In Poland 2011 is the year of Jan Heweliusz, or Johannes Hevelius (1611-1687). It is a good opportunity to remember and celebrate the astronomer's work. The PAS Gdańsk Library is the only library in the world where all the works by Hevelius has been gathered. *Johannis Hevelii Selenographia Sive, Lunæ Descriptio […]* and other works by the renowned Gdańsk astronomer are accessible in the Pomorska Biblioteka Cyfrowa (Pomeranian Digital Library: http://pbc.gda.pl/dlibra). Enjoy your astronomy adventure!

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The National Library of Lithuania

Virtual Electronic Heritage System: Digital Content and Electronic Services for Lithuania and Europe
Dr. Regina Varnienė-Janssen

The article introduces the national project „Development of the Virtual Electronic Heritage System", which is a follow-up of the 2005-2008 project.

Introduction

The recent strategic document of the European Commission "Europe 2020: A European Strategy for Smart, Sustainable and Inclusive Growth" and one of its flagship initiatives "A Digital Agenda for Europe" identifying 7 priority action areas – development of a single digital market, enhanced interoperability, internet trust and security, faster broadband, more sustainable investments in research and development, enhancing digital literacy, skills and inclusion, and increasing ICT benefits to society – give clear evidence that the provisions of "The Strategy for Digitization of the Lithuanian Cultural Heritage, Digital Content Preservation and Access" adopted by the Government of the Republic of Lithuania in 2009 have retained their currency up to the present day. "The Strategy for the Development of the Lithuanian Information Society in 2010-2015" defining one of its principle objectives as "fostering the Lithuanian language and culture by using information technologies" also confirms that creation of the digital content of the national cultural heritage and providing access to it remains one of the priority areas for the information society. This largely coincides with the

measure "Lithuanian culture in the information society" of the 3rd priority of Lithuania's "Action Programme for Economic Growth in 2007-2013".

The continuity of the information society policy against the European and national context makes a sustainable case for the paradigm of interaction between memory institutions involved in creation of the national digital content, which has considerably influenced the Lithuanian cultural policy. The most significant cultural policy document of recent years "The Strategy for Digitization of the Lithuanian Cultural Heritage, Digital Content Preservation and Access" and its Implementation Framework provide for a grant of EUR 17 391 304 for the realization of seven projects, all of which are under implementation.

One of the most important projects is "Development of the Virtual Electronic Heritage System" which has been recently granted a national status by the Ministry of Culture. It was launched by Martynas Mažvydas National Library of Lithuania together with 9 partners on 3 February 2010. Here is a brief overview of the project's background.

1. Methodology: a common approach to the cultural heritage

Preservation of cultural heritage objects and information about them is at the core of the mission of memory institutions: archives, libraries and museums. Blurring of sectoral boundaries between them could often be observed when taking into consideration memory institutions which, due to historical circumstances, sheltered cultural heritage assets that differed from the type of objects usually preserved at them. Though this "object type" factor still plays an important role in framing the organizational structure for memory institutions, it could hardly be argued, however, that a work of art, the authorial manuscript of this work or a review of this same work – all of them share the same cultural and historical context, and provide evidence of comparable cultural features. With the purpose to achieve consistency between the cultural heritage content and presentation of information about this content, IFLA, CIDOC, ISO and other communities have started developing common conceptualization of information about the cultural heritage preserved by archives, libraries and museums. In this context, the results achieved by the International Working Group on FRBR/CIDOC CRM Harmonization are very encouraging with respect to the implementation of an integrated common ontology for the information accumulated by both libraries and museums. This, in its turn, will ensure integrity of the cultural heritage content and convenient access under the Semantic Web environment.

We could finally admit, with some satisfaction, that the initiative started by the Centre of Bibliography and Book Science at Martynas Mažvydas National Library of Lithuania, which originated in a request for financial support from the European Structural Funds, has developed into a common methodological approach to cultural heritage digitization and access with respect to modeling, standards, recommendations and practices. The methodology has been:

– defined in the following strategic documents: "A Concept for Lithuanian Cultural Heritage Digitization"; "The Strategy for Digitization of the Lithuanian Cultural Heritage, Digital Content Preservation and Access" and "The Implementation Framework for the Strategy for Digitization of the Lithuanian Cultural Heritage, Digital Content Preservation and Access 2009-2013";

– implemented within the Virtual Electronic Heritage System (*Virtuali elektroninio paveldo sistema* – VEPS) and the portal of the cultural heritage www.epaveldas.lt;

2. Objectives
2.1. New paradigm in the legislation on the cultural heritage: concept, strategy and implementation framework

A step of major significance for the Lithuanian cultural policy, which lay the groundwork for the interaction of memory institutions, was "A Concept for Lithuanian Cultural Heritage Digitization".[1]

The Concept defines the objective, goals and principles of cultural heritage digitization, also common selection criteria for objects to be digitized, setting the foundation for consistent and purposeful activities by memory institutions in securing and maintaining currency of the nation's cultural heritage as well as enhancing access to it. On the basis of the Concept, coordination and monitoring of the support for cultural heritage digitization on a national level is carried out by the Ministry of Culture of the Republic of Lithuania together with the Ministry of Education and Science, Information Society Development Committee under the Government of the Republic of Lithuania and the Office of the Chief Archivist of Lithuania under the Government of the Republic of Lithuania. They also present suggestions for efficient realization of this support to the Council on Digitization of the Lithuanian Cultural Heritage.

The Concept, however, does not define organization of digitization activities and funding of these activities. This imperfection prompted the author of this report to initiate further updating of the regulatory framework. The initiative group summoned by the author of this article developed a draft project for a digitization strategy and presented it to the Ministry of Culture. After a general debate by the team from the Ministry of Culture and the Council on Digitization as well as a public debate, "The Strategy for Digitization of the Lithuanian Cultural Heritage, Digital Content Preservation and Access" and its "Implementation Framework 2009-2013"[2] were approved and adopted by the Government of the Republic of Lithuania on 20 May 2009. These strategic documents will help to expand the existing infrastructure for the purpose to create a single digital space of the cultural heritage information, extend the lifetime of cultural heritage objects, provide current and authoritative information about the Lithuanian cultural heritage in the virtual environment and facilitate preservation and promotion of Lithuanian culture in a globalized world.

To give a concise description of the purpose of the Strategy, the main emphasis should be on provisions that define coordination of digitization activities through digitization centres. Their role is to be taken by institutions having the most prolific experience in digitization and providing access to the digitized material: Martynas Mažvydas National Library of Lithuania, the Lithuanian Art Museum and the Office of the Chief Archivist of Lithuania. The establishment of such competence centres within national memory institutions facilitated selection of cultural objects to be digitized and compiling lists of such objects. The centres' remit includes provision of manifold methodological assistance and training services for the professional community as well as invariable concern about financial support, which could be obtained in line with the guidelines provided in the above-mentioned strategic documents.

The vision of the Strategy manifests itself as a single digital information space of the Lithuanian cultural heritage, which extends the lifetime of cultural heritage objects; provides current, exhaustive and authoritative information about the Lithuanian cultural heritage to the European and worldwide public; ensures permanent and reliable use of cultural heritage resources for research, educational and cultural purposes. The Strategy aims at promoting digitization activities among memory institutions, ensuring long-term preservation of the Lithuanian cultural heritage, its integration into the global digital space and worldwide access to it.

The Strategy aspires to:

– create a seamless system of cultural heritage digitization and guarantee its reliable functionality;
– develop and expand the virtual system of the digital cultural heritage combining search, preservation and access features;
– standardize cultural heritage digitization, preservation and access workflows;
– digitize cultural heritage objects and deliver their content into the common Web portal of the cultural heritage;
– encourage initiatives on cultural heritage access.

It must also be taken into consideration that the adopted Implementation Framework for 2009-2013 provided a foundation for seeking sustainable funding options both from the state budget and the EU Structural Funds. Priority should be given to projects that provide possibilities for participation in multi-partner activities of creating a single digital information space of the Lithuanian cultural heritage and integration of its objects into the digital system of the cultural heritage and the common Web portal.
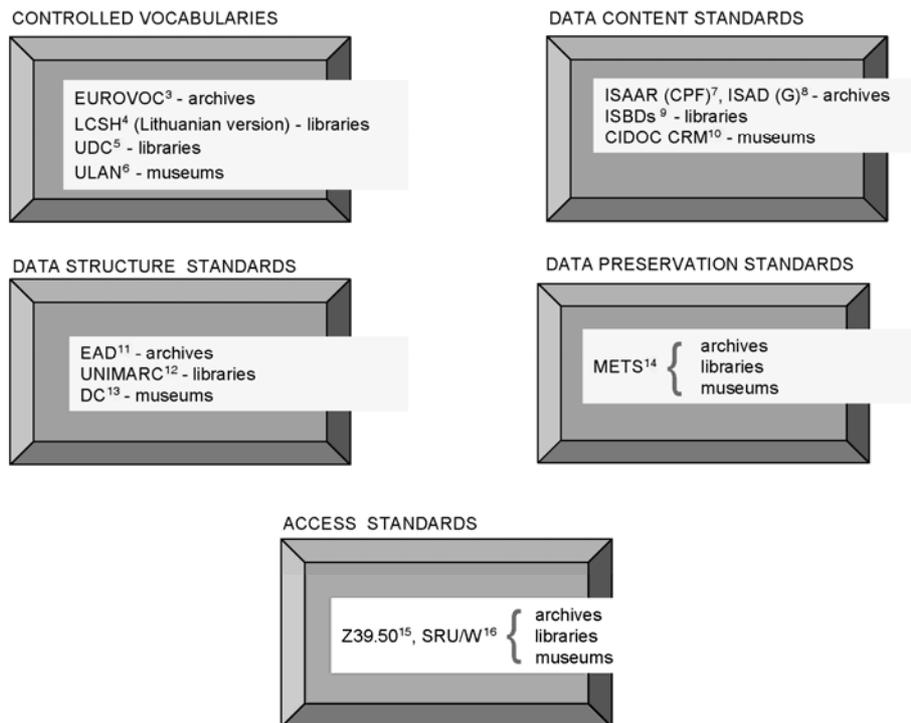
2.2. Shared standards within the Virtual Electronic Heritage System

Expansion of digitization activities has stimulated development of an integrated shared ontology for the information about the collections held by memory institutions. It was only a short time ago that shared standards started to be applied for most of the digital repositories and access systems set up by memory institutions. Prior to that, the absence of concern for application of shared standards prevented consistency in the access to the digital content and its retrieval. Therefore the above-mentioned strategic documents on cultural heritage digitization give special prominence to the necessity for a common ontology, and a goal has been set to have shared digitization standards adopted in order to coordinate projects and initiatives undertaken by memory institutions, ensure compatibility of cultural heritage repositories on a national level and their integration into the European digital space.

Currently the National Library together with the project partners, the Office of the Chief Archivist of Lithuania and the Lithuanian Art Museum, are the only institutions adhering to shared standards for metadata and digital object archiving, preservation and access.

Application of shared standards is essential, because they call for integrity of the digital content and more qualitative information resources, where objects can be browsable, searchable and identifiable within a hierarchy system.

To achieve interoperability with national memory institutions, the European Digital Library (EDL) (www.theeuropeanlibrary.org) and Europeana (www.europeana.eu/portal), the following standards have been applied within VEPS:

CONTROLLED VOCABULARIES

EUROVOC[3] - archives
LCSH[4] (Lithuanian version) - libraries
UDC[5] - libraries
ULAN[6] - museums

DATA CONTENT STANDARDS

ISAAR (CPF)[7], ISAD (G)[8] - archives
ISBDs[9] - libraries
CIDOC CRM[10] - museums

DATA STRUCTURE STANDARDS

EAD[11] - archives
UNIMARC[12] - libraries
DC[13] - museums

DATA PRESERVATION STANDARDS

METS[14] { archives libraries museums

ACCESS STANDARDS

Z39.50[15], SRU/W[16] { archives libraries museums

Shared standards within VEPS

2.3. Access solutions

For access to VEPS, the portal www.epaveldas.lt, which employs SRU/W, Z39.50 and OAI.(since 2011) has been created. Since VEPS has been designed for provision of visual information, digital objects within this system also contain descriptive metadata. The user interface permits switching to extensive records within LIBIS (library system), LAFSIS (archives system) and IRIS (museum system). For this purpose, a reciprocal linking system has been introduced, i.e. there is a link between each object and its relevant description in the source system, and vice versa. Permanent HTTP links between objects within VEPS are retained: even with changes occurring within the Virtual System, the links will remain intact. The structure of the link is the following:
http://www.epaveldas.lt/vbspi/biDetails.do?libisId=C1R0000046342. Here
http://www.epaveldas.lt/vbspi/biDetails.do is the permanent part, and
libisId=C1R0000046342 is the variable part, which corresponds to the value of field 001 of the UNIMARC record.
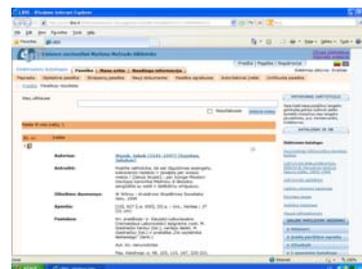

Fig.1. DC metadata and digital objects

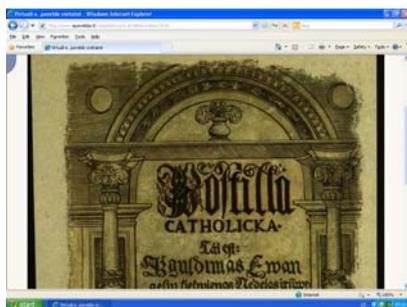Fig. 2. Extensive record within LIBIS

Fig. 3. Digital image of *Postilla* by Mikalojus Daukša

3. Development of VEPS
3.1. Objectives

On 3 February 2010, the following objectives were defined:
- expanding the network for creation of the cultural heritage content by establishing new digitization centres and units;
- development and improvement of VEPS;
- ensuring digitization of cultural heritage objects and access on the basis of interaction of memory institutions defined within strategic documents, received financial grant and the methodology for this interaction created within the project of 2005-2008 and based on shared standards, a common virtual electronic heritage system and Web portal.

The project received the financial grant of EUR 3 700 000.

3.2. Content

During the first phase of project, we succeeded to digitize only a small portion of the national published heritage. Therefore participation in the project of the main Lithuanian research libraries, i.e. Vilnius University Library and Wroblewski Library of the Lithuanian Academy of Sciences, is of major significance. Their contribution will enable fixing the gaps on the portal www.epaveldas.lt, which reflect the absence of some documents within the collections of the National Library: for example, some most valuable heritage content from the 16th-19th centuries will find its place on the Web portal. The portal will also be enriched by digital copies of Lithuanian, Polish and Yiddish newspapers issued in Lithuania, and newspapers in the Lithuanian language published outside Lithuania during 1918-1940. The scope of the digital content will expand by adding sound materials – the National Library is ready to start digitization of old shellac records, thus reviving famous Lithuanian performers of the past.

VEPS will be significantly enriched with Lituanistic content, as agreements with 82 Lithuanian publishers from abroad have been signed regarding digitization of 82 publications and their presentation on the portal www.epaveldas.lt. During the new project, 2 million pages, or 78 585 cultural heritage works from the collections of archives, libraries and museums, will be digitized. In addition to the already mentioned shellac records and books, we will pursue digitization of church birth record books and works of fine and applied arts, which will be delivered to the VEPS and the portal www.epaveldas.lt. It will enable anyone wishing to get acquainted with the national cultural heritage objects to get prompt and easy access to them irrespective of one's location.

The project has achieved the following results:
- the infrastructure of digitization centres has been expanded;
- new software has been created;

- digital cultural heritage content has been enriched by 78 000 objects (2 295 506 pages).

Electronic services are being further developed: the portal www.epaveldas.lt is being improved and expanded by increasing the extent and variety of cultural heritage objects delivered to it. Along the way, the system is being optimized for supporting high levels of content search and retrieval based on a common cultural heritage ontology (CIDOC CRM) and the user-oriented architecture, i.e. SOA tools.

The software applications used will employ the CIDOC CRM-based BAVIC (Common Thesaurus of Personal Names, Geographical Names and Historical Chronology) model, which pursues the following goals:
- establishment of a universal method for presentation of historical, chronological and biographical data in the digital environment;
- consolidation of the general scheme for historical chronology, historical geography and historical biography;
- setting standards for presentation of space, biographical and chronological data in the digital environment;
- setting the management of the digital cultural heritage information;
- enabling geographical, historical and personal names related classification of cultural heritage objects;
- creation of a model for integration of all historical, biographical and geographical data within a single system;
- introducing a common and integral digital form for diverse heritage object data;
- analysis of cultural heritage objects and their dating;
- framing of cultural evolution schemes.

Conclusions

1. A common methodological approach to digitization of the cultural heritage and access grounded on "A Concept for Lithuanian Cultural Heritage Digitization" (2005) and "The Strategy for Digitization of the Lithuanian Cultural Heritage, Digital Content Preservation and Access" (2009) has developed in Lithuania.
2. The established Virtual Electronic Heritage System (VEPS), being based on shared standards, ensures integrity of the digital content and convenient access to it.
3. Further development of the Virtual Electronic Heritage System will involve enrichment of the digital content by adding diverse cultural heritage objects and improving access to this content with the help of a common cultural heritage ontology (CIDOC CRM) and the user-oriented architecture (SOA tools).

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[3] EUROVOC [retrieved 24 April 2009], http://www3lt/pls/ev/ev.main
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[7] ISAR(CPF) : international standard archival authority record for corporate bodies, persons, and families [retrieved 24 April 2009], http://www.ica.org/en/node/30004

[8] ISAD(G) : general international standard archival description. 2nd ed. ICA, Ottawa, 2000 [retrieved 24 April 2009], http://www.ica.org/sites/default/files/isad_g_2e.pdf

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ISBD(CM) : kartografinės medžiagos tarptautinis standartinis aprašas. Vilnius : Lietuvos nacionalinė Martyno Mažvydo biblioteka. Bibliografijos ir knygotyros centras, 1999.
ISBD(CR) : serialinių leidinių ir kitų tęsiamųjų išteklių tarptautinis standartinis bibliografinis aprašas. Vilnius : Lietuvos nacionalinė Martyno Mažvydo biblioteka, 2007.
ISBD(G) : bendras standartinis bibliografinis aprašas. Vilnius : Lietuvos nacionalinė Martyno Mažvydo biblioteka. Bibliografijos ir knygotyros centras, 1995.
ISBD(M) : monografinių leidinių tarptautinis standartinis bibliografinis aprašas. Vilnius : Lietuvos nacionalinė Martyno Mažvydo biblioteka. Bibliografijos ir knygotyros centras, 1997.
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