

Global Issues 2001

Global Issues and Cartography

Milan Konecny
vice-president; ICA

1. Introduction

ICA is approaching the Global Issues in several ways. What can we offer as cartographers to solve these problems? There are cartographic approaches based on cartographic theory, methodology and practices as well as cartographic products at disposal to the users. The situation in the availability to data and information, and the knowledge in how to handle geographic information (GI) digitally have changed dramatically in last years. We can now talk about information-rich societies, knowledge societies and knowledge economies. Generally the stage of development of the global society is characterised as an Information one. More and more scientists, philosophers, politicians, economists, and writers are talking about the Global Information Society. Cartographers as well as other spatial information scientists are part of this development. The new concepts of geospatial data, information and knowledge to decision support at the global scale are developed in new initiatives such as Global Map, Global Spatial Data Infrastructure, United Nations Geographic Data Base and Digital Earth.

The development of these geospatially-oriented concepts will be influenced not only by technological, but also political, economical, philosophical, educational as well as cultural aspects. The idea behind the creation of these concepts and global projects is generally to achieve a technological *unified* World. On the other hand, there are on many places around the World very different starting conditions for development and applications of the concepts depending on the economic level, the technological development and the cultural heritage of the countries concerned. In different regions and states we can recognise different accents on above mentioned spheres. The aim of spatial concepts should be to open and ensure to them to be able to be part and to play an important role in the global processes. Today in many countries a lot of people are glad, while others are afraid about certain aspects of the globalisation. The objective of the spatial concepts development should be to facilitate the process and to get as many countries as possible to participate. One very important technological presumption of the global concepts is the creation and existence of Geospatial Data Infrastructures (GDI) as a part of the National Information Infrastructures (NII). The local, regional and global levels of the collection, handling and interpretation of spatial data, information and knowledge will create powerful tools for decision making processes concerning the conditions of the global information society.

2. Global problems, global solutions, the effort towards sustainable development

Since the 1972 United Nations Human Environmental Conference, people around the world have realised that *solving global environmental problems needs to be done at a global scale*, that is co-operatively. For that reason, international organisations and institutions around the globe provide and share global map information about the state of the globe and its changes. The "Earth Summit" - the United Nations Conference on Environment and Development" (UNCED) - in Rio in June 1992 also *addresses the issue of information access*. Eight chapters of the Agenda 21 plan dealt with the need to provide geographic information. In particular Chapter 40 aims at decreasing the gap in availability, quality, standardisation and accessibility of data between nations.

This was reinforced by the Special Session of the United Nations General Assembly on the Implementation of Agenda 21 held in June 1997. The report of this session includes mention of the need for global mapping, stressing the importance of public access to information and international co-operation in making it available (Report 2000).

The tenth anniversary of the signing of Agenda 21 is just over a year away. What has happened with humankind since 1992 and what is the condition of the face of our planet today? In the last nine years world population has grown by 13 percent, from 5.45 billion to 6.16 billion (U.S. Census Bureau 2001). The compounding effects of population growth and the rightful desire for improved living standards for everyone have placed increased stresses on the environment. They have increased our demands for energy and food. They have caused the demand for luxury items to grow as well as the demand for basic necessities. They have caused our cities to swell and grow beyond our expectations. This, in turn, has put more people in harm's way due to their proximity to natural and human-induced hazards (Kelmelis 2001).

According to the Intergovernmental Panel of Climate Change (IPCC), human activities are destabilising the global climate (IPCC 2001) and the effects are measurable. As Kofi Annan, secretary-general of the United Nations, pointed out (Annan 2001 in Kelmelis 2001) "environmental problems build up over time, and take an equally long time to remedy." We must work on at least two fronts: to remedy or mitigate the environmental problems, such as climate change, land degradation, desertification, depletion of natural resources, species loss and invasive species, mobilisation and establishment of new diseases, and others that we have caused over the years and continue to cause. We must also work to adapt to the current and changing situation. We must live in the best way possible while we attempt to correct the unintended consequences of our previous actions. All activities can help the people of the world remediate and mitigate as well as adapt.

Sustainable development (SD) effort is very often limited only to ecological or economical aspects. There are different approaches towards the solutions according to political, economical and social systems. What is general and necessary is *to understand SD as a set of the equal important parts: economic, ecological, technological, social, cultural, ethical aspects*.

The Information Society is giving to us new chances to solve old problems in new ways.

At Expo 2000 in Hanover the next important aspects of the development of the *Information Society* have been formulated (Stadtsparkasse Koeln 2000):

- Knowledge: Information, Communication,
- Humankind,
- Environment: Landscape, Climate,
- Mobility, The Future of Work,
- Energy,
- Health Futures,
- Nutrition,
- Basic Needs,
- Planet of Visions,
- 21st Century

The approach to SD, especially how it could be attained in the next century have been overviewed. There are different ways, ideas and concepts across the world on how to solve this problem. E.g. The European Way provides for utilisation of market efficiency, but in an appropriate social and ecological setting (Radermacher 2000).

The following conditions are necessary to achieve this goal:

- Markets and global financial systems,
- Creativity and innovation,
- Solidarity and environmental awareness,
- Fair, world-wide regulatory systems and responsibility

What processes need to be taken into consideration to cope with the challenges of the 21st century (Stadtsparkasse Koeln, 2001)?

1. Globalisation is starting to affect many other areas besides the economy.
2. Information and communication technology is a driver of this development. The world-wide Information Society, though, offers us many opportunities.
3. World population is still growing dramatically, especially in Asia and Africa.
4. Supporting ever higher standards of living forever more people is placing stress on the earth's limited resources in a way that jeopardises the future.
5. Over the next century we will have to learn how to produce up to ten times as much economic output without increasing the present stress on the earth.
6. Such higher economic output must benefit the countries of the South especially.
7. Such extreme dematerialization can only be reached through increased innovation, for which information technology offers especially good potential.

To realise these intentions it will be necessary to start global wide dialogues. One of these dialogues, perhaps only from the point of view of the scale and complexity of interests, is Global Society Dialogue (GSD) (<http://www.global-society-dialogue.org>). This dialogue was officially established and also began its activity at the time of Expo 2000 in Hanover and is organised by Information Society Forum of European

Commission (ISF) in Brussels. Participating and observing parties are from different countries of the World, such as Nepal, Moldavia, Russia, USA or China.

The central objective of the Global Society Dialogue is to work on a framework which can orient a globalised economy towards sustainable development for the benefit of all. The GSD deals with sustainability in all its dimensions in a global perspective, environmental, technological, economic, social, cultural and ethical.

The GSD is an important civil society forum with an ongoing commitment to reach for consensus on core values that could eventually be translated into a coherent framework for international governance and trade. Naturally, there is a deep concern with the further development of the WTO and the post-Kyoto process. The GSD will also monitor the Global Business Dialogue (GBDe) and put it in a context beyond the e-commerce world. In times of Global Markets we need Global Frameworks based upon Global Ethics.

In the context of the WTO Millennium Round meeting in Seattle in November 1999 the ISF has communicated the topic of cultural sustainability in its Seattle Declaration. The ISF has also proposed a new conference on Information Society and Development (ISAD 2) with developing countries concerning action *against the global digital divide*. This is related to the G-8 discussions from the Okinawa summit in Japan.

The ISF has initiated a Global Society Dialogue with information society fora and world ethos initiatives to work on the design of frameworks for a *global sustainable information society*. The growing importance of the above mentioned efforts and processes will also affect the geospatial information disciplines including cartography.

3. Information Infrastructures and Technological Aspects

Since the Rio de Janeiro conference the technology is progressively changing. E.g. now over 450 mil people are connected to the Internet. Many more use it. Computer capacity and speed have grown as well. In 1992 a top of the line personal computer had a hard drive of 100 megabytes, 4 megabytes of random access memory (RAM), and a 486 chip with a speed of 25 to 50 megahertz. Today a top of line personal computer has a hard drive with 30 gigabytes, 512 megabytes of RAM, and a Pentium IV chip with a speed of 1 gigahertz (Kelmelis 2001).

One of the most important factors for realisation of the ideas of the Rio conference and for other efforts such as how *to remove digital divide problems* which exist not only generally but also partially in the spatial information world, is the creation of *Information Infrastructures*. The *General Information Infrastructures* (Boes 1999) consist of the push for global access to information and technology realised by WWW / Internet / Intranet / Extranet. Many information islands still exist. The new communication order is unclear. Also regulatory problems are enormous.

The field of the *Internet and World-Wide-Web* is characterised by the:

- Universal and interoperable networks
- Explosive growth
- Major driver
- Continuous and rapid change
- Future needs higher performance and user-friendliness
- Future needs trust and electronic commerce build on Internet.

The development is realised in the industrial and economic context:

- Information and communication technology is driver of the global market
- Convergence of IT, communications, consumer electronics and media
- Deregulation, privatisation, mergers
- Old jobs disappearing, new jobs created
- Competitive advantage in the future will depend on:
 - access to information, usability & best practice
 - quality of human resources
 - speed of (re-)action.

Boes (1999) also describes the key factors for the use of ICT:

- Telecommunications Infrastructure
- Qualified Personnel
- Awareness
- Technology Transfer
- Collaboration and Partnership
- Public- Private-Partnerships
- European Community (or different regional political body) and Administrations are catalysts.

Finally, The Way Forward needs:

- *Integration & Standardisation*
- *Networks and Pilots*
- *Education and Training*
- *Global Co-operation*
- *International Regulation*
- Citizen in the centre

4. Spatial part of the stake

The way to be effective in the wide stream of the activities trying to solve Global Issues is linked to Geospatial Data Infrastructures focused in their national, regional and global levels.

There are several very important efforts in which ICA is participating on the above mentioned vertical levels:

1. Global Map (GM),
2. Global Spatial Data Infrastructures (GSDI),
3. United Nations Geographic Data Base (UNGDB),
4. Digital Earth.

Ad.1. The concept of *Global Map* (<http://www1.gsi-mc.go.jp/iscgm-sec>), and the establishment of an international body for GM, was first proposed by the Ministry of Construction of Japan in 1992; and in 1994 the Geographical Survey Institute of Japan (GSI) proposed the first draft Map Specifications. A lot of vitally important work was done under presidency of John (Jack) E. Estes at this project. Unfortunately he passed away suddenly on 9th March 2001.

The main objective of this global project is to bring all nations and concerned organisations together to develop and provide easy and open access to global digital geographic information at a scale of 1:1 million. This would be used to facilitate the implementation of global agreements and conventions for environmental protection, for monitoring of major environmental phenomena and to encourage economic growth within the context of sustainable development. The Global Map version 1.0 was successfully demonstrated at the Global Mapping Forum in Hiroshima, Japan, November 2000.

Ad.2. The *GSDI* (<http://www.gsdi.org>) has been envisaged to encompass the broad policy, organisational, technical and financial arrangements needed to support ready global access to geographic information.

The *GSDI* Steering Committee at the GSDI5 meeting in Cartagena, Colombia on May 21-25, 2001, revised the definition for the GSDI as follows: "The GSDI is a co-ordinated set of actions of nations and organisations that promotes awareness and implementation of common policies and standards for the development of interoperable digital geographic data and technologies to support decision making at all scales for multiple purposes". This definition will be discussed by members of the GSDI and finally approved. More simply put, the purpose of the GSDI is to encourage the growth of compatible SDI that are capable of supporting collaboration on regional and global issues of importance.

Ad.3. The UNGDB (<http://www.un.org/Depts/Cartographic/english/htmain.htm>.) objective is: "To develop and maintain a global geographic database consisting of basic cartographic elements and toponymic information, which serves as a geo-referenced base for overlaying and exchanging information within UN system. Such a database must reflect appropriately the views and policies of the United Nations, and should be viewed as a crucial capacity building effort that will revolutionize the way various components of the Organization interact in pursuit of common goals." (Pinther M., Chow A., 2000).

Mr. Kofi Annan, secretary-general of the United Nations, acknowledged the relevance of Geographic Information Working Group (UNGIWG) in his keynote address at the meeting of the Association of American Geographers (AAG) held in New York on 1 March 2001. In his words, "last year we at the United Nations established a UNGIWG

to improve the way in which the many entities in our far-flung system use cartographic and geographic information. One of the Group's main goals is to establish a common UN Geographic Database. It will be working with national mapping agencies, non governmental organisations, industry groups and research institutions."

Ad. 4. The *Digital Earth* concept, which should be understood as a second step of the concept of SDI in global scale was published by Al Gore (1998): "A new wave of technological innovation is allowing us to capture, store, process and display an unprecedented amount of information about our planet and a wide variety of environmental and cultural phenomena. Much of this information will be "georeferenced": - that is, it will refer to some specific place on the Earth's surface. The hard part of taking advantage of this flood of geospatial information will be making sense of it - turning raw data into understandable information." The Gore is continuing that "part of the problem has *to do with the way information is displayed*. I believe we need a *Digital Earth*: A multi-resolution, three-dimensional representation of the planet, into which we can embed vast quantities of geo-referenced data. This project was originally the idea of former U.S. vice-president Al Gore, but the first congress was held in this town, Beijing (which is hosting International Cartographic Congress 2001) at the end of 1999. The second took place in Fredericton, Canada just over 1 month before the ICC Beijing event.

We have been talking about global problems and issues for many years. Some of them are the same and dangerous (such as soil erosion), some of them are more recently or or with growing sensitivity, also accepted as dangerous (such as global warming and desertification). But the conditions we would like to solve our problems are changing. The Information Society is giving us and also to cartographers a many new tools on how to solve contemporary and future problems by in ways.

5. The Role of Cartography

At this *Plenary Session I* I will not comment the cartography as a science. The cartography research agenda will take place at the Plenary Session II, which will be lead by Bengt Rystedt. Important information about contemporary thoughts can also be found in Ormeling (2000), Rystedt (2000, 2001), Wood (1999, 2001), Moellering (2001), Rhind (2000 and 2001), Konecny (2001) and other papers.

According to the mission of ICA adopted by the ICA General Assembly 1995 the International Cartographic Association exists:

- to contribute to the understanding and solution of world-wide problems through the use of cartography in decision-making processes;
- to foster the international dissemination of environmental, economic, social and spatial information through mapping;
- to provide a global forum for discussion of the role and status of cartography;

- to facilitate the transfer of new cartographic technology and knowledge between nations, especially to the developing nations;
- to carry out or to promote multi-national cartographic research in order to solve scientific and applied problems;
- to enhance cartographic education in the broadest sense through publications, seminars and conferences;
- to promote the use of professional and technical standards in cartography.

Over the world we can find many cartographers dealing with the global issues incl. sustainable development. Let me give you two examples from the Euro-Asian region.

Tikunov (2000) describes "Atlas Information System for Environmentally Sustainable Development of Russia (Multimedia version)" as follows. Upper block of the hierarchically composed system would describe the position and role of Russia in the solution of global issues. World maps of this block would represent the reserves of the main natural resources and the balance of their production and consumption; dynamics of the population growth; impact of Russian and other nations on the global environmental situation. Anamorphosies, diagrams, graphs, tables and explanatory texts should stress the role of Russia for the solution of the most urgent global issues. It would be also useful to compare Russia's regions and foreign countries within a single information massif. The work has been already done to apply multidimensional ranking using the sets of comparable parameters. According to several integral indicators the regions of Russia could be correlated to quite different countries, from Austria (the city of Moscow) to Nicaragua (Republic of Tuva).

The blocks of federal level would be devoted to the environment sustainability of Russia under the anthropogenic pressure, the sustainable economic development of Russia and the sustainable socio-demographic development of Russia. A number of original topics would supplement the general description of all elements in the system of "Nature-Economy-Population" with particular emphasis to the changes that are now at progress. The final topics of the blocks would be the evaluation of environment resistance to the anthropogenic pressure, sustainability of the economic development and socio-demographic sustainability respectively, as well as some other integrating assessments.

An important block of the system would be the models of transfer to sustainable development for the regions of Russia. As in other blocks of the system the main aim is to characterize the environmental, economic and social components of sustainable development of the territories. The work will soon begin on a hypermedia branch of the system for the Baikal Lake area, Irkutsk oblast and the town of Irkutsk. The region would be analyzed as both an element of a larger territorial unit, i.e. the country, and a somewhat self-sufficient integrity capable of development on the basis of internal resources. The composed maps would make it possible to propose the strategy of development and innovative activities for the whole region and its particular areas. The typology of all regions of Russia has already been done and typical representatives of different groups, such as industrial, agrarian, poorly developed, etc., have been identified. Other regional branches of the system could represent different types of the territories within the country.

The information system allows to evaluate different versions of the projects of international and regional scope. In the case of Altai region, for example, it would be possible to analyze its alternative development if the proposed Shanghai-Rotterdam railway cross its territory. At present this Trans-Eurasian transportation corridor is planned to go along the ancient Great Silk Route bypassing the territory of Russia. Chinese railroads would be connected through Kazakhstan (the Urumchi-Alma Ata railway) and further there are a number of possible routes across the Central Asia, Transcaucasia, Turkey, Ukraine, etc. Integral analysis of economic, environmental, social and political aspects of this project would contribute to the adequate evaluation of all pros and contras resulting from the passage of this railway across the Russia's territory.

Sustainable development studies require the analysis of dynamics of almost all thematic aspects which should be realized in the atlas information system. Several thematic animations are being worked out for the retrospective analysis, namely Changes of arable and forest lands within the Russia's regions for the recent 300 years, Development of city network in Russia, Dynamics of the population density in Russia during 1678 to 2011, Development of metallurgy in Russia during the 18th to 20th centuries and Development of railway network (expansion and electrification) in 19th and 20th centuries, the latter two being the first stage in the elaboration of a complex animation Development of industry and transport in Russia. Animations Population of Russia, Changes of administrative and territorial boundaries in Russia and some others are also in progress. The last one allows the users to see the boundaries of gubernias in the 19th century, view the hierarchy of administrative units (gubernia, uезд, volost), follow the changes of boundaries during the Soviet times and in the recent history of the country, identify stable boundaries and those frequently re-sited, obtain the encyclopedic information on the region, gain biographic data of the Governor, etc.

The work has begun that would allow the users to compile their own cartographic products using the basic map and the data acquired through the Internet. The means of modeling would be developed, mainly for the elaboration of different scenarios of transition to the sustainable development for particular regions of the country. Final stage of the project would be the intellectualization of the whole system that allows to produce the comprehensive system of decision-making support.

Within the project the above-mentioned blocks were illustrated by a number of examples providing for the rough description of the situation and the development of recommendations on sustainable development of some regions of the country.

Second "best practices" example of possible cartographic added-value products is "*The National Physical Atlas of China*" (1999) (further NPA). Professor Chen Shupeng, academician of the Chinese Academy of Science in Foreword of the Atlas is saying: "The compilation of the new edition of the NPA, having a foothold in China and having whole world in view, faces a fresh new challenge: the earth observation system such as satellite remote sensing and Global Positioning System are being constantly perfected; the international invigoration of global research program and the development of information system have greatly accelerated the advancement in the study of complexity and systematization of earth system science; and issues of global change and land degradation (desertification), biodiversity, and concept of environmental conservation and sustainable socio-economic development have gradually become the focuses of general concern. Confronting such a new situation, the guiding principle for the compilation of the NPA can not just be aimed at revising the observational and statistical data, but through even more thorough studies and creations, making the Atlas close to people's life and need of production as much as possible, and furthering its depth and width to orient towards national economic construction and service of national security. To this end, the new edition, in addition to retaining the original seven map series related to natural environment, increases three new sections of natural resources, natural hazards, and nature utilization and conservation. Hence, the man-land relationship can be further elucidated and the common understanding of the global village can be deepened". Chen Shupeng is also describing the role of map: "Map, as a

visual language in regional science, has become more and more demonstrative of its peculiar superiority and of its wide-ranging potential in application with the advancement in modern science and technology”....”original data and maps available for the compilation NPA are really and extremely rich and sufficient information.....it is quite necessary to have the English and electronic versions of the NPA published simultaneously and to set up the Atlas data base for this conforms to the trends of international exchange in earth information science and information sharing” (p. 7).

Professor Liao Ke, editor-in-chief is describing Tasks and Aims of NPA as follows (Liao Ke, 1999, p. 17; in this paper reduced): “The NPA systematically reflects investigation and research results obtained in earth sciences, biology and environmental sciences in the past more than forty years; introduces complicated natural conditions and rich natural resources; and expounds the laws of formation and evolution of natural environments in China. It also reflects the distribution of different natural hazards, and achievements in utilization and transformation of the nature, and provides scientific basis for the comprehensive allocation and overall planning of the national economic construction and societal development“.

It is intended to use atlas for decision making process on all political and state administration levels. Liao Ke says: „It is an important reference book for the study of natural conditions, natural resources, natural hazards, nature conservation and regional natural environmental characteristics of China. The Atlas focuses on results of the scientific disciplines (from geology to environmental science) and „presents data accumulated through years and latest research and investigation results by relevant departments. It is thus helpful to interdisciplinary crossreference, mutual infiltration, and promotion of the advancement of various subject fields“. Finally Liao Ke says that NPA is: „Based on the experience in the compilation of various major atlases of domestic and foreign, studies on the design of various new types of thematic maps and exploration of computer-aided mapping techniques and application of remote sensing to the field have been carried out; computer-designed graphics and new plate-making technology were experimented with and adopted, which promoted development in cartography and complex mapping theory and new mapping techniques as well“.

Between Compilation Principle and Characteristics Liao Ke is mentioning, that: „The compilation of the NPA follows the strategy of „rejuvenating China by science and education“ and „sustainable development“, adheres to the guiding principle of serving the national economic construction and societal development, applies the theoretical methods of complex mapping, systematic mapping and systematic engineering, uses as much as possible new mapping techniques, and adopts a number of methods and measures in the preparation and production process to guarantee the unity and harmony of the NPA, and its comparative higher scientific level and practical utility value“.

In NPA for example *maps of natural resources* include mineral, water, climate and land resources, biological resources, and natural scenery and tourism resources. *Maps of natural hazards* cover five series of seismic hazards, climatic hazards, soil erosion and degradation, harmful animals, life elements and endemic diseases. There is a lot of other knowledge in the NPA giving new impulses to the development of the theory and practice of cartography, integration and interoperability of the data and information from different modern technological sources and procedures how to use maps for decision-making process with the aim to establish sustainable development conditions at the local, regional and global levels.

ICA is permanently investigating and developing present-day or near future roles of maps and cartography (Ormeling 2000). It is the distribution of the GI through **the Internet**, which leads us to a whole new range of users. In the Internet as well as by other electronic means of data presentation, the role of maps is changing. Before the electronic age, maps served two functions: both storage and display. Nowadays, these *two functions can be separated*. The *storage function* rests in the data files or data base; the *display function* is determined by users on the basis of what they need for a specific spatial data – based task. But the development goes even further. The map on the computer monitor or on the mobile phone is changing into an *interface* to access the spatial data behind it.

The fact that spatial information is now available in digital form allows us to turn it into so-called *smart maps*. Another important aspect of the digital revolution is that finally we are able to produce *animated maps and model dynamic reality* with our maps more accurately than ever. Finally it is *virtual maps* that we are now producing, when planning for the future we can create three-dimensional scenes in a realistic way that show what the proposed changes would look like in reality, on the basis of our databases.

4. ICA and GDI

The Executive Committee of the ICA, and also I personally, believe that discussion about this key topic for cartography will go on at this Plenary and many other discussions in the commissions of the ICA, sections of the programs and also on the personal level.

In some way, *cartographers become a kind of spatial information brokers* (Rystedt 2000, Ormeling 2001): they would be able to indicate to would-be users of spatial data, what kind of data, with what level of quality would be needed for specific tasks. They would be able to show the way in a spatial data jungle characterised by conflicting trends: *decreased spatial data access* because of digitisation and price considerations and *increased spatial data access* because of the information super highway.

Very important are education and training aspects which cartography can offer through the Internet and so called *portals* which are starting to be part of NII or NSDI. It will not only open information about cartography and its possibilities to wide publicity but also improve the use of cartographic methods by better and higher quality ways from local to global levels (Konecny, Stanek 2001).

Rystedt (2001) describes possible cartographic approaches to Geospatial data Infrastructures, He says: "It is often stated that 80% of all data can be tied to a location. In cartography we deal with location of real world objects and of activities in the natural and cultural environment. By considering the whole life cycle of each object together with its usage and user(s) it is easy to realise that the ability to handle location has a great potential, which includes many possibilities to increase the efficiency of the cartographic displays in decision support systems". Rystedt is delimitating general,

global, regional and local levels of SDI. "At the general level we see that geospatial data will be available and used in many kinds of applications. Almost all countries are in the process of establishing a National Spatial Data Infrastructure as exemplified in other papers to this conference. Furthermore, the infrastructure for telecommunication will facilitate the accessibility not only to office use but also for use in mobile units. There is, however, also a great need of standardisation and development of methods to describe the spatial objects we are dealing with. The technical committee number 211 of the International Standardisation Organisation (ISO/TC211) is currently developing standards for geospatial data. Since a general description of all kinds of geographical features is complicated in a talking language it is even more complicated to achieve a description to be understood by a computer. The full standard will comprise a set of sub-standards and in addition be based on other IT standards. According to the latest timetable the first standards will be released during 2001." Further, Rystedt gives an overview of possible activities on all above mentioned levels of the GDI enhancing the role of cartographical modelling, simulation and visualisation.

I would like to define here only several basic presumptions which could be basic for our discussion. I do not think they are complete but I think they will be included with some other aspects in helping us, as an organisation, to define our role in these processes.

What is the ICA position in this so important field?

Firstly, ICA fully supports all global spatially-oriented activities such as Global Map, GSDI, Digital Earth and U.N. Geographic Data Base. On the Executive level of ICA there are ongoing activities in order to increase the participation and contribution from the cartographic community.

Secondly, within the ICA several commissions have an interest in developing an ICA strategy for GDI. The Executive Committee has set up a Working Group on GDI and also commissions, such as the Commission on Standardisation, are co-operating in this field. At the ICC in Beijing one of the two plenary sessions is being devoted to Global Issues and the possible role of ICA in GDI will be discussed just here in Beijing.

Thirdly, ICA's presently agreed-upon conditions for future developments are based on the facts that the SDI effort of ICA will not overlap similar activities of other organisations. The ICA will define its own policy and contribution to the GDI activities.

Fourthly, the ICA will co-operate with sister organisations to establish a visible GI community in the global information society environment.

Fifthly, last but not least, the ICA and its commissions will create adequate cartographic methods, approaches and tools to deal with possibilities offered by existence of GDI.

5. Plenary Session I Content

In addition to my introduction *Plenary Session I* contains four papers. First will be a paper given by the famous and outstanding Chinese scientist, professor and academician **Chen Shupeng**. The paper "Cartographic Methodology for Geo-Information Science" gives an overview about the development of cartographic methodology from ancient times (Shang Dynasty 3,500 years ago) to new thoughts of Chinese Geo-Information Tupu as a perspective for the start of 21st century. As Prof. Chen Shupeng mentions " Graphs(Tu) are commonly used to represent spatial distribution or spatial analysis, while diagrams (Pu) are commonly used to represent temporal courses. It is possible to systematically describe spatial structures or to deduce by past course and future situation using multi-dimensional combination, transform and display of Tupu. Thus, the traditional static cartography method evolves into dynamic and visual science thought and foretells. It is a kind of supplement and extension to mathematical statistic spatial analysis methods that are widely used. It may be "an invisible hand" newly discovered in the field of cartography".

Prof. Gao Jun from China will give a paper "Virtual Terrain Environment: A New Annotation for Maps and Cartography". Prof. Gao Jun introduces his paper with the words: "Under the condition of digital mapping and the network, especially the broadband network, a kind of 3-D, dynamic map supported by the Virtual Reality technology is gradually coming into its practical phase. From the technical viewpoint, we may call it a virtual environment, a terrain simulation, or a cyberspace. But from the cartographic viewpoint, it is a new kind of immerseable map". He presents results of the research started at 90's of the last century and demanding to redefine the map and cartography.

Both speakers Chen Shupeng and Gao Jun strongly believe in the future of cartography as a science and its important place and role in the innovation of science in general.

The third speaker, **Vladimir Bessarabov**, from the United Nations Cartographic Section in New York, in his paper "Recent Activities of the United Nations Geographic Information Working Group (UNGIWG)" informs us about positive development in the field of spatial data and information support of U.N. activities and operations. The UN cartographic section is developing U.N. Geographic Data Base. As Bessarabov reminds us: " Mr. Kofi Annan, Secretary-General of the United Nations, acknowledged the relevance of UNGIWG in his keynote address at the meeting of the Association of American Geographers (AAG) held in New York on 1 March 2001. In his words, "last year we at the United Nations established a Geographic Information Working Group to improve the way in which the many entities in our far-flung system use cartographic and geographic information. One of the Group's main goals is to establish a common UN Geographic Database. It will be working with national mapping agencies, non governmental organisations, industry groups and research institutions."

I am familiar with the activities of this section, newly headed by Mr. Hiroshi Murakami from Japan. I recognise that the Cartographic Section is trusted as (and sometimes requested to be) a place with an increasingly important co-ordinating role between several existing spatial oriented projects.

Fourth, last but certainly not least, speaker of the Plenary Session I is **Derek Clarke** from South Africa, last period the president of the GSDI initiative. The title of his paper is "Global Spatial Information Issues and Challenges and Opportunities for developing Nations". He is concentrating on the characterisation of the two initiatives GSDI and Global Map, concluding "they are not competing, more importantly, the two initiatives complement each other. GSDI is focusing on the infrastructure while Global Map is focusing on the data sets". The second part of his paper is devoted to the challenges facing developing countries to participate in global initiatives such as GSDI and Global Map.

All speakers are certain about the very important role which cartography is playing and will continue to play in the near future. It depends on cartographers how successful they will be in realisation of these ambitions. I hope that this Plenary Session I and the whole International Cartographic Congress in Beijing will foster every all effort of cartographers towards existing and coming global issues.

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