Synthesis Using the Invariant Approach." 2. A document titled "Proceedings of Twelfth World Congress in Mechanism and Machine Science: The modified pitch cone method of the hypoid gear." 3. A document titled "Proceedings of Twelfth World Congress in Mechanism and Machine Science: Modeling of Cylinder-Conical and Cylinder-Hypoid Gear Transmissions with the Screw Motion of the Output Unit." 4. An image showing a hypoid gear assembly.

Figure 2. Example of “occurrence” search in the thesaurus (!Thes > Occu. tab): the term “engrenage hypoïde” (FR) can be translated into “hypoid gear” (EN) or “hypoidrad” (DE). A complete list of documents where occurrence of the term appear is provided, including pages into text documents and separate images.

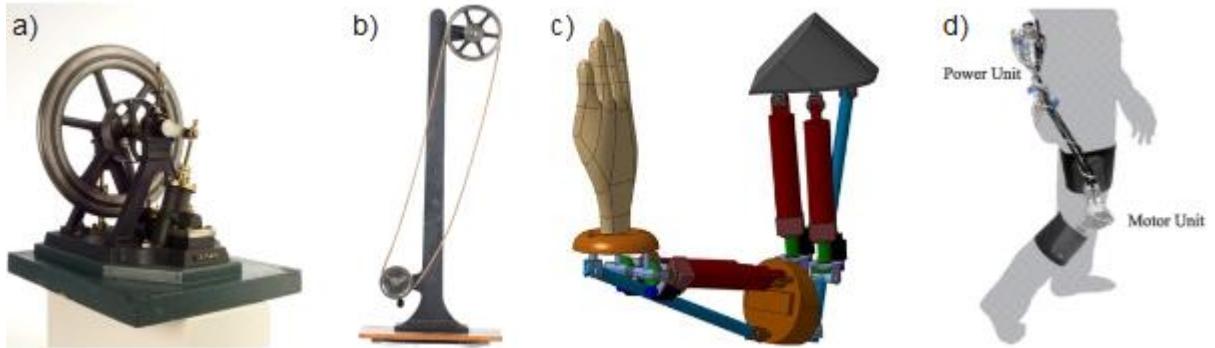


Figure 3. Examples of illustrative figures for the concepts:
a) “machine”, b) “pulley”, c) “prostheses”, d) “exo-skeleton”.

Henceforth, task 8.4 allowed building a complete DMG-Lib dictionary, which contains official terms of the IFToMM’s dictionary together with a clarification on those terms. Each term is translated in 6 languages, and the main ones are illustrated with relevant content from the DMG-Lib portal.

4 Conclusion

As a conclusion, it can be considered that the work to make the thesaurus usable now makes sense, as the vocabulary is available in 6 official languages. Moreover, it gives access to content from the DMG-Lib database, thanks to a powerful searching tool.

As the thesaurus maintenance is now effective, we can consider that it fits into the vision of the portal, granting fast access to technical vocabulary in important native languages. This thesaurus can be considered as a major milestone for better dissemination of technical contents in Europeana.

References

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