

Preface

The First International Joint Workshop on Ubiquitous, Pervasive and Internet Mapping, held in Tokyo from September 7th to 9th, 2004, is sponsored by the International Cartographic Association (ICA) Commission on Ubiquitous Mapping, the ICA Commission on Maps and the Internet, the Center for Spatial Information Science (CSIS) at the University of Tokyo, the Geographic Information Systems Association (GISA) of Japan, and the Japan Cartographers Association (JCA).

The proceedings provide technical papers selected by the program committee one month prior to the workshop. The most recent versions of these papers will be made available on the program pages of the Ubimap website (<http://www.ubimap.net/upimap2004/>) in downloadable PDF (Adobe Acrobat) format. The contributors are from eight different countries, presenting a wide variety of topics reflecting their own research circumstances.

The ICA has adopted a Strategic Plan for 2010, initiated at the general assembly held in summer 2003, and it has come time for each of the ICA commissions to begin implementation of the prescribed strategic goals. Research under the ICA is generally performed by the commissions and working groups, and new commissions such as the Commission on Ubiquitous Mapping are expected to provide new directions for the ICA.

In the 1960s and '70s, when digital technologies for cartography were first introduced, the main objective was to replace human labor with machine processing. This represented the birth of "automated mapping", and digital mapping techniques were soon to be applied for mapping based on aerial photography and ground surveys. In the 1980s, geographic information system (GIS) technology was introduced as a thematic mapping technique for applications such as land management and spatial analysis using a range of databases. This period also marked the introduction of interactive mapping, although the first tools were very difficult to manipulate and could only be used effectively by specialists. In the 1990s, with the advancement of personal computers and the introduction of high-capacity storage such as CD-ROM, multimedia cartography began to be utilized to present spatial information in an interactive way using photographs, video, text and voice to enhance map functionality. In the mid 1990s, the Internet began to allow users to access to an immense variety of spatial information. The integration of global position system (GPS) functionality also allows a user's actual position to be projected onto a map. This advancement, coupled with wireless communication technologies, eventually lead to consumer applications such as in-car navigation systems. Since 2000, cellular phones and wireless data assistants have begun to provide real-time, egocentric mapping functions in a wireless environment, representing a new direction for mapping technology and utilization.

To meet the rapidly evolving mapping environment, a number of commissions have been established over the last two decades, including the Commissions on Map and Spatial Data Use, Map Use, and Maps and the Internet. Other commissions such as the Commissions on Cartographic visualization, Cartographic generalization, and Theoretical Cartography, have examined different theoretical and cognitive approaches to mapping. The Commission on Ubiquitous Mapping was in fact established out of a need recognized by the Commission on Theoretical Cartography.

The Terms of Reference for the Commission on Ubiquitous Mapping are as follows: (1) to organize regional workshops and site observations to determine the contemporary situation of mobile, car-navigation and location-based mapping; (2) to clarify the similarities and differences between the various systems to establish an evaluation scheme; and (3) to enshrine the concept of Ubiquitous Mapping in the domain of Theoretical Cartography.

An important question that many might ask at the end of the workshop or the four-year term of the commission is: What is ubiquitous mapping? To aid discussion at the workshop, a simple principal framework for ubiquitous mapping, or UbiMap, is provided below.

1. Maps provide a framework for relative or absolute spatial positioning and are presented primarily in visual form.
2. GIS tools differ from UbiMap tools in that GIS is oriented toward data input, database building, data analysis, and data output (map), whereas UbiMap is human-oriented, emphasizing the interaction

between the output map and human reactions including spatial cognition, decision making and communication.

3. UbiMap is strongly influenced by changes in the technical environment. Advances in information technology, including the development of wireless systems, high-density data storage and broadband communications, stimulate and facilitate dynamic, personalized mapping.
4. “Ubiquitous” mapping technologies are defined as those that allow users to utilize and create maps anywhere and which allow any point in the map to be visualized at any time.
5. The concept of a “map” should be replaced with the concept of “mapping” in UbiMap, as digital maps allow for real-time creation and manipulation. Thus, users can create maps to resolve spatial problems in any situation through the use of advanced technologies.
6. The concept of ubiquitous mapping refers to the ability for users to create and use maps in any place and at any time to resolve spatial problems.
7. UbiMap consists of three basic elements: the real world, the map, and the user (spatial image in the human), with interactions between each element.
8. UbiMap applications can be described in terms of five principles; (1) the situation or context, (2) the definition of the problem, (3) strategic planning, (4) the solution process, and (5) results and evaluation.
9. The major related research areas include information technology, information design (visual communication), spatial cognition and urban spatial design.
10. UbiMap should also consider how UbiMap tools can be introduced into society, and predict the effect on society.

Following the General Assembly of ICA last summer (2003), the Commission on Maps and the Internet proposed that a joint workshop be held with the Commission on Ubiquitous Mapping in Tokyo. One year later, this workshop has become a realization, and every effort has been made to present the actual situation of UbiMap in Tokyo. The purpose of the workshop is to highlight the differences in UbiMap implementations between countries, recognizing that UbiMap depends on both the social infrastructure and physical structure of a city. Thus, it is anticipated that much of the material presented at the workshop will be new and unusual to many of the participants. The workshop therefore represents an opportunity to discover new ideas and identify similarities, stimulating further discussion and innovation.

Our sincerest gratitude is extended to all contributors and the many local staff who helped make this workshop a reality.

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Takashi MORITA

Chair of the Program Committee, International Joint Workshop on Ubiquitous, Pervasive and Internet Mapping, 2004

Chair of the Commission on Ubiquitous Mapping, International Cartographic Association

Chair of the Executive Committee, Japan Cartographers Association

Professor of the Department of Civil and Environmental Engineering, Hosei University, Tokyo