MEDICAL PHYSICS THESAURUS AND INTERNATIONAL DICTIONARY

S Tabakov[1,2], V Tabakova[1], M Stoeva[3], A. Cvetkov[3] , F Milano[4], S-E Strand[5], J-Y Giraud[6], C Lewis[7]

[1] King's College London, UK; [2] International Organization for Medical Physics; [3] AM Studio Plovdiv, Bulgaria [4] University of Florence, Italy; [5] University of Lund, Sweden; [6]Hospital Albert Michallon, Grenoble, France[7], King's College Hospital NHS Foundation Trust, London, UK;

Abstract

The paper describes the development of the first Thesaurus of Medical Physics Terms (currently c. 3500 terms) and its International Dictionary, currently including 29 languages. The Dictionary has been used as a foundation for the development of the EMITEL e-Encyclopaedia of Medical Physics. The project for the development of the Dictionary and its translation has attracted more than 200 senior colleagues. The paper gratefully acknowledges the contribution of all those colleagues, forming the largest international network in medical physics. Currently the Dictionary is one of the main Reference sources in the profession, used by more than 2000 colleagues per month.

I. INTRODUCTION

The quick international dissemination of the e-Learning materials of project EMERALD [1] during the late 1990-ies led to the need of an International Dictionary of Medical Physics. To address this need a sub-task was added to the next project EMIT [2] (an EU Leonardo da Vinci project, 2001-04) for the creation of a Dictionary of Medical Physics – alongside with the development of e-Learning materials in the field of Ultrasound and MR Imaging. Initially the Dictionary had to include 5 main languages (English, German, French, Italian and Swedish), however after the first announcement of the Dictionary a number of colleagues from other countries volunteered to include their languages and by 2013 the Dictionary included 29 languages. A number of papers have described the development of the e-Encyclopaedia of Medical Physics EMITEL [3,4,5]. This papers aims to describe the development of its predecessor and companion – The Medical Physics Thesaurus and International Dictionary.

II. THESAURUS OF MEDICAL PHYSICS TERMS

The first and most difficult task of the Dictionary was to develop a Thesaurus of Medical Physics Terms. To deal with this the Working Group of the partnership selected 20 well known books covering various fields of the profession. All these books were in English and this was the language used for the creation of the Thesaurus. The terms were formed of one or more words (e.g. Dose, Absorbed Dose, Absorbed Dose Conversion Factor, etc). The most important terms from these books were selected and listed in parallel tables. The initial list included almost 15,000 terms in English, but many were repetitions and old terms. Removing those reduced the number to about 8000. Following this the terms were grouped and distributed according to the filed (specialism). This process included the following main steps:

- Merging identical terms;
- Grouping the terms according to their field (large groups);
- Grouping synonyms (and some homonyms) the terms (small groups);
- Identifying other terms (from medicine, physics, chemistry, mathematics, etc) with specific use in Medical Physics;
- Creating a master table (Thesaurus) with Medical Physics Terms.

This way the first Thesaurus of Medical Physics was created, its initial number of terms being 3706. However this number included a small number of repetitions of terms known with their abbreviations (i.e. Modulation Transfer Function co-existed with MTF). At that stage this was necessary for formation of a printed alphabetical index.

Each term from the Thesaurus was assigned an ID number and from this moment all translations were based on the IDs of the English terms. Groups of translators were formed including specialists in the 6 main fields of the professions (Physics of: X-ray Diagnostic radiology, Nuclear Medicine, Radiotherapy, Ultrasound Imaging, Magnetic Resonance Imaging, Radiation Safety). General terms were covered by all translators.

Soon the initial 5 languages were joined by additional translations into Spanish and Portuguese (please see at the end list of the Translation Groups). Parallel tables for each translation were created (aligned as per the term ID), forming a multilingual database. This allowed smooth move from one language to another – i.e. cross-translation between any two languages.

III. EMIT CT DICTIONARY

The need for electronic dissemination of the first Dictionary led to the inclusion of software developers in the team (AM Studio) in 2003. At that stage the development of a further Encyclopaedia was already planned and the interface of the Dictionary was made to be able to display text associated with the respective term from the Thesaurus database (temporarily filled with an image with the logo of the project).

The first e-Dictionary was developed early in 2003 and was engraved on a Mini CD, together with demos of the e-Learning materials EMERALD and EMIT (Figure 1). The Mini CD included an executive file of the Dictionary and required installation on the PC of the user. The interface required selection of the two languages for the translation (from .. to…) and included the necessary fonts. This user-friendly design allowed very easy use of the Dictionary. There were three Dictionary windows: the Left Search window (From), where the user types the term; the Left Display window, which presented a limited list of the respective Language table from the database (from the Input Language); a Right (To) window presenting the translation of the selected text from the Output language (Figure 1). Search was performed in the usual way of handling databases - the user types the first letters of the term in the Left search window and these letters call the respective initial term from the list of terms in the Display window.

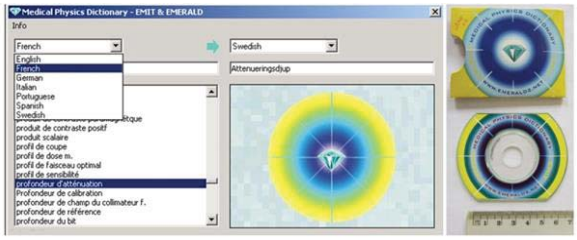

Figure 1. Screen shot of the Mini CD Dictionary and a photo of the CD.

One thousands of these Mini CDs were distributed free during the World Congress on Medical Physics and Biomedical Engineering in Sydney, Australia (August 2003). This distribution of the Dictionary and the Thesaurus of Medical Physics Terms triggered similar ideas for the development of similar Dictionaries in specific languages.

A special Conference (ICTP, Trieste, Italy, 2003) addressed the assessment of the Dictionary and found it extremely useful. This was supported by the use of the Dictionary during the International Medical Physics College on the following year (ICTP, Trieste, 2004). These two events and the World Congress triggered enormous interest in the Dictionary and a number of colleagues from various countries volunteered in the translation of the Thesaurus into their languages.

The novelty and comprehensive content delivered by the EMERALD and EMIT projects, as well as their global impact through our unique International Dictionary of Medical Physics Terms, led to the inaugural EU Leonardo da Vinci Award presented to the team of EMIT project (Maastricht, Netherlands, 2004) [6].

IV. WEB DICTIONARY

The inclusion of new languages in the Dictionary presented new challenges because of the different alphabets, which were difficult to be handled by the existing software. However at that time the current web technologies advanced enough to allow to transfer the Dictionary on the Web. A new domain was registered (www.emitdictionary.co.uk) and the new software was made by AM Studio (Figure 2).

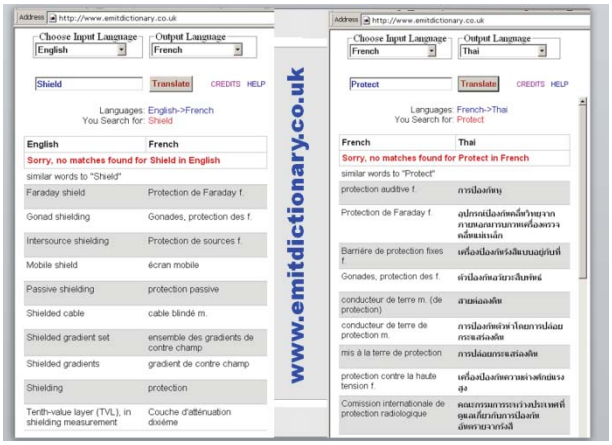

Figure 2. Screen shot of the first web design of the Dictionary

This Web Dictionary was using the users' Internet browser settings, hence it was working with various alphabets, as per the settings. This led to rapid expansion of the number of languages in the Dictionary.

The new web design included own search engine, what allowed direct search for terms, or part of terms, this way reducing the problems with possible misspelling.

The design again used a user-friendly interface with windows for Input and Output Languages and a small Search window for the term to be translated. The results were displayed as two parallel tables of corresponding terms (scrollable).

The new Web Dictionary was launched in 2005 and for several months attracted thousands of users. This led to further increase of the number of languages. This expanded use required a dedicated Coordinator to be used for providing link between the Groups of professionals translating the terms. A number of societies realised at this stage that no specific translation exists for some terms in their own language. The rapid development of the profession, often triggered by quick publications in English

had left some terms without sufficient coverage in the respective language. This triggered creation of national terms and respectively some changes in the Dictionary translations (all handled by the Coordinator and AM Studio).

V. EMITEL ENCYLOPAEDIA WITH DICTIONARY

The initial idea of a Dictionary of terms with explanations was developed in a new project EMITEL, which aimed at developing explanatory articles for each term (and at the same time expanding the number of languages in the Dictionary) [7]. This project was approved by the EU Leonardo programme during 2006 and was announced during the 2006 World Congress of Medical Physics and Biomedical Engineering in Seoul, South Korea [8]. While the previous EMIT project included as a partner the European Federation of the Organisations for Medical Physics (EFOMP), the new project EMITEL included as partner the International Organisation for Medical Physics (IOMP). These were the first large projects for both institutions, allowing them future inclusion and initiation of new projects and attracting respective funding.

A new web site was developed for EMITEL (www.emitel2.eu), handling both the Dictionary and the future Encyclopaedia [9]. New design was introduced (again by AM Studio, now a full partner to the project). It included a new web database, but still was using the initial parallel language tables, which proved very useful. Two Search Engines were designed – one of those being Multilingual (handling the Dictionary), the other one – in English, only for the Encyclopaedic entries (Figure 3) [10].

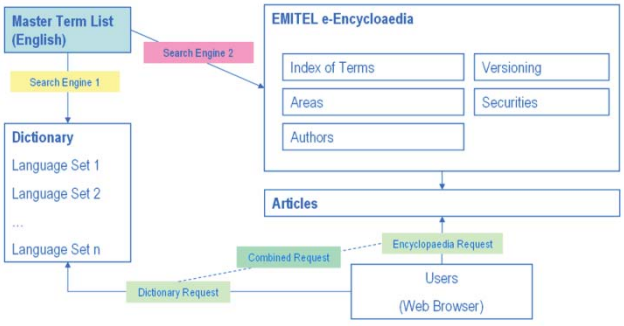

Figure 3. Diagram of the information flow of the EMITEL web site, including both the Encyclopaedia and Dictionary

During the process of this development the Thesaurus was updated due to the evolution of the profession in the past decade. To handle this the IDs of the existing terms were left 'as is' and a new continuation of the main English master file was made starting with ID 4000 (again including all new terms in alphabetical order from 4001 onwards). New 756 terms were added this way. However the existing terms (from the beginning of the project) were reduced with 990, excluding some terms which could be explained through other terms (and hence listed as similar to synonyms). Following this the overall number of terms in the Encyclopaedia was 3576. These final terms of the updated Thesaurus were explained in the Encyclopaedia with respective articles (and displayed in the Dictionary at www.emitel2.eu).

During the paper print of the Encyclopaedia (2010-12) the number of terms covered with articles was further reduced (mainly through merging of terms and excluding abbreviations), but the above number is still used on the web site.

VI. DICTIONARY USE AND CONCLUSION

Despite the fact that the Encyclopaedia web site www.emitel2.eu includes the Dictionary (used by many professionals), the old web site www.emitdictionary.co.uk is still alive and currently has some 1200 users per month. During the 3 months (April – June 2013) 4619 colleagues have used the old web site (Figure 4), while the new web site, including the Encyclopaedia and Dictionary, has been used by 10,174 colleagues.

Currently the Dictionary exists in 29 languages, translated by colleagues listed at the end of this paper. Thus the original 7 languages English, Swedish, Italian, French, German, Portuguese, Spanish, were supplemented by new 22 languages (as per their inclusion): Bulgarian, Czech, Estonian, Greek, Hungarian, Latvian, Lithuanian, Polish, Romanian, Slovenian, Bengal, Chinese, Croatian, Iranian, Arabic, Malaysian, Russian, Thai, Turkish, Japanese, Finnish and most recently Korean.

Figure 4. Statistics of web Dictionary use in the period Apr-June 2013 (for www.emitdictionary.co.uk)

Today, 10 years since its first introduction the Dictionary of Medical Physics Terms continues to be one of the most important references of the profession. Thousands of colleagues use it every month. The constant assessment and update of the Dictionary through the bi-annual College of Medical Physics in ICTP, Trieste (including colleagues from c. 30 countries in each College) keeps the Dictionary up-to date and in line with the development of the profession.

The first Thesaurus of Medical Physics Terms provided background for other Dictionaries and will be the starting

point of a number of new projects for the international expansion of the profession.

One very important outcome of the project was that it collated for the first time in the profession a team of over 200 specialists from 29 countries. These included senior officers of IOMP, EFOMP, AFOMP, ALFIM and Past and Present Presidents of 21 National Medical Physics Societies. ACKNOWLEDGEMENTS

EMITEL gratefully acknowledges the volunteering translation of the Dictionary made by the following Contributors (included in the EMITEL Network together with the Contributors to the Encyclopaedia):

English Terms Collection (Master file) - all EMIT and EMITEL project Consortium members

German Translation:

Dr Markus Buchgeister (Universitätsklinikum Tübingen); Dr Gunther Helms (Universitätsklinikum Tübingen); Dr Stefan Delorme (DKFZ Heidelberg)

French Translation:

Dr Alain Noel (Centre Alexis Vautrin, Nancy); Dr Jean-Yves Giraud (Hôpital Albert Michallon, Grenoble); Dr Hélène Bouscayrol (Service de radiothérapie, CHR Orléans); Mr Louis Blache (Bioconceil International, Nimes, France)

Swedish Translation:

Dr Inger-Lena Lamm (Universitetssjukhuset I Lund) [Swedish Coordinator]; Dr Monica Almquist (Universitetssjukhuset I Lund); Dr Thomas Jansson (Universitetssjukhuset I Lund); Dr Ronnie Wirestam (Lunds Universitet); Prof. Sven-Erik Strand (Lunds Universitet); Dr Bo-Anders Jonsson (Lunds Universitet); Dr Michael Ljungberg (Lunds Universitet); Prof. Freddy Stahlberg (Lunds Universitet)

Italian Translation:

Prof. Franco Milano (Universita degli studi di Firenze)

Portuguese Translation:

Dr Ana Pascoal [Portuguese Coordinator], (Universidade Catolica Portuguesa); Prof. Nuno Teixeira and Prof. Nuno Machado (Escola Superior Tec. Saude de Lisboa); Dr Paulo Ferreira (Portuguese Cancer Institute in Lisbon);

Spanish Translation:

Dr Ana Paula Millán [Spanish Coordinator] (Técnicas Radiofísicas, S.L. Zaragoza); Dr Alejandro García (Hospital Clínico Universitario Lozano Blesa. Zaragoza); Dr Ignacio Hernando (Hospital Universitario Río Hortega. Valladolid)

Polish Translation:

Prof. Marta Wasilewska-Radwanska [Polish Coordinator], Dr Aleksandra Jung, Dr Katarzyna Matusiak, Dr Zenon Matuszak (all from AGH University of Science and Technology, Faculty of Physics and Applied Computer Science, Department of Medical Physics, Krakow, Poland)

Thai Translation:

Prof. Anchali Krisanachinda [Thai Coordinator]; Prof. Sivalee Suriyapee; Mr Tanawat Sontrapornpol; Mr Panya Pasawang; Mrs Chotika Jumpangern; Mr Taweap Sanghangthum; Mr Isra Israngkul Na Ayuthaya; Mr Sornjarod Oonsiri (all from King Chulalongkorn Memorial Hospital, Bangkok, Thailand).

Hungarian Translation:

Prof. Paul Zarand [Hungarian Coordinator], Dr Istvan Polgar (Uzsoki Hospital, Radiation Oncology Dept, Budapest), Prof. Geza Safrany; Dr Tamas Porubszky (National Institute for Radiobiology and Radiohygiene, Budapest) Dr Janos Martos (National Inst. of Neurosurgery, Budapest) Dr Tamas Daboczi (Budapest University of Technology and Economics) Dr Jozsef Varga (University of Debrecen, Hungary)

Estonian translation:

Prof. Kalju Meigas (Tallinn University of Technology) Dr Kalle Kepler [Estonian Coordinator]; Mrs Sigrid Rootsmaa; Dr Jüri Vedru (University of Tartu, Estonia); MSc Eduard Gershkevitch

Lithuanian translation:

Prof. Diana Adliene [Lithuanian Coordinator], Prof. Arunas Lukosevicius, and Ms Dovile Serenaite (all from Kaunas University of Technology), Dr Algidas Basevicius (Kaunas University Hospital)

Romanian translation:

Mrs Daniela Andrei [Romanian Coordinator], National Commission for Nuclear Activities Control, Bucharest; Mrs Cristina Petroiu, INFORAD EXPERT SRL, Bucharest; Prof. Aurel Popescu and Prof. Octavian Duliu, University of Bucharest, Dr Raducu Popa, „Alexandru Trestioreanu" Oncological Institute, Bucharest; Prof. Constantin Milu, Institute for Public Health, Bucharest, Romania

Turkish translation:

Prof. Perihan Unak [Turkish Coordinator], Prof. Fatma Yurt Lambrecht, Dr Turgay Karalý, Dr Zumrut Biber Muftuler, Dr Serap Teksoz (all from Institute of Nuclear Sciences, Ege University, Izmir, Turkey)

Arabic translation:

Dr Farida Bentayeb [Arabic Coordinator], University Mohammed V Agdal, Rabat , Morocco; Dr Rachida El Meliani, University Mohammed V Agdal, Rabat ,Morocco; Dr Ibrahim Elyaseery and Dr Nagi Hussein, Garyounis Univ., Libya ; Dr Salem Sassi, Royal Marsden Hospital, London, UK

Greek Translation:

Dr Christofides Stelios [Greek Coordinator], Dr Kaplanis Prodromos, Mrs Kokona Georgiana, Mr Kaolis Demetrios, Mr Menikou Georgios, Mr Papaefstathiou Christos, Mr Yianakkaras Charalambos, Mrs Charalambous Dora, Ms Constantinou Demetra, Mr Gerogiannis Yiannis, Mr Heraklides Michalis, Mr Mikelides Andreas, Mr Papadopoulos Nicos, (all from Nicosia General Hospital, Cyprus); Dr Spyrou Spyros, Cyprus University of Technology; Mr Christodoulou Christodoulos, Private sector, Cyprus; Mrs Sissou Anastasia, Ministry of Labour and Social Insurance; Mr Christodoulides George, Consultant, Cyprus

Latvian Translation:

Prof. Juri Dekhtyar [Latvian Coordinator], Dr Aleksei Katashevs, Ms Lada Bumbure, Dr Juris Rauzins, Ms

Sandija Plaude, (all from Riga Technical University); Dr Dzintars Emzins, Dr Sergejs Popovs (from Oncological Centre of Latvia), Ms. Marite Chaikovska Radiation Safety Centre Latvia

Czech Translation:

Dr Ing. Ivana Horakova, [Czech Coordinator] CSc. (SURO, Prague); Ing. Josef Pacholik (SÚRO) Ing. Anna Kindlova (FN Motol Praha); Ing. Simona Trampotova (VFN Praha); Ing. Daniela Kotalova (VFN Praha); Prof. Ing. Václav Husak, CSc. (FN Olomouc); Ing. Jaroslav Ptacek (FN Olomouc);

Bengal Translation:

Prof. Golam Abu Zakaria (University of Cologne, Germany); Ms Hasin Azhari (Anupama) [Bengali Coordinator], Mr Md Akhteruzzaman, Mr Safayet Zaman, (all from Gono University, Dhaka)

Chinese Translation:

Dr Andy A Zhu [Chinese Coordinator] (David C Pratt Cancer Centre, St Louis Missouri); Prof. Wu Wenkai (Chinese Academy of Medical Sciences); Prof. Bao Shanglian (Beijing Key Lab of Medical Physics and Engineering); Prof. Geng Jianhua (Chinese Academy of Medical Sciences); Prof Yimin Hu (Cancer Institute CAMS Beijing); Prof. Yin Yong (Shandong Hospital Jinan); Prof. Zhang Jiutang (Hunan General Hospital, Changsha); Prof. Xu Xiao (Tianjin Medical Univertsity); Dr Dai Jianrong (Chinese Academy of Medical Sciences); Mr Dai Liyan (Shanghai Jiaotong University School of Medicine); Mr Dai Xiangkun (PLA General Hospital Beijing); Dr Wang Yunlai (PLA General Hospital Beijing); Mr Fu Guishan (Chinese Academy of Medical Sciences); Mr Geng Hui (Hong Kong Sanatorium and Hospital); Mr Wang Jianhua (Lihuili Hopsital, Zhejiang); Mr He Zhengzhong (Hubei Hospital, Wahan); Dr Xu Zhiyong (Fudan University, Shanghai); Mr Zhang Yue (TomoKnife Company Ltd, Beijing).

Bulgarian Translation:

Dr Jenia Vassileva [Bulgarian Coordinator] (National Center of Radiobiology and Radiation Protection); Prof. Petar Trindev (Medical Academy, Sofia); Dr Borislav Constantinov, Consultant, Sofia; Prof. Venceslav Todorov, Consultant, Sofia; Mr Anastas Litchev, Consultant, Plovdiv; Dr Slavik Tabakov, King's College London, UK

Russian Translation:

Prof. Valery Kostiliev, AMPHR [Russian Coordinator], Dr Nina Liutova, AMPHR; Dr Tatyana Ratner, Dr Boris Narkevitch, Mrs Marina Kislyakova (all from Cancer Research Centre, Moscow)

Malay Translation:

Dr David Bradley [Malay Coordinator], Surrey University, UK; Dr Suhairul Hashim, (University of Technology Malaysia)

Iranian Translation:

Prof. Alireza Binesh [Persian Coordinator], (Payam Nour Univ., Fariman, Iran); Prof. Azam Niroomand-Rad, Past President IOMP, USA; Dr Ali Asghar Mowlavi, (Sabzevar Tarbiat Moallem University, Sabzevar, Iran)

Slovenian Translation:

Prof. Ervin B. Podgorsak (McGill University Canada); Mr Bozidar Casar [Slovenian Coordinator]; Dr Vili Kovac; Mr Damijan Skrk; Ms Petra Tomse; Mr Boris Sekeres; Mr Urban Zdesar, Mr Urban Simoncic (all from Institute of Oncology Ljubljana)

Japanese Translation:

Dr Koichi Ogawa (Hosei University) [Japanese Coordinator]; Dr Katsuyuki Nishimura (Ibaraki Prefectural University of Health Sciences); Dr Kanae Nishizawa (National Institute of Radiological Sciences); Dr Suoh Sakata (National Institute of Radiological Sciences); Dr Hidetoshi Saitoh (Tokyo Metropolitan University); Dr Keiko Imamura (St. Marianna University)

Croatian Translation:

Dr Mario Medvedec [Croatian Coordinator]: Mr Jurica Bibic; Mrs Ana Buinac; Mr Hrvoje Hrsak; Mrs Sandra Kos; Mr Nenad Kovacevic; Prof. Srecko Loncaric (all from University Hospital Centre Zagreb, Croatia); Dr Tomislav Bokulic; Mrs Iva Mrcela (all from University Hospital Sestre Milosrdnice, Zagreb, Croatia); Dr Zeljka Knezevic; Dr Saveta Miljanic (all from Rudjer Boskovic Institute); Prof. Dario Faj (University Hospital Osijek, Croatia); Mr Slaven Jurkovic; Mrs Deni Smilovic Radojcic (all from University Hospital Centre Rijeka, Croatia); Prof. Igor Lackovic (Faculty of Electrical Engineering and Computing), Prof. Branko Breyer (Laboratory Breyer, Zagreb, Croatia); Dr Milica Mihaljevic (Institute of Croatian Language and Linguistics, Zagreb, Croatia)

Finnish Translation:

Prof. Hannu Eskola [Finnish Coordinator], Dr Paivi Laarne (from Tampere Univ. of Technology, Tampere, Finland)

Korean Translation:

Prof. Tae Suk Suh (Catholic Research Institute of Medical Science, Seoul), Dr Chang-Hoon Choi [Korean Coordinator] (MR Solutions Ltd., UK), Dr Wee-Saing Kang (Chair of Committee on Terminology , KSMP)

Dictionary Web Design:

Dr Magdalena Stoeva and Mr Assen Cvetkov (AM Studio Ltd, Plovdiv, Bulgaria)

Dictionary Coordinator:

Dr Vassilka Tabakova (King's College London, UK)

Overall Project Developer and Coordinator:

Dr Slavik Tabakov (IOMP, King's College London, King's College Hospital, UK)

VII. ANNEX: "HOW TO USE THE WEB DICTIONARY"

To use the Dictionary at WWW.EMITEL2.EU >> select *Dictionary* >> choose the Input and Output languages >> write the term you want to see at the window >> click Search. A list with terms is displayed, where the terms are found either as single word, or in combination with other words (the e-Dictionary assumes that the user's Internet

browser already supports the Languages). Terms without existing translation are in English.

To use the Encyclopaedic articles titles (quick search in English) >> select *Encyclopaedia* plus *Title* combo >> write the term you want to see in the window >> click Search. A list with terms is displayed – against each one is a blue hyperlink related to the area of the term >> click the hyperlink to read the article. This search covers only the titles of the articles. Some articles have two entries (related to two categories – e.g. Magnetic Resonance and Ultrasound) – in this case select the necessary cathegory.

To search for a specific word/title within the text of the entires the user has to select *Encyclopaedia* plus *Search in Full Text* combo >> specify the category/area of the search (e.g. Radiotherapy) and proceed as above. In case of UK or American/English differences try both spellings or search only part of the term.

To use both the Encyclopaedia + Dictionary >> select *Combined* and proceed as above (this search is limited only to the title of the article, not inside its text). The text and images of the articles allow copy/paste in another file (N.B. formula-related text is presented as image).

References

[1] EC Project 02620 (1995-98), EMERALD "European Medical Radiation Learning Development" (countries: UK, Sweden, Italy, Portugal)

[2] EC Project 129_308 (2001-04), EMIT "European Medical Imaging Technology Training" (UK, Sweden, France, Italy)

[3] Tabakov S, Roberts C., Jonsson B., Ljungberg M., Lewis C., Strand S., Lamm I., Milano F., Wirestam R., Simmons A., Deane C., Goss D., Aitken V., Noel A., Giraud J. (2005), Development of Educational Image Databses and e-books for Medical Physics Training, *Journal Medical Engineering and Physics*, Elsevier, vol.27, N.7, p 591-599.

[4] Tabakov S, (2008) e-Learning development in medical physics and engineering, *Biomedical Imaging and Intervention Journal*, vo.4, 1, p29-34

[5] Tabakov S, Smith P, Milano F, Strand S-E, Lamm I-L, Lewis C, Stoeva M, Cvetkov A, Tabakova V, EMITEL e-Encyclopaedia of Medical Physics with Multilingual Dictionary, in *Medical Physics and Engineering Education and Training – part I*, ISBN 92-95003-44-6, ICTP, Trieste, Italy, p 234-240

[6] Tabakov, S, (2005), First International Prize for Education and Training - The EU Leonardo Da Vinci Award - Comes to Medical Physics, *Medical Physics World*, v.21, No1, p 18

[7] EC project 162-504 (2006-2009) EMITEL "European Medical Imaging Technology Encyclopaedia for Lifelong Learning" (countries: UK, Sweden, Italy, Bulgaria, IOMP)

[8] Tabakov, S, (2006), IOMP Education and Training Committee - Short Report for the period 2003-2006, *Medical Physics World*, v.22, No2, p 16

[9] Stoeva M, Cvetkov A, Tabakov S (2009), Web site Development for EMITEL e-Encyclopaedia and Multilingual Dictionary, World Congress on Medical Physics and Biomedical Engineering, September 7 - 12, 2009, Munich, Germany, IFMBE Proceedings, 2009, Volume 25/12, 255-256, DOI: 10.1007/978-3-642-03893-8_72

[10] Stoeva M, Tabakova V, Cvetkov A, (2012), EMITEL – Global Reference Resource for Medical Physics – Upgrading the Web Management System to the Latest Technology Standards, World Congress on Medical Physics and Biomedical Engineering, 2012, Beijing, China, IFMBE Proceedings, 2012

Contacts of the corresponding author:

Author: Slavik Tabakov,
Institute: Department of Medical Engineering and Physics, King's College Hospital NHS Foundation Trust and King's College London, UK
Street: 124 Denmark Hill
City: London SE5 9RS, UK
Tel: +44 20 3299 3536
E-mails: slavik.tabakov@emerald2.co.uk; slavik.tabakov@kcl.ac.uk