Does cartography still exist?

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ABSTRACT: When the International Cartographic Association was formed in 1959, most of the modern cartographic technologies (including remote sensing, GPS, computer technologies) were not yet invented. We can realize that more and more technologies have been integrated into cartography especially due to the satellites and information technology. One of the consequences of this integration is that we have more and more specialists in cartography (or in geographic information science), but less and less call themselves cartographer. Although cartography is not treated as a modern term for many people, the integrative character of cartography became more important in the Internet era. Nowadays we have not only specialized experts in our science, but lot of volunteers (using web 2.0 technologies like social networks, crowd sourcing) collecting and sharing geographic information. Our science is changing, but cartographic traditions and technologies are valid in these new environments; effective maps can be produced only by experts who are familiar with the theory of our science. Moreover, whatever term is used, it is practically cartography.

KEYWORDS: cartography, ICA, research

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Introduction

The answer to the provoking question in the title is definitely yes, at least my answer, who still defines himself as cartographer. However, we have to realize that terms ‘cartographer’ and ‘cartography’ are used less frequently in certain countries/areas. It is not unusual that new terms replace old terms, but some new terms can survive only for a short time (following actual trends), while traditional terms remain widely used. The main advantage of using traditional terms is that they are well-established; even most users have no exact idea of the opportunities and technologies in our subject, but they will have a notion of what cartography is good for, because people regularly use maps, and cartography is a science of mapmaking (as a very simple interpretation by ordinary users).

It is essential that every science has to keep up with technological developments, which cannot be restricted only to their own science, but every science has to be able to integrate the advances of other disciplines. Nevertheless, any development in the context of a science (especially sciences similar to cartography) must focus on users than being data or technology-driven. The latter one is a real risk nowadays, when the development

of information technology is very rapid. Cartography as any other science has to understand this principle, and we have to consider also other aspects (such as cognitive and theoretical issues), especially usability research.

The development of cartography in the 20th century, the role of the International Cartographic Association

The International Cartographic Association (ICA) was founded in 1959. In the second part of the 1950s, new map production techniques became available. A Swedish mapmaking company (Esselte Map Services) organized an international conference on map production (Esselte Conference on Applied Cartography) in Stockholm in 1956, where experts of eleven countries were present mostly from the most developed countries in order to exchange their knowledge on the development of cartographic technologies. The participants initiated the international connection of cartographers and established an ad-hoc committee to examine the need of an international cartographic organization.

Cartography as a science was previously represented in the International Geographic Union (IGU) and the formerly established International Association of Geodesy (IAG), International Federation of Surveyors (FIG), International Society for Photogrammetry (ISP), which was renamed to International Society for Photogrammetry and Remote Sensing (ISPRS) in 1980. The FIG was founded in 1878 in Paris and the ISP in 1910 in Vienna. The IAG was originally formed as the Mitteleuropäische Gradmessung (Central European Arc Measurement) in 1862, later became part of the International Union of Geodesy and Geophysics (IUGG). The IAG got its present name in 1946. All of these three international organizations were related to engineering, to basic applied science. Institutes of technology and polytechnics have been in existence since the 18th century, but they became popular after World War II, associated with the new needs created by industrialization. The foundation of international scientific organizations had a strong relationship with the higher education and industry, so it is understandable why these organizations were established more than hundred years ago and why it took more time to establish a more general international scientific association on cartography. The main reason was that the rapid development of new areas enforced a continuous international cooperation among the experts, while the map production process had already been well-developed for long time.

It is interesting to investigate the meaning of the term cartographer in the first part of the 20th century. This was the time when cartography became an independent science. The first cartographic magazines were published at that time: Globen, Sweden – 1922; Polski Przeglad Kartograficzny, Poland – 1923; Kartographische Mitteilungen, Austria – 1930 (Table 1).

Erwin Raisz, one of the most famous cartographers of the 20th century got his PhD in 1929, which was one the first in United States (basic training in cartography started in the United States around 1900) (McMaster, R. and McMaster, S., 2002).

The first independent cartographic courses were established in MIIGAiK, Moscow in 1923, but the most important institutes concerning cartography at that time were in Zürich and in Vienna. The first scientific organization of cartography, the Swedish Cartographic Society was formed in 1908, followed by Institut für Kartografie, ETH Zürich – 1925; and German Cartographic Association – 1937 (Salichtchev, 1979).

Table 1: Foundation year of selected cartographic magazines after WW II

Cartographic periodical	*Country*	*Year of foundation*
Cartographic Perspectives	USA	1947
National Mapping Bulletin	Australia	1950
Kartographische Nachrichten	Germany (FRG)	1950
Geodézia és Kartográfia	Hungary	1950
World Cartography	United Nations	1951
Revista Cartografica	Argentina	1952
Cartography	Australia	1954
Geodetický a kartografický obzor	Czechoslovakia	1955
Map	Japan	1962
The Cartographic Journal	United Kingdom	1964
Cartographica	Canada	1964
Cartographica Helvetica	Switzerland	1969
The American Cartographer	USA	1974

When the above mentioned ad-hoc committee was established in 1956, the IGU decided to strengthen its cartographic activities. The German Cartographic Society invited the ad-hoc committee in 1958 to discuss the establishment of a new organization. They suggested that Eduard Imhof be the first president of the organization and charged him to organize the founding meeting, which was held in Bern in 1959.

The first ICA General Assembly was organized in Paris in 1961. The Statutes as adopted there made it clear that the ICA did not represent either government or commercial cartographic interest. There was a continuous discussion on the relationship between the ICA and IGU. Socialist countries were not allowed to join the ICA before 1964, probably

because the first conferences were initiated by private firms. The IGU was not very happy with the presence of commercial companies in a scientific organization. Having more member nations in the ICA, the Association became more and more independent, and after 1980, the ICA started to organize its big conferences not in conjunction with the IGU conferences.

As well as being statutory and commercial, the early aims and achievements of the ICA were scholarly and scientific, embracing cartography as a discipline. With the increasing influence of new technology (especially computing and electronic communication) on map production and use, cartographers began examining more technical and management support topics. In 1959, the cartographic profession within the national agencies and commercial companies was distinctive and unchallenged. The Cartography and GIScience world has changed significantly since 1959 – the role and impact of the ICA has been steadfast. Its mission is to support and promote Cartography and GIScience – globally. Its outreach programs, in many instances conducted with national member organizations, affiliates and industry, are conducted to contribute to the transfer of knowledge and to foster the advancement of the discipline.

Commissions of the ICA

The realization of the main objectives of the Association, the encouragement and coordination of cartographic research is assigned to the commissions, and cartographic research is assigned to commissions and working groups. Commissions and working groups form the most vital part of the Association. The initial Statutes of the ICA only roughly outlined as to how the commissions should be established and should perform. It became common practice and later part of the Statutes that the member nations can propose commissions, which is subject to approval of the four-yearly General Assembly. The commissions' terms of reference are also approved by the General Assembly. The changes of the established ICA commissions and the selected themes of international cartographic conferences clearly reflect the evolution of modern cartography.

At the first International Cartographic Conference in Frankfurt am Main, Germany, in 1962, there were three main themes: Generalization on maps, Map revision, and Automated cartography. The automated methods of cartography were one of the most important themes, which helped the participants of the international cartographic conferences to be familiar with most recent technological developments. The theoretical themes (like generalisation) were also important to make the research more international and share the experiences amongst researchers. The number of themes was continuously growing: at the forthcoming conference, in 2013 in Dresden, we will have 37 themes.

Commissions were established for the first time at the General Assembly in 1964: Training of Cartographers; Definition, Classification and Standardization of Cartographic Terms; and Automation in Cartography. Four years later, in 1968, the Commission of Training of Cartographers was converted to the Commission on Education in Cartography and this commission, being the most traditional commission of the ICA, has been existing since then (the current name is Commission on Education and Training). In 1968, in addition to the two existing commissions, a new commission was founded on

Thematic Cartography and a working group on Cartographic Information. In 1972, two other new commissions and working groups were created (History of Cartography and Oceanic/Marine Cartography). In 1984, the ICA had four commissions: Training and Education; Map Production Technology; Advanced Technology; and History of Cartography; five ad-hoc commissions: Thematic Mapping from Satellite Imagery; Urban Cartography; Tactual Mapping; Marine Cartography; and Population Cartography; three working groups: Cartographic Enterprise; Concepts and Methodology in Cartography; and Map Use; in addition, two joint working groups with other international organizations.

The 10th General Assembly, in 1995, established 13 commissions and 2 working groups. Most of the commissions were the same or very similar ones, but there were some new special themes: Standards for the Transfer of Spatial Data, Spatial Data Quality, and Visualization. These new commissions reflect the new trends of cartography.

Today (after the General Assembly in 2011), the number of ICA commissions was doubled compared to the situation in 1995. If we look at the composition of commissions, we can realize that some of the commissions are very specialized. If we just read the names, we may not always find out that the activity is related to cartography (e.g., Early Warning and Crisis Management, Cognitive Visualization, Data Quality, Geoinformation Infrastructures and Standards, Geospatial Analysis and Modeling, GI for Sustainability, Open Source Geospatial Technologies). Some other commissions are definitely cartography-specific, but they are much more specialized than the previous ICA commissions: Map Production and Geo-Business, Maps and Society, Neocartography, Ubiquitous Mapping, Use and User Issues (Figure 1).

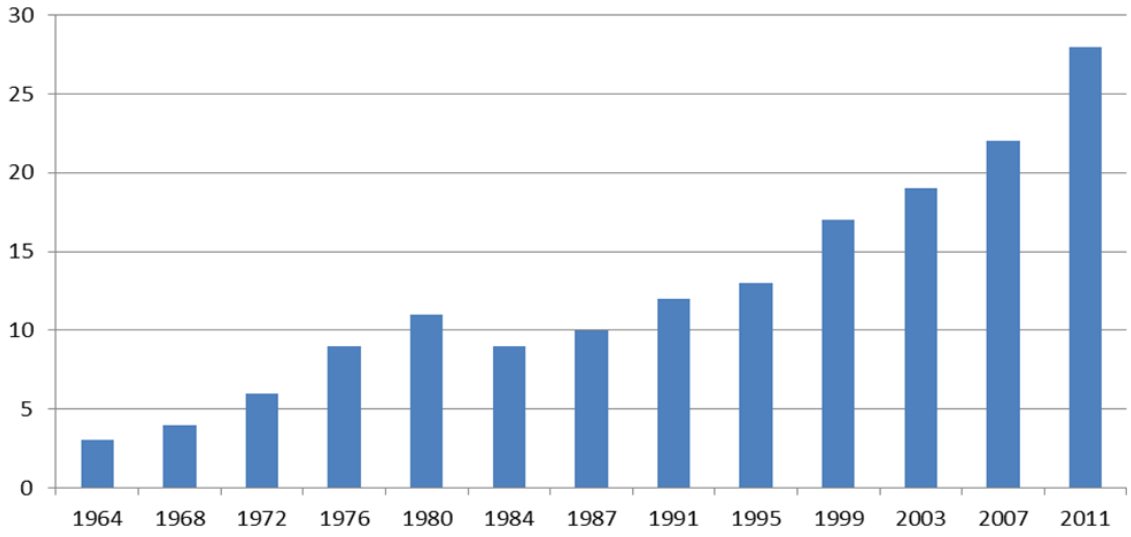

Figure 1: Changes in the number of ICA commissions

International Cartographic Conferences

The International Cartographic Conference (ICC) is the most important scientific event for cartographers. More and more papers of the ICC's are dealing with new topics, while some traditional topics (like map drawing, reproduction techniques) nearly totally disappeared or became the part of the history of cartography sessions.

The main topics of the International Cartographic Conferences have changed in these times to show clearly how the information technologies were incorporated into cartography. We have to understand and accept that cartography has never been so widely used that it could influence the development of information technology, although special hardware and software for cartographic application were developed when the technology has reached a certain level. Around 1960-1970, lots of papers were focusing on special technological elements of map production, but nowadays the importance of traditional paper maps is continuously decreasing, at least it is not necessary to conduct research on the map production techniques.

The importance of these conferences can be underlined by the increasing number of participants and scientific interests: more papers and posters. When the ICA released the call to organize the next ICC in 2017, the six bids clearly showed the increasing scientific importance of this event. The winner of this process, Washington DC and the American cartographers will have the opportunity to host this conference and demonstrate the American interpretation of modern cartography as well as to give the opportunity to all participants to present their results.

It is important to mention that in 2003, at the International Cartographic Conference in Durban, South Africa, the ICA initiated the idea of Joint Board of Geospatial Organizations (JB GIS) and asked to be followed by other sister organizations, such as ISPRS, FIG, IHO, IAG, IMTA, ISCGM and IGU. The JB GIS is a coalition of leading international geospatial societies which can speak on behalf of the geospatial profession at international level, especially to the United Nations and other global stakeholders. Its second goal is to coordinate activities within the geospatial society and organisations.

What about ‘cartography’?

The essence of the term cartography and cartographer has not changed too much until the end of the 18th century. The very first changes were caused by the invention of the printing and engraving techniques (lithography). The second change was brought about by the time of the beginning of the regular military surveys, when the large-scale topographic mapping became a continuous task of cartographers. In practice, this was only a quantitative change to increase the number of topographers, and was not a real qualitative development.

At that time, the term cartography was nearly the synonym of mapmaking. As the technical development continued, cartographers had to be familiar with new measuring techniques, although the term still included not only the technological and scientific part, but an art too. The invention and rapid development of photography and its incorporation into cartography and the development of offset printing at the end of the 19th century and

the beginning of the 20th century were important milestones in the development of cartography.

The ICA defined cartography in 1973 as “the art, science and technology of making maps, together with their study as scientific documents and works of art. In this context maps may be regarded as including all types of maps, charts and sections, three dimensional models and globes representing the Earth or any celestial body at any scale”.

After the integration of photogrammetry into the tools of cartography, the next challenge was the remote sensing. During the cold war, it was difficult to get reliable and “mappable” information on certain countries, so the remote sensing technologies were accepted immediately in cartography. The satellite images also helped cartography to decrease the role of secrecy (although we had to wait for the Internet age to let GoogleEarth and GoogleMaps make secrecy more and more obsolete). Although remote sensing has not affected considerably the topographic mapping, its use in thematic mapping was important as an easily accessible tool for data collection.

Cartography, like most of the similar sciences and professions, was very sensitive to adopting computer technology. This process affected all parts of cartography, but new professions (like remote sensing, geographic information system, global positioning system, location-based services) have also come into existence as the technology has managed to serve specific demands. It is also exciting to investigate the process how the terms GIS, geoinformatics or GIScience have changed the term ‘cartography’ (Zentai, 2009).

Several new organizations were established in the domain of geoinformatics in the last two or three decades of the 20th century. This trend is continuing to follow the development of this area. This change affected the International Cartographic Association itself, which was manifested in a long term discussion and finally led to an official suggestion to change the name of the organization. In 2005, the ICA organized (an extraordinary) General Assembly to vote on the proposal to change the statutes and modify the name of the ICA by adding the subtitle International Association for Cartography and Geographic Information. 26 members of the ICA voted for the addition of the subtitle to the name of ICA, 2 abstained and 18 voted against. As this number of 26 was below the required number of more than half the members with voting rights (as defined in the Statutes), the proposal to add the subtitle to the name was not accepted; the name ICA would remain without a subtitle. The Swiss delegate, Lorenz Hurni made a statement in this General Assembly, which summarizes well even the current situation: *“We think that instead of discussing formal aspects we should rather concentrate on contents in ICA. Furthermore we should use our strength to influence organizations and institutions who actually lead the agenda in GI science ... We can now concentrate again on our core business, the application of our cartographic know-how to all kind of old and new media. And we are sure that our knowledge is more appreciated than ever.”*

If we look at the history of cartography, the development of the last decades resulted the most rapid changes. The meaning of the term cartography is continuously changing by integrating more and more areas of information technology into cartography. Most of this

knowledge is becoming a mere feature in smart software, but cartography (or just mapmaking) will never become so simple that everybody can create his/her professional map just with some clicks. The technology, the software is improving, but the map itself is a complex item and to simplify such items is a very complicated (or nearly impossible) task.

Modern cartography

Modern cartography is reflected in all aspects of our daily life. Cartography is science, technology and art, but we have to develop a new definition to emphasize the more and more important aspect: the cartographic communication. The role of maps has considerably changed in the digital era: maps are no longer simple products, but rather a special collection of information with increasing number of functions using the database behind the map. Most of the users are probably not aware of most of these new opportunities. A modern map is a spatial product, although I think the term ‘spatial’ will be the most popular term in the next years of cartography just to emphasize the more developed form of our discipline.

Knowledge about spatial relations and location of objects are most important for enabling economic development, for managing and administering land, for handling disasters and crisis situations or simply to be able to make decision on a personal scale on where and how to go to a particular place. New and innovative technologies have an important impact on what cartographers are doing. Maps can be derived automatically from geodata acquisition methods or we can use interactive methods to combine our data with on-line maps offered by map services. Many people like using maps; we can witness a striking increase in the number of users and use of maps currently. The role of geographic data in a wide range of human, social, economic, scientific, and environmental activities has dramatically increased. The result is that cartography is being produced, used, managed, disseminated and analysed by more people than ever before through the use of a more diverse set of technologies, operating within a greater number of scientific paradigms than before.

There is a wide range of ICA commissions: 28 commissions were established by the General Assembly in 2011 in Paris. Figure 2 shows how these commissions of the ICA can cover the whole domain of modern cartography representing also the more dynamic areas of nowadays cartography. The figure is compiled on the basis of a self-definition exercise of the commission chairs made at a joint meeting in November 2011. The activities of these commissions as one of the most important actions of cartography at international level can immediately reflect on all changes in our discipline.

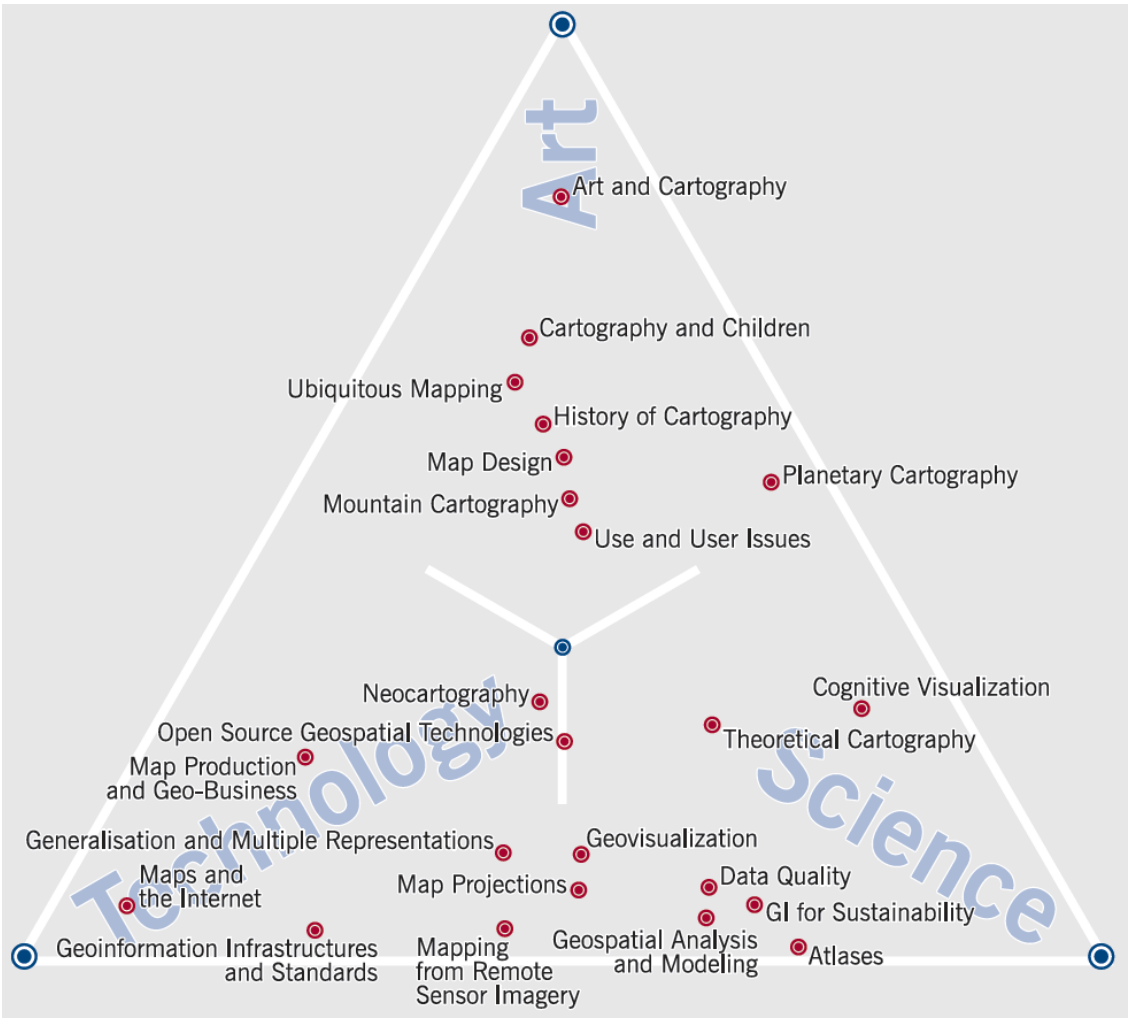

Figure 2: The ICA commissions' matrix based on the joint Executive Committee meeting with commission chairs (ICA News, No. 57, page 25). The original version was created by the authors, this enhanced version was fine-tuned by Igor Drecki, ICA News editor. Note that some commission chairs were missing during this activity.

Conclusions

The actual developments in technology have helped to "democratize" the cartographic communication processes (by means of user-friendly graphics packages for presentation, with GI Systems for geographic data exploration and analysis, and with networks for data provision, advanced geographic data handling, visualization and representation). Such democratization may carry its dangers, but, more importantly, increasingly interactive Internet mapping systems are quietly helping people rediscover their mapping instinct, and learn to use Cartography (in its widest sense). Not only are more maps used today (map is one of the most popular searching terms in global searching engines), but Cartography has regained its stature as a discipline of importance, interest, innovation and impact. Yes, we have different new terms to reflect the development, and many countries as well as organizations are very keen on using these trendy terms and skip the well-known and well-accepted term 'cartography'. The freedom of research allows every individual, researcher and scientist name or rename the area they are dealing with. It is

our turn whether we emphasize that cartography is still the most relevant term, because it can reflect all new developments integrating them or it is better to invent a new, trendier term.

These challenges can only be faced at an international level: the ICA sees itself as part of a wider international initiative, addressing the problems of our planet and is increasingly involved in scientific and technical matters such as geospatial data standards and infrastructures, multi-scale issues, Internet and satellite mapping, and geospatial analysis and modelling.

As for me, I would rather call it cartography, not just being old-fashioned, but a real fan of cartography, being lucky enough to live in a time when I had the opportunity to create maps by traditional hand drawing and later – using the technological developments – shift to computer based methods.

Long live cartography!

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