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MEDIÆVAL SLAVONIC WRITTEN CULTURAL HERITAGE IN THE E-WORLD: THE BULGARIAN EXPERIENCE

The article presents the experience on digitisation of mediæval manuscripts in Bulgaria where the most extensive work have been done in the field of manuscript cataloguing in electronic form, while efforts on digital imaging and text corpora have not been launched on a wide scope. We compare the outcomes of the Bulgarian experience to the Lund principles manifesting the current European trends in digital preservation and access to cultural heritage. We present a SWOT analysis, which shows the most important directions for work in the field taking into account the local experience. To illusrate the topic, we describe a current endeavour of the Institute of Mathematics and Informatics at the Bulgarian Academy of Sciences, aimed at the development of a tool for Internet publishing of manuscripts.
The current status in digitisation of manuscripts' field in Bulgaria could not be considered as a unique one, because similar problems are faced in many countries of the Central and Eastern Europe and the NIS. We believe that the experience presented here will serve as an interesting example to other people interested in this field and will boost future joint endeavours.

Key words: digitization, Bulgaria, mediaevel Slavonic manuscripts

Introduction: The Achilles and the tortoise paradox

Developing information technologies' applications in any domain is somehow similar to the *Achilles and the Tortoise Paradox* of Zeno of Elea (5th century BC). Let us remind briefly: in a race with Achilles, the tortoise is given a head start. Before the mythical hero, famous for his fast running, can overtake the tortoise, he must run to the point A where the tortoise was in the time he started, but meanwhile the tortoise has moved on to some other point B. From point A Achilles now has to reach point B, while the tortoise is already at point C. This goes on forever, and Achilles can never win the race. Mathematics provides solution to this paradox. But in most technological fields nowadays development reminds this never-ending competition. At the time when a technology starts to be developed, it follows in the best case the most modern methods. But at the time when the technology is implemented in practice, it is already obsolete in some sense. This raises the crucial issue of the choice of an approach, which would allow continuation of the work and avoiding efforts to transform the existing data into some new format, which would be equal to these of starting the whole work from the very beginning.

When we speak about digitisation efforts, there are several factors that should be taken into account: volume of resources; data formats; storage, processing and usage tools. Having in mind that digitisation is aimed at presentation of vast resources, we would not like to start this work from the beginning every ten years, because data formats and tools meanwhile changed dramatically.

In fact, should we see our role as the Achilles' one, trying to reach some target which is always on move? When we speak about digitisation of Slavonic mediæval written cultural heritage, the examples of finished and generally accepted work are quite scarce. This article does not give a definite recipe what and how should be done in the field of digitisation of Slavonic manuscripts, but shares experience hoping that this will contribute to the development of joint endeavours in this field. It is written with the view that these endeavours should be placed on the 'tortoise' position. Is that possible at all? Yes, if we can define what in this field will be most stable and would allow continuous use and development.

Digitisation – Narrow and Broad View

The narrow view on digitisation of cultural heritage is restricted to digital imaging (for a good tutorial on this topic, see [Tutorial]). We will stick to the broader view on digitisation, which corresponds to the one presented in [Ognjanović 02]:

> *"Digitisation of the cultural and scientific heritage means creating multimedia databases containing images, movies, sounds, factual data, etc., and descriptions of items (paintings, sculptures, monuments, old texts, scientific journals and books, …) that constitute the heritage."*.

To implement in practice a general framework for the presentation of the cultural heritage, several issues need serious discussion:

- **Data:** this view unifies various data types, which not only have to be presented in a proper way assuring long-lasting conformance to quality standards, but also coming from different data providers. For example, libraries might be able to contribute by preparing manuscript descriptions and giving access to capture the images, but usually their staff cannot cover the text entry and annotation (in the case of written cultural heritage). The obvious suppliers of annotated texts in computer form could be the research groups, but should they take care for the image capture or catalogue descriptions of the respective sources?
- **Methods:** The modern information technologies (IT) are still not meeting a common ground for the Slavonic cultural heritage. Adopting available state-of-the-art with the specific features of the materials is the only possible approach.
- **Target groups**: The presentation of cultural heritage should be flexible in order to serve different target groups. Of special importance amongst them is the target group of citizens as a whole and the group of specialists. Traditionally, the efforts of publishers and first computer attempts were aimed at serving the needs for research. The World Wide Web changes completely the accent: what is available there, is open ideally for people with

all sorts of background and interests. How should we present our cultural heritage to such an audience?

– **Scope of effort**: unfortunately, digitisation policies are not yet in the focus in many countries of our region. The constitution of a National Digitisation Centre in Yugoslavia is one happy exception, which should contribute to unifying the efforts in various institutions in the country.

The current European trends and the status of the Slavonic cultural heritage

The Cultural Heritage Applications Unit of the Information Society Directorate General of the European Commission has organised an experts' meeting held in Lund in April 2001 [Lund Principles 01]. The conclusions of this meeting are popular as the **Lund Principles.** Prescriptions for specific actions are given in the **Lund Action Plan**. In summary, the Lund Principles put emphasis on *making visible and accessible the digitised cultural and scientific heritage of Europe*; *coordination of efforts*; *development of a European view on policies and programmes*, as well as of *mechanisms to promote good practice in a consistent manner*. The key message is expressed as follows [Lund Principles 01]:

> *"Europe's cultural and scientific knowledge resources are a unique public asset forming the collective and evolving memory of our diverse societies and providing a solid basis for the development of our digital content industries in a sustainable knowledge society."*

With the acceptance of the first Slavonic countries in the European Community, a clear gap in the European electronic space will be encountered. It reflects the presentation of the Slavonic cultural and scientific heritage, which currently is accessible with great difficulty.

The basic issues raised in the Lund principles do not apply to our collections. *Making visible and accessible the digitised cultural and scientific heritage of Europe* does not involve Slavonic materials because they are still scarce; *coordination of efforts* still has to be built; *development of a European view on policies and programmes* seems a lofty goal on the background of missing national policies in most of the countries; *mechanisms to promote good practice in a consistent manner* still need to be designed and introduced.

One of the basic concerns of EC cultural heritage institutions nowadays is the adoption of brand-new IT, such as digital asset management systems (DAMS), new human-computer interfaces, games technologies, radio-frequency identification tags (RFID), etc. (see, e.g., the DigiCULT report [Ross et al. 03]). The institutions dealing with Slavonic sources still do not have a common solution for traditional IT-supported tasks. The manuscripts, the oldest dating back to the ninth century, are not digitalised (with certain exceptions); only facsimile copies of some of them are available.

In this respect, the actions from the Lund Action Plan, which are most relevant to our current setting, are

– Supporting coordination activities.
– Promotion of good practice.

Another priority field should be also considered:

- Discovery of digitised resources (national inventories, discovery of digitised content).

It is important to mention, that the European Commission does not set as a priority the digitisation work itself —it is considered that major efforts were already done, or it will be supported by other sources. Generally speaking, we still need support for *mass* digitisation adapted to the specific features of our cultural and scientific heritage.

What Can be Learned from the Bulgarian Experience?

Collections in Bulgaria.

Only in Bulgaria, over 12500 manuscripts of Slavonic, Greek, Latin, Ottoman Turkish and other origin are being stored. Bulgarian institutions also keep the third largest collection in the world following Italy and Greece of epigraphic inscriptions from the Antiquity period. It is obvious that such materials are of interest not only for the local community, but also on a European and global scale.

This set of resources is still hardly accessible in its fullness not only to foreign experts, but also to regional experts. Electronic cataloguing and digital preservation are still not popular in the region.

Brief History of Digitisation Initiatives

The first initiatives in this field were launched about 15 years ago by research institutions and companies. A national strategy and funding for digitisation programmes has not been available since the very beginning of work. Actual work on digitisation has not been done on large-scale basis yet.

The first field where computers were introduced in the late 80es-early 90es of the last century was *cataloguing*. The **ISIS** library cataloguing software was introduced in Bulgaria and tested in the National Library "St. Cyril and St. Methodius". However, major cataloguing effort has not been started in that time, because of the limitations of the model. Already in this first introduction of computers the expectations that the new technologies would assist the work of specialists in mediæval manuscripts, had not overcome the fact that these specialists did not like the model built in the system.

A next effort in the field of electronic presentation of manuscript data is the project called **The Repertorium of Old Bulgarian Literature and Letters**. The project was started as "…an archival repository capable of encoding and preserving in SGML (and, subsequently, XML) format of archeographic, palæographic, codicological, textological, and literary-historical data concerning original and translated medieval texts represented in Balkan Cyrillic manuscripts" [Repertorium]. The project grew out of an initiative of D. Birnbaum (University of Pittsburgh), A. Bojadžiev (University of Sofia), M. Dobreva (Institute of Mathematics and Informatics, Bulgarian Academy of Sciences), and A. Miltenova (Institute of Literature, Bulgarian Academy of Sciences) in 1994. The computer model is discussed in [Dobreva 00]. Currently there are 300 manuscript descriptions available in the Institute of Literature of the Bulgarian Academy of Sciences. The major publication on this endeavour is [MB 00].

Adoption of MASTER—Manuscript Access through Standards for Electronic Records for Cataloguing of Old Bulgarian Manuscripts. MASTER was a European project funded under the Framework IV Telematics for Libraries programme [MASTER]. It developed a TEI[1]-conformant DTD for mediæval manuscripts with the ambition to serve the needs of all repositories in Europe, and software for making and visualising records on manuscripts. The MASTER standard (may be with small revisions) should be adopted by the TEI in May 2003. The National Library "St. Cyril and St. Methodius" and the Institute of Mathematics and Informatics joined MASTER as associated members. They made 30 descriptions of manuscripts with two basic aims: to test descriptions providing data both in English and Bulgarian, and to supply examples coming from the non-Latin literary tradition.

Although the *Repertorium* and *Master* project are oriented to the same standard framework, the models underlying both projects are different (i.e. they contain different sets of elements structured in diverse ways).

In addition to these cataloguing efforts, some companies oriented towards creating CD-ROMs (four CD-ROMs already exist, two of manuscripts from the National Library 'St. Cyril and St. Methodius', one of Macedonian coins and one of Bulgarian Iconography).

Beyond the manuscript field, an interesting project was launched to present one of the most interesting historic buildings in Bulgaria—the Boyana Church in 2000-2002 [Boyana]. This is the first computer-based 3D model of a Bulgarian monument of culture. Author of this project is Trifon A. Trifonov.

In addition, Bulgaria hosted a number of international events related to digitisation of cultural heritage. The First International *Conference Computer Processing of Medieval Slavic Mauscripts* was held in Blagoevgrad in 1995 (see [BBDM 95]). The UNESCO workshop *Text Variety in the Witnesses of Medieval Texts* was held in Sofia in 1997 (see [Dobreva 98]). The conference *Electronic Description and Edition of Slavic Sources* took place in Pomorie in 2002. The Institute of Mathematics and Informatics organised a series of summer schools in 1998, 1999 and 2002 aimed at enlarging the international community of young specialists who would share their experience, and form co-operation ties.

Some Conclusions

From this brief presentation of digitisation-related experience, it is easy to see that the major field where experience was gained is electronic cataloguing of manuscripts. Yet, we cannot speak about a complete consensus between different teams, using separate catalogue descriptions. While this promotes diversity in approaches, it also illustrates that there is a lack of efforts integration, which on the long term run leads to dissolved results. Such disagreement is also contradictory to the European recommendations expressed in the Lund principles.

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[1] Text Encoding Initiative, see [TEI].

SWOT Analysis of the Current State

Traditionally, SWOT (strengths—weaknesses opportunities—threats) analysis can help us to make conclusions about priorities for action. Setting properly priorities in the field of Digitisation is not easy because of the numerous factors which has to be taken into account. We will use the analysis to suggest answers to the following questions:

  – What should be done more of and what—less of?
  – What activities should be stopped and what—started?
  –

Strengths	Weaknesses
– Experience on the different parts of the process – Knowledgeable staff – Learning from the experience of others	– Lack of enthusiasm – Lack of simple forms of access for the specialists and the general public – Intellectual property rights (IPR) issues – Insufficient institutional investment and commitment
Opportunities	**Threats**
– A chance to start major effort on a common grounds – Support for cultural diversity and education – Digitised resources of great variety and richness	– Lack of dialogue – Fragmentation of approach – Someone else will make the framework or it will never be done – Lack of synergies between culture and new technologies – Funding

Strengths (or what can we capitalize)

  1. *Experience on the different parts of the process.*
The last decade helped to try different paths in the field of digitisation (in cataloguing, digital image capture, text analysis). This experience is of high value for all future endeavours.
  2. *Knowledgeable specialists*
It is understandable that specialists in the field of Slavonic studies, who form the greater knowledgeable community in the subject, work in the Slavonic countries. They also had the greatest chances to work with the sources *in situ*. The knowledge of all these people should be incorporated into any future developments.
  3. *Learning from the experience of others*
Since digitisation efforts were launched in many different organisations, we have the chance to learn from their experience. This can help us to skip a phase of re-inventing the wheel and concentrate on the best models for presenting of our cultural heritage. A non-comprehensive list of web resources, which might be of interest is given in the end of this article.

Weaknesses

1. Lack of enthusiasm

After trying some solutions, which are not answering their idea of real needs, specialists might feel unhappy with the idea of implementing computer applications. While it is intuitively clear that the computer world can not be avoided, the necessity to put extra effort in a project with outcomes which are not clear, does not stimulate any activity. A possible change in this pattern could be caused with projects where the outcomes are clearly defined and presented, using early prototyping techniques.

2. Lack of simple forms of access for the specialists and the general public

This is a field, which is not well-developed for the presentation of Slavonic cultural heritage. Moreover, the ways to present content to the general public, and especially the one which is not of Slavonic origin, still have to be found.

3. Intellectual property rights (IPR) issues

One of the most important problems in the field of digitisation is connected with the copyright on materials for digitisation and IPR. Copyright issues in such a complex field have to be clearly defined for two different situations:

        a. when primarily sources are being digitised, and

        b. when publications of research of different specialists are being incorporated into the final product.

The second case is very important and even more complicated than the first one, because scholarly annotations and commentaries are important components of any digitised collections. Since this work is done in teams, the contribution of each member of the team has to be clearly defined and his/her rights—protected.

4. Insufficient institutional investment and commitment

Five types of organisations are potentially interested in digitisation of cultural heritage: government bodies, repositories, research and/or educational institutions, companies and foundations. These organisations with a different profile have different interests and approaches in the field of digitisation of cultural heritage due to their different aims and needs.

Government bodies (like the Ministry of culture) are entrusted with the supervision of activities related to cultural heritage preservation and presentation. While we would expect to find a general framework for digitisation activities, in Bulgaria it has not been developed yet.

Repositories (libraries and museums) seem the most natural initiators of digitisation projects because of the close relationship between digitisation and preservation, in Bulgaria are currently in the position of observers due to lack of resources on the one hand, and copyright issues for digital collections, on the other hand.

Research and/or educational institutions are the most active initiators of digitisation projects in Bulgaria as centres of study of the cultural heritage and the impact which digitisation could have on:

       − routine work

       − potential for large-scale comparative studies

       − application of new research methods.

However, these institutions do not have the necessary resources to perform large-scale activities on their own. Another problem is whether their specialists put an emphasis on the presentation of the cultural heritage for the general public.

Companies are interested in presenting sections of cultural heritage, which they believe
        will be easily realised on the market. The Bulgarian market of such products is
        too small. This is why their main market is abroad. The companies produce
        basically CD-Roms, but with the developments of e-commerce and e-payment,
        this definitely would give prevealance to Internet.

Funding bodies (foundations) supported practically all projects undertaken in Bulgaria
        in the field of digitisation. However, the scale of their support cannot meet the
        real costs of serious digitisation projects.

It is clear, that only a structured joint effort combining the efforts of the various types of
institutions could change the current situation.

Opportunities

    1. *A chance to start major effort on a common grounds*

This is the most important perspective: in a situation where electronic resources are still
of small scale, the time had come to think about global initiatives.

    2. *Support for cultural diversity and education*

The expected outcomes of digitisation effort should be considered as resources which
would contribute to the presentation of the unique cultural heritage. In addition, they
should be easily used for education purposes.

    3. *Digitised resources of great variety and richness*

The lofty goal which can be achieved with well-balanced digitisation efforts is to offer
resources presenting various aspects of the culture. In the case of mediæval manuscripts,
this naturally would include a selection of diachronic and diatopic origin; various genres
including religious and secular literatures; and a rich set of commentaries on
development of written culture, literary schools, etc. This requires enormous
preparatory work, which can be achieved again only in the frameworks of cooperation
between many teams in different countries. It is also of special importance to build tools
for handling linguistic variety (the so-called revisions of the Old Church Slavonic
language) which would support full-text search in sources coming from different places
and times.

Threats

    1. *Lack of dialogue*

Unfortunately, the current practice shows that dialogue between specialists from various
institutions is not always leading to common views on the best practice approaches. If
this continues in the future, the efforts will not lead to significant changes from the
current situation.

    2. *Fragmentation of approach*

Up till now, efforts in Bulgaria were directed towards the presentation of specific data
on manuscripts. This is understandable having in mind the different interests of various
types of institutions, presented above. Nevertheless, the future belongs to the
approaches which would combine various types of data on the same manuscript
(including, images, texts, description, etc.).

    3. *Someone else will make the framework or it will never be done*

If we do not start serious work towards digitisation of our heritage, it is possible that
consortia, which are not really interested in the local specifics, will do this work
following their own frameworks and understanding. This implies a threat of choosing
presentations which would not give clear idea on the local specifics. On the other hand,

there is no guarantee that any body would be interested to invest such great effort on Slavonic materials. If this happens, the voice of our culture would be lost in the World Wide Web.

    4. Lack of synergies between culture and new technologies

This is not our specific problem; it is a common one—the cooperation between culture and technologies is not easily defined and followed. We could expect that in future more and more teams involving specialists not only with various specific expertises will be formed, but also the number of people who have 'mixed' background will increase. Now we should look for ways to bring more often specialists from various domains together.

    5. Funding

This is also a common problem, with one important specific feature concerning digitisation of the Slavonic cultural heritage—funding should be assured for building the cooperation network and the digitisation work itself, while in many places in Europe and the USA the digitisation itself is done to a certain extent. Most often this is in the narrow sense of the term, which is still a good starting point to encode texts and descriptions.

One Current Project:
a Tool for Manuscripts' Electronic Publishing
The General Setting

Following the presentation of the challenges which digitisation of our cultural heritage has to overcome, we would like to present here one on-going project of the Institute of Mathematics and Informatics. Its purpose is to develop a tool which would build automatically Internet publication of a manuscript. This edition would be based on browsing of the manuscript page by page (this is chosen as the best possible presentation of the object). The images of the manuscript folia will be accompanied by the original text in Old Church Slavonic and translation. Because of the limitations of the screen size, the user would be able to see one translation from several offered (this possibility to choose is meant to answer the needs of potential readers of the publication with various backgrounds). The user also will have the option to play an audio file and thus to get an idea how this text could sound.

    The aim of the tool would be to collect different pieces of data and put them together in web-pages. The model of the manuscript is in fact a XML DTD, while the procedures for collection of all data and the generation of HTML pages that visualise the edition are written in Perl. The basic idea is to save time necessary for writing hundreds of similar web-pages, but the preparatory work on collecting all necessary data remains. When we have such a tool, the physical location of such data would not be important, the important part would be to link together different data. This idea corresponds with the fact that different organisations would serve as content providers in the most cases, having for example catalogue data and images supplied by libraries; texts supplied by research organisations or individual researchers. This view is presented on Fig. 1 below. It presents various content providers which give access to different types of data. These data are processed by a tool, and become a part of an electronic repository which could be consulted by different users.
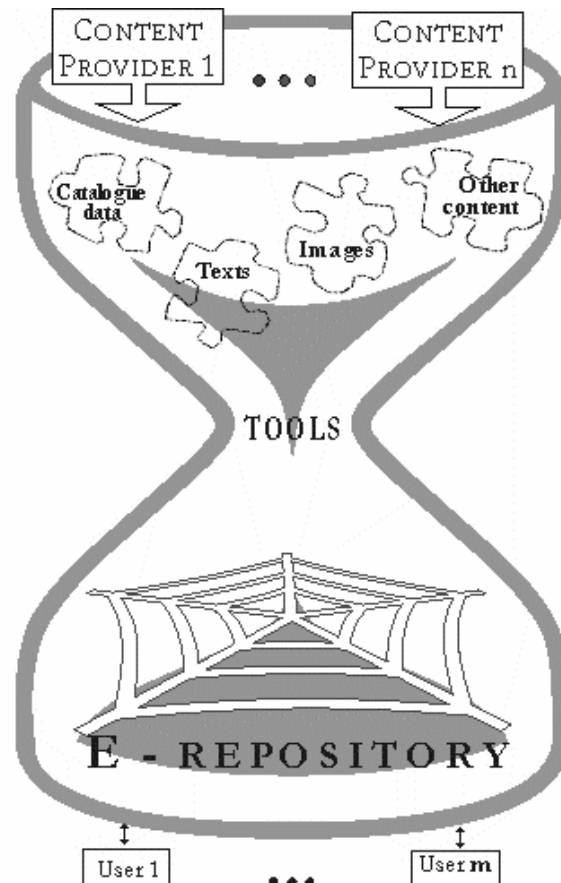
Fig. 1

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The First Expected Edition: The Enina Apostle

The *Enina Apostle* is a seriously damaged manuscript dated 11 century. Only 39 folios of the manuscript survived, they were discovered by a happy chance in a lime-pit during the reconstruction of the church in the village Enina. The access to the manuscript is highly restricted. This was a good reason to choose it for this experimental

Fig. 2

edition. In addition, this is the oldest manuscript written in Cyrillic which belongs to a Bulgarian collection, in this case the National Library "St. Cyril and St. Methodius".

The project was started with the intention to illustrate how a feasible digitisation work could be done with little or no external funding based on mutual co-operation of a library willing to promote activities in this field with a team of researchers who were able to help with expertise and supply the necessary equipment to fulfil the task. This joint team includes four specialists from the Institute of mathematics and computer science and two members from the manuscript department of the National library. The electronic edition of Enina Apostle will include digitised images, its text in Old Bulgarian language with references to the current Biblical texts in Bulgarian, English, Russian, Latin, Serbian, German and French (this is envisaged to make clear its contents to a wider audience), audio files which would present the reading of the text, and analytical description of the manuscript. Currently we are collecting the contents, trying at the same time to solve copyright issues which would made possible scanning of the original.

Images

The electronic images are archival quality copies of the manuscript originals. The copyright issues are still under discussion and only two folia were scanned from the original. We show here an illustration of a scanned image of folio 6r. During scanning (made at 600 dpi) Kodak colour control patches and a ruler were added with the idea to provide the user with a tool to adjust display and printer settings to produce a copy, which presents the original in a best possible way (Fig. 2).

Texts

The complete text of the manuscript was entered following all its specifics (superscript letters, abbreviations, titles). Since the texts present in the manuscript are excerpts from the Epistles of the Apostles, the current versions of the texts in Bulgarian, English, Latin, Russian, Serbian, German and French will be included in the digital edition. These modern texts are not translations of the manuscript' ones, but are present to give an idea what is the content of the manuscript.

Working on an electronic edition is a serious challenge to the presentation of a digital content. It could be done in two different ways—presenting just the object (in this case we would have only images and texts), or accompanying it with various additional pieces of information, which would help the readers to learn more about the manuscript. We are trying to accompany the content with such useful additional information, because if in the previous decades a traditional edition would go basically to readers who are specialists in the field, now the situation is completely different and potentially anyone who has access to Internet could have a look. Strict rules how to prepare a good electronic edition of such a specialised object do not exist.

Analytical Description

The analytical description of the manuscript is done following the MASTER [MASTER] project DTD for manuscript description (Fig. 3). The complete description is quite long, here we give an example which shows that the data are supplied both in English and Bulgarian languages which makes it usable by local and foreign specialists. For the electronic edition purposes, we will use only the relevant data from the

description—the use of the complete file including all tags would not contribute to the users' comprehension.

```
<msContents>
<msItem n="1">
<locus from="1r" to="20r" supplied="yes">19</locus>
<title type="uniform" lang="BUL">липсва в текста</title>
<title type="uniform" lang="ENG">missing</title>
<rubric lang="OBG">Съв пред Месопоустна</rubric>
<note lang="BUL">Това е първата запазена рубрика в текста; целият фрагмент започва с 2 Тим. II, 4-10.1
<bibl>Мирчев, К., Кодов, X. Енински апостол ..., с. 9</bibl>
</note>
<note lang="ENG">This is the first extant rubric in the MS; the whole fragment begins with 2 Tim. II, 4-10.1 <bibl>
Мирчев, К., Кодов, X. Енински апостол ..., с. 9</bibl>
</note>
<incipit lang="OBG">fragm: [воннъ] въвъдл овл[з]дтъ сіа кооуплни житннсклни</incipit>
<note lang="BUL">В състава на ръкописа се отбелязват само тези главни дялове; не се отбелязват отделните
четива от Апостолските послания и съпровождащите ги допълнителни текстови части като антифони,
прокимени, алилуярии и причастни, съставени от псалтирни стихове, както и молитвите и типикарските
указания.</note>
<note lang="ENG">Here are not listed the separate lessons derived from the Epistles, nor the additional texts such as
antiphons, prokimena, hallelujaria and koinonika, all composed of Psalm verses accompanying the lessons, nor the
prayers or indications of the Typika.</note>
</msItem>
. . .
</msContents>
```

Fig. 3

In addition, audio files will present the sounding of the text.

Conclusions

The project presented in the article can serve only as an illustration of the work, which has to be done in a considerably larger scale. To achieve this, building a common framework and cooperation of various institutions is crucial. It will help to find solutions to the following problems which are delaying the work:
-   There is a clear need for international co-operation in the fields of Slavonic and Balkan Studies, because of the wide spread of primarily sources throughout the whole of Europe.
-   The work of separate teams in the same field has lead to the application of many different *ad hoc* solutions, instead of a search for a general *ad modum* strategy.
-   Ambiguity of legal copyright issues has lead to serious problems in persuading researchers to share their knowledge in digitisation projects affecting the level of presentation of materials, and restricting depth of presentation.

We hope that the future work of centers such as the National Center for Digitisation in Yugoslavia, will help to overcome those obstacles in a way which would assure the stable development in the field of digitisation of the Slavonic cultural heritage.

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[Tutorial]   http://www.library.cornell.edu/preservation/tutorial/—*Moving Theory into Practice: Digital Imaging Tutorial*

Web resources

http://palimpsest.stanford.edu/—CoOL, Conservation OnLine, incl.
          http://palimpsest.stanford.edu/bytopic/imaging/—Digital Imaging

http://www.bl.uk/gabriel/services/lists_generated/services_digital_en.html—Gabriel (links to collections of Europe's national libraries that have been digitised)

http://www.hatii.arts.gla.ac.uk/SumProg/DigiSS03/urls.htm#DigiHerAssets—The Humanities Advanced Technology and Information Institute, University of Glasgow, Links to digitisation resources and sites

http://www.isos.dcu.ie— Irish Script on Screen (ISOS)

http://www.kb.nl/kb/resources/frameset_kb.html?/kb/sbo/digi/verhanen.html—Research and development of electronic access to Medieval Illuminated Manuscripts from the Koninklijke Bibliotheek, The Netherlands

http://www.memss.arts.gla.ac.uk/—The Digitisation of Middle English Manuscripts

SREDNJOVEKOVNA SLOVENSKA PISANA KULTURNA BAŠTINA U E-SVETU: BUGARSKA ISKUSTVA

Rad prikazuje iskustva u digitalizaciji srednjevekovnih rukopisa u Bugarskoj. Do sada, najviše je rađena elektronska katalogizacija, dok digitalno snimanje i analiza teksta nije šire zastupljena. Porede se stečena iskustva s principima iz Lunda koji manifestuju tekuće evropske trendove u digitalnoj zaštiti i pristupu kulturnoj baštini. Koristeći SWOT analizu i lokalna iskustva, ukazuje se na najvažnije pravce rada. Kao ilustracija, opisuju se tekući projekat razvoja alata za publikovanje rukopisa na Internetu koji se izvodi u Institutu za matematiku i informatiku Bugarske akademije nauka. Tekuće stanje na polju digitalizacije rukopisa u Bugarskoj ima značajne sličnosti s problemima koji se sreću u mnogim zemljama centralne i istočne Evrope i bivšeg SSSR-a.

Ključne reči: digitalizacija, Bugarska, srednjevekovni slovenski rukopisi