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Preservation of modern cartographic products

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Summary

Old globes and maps are obviously part of the cartographic heritage. However, we have modern cartographic products not only on paper, but in digital form, too. The fact that a relatively large portion of digital documents that only existed in digital form has been perished due to technical failures or due to the omitted archiving is less known for nowadays users. The preservation of modern cartographic products is also difficult due to the copyright issues. In many countries, the digitizing of these products is allowed only with the approval of the copyright owner (creator), but sometimes this cannot be realized. Most countries have rights to collect their modern prints (books, maps, newspapers) by their national archives to preserve them as a part of the national heritage. We have cartographic products (media maps, maps of web sites, "disposable maps") which are probably not collected by anyone, so they are to disappear in some years. Do we have chances and methods to preserve these products? Whose obligation is the preservation of these special products? It is very difficult to answer these questions, but in my paper I try to summarize some suitable solutions and methods.

Introduction

One of the goals of this ICA Working Group and the First International Workshop on Digital Approaches to Cartographic Heritage itself is the demonstration that this topic is really relevant and important in contemporary cartography. Checking the list of the accepted papers of this workshop, I see that most of the papers refer to old maps, which is very understandable. These maps are rare; they are historically important, parts of the cartographic (and national) heritage. In many countries the digitizing of the valuable (old) cartographic products has already started: national archives are expected to make their maps available on the Internet, which also helps them to preserve the conditions of the original maps. In few countries, some of these old maps are also digitized in GIS software to allow the comparison of old data to the actual ones. This procedure requires cartographic skills to eliminate the mapping errors of our ancestors and correct the geographic locations of old data.

Raster format, the easy solution for the users and providers

One of the main questions is the format of the digital storage. The most standardised, commonly used formats are the raster files. The raster files are very similar in structure; the difference between the formats is not relevant. Raster files can easily survive the technological changes and the conversion into new formats is simple. However, these files are only pictures; they are not suitable to store structural (database-like) information. Few of them can be geo-referenced (like GeoTIFF, GeoJPG) to help the professional users, but this function is not easily available for the Internet users. Most of the users are happy with JPG files, they cannot handle the more sophisti-

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cated formats or simply do not know any other formats just those ones which are supported by their Internet browser. Wavelet formats (MrSID, ECW) became more and more popular (but their support is still missing from the most browsers and well-known image processing software). Wavelet formats are very useful to publish very large images (large size old maps, air photographs, satellite images etc.).

Vector formats

If we want to store more complicated structures, like a map as a database (GIS), we have to use different formats. The GIS formats are less standardised, they are not independent formats, and most of them are connected existing GIS software. Therefore, the GIS formats are linked to special software and only this software can use all advantages of certain formats. Software is continuously changing, these are commercial products and the developers are improving their products adding new functions to stay on the market. Firms are not concerned in supporting the opponents' standard formats, but few formats are treated as independent ones, especially in raster formats.

In GIS the basic vector data (the geographic location of the features) is regularly stored in easily convertible format (like DXF), but the main advantage, the connection to the database structure is software independent and this complex relationship can be visualized on the web only with map servers. Nevertheless, other formats are also used (like Flash, SVG), where the vector data can be easily visualised and improved graphic capabilities are available. These are individual files, which can be easily saved and stored, and hopefully these or similar file formats will survive for long in the future.

Digital cartographic products

So the real question is not "How can we store and publish our maps...?", because we have methods and software for this purpose. In my paper, "What kind of modern maps to be preserved...?" is more important, and I will concentrate on this question. A more interesting question is how can we preserve maps that were originally published in digital form? It is not a well-known fact that every year we lose some percent of originally digitally created and stored information. The reason is partly that the storage system or the media was not reliable enough and we cannot read the media (floppy disk, CD-ROM, streamer cassette) anymore we used to use for storage. Sometimes the media can be probably readable, but the storage system is totally out-of-use and it would require too much effort and cost to try to retrieve the stored information.

It can also happen that the media is readable, the devices are good, but the file format in which we stored the information previously is already out-of-use or disappeared in the information technology. In the very beginning of the PC based graphics there were several good software products which have totally disappeared (like GEM Artline, Harvard Graphics, Draw Perfect), although lots of graphics (maps) were created using these software at the end of '80s. Nowadays the general graphic software cannot read these file formats or it is difficult to find software that can open these file formats and able to convert into more frequently used formats. If we check the most important general graphic software you can see that CorelDraw and Adobe Illustrator can easily read all (or most) of their previous formats. The future of Aldus Freehand (previously Macromedia Freehand) is pending, but the new versions can read the formats of the previous version. To read very old versions requires other software or older versions of Freehand.

It is more difficult to make the GIS information survive. It has also happened that popular software products disappeared, no more support, only few old products are still on the market. The geographic information and the database are probably converted into other formats and they survived, but the complex connection between them cannot be reconstructed again in the actual software environment. We can easily preserve the very early cartographic CD-ROM products, but because of the development of the information technology, we have lots of difficulties if you really want to use them or just demonstrate their content. Even the media is readable, but these stand-alone DOS applications may require special hardware and software environment (like special management of the RAM) to run. Having more and more advanced PCs we have less chance to really use these old products, unless you preserve also some contemporary hardware which does not make too much sense for just archiving maps.

We have more and more cartographic products available for “digital” users: maps for navigation (GPS users, location based services etc.). GoogleMaps and GoogleEarth put the mapping and map use much closer to the Internet users giving new challenge for cartographers. The users hope that these kinds of services are continuously improving (without changing the policy and offer some of the services free), but for historical reasons it would be useful to make snapshots of this process.

Maps on the web

The webmaps are more frequently used nowadays and the preservation of these cartographic products is practically unsolved. Most of these websites offer interactive maps so the number of combinations is too much to preserve each of them separately. Only the providers can preserve the whole functionality of their service, so they are the only one who can make something for the long-term preservation. However, this is regularly not the part of their activity; they are working on the continuous updating and developing of their service. How can we preserve these services as the representation of cartography? Cartography is not the only area where the demand of this kind of preservation has emerged. One of the most interesting solutions is simply to archive the content of the whole web.

<http://www.archive.org/> is a so-called Wayback Machine. <http://archive.bibalex.org>, the Internet archives at the New Library of Alexandria, Egypt, mirrors the Wayback Machine, which makes the preservation safer. The Internet Archive Wayback Machine is a service created by Alexa to enable people to surf ongoing archives of the web. Alexa crawls and archives the entire web, making it possible for historians, scholars, and the curious to revisit the web's past. These are only snapshots of certain times since 1996. The Internet Archive Wayback Machine actually contains approximately 1 petabyte of data and is currently growing at a rate of 20 terabytes per month.

We can also mention the Minerva project (**M**apping the **I**nternet **E**lectronic **R**esources **V**irtual **A**rchive) of the Library of Congress. The MINERVA Web Archiving Project was established to initiate a broad program to collect and preserve these primary source materials. A multi-disciplinary team of Library staff representing cataloguing, legal, public services, and technology services is studying methods to evaluate, select, collect, catalogue, provide access to, and preserve these materials for future generations of researchers.



Figure 1. The first stored version of www.icaci.org on the Internet Archive Wayback Machine (19 Aug 2000) – Some pictures are missing in the web archives.

An ever-increasing amount of the world's cultural and intellectual output is presently created in digital formats and it does not exist in any physical form. Such materials are colloquially described as "born digital." The Library of Congress' mission is to make its resources available and useful to the Congress and the American people and to sustain and preserve a universal collection of knowledge and creativity for future generations. The European Union is also working on a similar project. 'Digital Heritage and Cultural Content' (DigiCult) is a domain of research activity in the Information Society Technologies (IST) Programme, a European Commission programme addressing the pervasion of Information and Communication Technologies (ICT) into all aspects of the European citizen's life. DigiCult research work is driven by the need to ensure that institutions holding such resources fully exploit the opportunities created by the advent of digital technologies for providing quality access by all European citizens to them, as well as for preserving them for the future. Maps are only particular parts of these large projects, but to be included in these projects can guarantee the preservation of our cartographic heritage.

Modern paper maps to preserve

We have to consider that not all the paper maps are preserved. "Disposable maps", which are used for advertising purposes, are regularly not preserved. According to the national laws, the published maps are collected by the national archives or libraries, but the "disposable maps" are probably not collected as maps. The map function is regularly less important than the advertising purpose and these prints are much less important, these are not treated as the part of the cartographic heritage. This is obvious now, but the researchers of the future can be interested in these "map-like" products after some ten years. Then, these "disposable maps" cannot be easily reconstructed.

An interesting kind of “disposable maps” is the orienteering map. These maps are used for competitions and these maps are normally not sold and only orienteers can meet these cartographic products. If orienteers themselves will not take care of creating a collection of these maps (to preserve them without any concrete purpose), nobody will collect them and the older maps are simply lost. In some countries, digital archives are created to store the images of these orienteering maps (raster files are enough). Media maps are also interesting. The maps that were published in printed form (newspapers, magazines) are collected as a part of the main product. They are preserved, but sometimes it is not easy to search these maps. The media maps which were presented on television are more difficult to preserve (they are digital maps and they are not printed at all). We can record the broadcast on a video cassette, but can have problems with the changing media (nowadays the platform is changing from VHS cassette to DVD-ROM). The copyright issues also make the preservation process a little bit confusing. The preservation (making a safe copy on another media or storage device) is not a process that is regularly allowed in the national copyright laws. Even we think that the preservation is important because these maps are parts of the cartographic heritage, but the preservation process can be illegal.

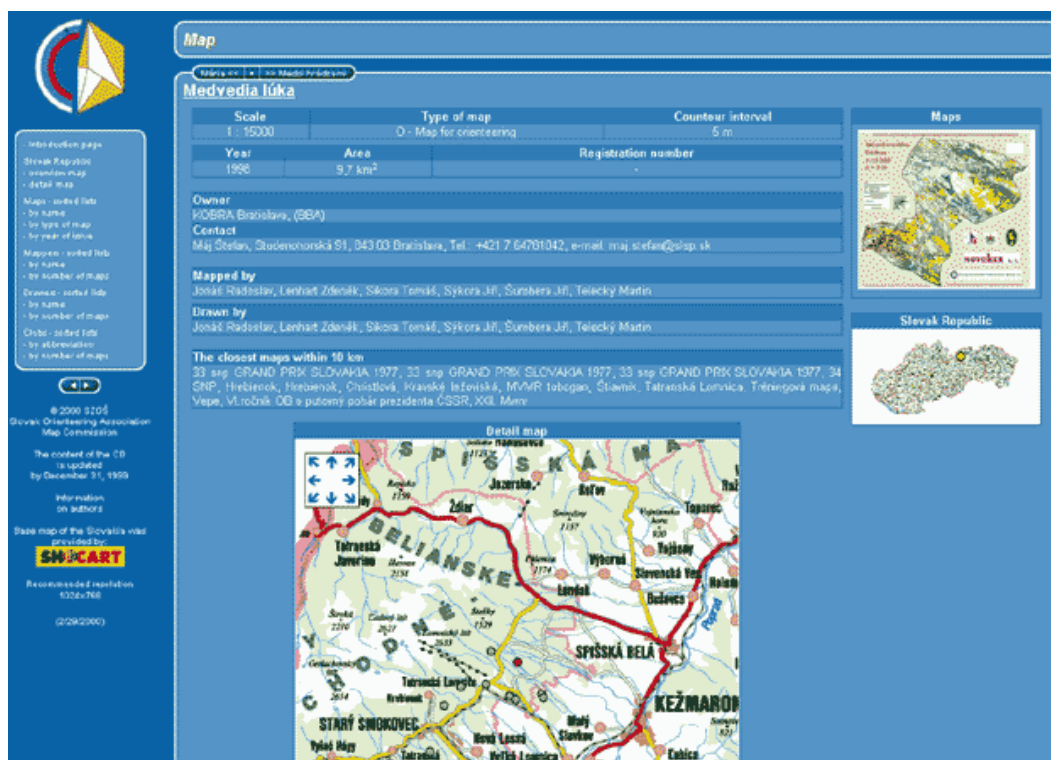


Figure 2. The database of Slovakian orienteering maps with a relatively high resolution scanned map images (CD-ROM version).

Conclusion

I would like to call your attention to these modern maps and map-like products to give a chance for the preservation. The cartographers have to find out which maps are worth preserving and they have to choose a proper method for the preservation process. Some maps are out of the scope of professional cartography (business and scientific) and we, cartographers have to make extra efforts to preserve these products. Modern maps are also a part of our cartographic heritage. If we do not take care of their preservation, these maps can easily disappear in the very near future. Internet maps and television maps require special methodology because these maps have never

materialized; we have to preserve these virtual maps too. We need long term digital standards to make sure that our digitally stored information (maps) will be easily readable for several years, but the standardisation is out of our responsibility: cartography is too small to influence the process. We have to be familiar with the new information technology and we have to make the decision of the format of preservation.

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