Digital Service at the University Library: Portal of Old Cartographic Materials

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ABSTRACT: Since its founding, the University Library "Svetozar Marković" has been diligently building and enriching its collection of cartographic materials, acquired primarily through purchase, but also through donations. Owing to their value and significance, the collection is preserved under special conditions in the Old and Rare Books Department and comprises several hundred charts spanning the period from the 16th to the 21st century. The Library has carried out three cartographic digitization projects (2023–2025), financially supported by the Ministry of Culture of the Republic of Serbia, resulting in the Portal of Old Cartographic Materials. This paper discusses the digitized cartographic materials selected for the projects, the structure and significance of the Portal, as well as its role in enhancing the user experience. Digitization enables the presentation of this type of library material for the purpose of promoting the Library's collections, provides access to old and damaged materials preserved under special conditions, and facilitates further collaboration on joint projects with other cultural and scientific institutions.
KEYWORDS: cartographic materials, cartography, University Library "Svetozar Marković," Portal of Old Cartographic Materials, map digitization.

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1 Introduction

In the modern information society, libraries play a significant role not only as custodians of written materials, but also as active mediators in the dissemination of knowledge and information. The development of digital technologies has led to a transformation of library services, with library websites becoming one of the most important channels of communication with users (Stokić Simončić 2018, 21–25). Through their websites, libraries today offer catalogs, digital collections, electronic databases, and additional digital tools that assist users in navigating and utilizing library resources.

The University Library "Svetozar Marković" was founded in 1926, and is one of the most significant library institutions in Serbia. Its primary function is to support the educational, scientific, and research activities of the University of Belgrade. It holds a rich collection of books, serial publications, manuscripts, non-book materials, archival documents, and electronic information resources available to users online. As the central library of the University of Belgrade, it follows contemporary trends and strives to make its services accessible and user-friendly. In addition to traditional library services, it devotes particular attention to the preservation of old and rare materials in its collections, such as its valuable collection of cartographic materials. For this reason, among other initiatives, the Library is developing a range of digital services, including the Portal of Old Cartographic Materials[1], which is presented in this paper. Between 2023 and 2025, three cartographic digitization projects were carried out with financial support from the Ministry of Culture of the Republic of Serbia. The digitization of these materials enables additional promotion of collections of the University Library "Svetozar Marković" (UBSM), allows researchers to study old and valuable materials that, due to various forms of damage, are stored under special conditions and cannot otherwise be accessed, and facilitates collaboration on joint projects with other cultural institutions and scientific organizations. The aim of this paper is to analyze the results achieved through the projects, the content and significance of the Portal created within their framework, and its role in enhancing the user experience.

2 The Concept of a Map

In practice, the terms *karta* and *mapa* are often used interchangeably. However, there is still some ambiguity regarding their precise meaning, and they

1. Portal of Old Cartographic Materials

are frequently considered synonyms. According to (Sretenović 1989, 57–59), a map is a conditionally mathematically reduced, generalized, and constructed pictorial-symbolic model of a specific spatial unit on a mathematical surface (globe) or on a mathematical plane (plan or map). Pavišić (Pavišić 1976, 13) similarly defines a geographic map as "a representation of the entire Earth's surface or part thereof, drawn using specific symbols, reduced in scale, generalized, and constructed on a plane according to a defined mathematical principle, indicating the geographical distribution and interrelationships of certain natural and social objects, phenomena, and facts." A map is an instrument for presenting the results of studying and explaining numerous natural and social phenomena and relationships across various scientific disciplines, as well as an essential tool for diverse terrain studies in support of the planning and construction of various facilities of general social significance (14). According to (14), the term *karta* derives from the Latin word *charta*, which originally meant "letter, message, report, document, or charter." It was not until the 14th century that the term came to be used in its current meaning.

Both terms are used in various countries, with distinctions drawn based on the type of map. Instead of *karta*, the term *mapa* is sometimes used — for example in Czech — while in English-speaking area the equivalent is "map." In Great Britain, the term chart is also used, but exclusively for nautical charts (13). In Serbia, the term *karta* is standard and encompasses all graphical representations of the Earth's surface, including all types of maps (plans, topographic maps, general geographic maps, thematic maps, etc.).

3 Map Digitization Projects at the UBSM

Three projects for the digitization of old and rare cartographic materials were carried out at the University Library "Svetozar Marković" between 2023 and 2025. For these purposes, materials of great importance were selected, both for domestic and international researchers across various humanities disciplines. Some of these materials document the historical development of Serbia and its territorial expansion, such as the map of the Principality of Serbia (Figure 1) by Jovan Bugarski, and constitute part of the national cultural heritage. Others stand out from the collection for their craftsmanship and exceptional beauty. Their value is assessed on the basis of the richness of illustrations, vignettes, dimensions, dedications, coats of arms, engravings, or the reputation of the printers of the period; some of these maps were handcolored with considerable detail (e.g., Tabvla – an engraving of the Slavs).

One such map is shown in Figure 2[2]. In addition to the outstanding value of the materials themselves, the Serbian cartographers and bibliophiles who collected cartographic materials are also of particular significance, as discussed in the sections that follow.

3.1 First Project

The first project, *Presentation and Permanent Archiving of Maps from the Collections of the University Library "Svetozar Marković" on a Specialized Portal and Further Preservation Work*, financially supported by the Ministry of Culture of the Republic of Serbia in 2023, provided for the digitization of geographic maps and their permanent archiving on a specialized portal so as to preserve them for future generations of researchers. In the first project, material selection was based on a territorial criterion: maps depicting Belgrade, Serbia, and Yugoslavia were selected first, followed by maps of Europe and the Adriatic Sea. The second criterion was chronological, with maps from the 16th, 17th, and 18th centuries digitized as a priority.

Maps from the 19th century were subsequently digitized, with particular emphasis on Jovan Bugarski (1803–1865), a prominent Serbian cartographer and engineer. Information about him has been preserved thanks to his son, the architect Aleksandar. It is known that Jovan Bugarski graduated and qualified as an engineer at the University of Budapest in 1838. He arrived in Serbia in 1840, and was granted Serbian citizenship in 1842. Upon his arrival in Serbia, he petitioned Prince Mihailo Obrenović for employment and, through the Prince's support, was appointed as an officer of the Main Control Department of the Ministry of Finance (Илић 2019).

One of the most important undertakings during his time in Serbia was the production of a map of Serbia. He drafted the first geographic map of the Principality of Serbia in Belgrade, in 1843, which was lithographed by Anastas Jovanović. The map was submitted to Prince Aleksandar with a petition requesting his assistance in its publication, having been reviewed by experts who deemed it accurate and useful. However, this did not happen for reasons that remain unknown, and Bugarski and Jovanović published the map at their own expense in Vienna in 1845, dedicating it to the former Prince Mihailo Obrenović. The map was issued in three variants. The first is in Serbian without a dedication; the second is in Serbian with a dedication to Prince Mihailo; and the third is in French, also with a dedication to

2. Object available at: https://maps.unilib.rs/?object=112

Prince Mihailo that is located on the left side of the map, and reads as follows: "Његовой Свѣтлости Милостивъйшем Господару Князу Михаилу М. Обреновићу Всепокорнъйше посвећуе издатель."[3] All three maps list Belgrade as the place of publication, although it is established that only the first variant was printed in Belgrade, while the other two were printed in Vienna. It is assumed that Prince Mihailo assisted with funding the printing, since the State Council had refused to do so — which may explain the dedication. However, it may also be understood as an expression of gratitude for Prince Mihailo's appointment of him to state service upon his arrival in Belgrade. This was unquestionably the first Serbian map recognized by the expert community of the time and cited by many foreign compilers of maps of Serbia. The Library received this map as a gift from collector Joca Vujić, and it bears the stamp of his Museum.

The Map of the Principality of Serbia from 1845, published in Vienna, is shown in Figure 1[4]. In the lower right corner of the map, a group of Serbs is depicted gathered around an oak tree bearing the Serbian coat of arms, with a panorama of Belgrade in the background. The scale is provided in Russian versts, geographic miles, and Turkish miles. In the middle of the upper section of the map, 17 Serbian districts are labeled: Aleksinac, Valjevo, Belgrade, Šabac, Kruševac, Čačak, Kragujevac, Morava, and others.

No existing platform was used for the Portal of Old Cartographic Materials, and it does not represent an enhancement of any previously existing portal. It was purpose-built for this project. All materials were digitized using equipment available in the Digitization Department at the UBSM: Bookeye 4 Archive and Epson GT 20000, at resolutions of 300 and 600 dpi in JPG format using the RGB color palette. In addition to digitization, metadata was also produced within the project framework. The metadata was generated by exporting bibliographic records from the COBISS catalog in COMRC/XML format via the Z39.50 protocol at the time of portal creation, with automated transfer to be established in subsequent phases when new objects are uploaded. Based on the bibliographic record, a metadata set was defined for describing digital objects on the Portal: title, author name, year of publication (for all objects the year of first edition is listed, and for most objects also the year of the facsimile edition, i.e. reprint), publisher, physical description, scale, and map description. A sample COMRC/XML

3. „Његовој Свјетлости Милостивејшем Господару Књазу Михаилу М. Обреновићу, Свепокорњејши посвећује издатељ."

4. Object available at: https://maps.unilib.rs/?object=22



Figure 1. Карта Княжества Србіе, 1845. (Map of the Principality of Serbia, 1845)



Figure 2. Tabvla Geographica exhibens Regnvm Sclavoniae cum Syrmii Ducatu

record and the metadata structure for the digital object shown in Figure 3[5] are provided below.

Sample COMRC/XML Record:[6]

```
<record xmlns="http://www.loc.gov/MARC21/slim">
<leader>00678cem a2200205 i 4500</leader>
<controlfield tag="001">19385868</controlfield>
<controlfield tag="003">SI-MaCOB</controlfield>
<controlfield tag="005">20260422000000.0</controlfield>
<controlfield tag="007">aj|aa|||</controlfield>
<controlfield tag="008">931013q1740||||gw |||||||||| ||1|||ger c</controlfield>
<datafield tag="034" ind1="1" ind2=" ">
<subfield code="a">a</subfield>
</datafield>
<datafield tag="040" ind1=" " ind2=" ">
<subfield code="a">NBS</subfield>
<subfield code="b">srp</subfield>
<subfield code="c">SI-MaIIZ</subfield>
<subfield code="d">UBSM</subfield>
<subfield code="e">ppiak</subfield>
</datafield>
<datafield tag="080" ind1=" " ind2=" ">
<subfield code="a">711.4</subfield>
</datafield>
<datafield tag="100" ind1="1" ind2=" ">
<subfield code="a">Baeck, Elias, </subfield>
<subfield code="d">1679-1747. </subfield>
<subfield code="4">aut</subfield>
<subfield code="0">(SI-MaCOB)66175241</subfield>
</datafield>
<datafield tag="245" ind1="0" ind2="0">
<subfield code="a">Neu accurater Plan der Haupt Vestung Belgrad / </subfield>
<subfield code="h">[Kartografska građa]</subfield>
<subfield code="c">Elias Baeck á H. sculps et excudit</subfield>
</datafield>
<datafield tag="255" ind1=" " ind2=" ">
<subfield code="a">[1:12 000].</subfield>
</datafield>
<datafield tag="260" ind1=" " ind2=" ">
<subfield code="a">Augusta Vind. : </subfield>
<subfield code="b">Elias Baeck, </subfield>
<subfield code="c">[1740?]</subfield>
</datafield>
<datafield tag="300" ind1=" " ind2=" ">
<subfield code="a">1 plan grada : </subfield>
<subfield code="b">bakrorez ; </subfield>
<subfield code="c">41 x 34 cm. </subfield>
</datafield>
<datafield tag="651" ind1=" " ind2="4">
<subfield code="a">Beograd</subfield>
<subfield code="v">Planovi gradova. </subfield>
</datafield>
<datafield tag="856" ind1="4" ind2="1">
<subfield code="u">https://maps.unilib.rs</subfield>
```

5. Object available at: https://maps.unilib.rs/?object=1
6. Permanent link: https://plus.cobiss.net/cobiss/sr/sr/data/cobib/19385868

```
</datafield>
</record>
```

Sample Metadata Structure on the Portal:

```
Наслов
Neu accurater Plan der Haupt Vestung Belgrad /
Аутор
Baeck, Elias, 1679-1747.
Година издања
1740?
Издавање и производња
Augusta Vind. : Elias Baeck,
Година првог издања
1740?
Физички опис
1 plan grada : bakrorez ; 41 x 34 cm.
Размера
[1 : 12000].
Опис
Beograd Planovi gradova.
```



Figure 3. Neu accurater Plan der Haupt Vestung Belgrad, 1740 (New Precise Plan of the Main Fortress of Belgrade, 1740)

The Portal also contains accompanying texts on individual maps, Serbian and foreign cartographers, and other information relevant to this subject. Importantly, the Portal was conceived and designed to allow new materials to be added on an ongoing basis, whether from future projects or as a part of everyday work activities.

A total of 61 maps were digitized and cataloged within the first project. During the project, the Faculty of Geography of the University of Belgrade

proposed a continuation that would include more intensive promotion of the digital collection to interested researchers — primarily those in the fields of geography, history, and cultural history — as well as to researchers in library and information science for professional development purposes, and to the broader interested public. Throughout its duration, the project was promoted via social media and the Library's website, with a clear acknowledgment that it had been funded by the Ministry of Culture of the Republic of Serbia.

3.2 Second Project

Based on the initiative of professors from the Faculty of Geography and the promotion of the Portal to researchers in that field, it was decided that the Library would apply for a continuation of the project in 2024. The Ministry of Culture of the Republic of Serbia funded the project Completing the Digitized Map Collection from the Collections of the University Library "Svetozar Marković" on the Specialized Portal and Further Preservation and Presentation Work, which provided for the digitization of geographic maps from special and legacy collections at the UBSM and their publication on the Portal with accompanying descriptions. The materials for this project were selected from collections with the status of cultural goods of great importance, using the same territorial and chronological criteria applied in the previous project. The selected materials depict the territory of Serbia and neighboring countries, as well as European countries. A total of 60 maps were digitized in this project.

In this project, a significant portion of the maps was digitized from the Special collection of Joca Vujić. The donation of the distinguished bibliophile and landowner Joca Vujić (1863–1934), born in Senta, is particularly noteworthy among private donors. A passionate collector, he opened the first private museum in his native town Senta, at the beginning of the 20th century, where he displayed 10,000 rare books, a collection of archival documents, a numismatic collection, 400 paintings from the Biedermeier and Romantic periods, and various ethnographic artifacts. An exceptional patron of culture, Joca Vujić bequeathed his private library and collection of archival documents to the University of Belgrade and the University Library (Брзуловић Станисављевић 2025, 67–72). Some of the maps in the UBSM collections originate from Vujić's museum and all bear his stamp. One map of particular note belongs to the *Siege of Belgrade* collection. The maps in this collection were predominantly produced using the copperplate

engraving technique, with the exception of one drawn by hand in iron gall ink and subsequently colored in watercolor. This map, shown in Figure 4, depicts a plan of the battle fought on August 16, 1717, under the command of Eugene of Savoy[7].



Figure 4. Plan de la glorieuse bataille donnée le 16.e aout, 1717. proche de Belgrade (Plan of the Glorious Battle Fought on August 16, 1717, near Belgrade)

3.3 Third Project

The successful two-year project was continued in 2025 with *The Future of the Past: Completing the Digitized Collection of Atlases and Maps on the Specialized Portal*, which, like its two predecessors, received financial support from the Ministry of Culture of the Republic of Serbia. Within the framework of this project, the digitization process was extended to include valuable atlases from the Library's collections, as well as vignette maps[8]

7. Object is available at https://maps.unilib.rs/?object=10

8. A vignette is a decorative ornament or illustration that gradually fades into the surrounding paper. Originally, it often took the form of a vine motif. It was

of Belgrade (20 maps were digitized), which are of particular cultural and historical significance. Both atlases and maps were added to the existing digital collections with accompanying texts, legends, and metadata. Given that the infrastructure was already in place, the project was completed within a remarkably short timeframe.

4 Portal Structure

The Portal of Old Cartographic Materials is organized into several sections: About Maps, Collections, Our Cartographers, Foreign Cartographers, and About the Project. Within the Collections section, maps are arranged by geographic principle across seven collections: Belgrade, Europe, the Adriatic Sea, the Mediterranean Sea, the Balkan Peninsula, Yugoslavia, and the World. To date, 120 individual geographic maps have been archived within the collections, along with two atlases. One atlas was produced by Pavle Solarić in 1804, and it contains 37 individual geographic maps (Figure 5)[9]. This valuable atlas also bears the stamp of the Joca Vujić Museum in Senta. The second was produced by Fra Mauro in 1457 (reprinet produced in 1956) and contains 49 individual geographic maps. This atlas is the most important medieval world map which combines geographical knowledge from Europe, Asia and Africa from that time[10]. Both atlases are archived in the World collection.

The oldest map on the Portal dates from the 16th century. It is an original work by Anthony Jenkinson from 1562, known for its depiction of Russia, Moscow, and Tartary. It contains various mythological scenes and depictions of people and domestic animals inspired by the travels of Marco Polo. These elements add a narrative layer to the map, merging exploration with

used as a decorative frame on maps. In cartography, vignettes were employed to create a soft, gradual fading of the image edge or a graphical effect along coastlines (or other boundaries), in order to highlight areas of interest. They produce a "soft" frame that draws the viewer's attention toward the centre of the map. Contour lines are emphasized through shading, so that boundaries are not sharp lines, thereby achieving visual prominence of selected areas. Vignettes may be used to accentuate borders, rivers, roads, or the transition between land and sea, among other features. For more information on vignettes, see:https://rhollick.wordpress.com/2018/09/21/vignette/

9. Object is available at: https://maps.unilib.rs/?object=186
10. Object is available at: https://maps.unilib.rs/?object=184



Figure 5. Пѣшїй землеписникъ (Atlas of Pavle Solarić), 1804.

imaginative storytelling (Figure 6)[11]. During this period, the leading European states were increasingly documenting and mapping distant lands, driven both by curiosity and colonial ambitions. The map reflects the contemporary European understanding of the vast regions of Russia and Central Asia, often blending factual geographical information with imaginative representations (Shirley 1983).

The map features a prominent decorative cartouche[12] framing the title. This element not only identifies the map, but also serves as an ornament

11. Object is available at: https://maps.unilib.rs/?object=64

12. A cartouche (French *cartouche*, from Italian *cartoccio*) is a decorative element or panel (often in the form of a partially unrolled scroll, shield, or wreath) on which various symbols or signs are placed (such as a monogram, motto, family coat of arms, or emblem). In the 16th–18th centuries, it was widely used in architecture, book design as a frame for an ex libris, printer's mark, publisher's imprint, etc.), manuscripts, and maps. On geographical maps, the cartouche typically contained the map title, information about the author, the name and portrait of the dedicatee of a dedicatory inscription, as well as mythological elements, scenes, scale information, and sometimes the map legend. The term also refers to the rope-shaped frame enclosing the name of a pharaoh in hieroglyphic and hieratic ancient Egyptian texts. For more information on cartouches, see: https://old.bigenc.ru/fine_art/text/2049830

typical of cartographic works from this era. Numerous inscriptions and labels in Latin provide descriptions of various regions and toponyms, bearing witness to the regional and cultural knowledge of the time. The map is also decorated with vignettes depicting mythological scenes, local populations, and wildlife. These illustrations serve to enhance the viewer's understanding of the region, albeit through the lens of European interpretation and mythology.



Figure 6. Russiae, Moscoviae et Tartariae description, 1562. (Russia, Moscow, and Tartary – Description, 1562)

On the Portal's homepage, some of the oldest maps are highlighted. Accessing the individual collections displays the digital objects, i.e., the cartographic materials belonging to that collection. Clicking the "more" button associated with each digital object opens more detailed information about the map, specifically the metadata describing the object in question. In addition, users may download the object and access its catalog record in COBISS. Correspondingly, the Portal URL has been added to all records in COBISS.

5 Conclusion

Geographic maps constitute a reliable historical source and a document of the era in which they were produced, reflecting the political, social, and natural conditions of a given period. They enable the reconstruction of former state borders, the tracking of their changes, and the analysis of the spatial distribution of settlements, transportation routes, forested areas, and hydrographic networks. For the scientific study of cartography, all maps that have been preserved across the various stages of societal development from the earliest times to the present are significant. They serve as references for drawing conclusions about the state of cartography in specific periods of social development.

The projects carried out between 2023 and 2025 led to the creation of the Portal of Old Cartographic Materials, which provides for the permanent archiving of this type of material. A total of 120 valuable maps with complete descriptions and accompanying texts, and 2 atlases comprising 86 geographic maps, have been published on the Portal. The Portal of Old Cartographic Materials is highly beneficial to researchers: it eliminates the need to travel to the library in person, offers a more convenient research experience, and is accessible at any time. Furthermore, each map has been cataloged and its metadata entered into the unified library system (COBISS), from which it has been transferred to the Portal. In addition to metadata, accompanying texts on individual maps, prominent Serbian cartographers, and other relevant information are provided alongside the digital objects. It is also worth emphasizing that the Portal was conceived and designed to allow new materials to be added on an ongoing basis, from future projects or as a part of everyday work activities.

The primary objective of the projects was the preservation of valuable old and rare materials from the UBSM collections — specifically, old maps of great importance. This objective has been fully achieved through digitization and permanent archiving on the Portal, with the possibility of extending the entire process since new materials can be added at any time. These materials are thus accessible to all interested researchers, as well as to the broader public, and accompanying texts make research process easier. At the same time, library professionals can use this Portal to familiarize themselves with the richness of the UBSM collections and to develop professional competencies in this area through supplementary workshops incorporated into the project framework.

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