



# DELIVERABLE

**Project Acronym:** thinkMOTION  
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## D8.4 – Thesaurus usable

**Revision: 1.1**

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Dissemination Level		
P	Public	x
C	Confidential, only for members of the consortium and the Commission Services	

## Revision History

Revision	Date	Author	Organization	Description
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1.0	31.05.2013	J.-C. Fauroux	IFMA	Review, Final version
1.1	31.05.2013	S. Falke	IUT	Review

### **Statement of originality:**

This deliverable contains original unpublished work except where clearly indicated otherwise. Acknowledgement of previously published material and of the work of others has been made through appropriate citation, quotation or both.

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## 1 Introduction

The thinkMOTION project<sup>1</sup> has the ambition to make the DMG-Lib portal<sup>2</sup> 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 (31<sup>st</sup> 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.

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

<sup>2</sup> 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 browser window with the URL www.dmg-lib.org/dmglib/prodb/inpTh.jsp?id=18056. The page title is 'DMG LIB'. The navigation bar includes links for ?Doc., ?Per., ?Mec., ?Img., ?FBC, ?AIS, ?Task, !Doc., !Per., !Mec., !Img., !FBC, !AIS, !Col., !Thes., #List, #Str., #Rgt., Scan, Logout, and a search icon. The main content area is titled 'Thesaurus workbench (ID:0018056)'. It features a thumbnail of a mechanical linkage and a text box with the following information:

Concept name: **barre de couplage** (barre de couplage | coupler | membre flottant | bielle | floating link | Koppel | шатун | плавающее звено)  
 Concept IDs: **concept\_18056\_coupler** | 1.1.9  
 Current state: hidden  
 Fast search:

Below this is a search interface with a 'name of concept:' field, an 'Expert mode' dropdown, and a 'Search' button. The results are displayed in a table with columns for ID, preferred name, and definition. The table shows three results:

ID	Preferred Name	Definition
1 723056	bras articule   arm   porteur   Arm   рука   Roboterarm	Ensemble des membres interconnectés par des articulations motorisées qui supporte, positionne et déplace l'[a][rftomm:5.2.9]effecteur/[a] du ...
2 298056	bras de levier   moment arm   Hebelarm einer Kraft   плечо силы	Plus courte distance de la [a][rftomm:3.2.2]ligne d'action d'une force/[a] à un point donné.
3 724056	bras superieur   upper arm   Oberarm   плечо	Membre du [a][rftomm:5.2.4]bras articulé/[a] qui est relié à l'[a][rftomm:5.2.3]épaule/[a].

**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.**

www.dmg-lib.org/dmglib/prodb/inpTh.jsp?id=49056

DMG LIB

show input helper (Ctrl+Alt+T) 03.06.2013 17:21:19 You are logged in as: jct

!Thes. #List #Str. #Pgt. Scan Logout

Thesaurus workbench (ID:0049056)

Concept name: **engrenage hypoïde** (engrenage hypoïde | hypoid gear | Hypoidrad | гипоидное зубчатое зацепление)  
 Concept IDs: **concept\_49056\_hypoid\_gear** | 1.1.32  
 Current state: hidden  
 Fast search:

found 58(+X...) items with potential occurrences

ser.No.	Type	Thumbnail	matches	Link
1	document		hypoid gear	19819009 ## Proceedings of Twelfth World Congress in Mechanism and Machine Science: A Regularization Method for Hypoid Gear Synthesis Using the Invariant Approach.
2	document		hypoid gear	20353009 ## Proceedings of Twelfth World Congress in Mechanism and Machine Science: The modified pitch cone method of the hypoid gear.
3	document		hypoid gear	20441009 ## 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	image		engrenage hypoïde   hypoid gear   Hypoidrad	5010023 ## Engrenage hypoïde / Hypoid gear / Hypoidrad / Roată dințată hipoidă

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.

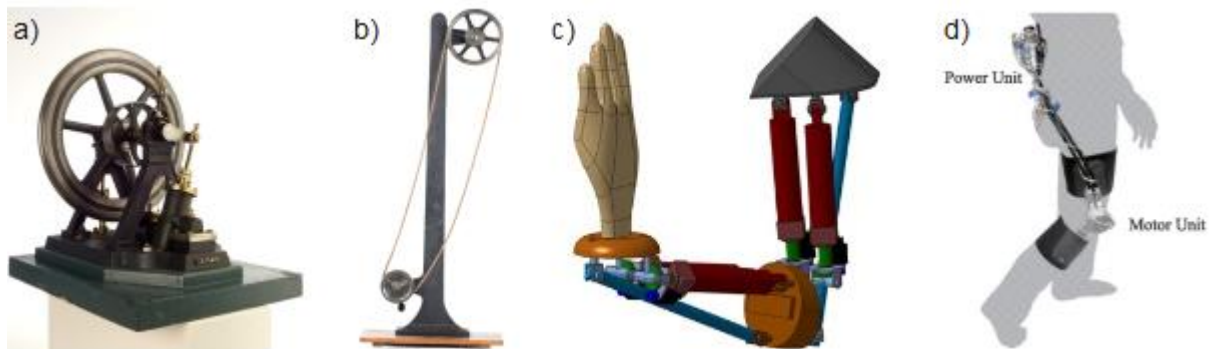


Figure 3. Examples of illustrative figures for the concepts: a) “machine”, b) “pulley”, c) “prosthesis”, d) “exo-skeleton”.

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

- [1] IFToMM dictionaries online. <http://www.iftomm.3me.tudelft.nl>. Retrieved June 3rd, 2013.
- [2] Bögelsack, G. *Twenty-five years IFToMM Commission A “Standardization of Terminology”;* history, methodology, results and future work. Mechanism and Machine Theory, Vol. 33, No ½, pp. 1-5, 1998.
- [3] Lovasz, Agneta. *Dezvoltarea unei biblioteci digitale de mecanisme: Development of an digital library of mechanisms*. PHD thesis. Universitatea Politehnica Timisoara. 2011. <http://www.dmg-lib.org/dmglib/main/portal.jsp?mainNaviState=browsen.docum.viewer&phyPageNo=1&id=25429009>
- [4] Döring, Ulf; Falke, Sascha. 14 February 2013. *Intermediate report on DMG-Lib thesaurus via SKOS-format*. thinkMOTION Deliverable 2.4. Retrieved May 31, 2013, from [http://www.thinkmotion.eu/wp-content/uploads/D2.4\\_final.pdf](http://www.thinkmotion.eu/wp-content/uploads/D2.4_final.pdf)