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# Evaluation
# of Multilingual Land Surveying Dictionaries –
# Part II

## 1. Introduction

The electronic media, especially the Internet, have had a strong impact on both general and specialised lexicography as the number of online and electronic dictionaries grew significantly over the last twenty years [10: 121]. It seems that lexicography has only to a limited degree exploited the potential offered by the new electronic media, especially the Internet. In fact, the design of the majority of electronic dictionaries has not changed. They are often copies of traditional printed dictionaries with quicker access by means of search engines and links. Many of these dictionaries still work as word lists with equivalents without definitions and with very limited (typically gender specification) or no grammatical information on terms. Therefore, they cannot provide help to translators or technical writers which is the most important role of bilingual/multilingual dictionaries. Tarp [9] notices that nowadays there is a huge need of lexicographic tools which provide quick and easy access to carefully selected and prepared data from which different users can retrieve information they need. Thus, not only the efficient search system is important, but also the quality and wide range of data that meet the expectations of different groups of users.

## 2. Electronic Land Surveying Dictionaries

This section focuses on electronic land surveying dictionaries which are still available on the market or which can be accessed on-line. This group of dictionaries is quite diversified because it comprises dictionaries published on CD-ROM [12] and on-line dictionaries [1] and [7]. What is more, it covers dictionaries compiled by publishing houses [12], research bodies [2] and individuals [5], dictionaries created by land surveyors [1, 12] and by professionals who have both land surveying background and lexicographic knowledge [7].

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## 2.1. *Słownik geodezyjny polsko-angielsko-niemiecki* 'Polish-English-German Land Surveying Dictionary'

*Słownik geodezyjny polsko-angielsko-niemiecki* in the electronic version (CD-ROM) [12] is the modified and expanded version of the paper dictionary published by Tatarczyk [11].

The dictionary includes 8,500 entries and covers various subfields of surveying and related disciplines, e.g. astronomy, civil engineering, physics, photography, photointerpretation, GPS, geology, computer science, mathematics, mining, remote sensing, optics. It can be accessed in Polish, English or German by selecting an appropriate flag. Entries in the dictionary are arranged alphabetically and can be searched either by typing the search word into a browser or by selecting the first letter of the word and scrolling the list of terms that start from this letter. The search terms are presented in the blue box on the left, whereas the search results are shown in orange boxes on the right (Fig. 1).
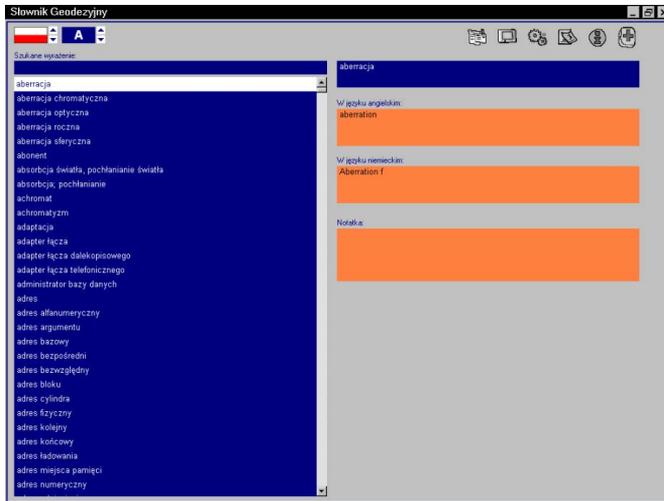


**Fig. 1.** Print screen from *Słownik geodezyjny polsko-angielsko-niemiecki* by Jerzy Tatarczyk
Source: [12]

In the top right corner of the screen the dictionary has six icons which extend functionality of the dictionary. They enable, for example, adding one's own terms and creating a personalised dictionary.

The scope of semantic or grammatical information included in the dictionary is quite limited. Apart from giving equivalent terms in the target language, the dictionary only provides gender specification for German terms.

The dictionary is still available on the Polish market. It can be purchased in various Internet bookshops. One of them is the publisher website, which offers the dictionary for the price of 98 PLN. The dictionary can be installed on one station only.

However, a change of computer or an operating system, which involves re-installing the dictionary, requires contacting the seller of the dictionary for guidelines how to install the dictionary again.

### 2.2. *Internetowy leksykon geomatyczny* 'Internet Lexicon of Geomatics'

'Internet Lexicon of Geomatics' was originally released as a hard copy [2] in 2002. Only two years later the Polish Association for Spatial Information published *Internetowy leksykon geomatyczny* 'Internet Lexicon of Geomatics' [1] on its website. The editorial team, appointed in 2005, aims to extend and update the content of the lexicon. People interested in Geoinformation and Geomatics are encouraged to contact the editorial team if they want to propose new entries or modify the existing entries in the dictionary. The proposed information is verified by the team, and if correct – it becomes the part of the lexicon.

The new dictionary has a user-friendly interface. 'Lexicon' provides information on the literature it was based on. This information may be accessed by clicking on 'wybrana literatura'. Terms may be searched in the lexicon either by typing the term in the browser or by selecting the first letter of the term from the list of letters that is available at the bottom of the page in the 'Lexicon' section (Fig. 2).
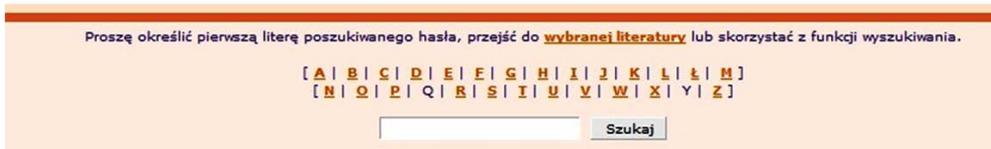


**Fig. 2.** Browsing options in the 'Internet Lexicon of Geomatics'

Source: [1]

If we select the first option, the term will be displayed if it is available in the dictionary. The second option will provide us with a list of terms that start from the selected letter. We have to click on the term that we are interested in. Terms in the lexicon are interlinked so if a definition of a term includes another term, it is presented as a cross-reference (orange underline) (Fig. 3).



**Fig. 3.** Interlinks between terms in the 'Internet Lexicon of Geomatics'

Source: [1]

In order to emphasise the contribution of users to the 'Lexicon', their names are given under definitions along with the date when the definition was entered/ modified (Fig. 4).
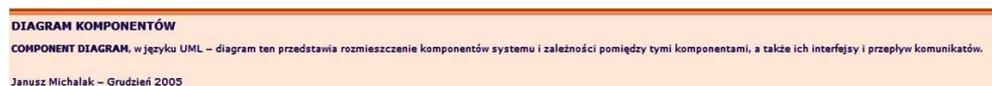


**Fig. 4.** Example of the definition that was modified by the user

Source: [1]

The 'Internet Lexicon of Geomatics', just like the printed version, encompasses 'The English-Polish Dictionary of Geomatics' which is available by selecting the British flag and switching to the English version of the website. It includes English headers and corresponding Polish terms linked to Polish definitions. It has exactly the same interface as the Polish-English 'Lexicon' (Fig. 5).
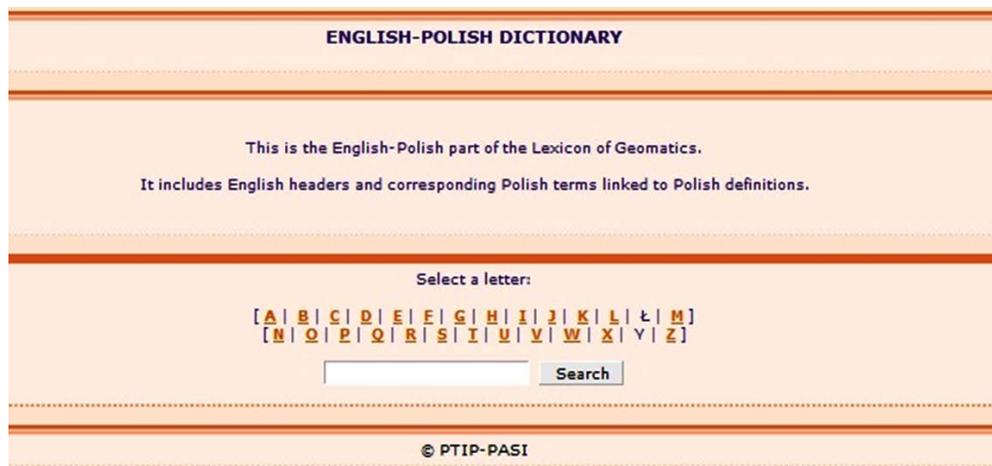


**Fig. 5.** The 'English-Polish Dictionary of Geomatics' available on the website of PTIP (2015)

Source: [1]

### 2.3. *Słownik geodezyjny angielsko-polski, polsko-angielski* **'English-Polish, Polish-English Land Surveying Dictionary'**

The dictionary was designed by Kwiatek [5] as part of her doctoral project at Swansea University in the United Kingdom. The dictionary combines knowledge of the land surveying field (the author has a degree in Land Surveying and Real Estate Management) with translation background and experience. It was designed using corpus linguistic methods and the lexicographic approach. The dictionary focuses on three fields of land surveying in particular: geodesy, cartography and GPS. For

these fields, corpora of texts (collections of texts) in the electronic form were compiled using text books, journal and magazine articles, and professional websites as the main source of data. Each of the corpora was compiled separately in English and Polish. The size of each corpus was approx. 40,000 words [5]. These corpora were later used to identify terms, find definitions, examples, etc. Terms and information that accompany them were later entered in the termbases in Access. A separate table was created for English terms and Polish terms. Each termbase contains such fields as:

- ID;
- Citation form;
- Abbreviation;
- Part of speech;
- Subject field (based on Encyclopaedia Britannica, Universal Decimal classification and classifications used in surveying textbooks the following subfields of land surveying were distinguished: Analysis and adjustment of errors, Satellite positioning system (GPS), Geodetic surveying, Topographic surveying, Cadastral surveying, Hydrographic surveying, Engineering surveying, Photogrammetry, Geographic information systems and Cartography);
- Definition;
- Source of definition;
- Examples (× 3);
- Source of examples;
- Synonym;
- Hyperonym (term denoting the more generic thing, e.g. *level* is a hyperonym of *spirit level*);
- Holonym (term denoting the whole, e.g. *GPS receiver* is a holonym of *antenna*);
- Entity type (describes the category to which a term belongs when there are difficulties in formulating definitions; entities may include: EVENT, STATE, THING, PROPERTY, PLACE, PATH, TIME, AMOUNT);
- Status (information on the quality of terms, typically it indicates standard body which uses a given term as the main term as other as synonyms, this category is useful in indicating reasons for which one form is treated as the term and others as synonyms);
- Notes;
- Author;
- Date;
- Equivalent.

When termbases were populated with data and equivalents were found for terms (nearly 500 terms in the English termbase and a similar number in the Polish termbase), termbases were published on-line.

The interesting feature of the dictionary was the user interface. Apart from selecting the search language (either English or Polish), the user could select whether

he is a translator or a surveyor. Depending on the type of user, different content of the dictionary was presented when viewing information. When the Surveyor option was chosen, the user could see the term, its definition and equivalents (Fig. 6).
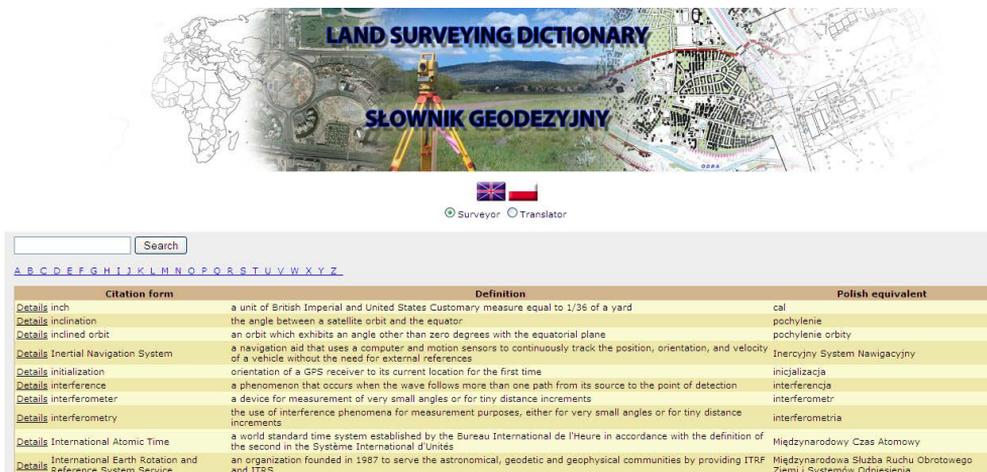


**Fig. 6.** Surveyor interface in the 'Land Surveying Dictionary'

Source: [7]

The user could change the user interface any time by selecting the Translator interface. It can be done by ticking the appropriate box located between the dictionary logo and the result box. Thus, the user gets access to complete information, which includes all categories in the Access databases mentioned above (Fig. 7).



**Fig. 7.** Translator interface in the 'Land Surveying Dictionary'

Source: [7]

As it is hard to read a great amount of data in this table, the user could change the display to a clearer one (Fig. 8) by clicking *Details* before the term (Fig. 7).



```
ID: 79
Citation form: International Atomic Time
Abbr: TAI
Gram info: NP
SF: GPS
Definition: a world standard time system established by the Bureau
International de l'Heure in accordance with the definition of the
second in the Système International d'Unités
Source of definition: Bannister et al. (1998: 169), modified by EK
Example 1: Because of irregularities in the rotation of the earth, TAI
has drifted out of step with the solar day.
Source of example 1: Bannister et al. (1998: 169)
Example 2: The time (TAI) was defined by the General Congress on
Weights and Measures in 1971.
Source of example 2: DeLoach (1994)
Example 3: International Atomic Time (TAI) is measured in the SI
second, defined in terms of vibrations of a cesium atom. It is
therefore not explicitly tied to the Earth's rotation, although that
was of course the motivation for the original definition of the second.
Source of example 3: Jones (2000)
Synonym:
Status:
Hyperonym: standard time system
Holonym:
Author ID: EK
Date: 2008-10-01 00:00:00
Notes:
Entity type:
Polish equivalent: Międzynarodowy Czas Atomowy
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**Fig. 8.** More convenient display of data in the 'Land Surveying Dictionary'

Source: [7]

Although the 'Land Surveying Dictionary' by Kwiatek [7] has a limited scope, it could be easily extended by adding new terms to the termbase. The crucial feature of this dictionary is the use of corpora as the source of data, which show how a given term is used in context. This feature is particularly useful to translators, who recently benefit from such dictionaries as Linguee or Glosbe[1] that rely on parallel (translation) corpora. As it has been already highlighted, the dictionary was designed in MS Access. It was published on the Windows server. The dictionary is available at http://surveying.azurewebsites.net/.

## 3.  Dictionaries Which Are Currently Not Available

Apart from dictionaries that may be purchased in bookstores or accessed on-line there are such land surveying dictionaries as *Słownik geoinformatyczny PAU* [4] which worked on-line for a limited period of time and are no longer available. As it was not published in any tangible form (book or CD-ROM) and the website where it was published is not working [4], the only traces of this dictionary may be found in the literature devoted to the description if its formalisms and operation [3].

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[1] http://www.linguee.pl/ (accessed: 10.04.2015); https://pl.glosbe.com/pl/en/ (accessed: 10.04.2015).

### 3.1. *Słownik Geoinformatyczny PAU*
### 'Multilingual Interdisciplinary Dictionary and Glossary
### of Terms for Geoinformatics of the Polish Academy of Arts
### and Sciences (PAU)'

The works on this interdisciplinary terminological dictionary were initiated in 2001 by the Geoinformatics Commission of the Polish Academy of Arts and Sciences (PAU) in Krakow. The dictionary was designed as an open Internet formula, which means that users can participate in the dictionary compilation.

The dictionary was divided into nine specialised areas which are fields related to land surveying. These are:

– Photogrammetry and Remote Sensing;
– Geology, Geophysics and Environmental Protection;
– Geography;
– Cartography;
– Geodesy and Spatial Information Systems;
– Mining and Mining Damages;
– Environmental Engineering;
– Soil Science;
– Computer Science.

A team of experts was appointed to work on terminology in each of these sub-fields. Each team is responsible for building and managing a termbase for its field. Each termbase contains such information on a term as: term name, its synonyms, short definition, examples of use, extensive characterization of the term and notes. The basis is to have one termbase in each field, but experts can set up additional termbases. For example, the field Photogrammetry and Remote Sensing contains two databases: the old one and the new one. The old one is a digital copy of the dictionary by Sitek [8] and the new one, whose entries can be updated when the need arises.

The open, Internet formula enables continuous, regular updates of the dictionary which are immediately made available to the users. The users can contribute to the dictionary by writing their notes in the designated field of the dictionary, by adding synonyms to the entries included in the dictionary or by suggesting new entries through the general box for comments and notes.

The repository of editors contains contact details of editors and co-authors of the dictionary so users can contact directly people who have full rights to the dictionary and are responsible for its appearance and content.

The dictionary is elaborated in five languages. The main language is Polish and other languages include: English, German, French and Russian. English is the language that combines records elaborated in different languages.

The structure of the dictionary can be extended by adding a new field or language any time. The authors of the dictionary expect to publish it in print when the compilation process is over. However, it will not stop editing work on the dictionary

as due to technological developments of the field the dictionary requires continuous verification and updating.

The dictionary was available under the following link:
 http://slownik.fotogrametria.agh.edu.pl/.

The user interface was built in such a way that the user needed to select the language version first (either English or Polish, where Polish is a default version) and to choose one of the nine fields (mentioned above) from the pick list. The next stage was to select languages. The most important was the first language (main language), which is the language in which headings and explanations are displayed. Searches are done in this language and new entries can be added in it, too. New subpages of the dictionary are displayed in the first language. The second language enables the entry of new terms in the second language, at least their names and definitions. By selecting the three other languages we can see entries in these languages when the search is done and compare this information. By clicking the name of the dictionary, i.e. *Słownik geomatyczny PAU* in the green box, we go back to the main page of the dictionary and can modify our search options [3].

The dictionary has three boxes under the languages selection area on the main page. These are: *Search*, *Edit* and *Verify*. The *Search* one is available to any user. By selecting this option, the user goes to the next page. On this page, the user can select the database in which the search is done (e.g. Photogrammetry and Remote Sensing have old and new bases), the search language and the entry presentation form. When the *Basic* form is selected, the user can see: term, its synonyms, definition, the English equivalent and English synonyms (if English was selected as the second language). When the *Complete* form is chosen, it is possible to view full information on terms which includes its extensive description, examples of use, notes, etc. The *User* option enables the user to define which fields they want to see. If a particular field where they can search entries and read them. The *Edit* and *Verify* options can be activated only by authorised users. *Edit* option allows users to add new records and edit existing ones, whereas the *Verify* option is used by reviewers to correct the proposed entries.

Each entry is accompanied with the *Discussion* box which by means of which the users can express their opinions and remarks on the term.

As it has already been mentioned, the dictionary encompasses photogrammetric dictionary by Sitek [8]. The printed version of 'Lexicon' of Geomatics [2] became the part of this dictionary, too. Although the dictionary had a great potential, it could be easily extended, modified and updated, for some reasons the work on it has stopped and it is no longer available.

## 4.   Conclusions

The evaluation of electronic land surveying dictionaries based on such criteria as language combinations, number of entries, data categories, layout/medium,

accessibility and availability can be illustrated with Table 1. Due to space restrictions, standardised language codes were used in the table: PL for Polish, RUS for Russian, DE for German, EN for English and FR for French.

The comparison of electronic and on-line land surveying dictionaries presented in Table 1 shows that on-line dictionaries offer more information on terms that electronic dictionaries. Whereas *Słownik geodezyjny polsko-angielsko-niemiecki* provides only terms, their equivalents and gender for German nouns, all on-line dictionaries include definitions of terms and some also examples of their use [4, 7]. In electronic and on-line dictionaries the role of Polish as the main language is not so prominent as in the paper dictionaries. It is due to the fact that these dictionaries offer the same browsing system for all languages. However, by analysing the content of these dictionaries it may be noticed that Polish is actually the main language in [1] and [4]. *Internetowy leksykon geomatyczny* does not provide equivalents for culture-specific concepts such as *REGON* in Polish. The fully bilingual dictionary makes an attempt to explain the meaning of such complex words even if direct equivalents do not exist. *Słownik geomatyczny PAU* has the Polish interface set as a default one which indicates the main language of the dictionary. *Słownik geodezyjny angielsko-polski, polsko-angielski* [7] has interfaces both in English and Polish and includes the same data categories for Polish and English. It was designed as a fully bilingual dictionary.

Another important feature of dictionaries is the subject field specification which enables to give a more precise meaning of terms. It was present in many paper land surveying dictionaries and it appears in [7] and [4]. It does not appear in the *Internetowy słownik geomatyczny*, which is more specialised than other dictionaries and its scope is narrowed to such fields as remote sensing, global positioning systems and geographic information systems. It may result in the small number of entries in this dictionary. However, it would be useful in [12], which has over 8,000 entries.

It may be noticed that all dictionaries presented in this article were created after 2000, while a flexible user interface and open formulas were designed after 2005, which may be treated as milestones in the evolution of specialised land surveying dictionaries. The number of on-line dictionaries will increase as they are cheaper to publish, modify and update than traditional dictionaries or even electronic dictionaries on CDs or DVDs. However, if they stop working there are no traces of them and they are no longer available to users unless they are also published on other media.

Internet dictionaries such as *Słownik geomatyczny PAU* or *Słownik geodezyjny angielsko-polski, polsko-angielski* offer convenient user interfaces which adjust the dictionary content to user's preferences. They can also allow users to participate in the process of dictionary creation. If they provide reach content and are based on real texts taken from original land surveying resources, they can be of great assistance to translators and technical writers who do not know the subject of land surveying so thoroughly as land surveyors. Such dictionaries make the process of looking for correct equivalents quicker and easier.

**Table 1.** Comparison of land surveying dictionaries

| Dictionary | Language combinations | Number of entries | Data categories | Layout/medium | Accessibility | Availability |
|---|---|---|---|---|---|---|
| *Słownik geodezyjny polsko-angielsko-niemiecki* (2005) | PL, EN, DE | 8,500 | Terms, equivalents, gender specification for DE nouns | CD, electronic dictionary with a browser and an index | License needs to be purchased, can be installed on one computer only | Available in the Internet book-shops, prices start from 98 PLN |
| *Internetowy leksykon geomatyczny* (2001) | PL, EN | Data not provided | PL part: terms, equivalents in EN, definitions of terms in PL, name of the author who entered the terms, cross-references to related terms | Electronic dictionary with a browser and an index, PL-EN Lexicon and an EN-PL glossary | Can be accessed without limitations | Available free of charge on the PTIP website |
| *Słownik geodezyjny angielsko-polski, polsko-angielski* (2012) | EN, PL | 500 entries | Surveyor option: IDs, terms, definitions, equivalents; translator option: enhanced with examples of use, sources of definitions and examples, synonyms, abbreviations, hyperonyms, holonyms, entity types, subject field specification, part of speech notes, equivalents | Electronic dictionary with a browser and an index, offering a translator and surveyor interface, dictionary based on corpora (collections) of real surveying texts | Can be accessed | Available to users free of charge |
| *Słownik geomatyczny PAU* (2005) | PL, EN, DE, FR, RUS | Data not provided | Basic option: terms, synonyms, definition, English equivalents and English synonyms, complete option: enhanced with: term description, examples of use, notes User option: fields selected by the user | Electronic dictionary with different user interfaces an open formula that enables users to participate in the dictionary creation | Cannot be accessed any more | Not available for purchase in any form |

To sum up, it is clear that the future belongs to on-line dictionaries with varied user interfaces which involve users in the process of their creation and which can be regularly updated, extended and modified with the help of users. Ideally, if these dictionaries could be based on corpora as they would provide real and complete evidence of term use in the language and would be of great help not only to land surveyors but also to translators and technical writers.

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