1999
Venice

Italy

21st Urban Data Management Symposium

April 21-23, 1999

urban data management society

themes

I.1 CADASTRAL SYSTEMS: Critical Success Factors

In this presentation the cadastral system will be discussed from different points of view, e. g. attention will be paid to political, organisational, legal, financial and technical aspects.

Nowadays the European Union supports the renewal of cadastral systems in Central Europe to a large extent. For these activities we use the term critical success factors. Critical in the sense that those investments of the EU are essential for the success of future development of the land market.
The fact that a democratic government and a good cadastral system goes hand in hand illustrates the political importance of the cadastral system. Civilised life is based to a large degree on the fact that people know who owns what.

Legally spoken, the main function of a cadastral system is the protection of the rights that people can have on land and property.

Without any doubt we can say that the way in which a national cadastre system is organised and managed is the most critical success factor of all. In the first place it is important how a cadastre is managed in a methodological way. Secondly it is important where the financial responsibility lies.
In general a cadastral system is organised on different governmental levels: national, regional and local. It is important that there is a good communication system between the different levels and to the end users.

The way in which a cadastral system is financed has its influence on the organisation.
Besides the organisation of the cadastre is strongly influenced by the introduction of modern information and communication technology (ICT).

Cadastral systems have to become customer- and market oriented with a service-directed attitude.

Theo Bogaerts
Department of Geodesy
Faculty of Civil Engineering
and Geosciences
Delft University of
Technology

I.2 CADASTRE, THE SURVEYING PROFESSION AND CADASTRAL DEVELOPMENT

Increasingly, countries are looking at ways to improve the performance of their cadastral systems. Commission 7 of the International Federation of Surveyors (FIG) is responsible for cadastre and land management matters within the FIG. The Commission has managed a project to compare the performance of cadastral systems internationally. In a report on the project, the authors refer to social and institutional differences among the countries. These differences makes it difficult to develop appropriate performance indicators, and - one could add - difficult to transfer experiences to improve the performance.

Despite these uncertainties you can notice a worldwide adoption of micro-economic reforms, often heralded with terms like 'deregulation', ?cost recovery? and ?privatisation?. Increased room for market forces is assumed to improve performance, but confirming evidence is lacking.

The purpose of the paper is to present evidence on recent, Danish development in the cadastral and related field. The message of the paper is that the Danish cadastral development can be described in terms of a balance between market forces and institutions like governmental agencies, municipalities, the professions, and university.

The paper outlines the Danish cadastral institutions and the related markets, and develops on

1. the adoption of an exchange format for geographic information,
2. the digitalisation of the Danish cadastral maps 1985-98, and
3. a recent project on mandatory change of information technology used by private practising licensed surveyors for updating cadastral records.

Erik Stubkj
Department of
Development and Planning
Aalborg University

I.3 ARE CADASTRES REALLY SERVING THE LANDOWNER?

Both private and public interests play an important role with regard to land. This certainly goes for registrations of land related rights and obligations. Even Napoleon said about his cadastre ?it meant a secure guarantee of land ownership, providing for every citizen certainty of independence.? Nevertheless his cadastre has become best known for serving the interest of the state, especially through raising land taxes.
The question will be raised if the existing cadastres and land registration systems these days are really tuned towards the needs and interests of the landowners (and other rightholders). Even though ?customer demands? is an often-used buzzword, getting a land transfer finalised is considered a pain in the neck by most landowners. Cadastral and related land administration procedures are often expensive, slow and bureaucratic in the minds of the landowner. In most countries there is ongoing work done on improving the cadastre, but these improvements usually mean that some legal technicality is further refined, that the accuracy of the surveying work is improved, or that the data has been moved to a new medium. These improvements might be interesting for the ?technocrats? involved, but often have very little bearing on the perception the landowners have of the whole system.

A similar ?technocratic? approach, separately administered by lawyers, surveyors and IT-specialists, has been used to characterise and classify the systems that can be found in different jurisdictions. This has lead to one-dimensional and often biased dichotomies like ?cadastre versus land registry?, ?title versus deeds? and ?fixed versus general boundaries?. Although this has lead to many interesting discussions at conferences, it has done little to help countries which do not have a well functioning land market to design the right system for their circumstances.

It appears that for many ?technocrats? involved the ?landowner has to serve the cadastre?; partly by supplying information and party by paying fees.
In the paper, however, the question is treated from the transaction cost approach, as inter alia advocated by the political economist and Nobel Prize Laureate Douglas North.

Jaap Zevenbergen
Delft University of
Technology
Department of Geodesy

I.4 A FISCAL APPROACH TO LAND ADMINISTRATION

The concept of land administration elaborated by a UN ECE task force is concerned with information about the ownership, value and use of land. Thus a land administration system is a specific land information system ? of a multipurpose cadastre type ? which is built around the three mentioned above land commodities.

Considering recent developments in Central Europe an expanded model for land administration and related land administration systems is proposed. It includes land and property taxation and is based on four commodities: the ownership, the value, the use of land and the land and property tax.

An overall countrywide land administration system is normally divided into a number of subsystems. Some principles of their structuring are presented as general guidelines to be observed when planning and implementing land administration reforms.

Finally, appropriate solutions to land administration management problems are discussed, including the role of computerisation and standardisation as management tools.

Theo Bogaerts
Department of Geodesy
Faculty of Civil Engineering and Geosciences
Delft University of Technology

Jerzy Gazdzicki
Polish Association for Spatial Information

I.5 CONCEPT OF IMPROVING THE CADASTRAL SYSTEM IN POLAND

In Poland there are two information systems concerning real estates, i.e. Land and Building Registers - kept by local administration organs or self-government agencies, and land and mortgage registers - kept by district courts. At present, the register containing a description of land and data on its owner and user, functions parallel to land and mortgage registers, which focus on the registration of rights to a real estate. An effective system must be ?tight? as concerns the exchange of documents and information between offices and documentation centres. There is a need to unify the structures, procedures, tools and methods of making the information more accessible.

The main objective of the current works is to transform the existing systems - in a way securing the continuity of their operation - to the standards of an official information system, linking the systems of land registration and land and mortgage registers. The concept of the new system is based upon two general solutions:

1. respective areas of responsibility
2. computer techniques and constancy of information.

The works were started in the administrative district of Wejherowo, located in the Pomeranian Province in Poland, as a pilot study.
Some elements of the concept of the Real Estate Information System are included in this paper.

Andrzej Hopfer
Warmia and Mazury
University in Olsztyn

Sabina Zr
Warmia and Mazury
University in Olsztyn

I.6 MUNICIPAL INFORMATION NETWORK SYSTEM FOR MULTI-PURPOSE USE AND MULTI-AGENT USE WITHIN THE FRAMEWORK OF A JOINT MUNICIPAL IT-STRATEGY: The Case of Bulgaria

In Bulgaria at present most registration systems are established by the central government. Most part of the registration is thus made in connection with the Land Reform Committee, The Notariat functions and the Tax Authorities apart from the manual registration associated with the district housing offices and the activities associated with the functions of the Chief Architect (construction permits and land-use/urban planning constraints). Among these stakeholders of information systems there is no formulated intentions to share information, which is almost a necessity as resources within the individual agency or municipal function is very limited.

The IT-strategy is recommended in order to increase efficiency foremost through an improved division of work and more systematic work-procedures and work-methods by the systematic use of modern technology and information systems. For this purpose a strategy for a step-by-step establishment and running of multi-purpose information systems and registrations including digital maps (GIS- Geographical Information Systems) should be developed.

The strategy will focus on ways and means to develop a framework for the systematic computer assisted municipal administration and decision making. The framework will outline the information policy preconditions for a systematic use of economic methods of benefit-cost analysis, accounting analysis and consequence-analysis for the municipal administration. Supplementary attention is devoted to training in the use of information systems established to serve management as well as administration on a cross institution and cross sectoral basis.

A Multi-purpose and Multi-agent Networking information system used for urban planning and the handling of applications for building permits - CISPlan - was developed in accordance with the named principles 1995-98 and the system is used in 3 major municipalities ? inter alia for the next master plan of Greater Sofia and Sliven.

Svend Trollegaard
National Association of
Local Authorities
Department of Project
Export

I.7 THE DEVELOPMENT OF A NEW CADASTRAL LAW IN CONTEXT OF THE GENERAL TREND IN EUROPE

The paper describes the main elements of a draft law on the cadastre for Norway, recently presented for general hearing. If generally accepted, and finally adopted by the Parliament, the law should come into force from January 2002.

The paper discusses also some main trends concerning the developments in land administration in Europe.

Helge Onsrud
The Norwegian State
Mapping Authority

I.8 "INFOLAND": The New Distribution Solution of Land Information in Norway

In addition to information from the central Land Information System, the market ? Real Estate Agencies, valuation officers, construction firms ? needs information which is physically stored at the municipalities and other public information sources. This information includes text, maps, plans and photos stored in both digital and analog form.
The new Internet-based commerce system ? infoLand takes care of the logistic; orders, delivery, settlements, invoices.

Norsk Eiendomsinformasjon as (Norway Land Information) is a state owned company responsible for development, maintenance, operation and distribution of information from the Norwegian Land Information System. The system consists of two databases, the Legal Cadastre and the Technical Cadastre. Other products are ?Norwegian Landed Properties on CDROM? and ?Norwegian Land Photos on Internet?.

Kristian Str
Norsk
Eiendomsinformasjon AS
Norway Land Information

I.9

DEVELOPING A VALUATION AND TRANSACTION INFORMATION SYSTEM (VTIS) FOR THE ESTONIAN CADASTRE

Within an EU-PHARE project we designed, developed and constructed a Valuation and Transaction Information System (VTIS) for the Estonian National Land Board (ENLB). The ENLB is among other tasks responsible for: (1) keeping the cadastre, (2) keeping the valuation and taxation register, (3) establishment of topographic maps and (4) maintaining the geodetic reference system. The VTIS is needed for:

1. Analyses for the determination of taxation values of land,
2. To publish information about Estonian land value and land use in order, amongst others, to stimulate the real estate market

Our main considerations that underlie the design of the VTIS are:

? Using extensively the capabilities of the expanding Information, Internet, and Telecommunication technology;

? To make as much as possible use of off-the-shelf software, in particular with respect to analysis of the data, presentation of information extracted from the data, and the processing of geo-related (topographical) data by GIS.

? Anticipation on the on-going computerisation of society and consequently the increasing availability of governmental and other data in digital form.

The consequences of this design philosophy are:

? much effort has to be spend on safety and protection aspects of the VTR database, because of the links with many external locations via Internet;

? to warrant the reliability of the data, rigorous data checks have to be carried out especially during data input;

? relevant software packages available at the market have to be evaluated for their suitability.

The system we developed and constructed within a period of 12 months has been successfully piloted in January and February 1999. In this paper we consider the background, design issues and data streams of the VTR. Amongst others data links via Internet with notaries and real estate agencies have been established. Furthermore, the piloting results are discussed. With respect to the design issues we focus on the quality aspects of the information system.

Mathias J.P.M.
Delft University of
Technology
Faculty of Civil Engineering
and Geosciences
Department of Geodesy

II.1 PLAINS: Prototype Landscape Assessment Information System

Several business sectors have identified the potential benefits of a landscape/urban assessment based upon the objective appraisal of the interaction of the cultural and natural landscapes. This paper describes a recently approved project (PLAINS) funded by DGXII of the European Union under the Framework IV Environment and Climate Programme. The aim of this project is to identify the benefits of introducing satellite Earth Observation data into the landscape assessment process and to develop a decision support system that will provide for landscape/urban classification tuned to satisfy specific customer requirements. The system will also allow the exploration of impact assessment (?what if?) scenarios. The project involves three different business sectors that have inherently similar requirements in landscape assessment. The ?customer? organisations involved in the project cover the sectors: regional planning authorities, Estate Agents and tourism. In all, there are 13 partners involved in the project from 5 countries (UK, Denmark, Germany, Italy and Poland). The initial development of the system will use test sites in the counties of Hereford and Worcester in the UK, with subsequent validation being carried out at sites in Italy (Province of Savona), Germany and Poland.

Wyn Cudlip
QinetiQ Space
Hants

Charlie Lysons
Space Department
DERA

Richard Ley
Space Department
DERA

G. Deane
Huntings Technical
Services Ltd

II.2 THE ISOLA PROJECT: A Novel Approach to Urban Environment Data Use

In the frame of the LIFE/Environment European program, the three-years long ISOLA project (Information System for the Orientation of Local Actions) is aimed at studying a unified way to organise and process urban environmental data in three fundamental activities:

? Eco-balance. Assessment of risks in the urban environment and its components, and measurement of the pressure coming from human activities and settlements.

? Eco-plan. Integration of environmental factors in urban planning according to proper methods, criteria and procedures.

? Eco-management. Support to decision-making by means of simulation tools that allow evaluating the impact of alternative scenarios.

The project intends to extend and generalise the experience acquired by the Modena municipality in several years of work in this field, with the objective to set-up an integrated approach that can be replicated in urban contexts differing in geographical, cultural and political conditions.

The expected project results are:

? a sound methodology expressed in form of guidelines addressed to the end users that intend to adopt a disciplined way of facing the environmental problem. The guidelines deal with clear identification of the goals to pursue, effective choice of the data to acquire, unambiguous representation of the output construction processes, explicit evaluation of cost/benefit factors;

? a software package, to support the methodology and make its application directly feasible and controlled by end-users not expert in GIS technology. It means splitting the package into a high-level user interface and an underlying GIS engine, and hiding the mapping between user requests and calls to the engine functions;

? an experiment obtained by applying the methodology to a real case provided by the Modena municipality. The experiment is aimed at both validating the methodology and testing user friendliness and performances of the software package;

? dissemination actions, to discuss and promote the ISOLA approach with the widest possible audience. Dissemination is carried out, among others, by constituting a user interest group, issuing a periodical publication, opening the ISOLA Web site, producing multimedia material referred, in particular, to the results of the experiment.

Flavio Bonfatti
Dept of Engineering Sciences
University of Modena and Reggio Emilia

Paola Daniela Monari
Dept of Engineering Sciences
University of Modena and Reggio Emilia

Carlo Alberto Muratori
Department of Environment Control and Planning
Municipality of Modena

II.3 DATA COLLECTION AND MANAGEMENT FOR TREE ASSETS IN URBAN ENVIRONMENTS

Trees are important and valuable assets in an urban environment. The presence of well-developed and healthy trees can add thousands of dollars to the value of adjoining land as well as enhancing the environment. However, unhealthy and poorly maintained trees can cause major health and safety problems that may lead to accidents and expensive litigation. Trees are also living organisms that pass through a sequence of life and habit stages with corresponding values and costs.

Data collected on urban trees must reflect the unique values of trees in an urban environment. These values are different from traditional forest or farm tree values. The management of the urban tree assets must also account for the growth of trees and their changing maintenance needs. The data may also need to be made available to a wide range of stakeholders.

This paper presents two case studies of decision support systems developed to collect and use data about trees for tree asset management. The first study describes a decision support system (DISMUT) that has been developed to assist in the management of about 500,000 trees in Canberra (the National Capital of Australia). The second case study focuses on a precinct-scale tree management system that uses a notebook computer, laser survey equipment and a pen-based Geographic Information System to help manage about 7,000 trees on a 100 ha campus within the city.

Cristopher Brack
Department of Forestry
Australian National University

Ryde James
Department of Forestry
Australian National University

J. Banks

II.4

DEVELOPMENT OF ENVIRONMENTAL MANAGEMENT FOR THE MEGACITY OF MOSCOW ON THE BASIS OF SATELLITE MONITORING TECHNOLOGIES AND COMPUTER TELECOMMUNICATION NETWORKS

The focus of our paper is on the importance of assuring the local government management that the satellite remote sensing techniques and new information technologies such as computer telecommunication networks reach the levels for development of environmental management systems. This requires a strong partnership between the science community and local government. We should to work together forward a common goal to reducing of urbanism effects and ecological problems of megacities. Earth Observation Techniques and the merging development of the so called information highway provides a new and potentially revolutionary option for the rapid, automatic, and global dissemination of the sufficient knowledge for supporting decisions of local government management. This is an extremely important point for environmental management in Moscow Megapolis. The Space Research Institute developed the megacity environmental monitoring based on space data from US meteorological satellites of the NOAA series and from Russian satellites of RESURS series. The satellites orbiting the Earth collect material from all over the Megacity Moscow. Currently satellite information after processing of images is used by us for following purposes: detection of heat map of Moscow; detection of temperature anomalies; revealing of smoke traces from industrial plants; measuring of the land temperature; determination of type of cloudiness; observations of the dynamics of the atmospheric fronts; detection of strong fires in forest around and near city; observations of snow cover dynamics and forecast of flood danger; detection and estimation of large floods. In order to ameliorate collaboration with emergency service it is crucial that disaster management specialists get to know the monitoring data and contact with Internet's World Wide Web information service, using the computer hypertext concept and computer telecommunication networks. The fast development of scientific computer networks brought about the integration of environmental systems. It is already possible for local government with the Internet to access a wide array of environmental information and products on the network. Clearly, the advent of the Internet provides for real-time dissemination of management data, both opportunity and challenge in determining how best to harness its potential for dissemination of supporting decisions and products while minimising the problems associated with new and open communications technology.

Yurii.K. Kravtsov
Space Research Institute

Efim B. Kudashev
Space Research Institute

II.5 URBAN PLAN MOSAIC FOR TORINO PROVINCIAL GOVERNMENT PLANNING: Environmental Information from Urban to Large Scale Planning

The governance of towns and country should contribute to the solution of the critical issues raised above by the necessity to achieve a compromise between competitiveness and sustainability of changes in the urban systems.
Piemonte Region, in the north-west industrial part of Italy, may be used as a good case study of this assessment: the region is passing through a difficult transition period when all economic activities, and particularly industrial sector, are trying to find new conditions for competitiveness even by new size, technological content, location, relationship of the industrial firms. These economic needs surely affect housing settlement location and, more generally, aims and outlines of urban plans and policies. It is not easy, in these conditions, to reconcile economic development and environmental protection.
The first, even if not the only one, tool for checking the urban development strategies in comparison with these aims in the Italian planning system, and particularly in Piemonte Region, is the Master Plan that each Municipality has to prepare and to manage.
We think that a very interesting contribution to this aim may be got by the intensive and innovative use of the Urban Plan Mosaic that the Provincial Government of Torino is using at the moment in order to support the Provincial Plan now in work.
We propose to discuss in the Conference the crossed results of three researches carried out jointly by the Planning Department of Politecnico di Torino with the Environmental Department of Piemonte Region, the Planning Department of Torino District, the Consortium for Information System Management of Piemonte Regione oriented to explore the possibility to use urban plans in order to tackle the evaluation of urban systems and support co-ordination and orientation of local plans towards sustainable development strategies.
The paper will expose the selection of a grid of indicators oriented to regional and country planning, which will allow the appropriate consideration of environmental aspects particularly referred to urban systems and test the technical feasibility of these indicators in the actual situation of GIS availability in Piemonte Region.
Moreover the paper will stress the importance of encouraging communication processes between institutional actors, around the information circuit that should feed and promote the use of Regional Information System, just taking advantage by the Master Plan periodic preparation and authorisation for improving the quality and quantity of informative circulation between different planning levels.
The research proposes general concepts and methodological outlines about the problem, but allows discussing even experimental results related to Torino area.

Agata Spaziante
Dipartimento Interateneo
Territorio
Politecnico di Torino

II.6 SALVA: A Vocal Automated System for Detecting Hydrological Alarm Situations

One of the missions of the Servizio Idrografico e Mareografico Nazionale (SIMN) consists in monitoring the hydro-meteo conditions interesting Italy. Such a task is performed by means of a measuring net (Rete nazionale di rilevamento e sorveglianza) connected by a telematic geographic net to an information system located in Rome. In order to furnish the people involved in the monitoring task with a suitable set of automated tools, several functionalities have been included in the information system.

The most recent one is named SALVA (Sistema di ALlarme Vocale Automatico), and consists in an autonomous automated system capable to detect situations of hydrological alarm as well as system faults and inform the users with a vocal message by using a normal telephonic line.
Such functionality allows a generic user to be informed about risk situations requiring only the possession of normal telephonic equipment, also a cellular telephone. The SALVA system is also capable to detect whether the user did not receive the message and consequently adopt the adequate procedures, such as, for example, call another user or retry.

The SALVA system has been realised taking into account some specifications, such as the simplicity of use (the system is user friendly), the modular design and development, the economisation (it is not required any special apparatus), reliability (the system must work 24 hours a day).
The SALVA system has been developed in Delphi under the Windows operating system (version 95, 98 and NT).

Nicol
Presidenza del Consiglio
dei Ministri
Dipartimento dei Servizi
Tecnici Nazionali
Servizio Idrografico e
Mareografico Nazionale

II.7

NATURAL RISK ASSESSMENT IN URBAN ZONES: Some Ideas and a Tool for Exchanging Complex Ground Data

In this paper we present a simple system for the exchange of complex data of localised events. Behind this tool, called MAG-RMF, there is also the philosophy of using it for sharing data that sometime may be confidential. After a brief glimpse to previous works, we present first, this philosophy, then the program itself with its easy to use front-end, and after a world wide application for landslides that are dangerous in urban areas.

Ren
Recherches en G

Abdelkader Maghraoui
Centre d'analyse d'image
des mat

II.8 RISK ASSESSMENT AND MANAGEMENT WITH INTEGRATING GIS APPLICATION

GIS technology is an important tool for natural and technological hazards and risk assessment, as well as management in urban areas.

The experience of past natural and technological hazards, such as strong earthquakes (Northridge, 1994; Kobe, 1995; Neftegorsk, 1995 et al.), flooding, forest fires and others, showed that unexpected events may cause significant social and economic losses. World statistics give evidence that number of fatalities due to natural disasters is increased annually by 3.4%, number of people injured ? by 5.6%, economic losses ? by 10.5%.

In the present study risk is understood as the probability of direct and indirect economic and social losses due to natural and technological hazards. The risk management is realised by preventive measures including earthquake resistance, land use planning and other measures.

At present the state strategy of natural and technological emergencies risk reduction and management is developed in the Russian Federation. The strategy is realised within the special Russian Federal Program "Natural and technological emergencies risk reduction and management in the Russian Federation up to 2005". One of the main blocks of this Program is the creation of the State Unified System of Monitoring and Forecast of Emergency Situations. As the first stage of the System realisation, the Agency of Monitoring and Forecast of Emergency Situations was organised. It combines the efforts of more than 25 organisations belonging to Ministry of Emergency Situation of Russian Federation, Russian Academy of Sciences, Russian Hydrometeorological and Environmental Monitoring Centre, Ministry of Defence of Russian Federation, Russian Space Agency, Ministry of Construction of Russian Federation, Ministry of Nuclear Power Engineering of Russian Federation and others. The Agency experience gives a good example of integration of federal, regional and local subsystems. Such approach allows increasing the accuracy of input data and the reliability of expected loss computations.

At the Agency the special Geographic Information System (GIS) was developed to estimate the expected losses due to natural and technological hazards, as well as to estimate the immediate response and preventive measures. It is designed to store, analyse and use in the most effective way the considerable information massif on co-operative basis.

M.A. Shakhramanjyan
Agency on Monitoring and Forecast ofEmergency Situations

G.M. Nigmetov
Agency on Monitoring and Forecast ofEmergency Situations

V.I. Larionov
Agency on Monitoring and Forecast ofEmergency Situations

Nina Frolova
Seismological Centre of IGE
Russian Academy of Sciences

III.1 ANALYSIS OF LOCAL GOVERNMENT GIS IMPLEMENTATION: Case Study of Florida Counties

Since the early 1960?s, the incorporation of information technology has expanded in local governments in the United States. However, in the first comprehensive analysis of urban information systems in the United States, the complexity, duplication, and imprecision of local government functions was a surprise to most urban analysts. In the Wichita Falls, Texas case study over 5,000 separate functions were documented.

The emergence of GIS in local government was very limited during the early 1970?s. Since then, GIS has been an almost universal function in North American local authorities. Using county governments in Florida in 1997, this paper examines the emergence of GIS in local authorities. It documents the variety of administrative schema and the variable expectations of objectives of GIS in North American local governments.

Robert T. Angeenbrug
Department of Geography
University of South Florida

III.2 MUNICIPAL GEO-INFORMATION INFRASTRUCTURE: How to find a way and oases in a long journey through the desert

The implementation of a geo-information infrastructure in municipalities is the greatest challenge for the next decade. A geo-information infrastructure, which facilitates the building up of a data-warehouse integrating both geometrical and administrative data, is the base for more and better use of technologies like GIS and Internet.

Some Dutch municipalities are trying with more or less success to implement such an information infrastructure. But for the most municipalities some major - mainly organisational - problems have to be solved before this development towards a geo-information infrastructure can go on. The paper will focus on these topics.

The paper is based on research, which has been carried out by the Delft University of Technology in Dutch municipalities between 1996 - 1999. This empirical research is founded on an extensive theoretical framework.

After the introduction and definition of a GI-infrastructure, the paper will focus on the following questions:

? Which municipalities have the best opportunities for a successful implementation of GI-infrastructure?

? What is the state of the art of geo-information in Dutch mid-sized municipalities; which developments can be expected?

? What are the most important elements for the process of integration according to the theory?

? How much time is needed to implement a GI-infrastructure and which oases can be found to survive this journey through desert?

Ad Graafland
Department. of Geodesy
Faculty of Civil Engineering
and Geosciences
Delft University of
Technology

III.3 ORGANIZATION AND TECHNIQUE: The conception of software in a city administration

This communication presents the problems built up from a study we have conducted within the technical services of a large French city. We have been able to observe the production of an artefact: in this case software.

When it meets its addressees (the city's civil servants). Why have observed in vivo an organization grappling with its ?creatures?. From the observation of the reactions of the different users of the software, a question has arisen about the usefulness of the artefact. This usefulness is far from being obvious, at least in the sense of what is commonly understood by service done: what service is actuality performed by a computer software? Is it only interesting the managing engineers, book keepers fieldworkers? In fact, conceiving such a kind of artefact means at the same time conceiving the organization, the job, the relationships between the members of the organization. Thus, from that point of view, the artefact is not only an object, it is mainly a project too.
The communication will not focussed on the organization -the local administration- but rather on the artefact itself as a mobilising agent, a project inside the organization. In fact, from the very stage of its specifications, the artefact triggers off questions about the role and importance of techniques and sciences in social practice.

Our observation have led us to the conclusion that in the conception of the software, the status of the effective users is crucial, not only in technical choices but also in the elaboration and technical validation of the software.

M. Zimmermann
INSA de Lyon

Jean-Yves Toussaint
INSA de Lyon

III.4

GIS AND URBAN PLANNING IN BRAZIL: Present situation, difficulties and trends

This paper presents the present situation of urban GIS projects implantation in Brazil, impediments to a full use of GIS in urban planning, the data question, the Salvador experience, and REBATE project. In Brazil the interest for GIS are advanced, like we can attest for the great number of events - conferences and seminars - occurring in the last years. In the Northeast of Brazil the introduction of GIS technologies is recent, we can detach a few projects, in most cases, digital cartography projects and LIS systems. In Salvador, Bahia capital, GIS is causing a strong interest, and several projects started with very different results. The principal cause of failure are identified as the lack of knowledge, personal, and notably, digital databases. This situation are discussed and in the sequence appointed the trends.

Gilberto Corso Pereira
UFBA
Universidade Federal da
Bahia

III.5 INTEGERATING DIGITAL MAPS AND ADMINISTRATIVE REGISTERS: Danish Experiences

During the last 25 years a lot of nationwide digital registers are established, and in the late nineties the nationwide Cadastral Map and the national topographic map - TOP10DK - was produced. Geographic Information Systems are able to integrate digital map information with attribute data associated with features that can be located on a map. Thus GIS can assist in the analysis of data in a spatial context to address issues and problems related to management and policy-making. The main problems are related to incompatible database keys and object definitions. The current paper describes methods to circumvent these problems.

Henning Sten Hansen
National Environmental
Research Institute &
Aalborg University

III.6 A GEOGRAPHICAL INFORMATION SYSTEM FOR THE RENEWAL OF GENOA?S CITY CENTRE

The paper aims at presenting the successful story of the Urban Observatory Civis.
The first part - Introduction - briefly describes the GIS activities carried out by the Municipality of Genoa through its two offices, the GIS Office and the Urban Observatory Civis.
The second part - The Urban Pilot Project Civis System - quickly reports of the Genoa Urban Pilot Project, carried out under the aegis of Article 10 of the European Regional Development Fund, which has led to the establishment of the Urban Observatory Civis.
The third part - The Urban Observatory Civis - after describing objectives and working perspectives of the Urban Observatory Civis and giving some details of the GIS of Genoa's historic city centre (which is hosted by the Observatory), goes on with the description of the office main activities. Particularly interesting is the reporting on some of the work in progress at the Urban Observatory Civis. Here many details are given of both work done in order to achieve and widespread knowledge about the historic city centre and work done in order to support various municipal offices at improving the efficiency of their actions on the historic city centre.
The fourth and last part draws some conclusions on the beneficial effects obtained thanks to the working method introduced by the GIS Office and the Urban Observatory Civis to other municipal and non-municipal offices: co-coperation.

Rosanna E. Russo
Comune di Genova
Osservatorio Civis

Sergio Farruggia
Municipality of Genova
Settore Sistema
Informativo Territoriale
Palazzo Tursi ? Galliera

III.7

DEVELOPMENT OF AN INTEGRATED DATA MANAGEMENT SYSTEM FOR LOCAL GOVERNMENT: Case Study from Ontario, Canada

There is an increasing demand from local governments for fully integrated data management systems that can manage a diverse set of data types. Current industry trends suggest that Data Management Systems be easy to use yet be able to store and manage a wide range of information including text based documents, images, and Geographical Information System (GIS) data. Many systems are available that rely on multi vendor/product support, limiting the final product to a specific set of functionality and increasing development and implementation costs. The case study presented here outlines the development framework used to create a "Multi User" integrated Database Management System for local government based on object oriented programming and component development tools. The final product is an open ended solution capable of expansion to parallel the growth of the organization.

Michael Bober
LandPro Systems

Ardyth Barr
LandPro Systems

Sandra Hanson
Central Lake Ontario Conservation Authority

III.8

A DECISION SUPPORT PROCEDURE FOR URBAN EXPANSION PLANNING IN RURAL AREAS

This paper illustrates the procedure adopted to obtain an Admissible Urban Expansion map for the Municipal District of Zoppola (Pordenone, Italy) using a simulation model, GIS technology and a multi-criteria decision support. The final map shows six classes of urban expansion admissibility, going from no limitation to total prohibition. Since about 80% of the area is cultivated, many agricultural aspects were considered, i.e. the potential and general cultural vocation of the area, the actual cultural vocation map and the natural landscape value map, all deriving from the soil use map and from several cultural vocation maps, specific for each of the main crops cultivated in the area. The crop specific vocation maps had an important weight in the decision system and were obtained from the following variables: soil charachteristics (soil depth, texture and rocks), model derived variables (soil water reserve and crop specific response to irrigation), GIS derived information (water availability, depending on distance from surfacewater bodies and depth of the water table) and farm data (yield productivity). The CSS (Crop System Simulator) model, developed at the DPVTA of the University of Udine, was employed.

Francesco Danuso
Dipartimento di Produzione Vegetale e Tecnologie Agrarie
Universit

D. Franz
Dipartimento di Produzione Vegetale e Tecnologie Agrarie
Universit

P.L. Paolillo
Dipartimento di Produzione Vegetale e Tecnologie Agrarie
Universit

R. Giovanardi
Dipartimento di Produzione Vegetale e Tecnologie Agrarie
Universit

III.9

A USER-FRIENDLY GIS APPLICATION FOR THE HELSINKI METROPOLITAN AREA REGISTERS SUPPORTING QUERIES, ANALYSES AND VISUALISATION

The Finnish metropolitan area of four municipalities is a functional entity where people and services move regardless of municipal boundaries. However, each municipality has its own systems and software for the collection and maintenance of geographical data sets and basic registers. This diversity has caused some difficulties in regional planning. For this reason, a uniform data package ? SeutuCD ? has been produced, where basic register data is assembled yearly from the metropolitan area municipalities and united in a single package. Seututieto is an application which was built to lower the threshold of data set adoption. It is a user interface for SeutuCD data enabling various enquiries and analyses concerning the metropolitan area to be conducted. Seututieto enables the creation of buffering around chosen objects, and can be used to study the location of objects fulfilling certain query criteria in a chosen area. All the results of the analyses are exportable to other applications and to transparencies for presentation purposes. The pilot version of Seututieto operates on CD-Rom but the intention is to take the production version, built from the application, to the Internet.

Tuija Rajala
The Helsinki University of Technology

Petri Alapiessa
The Helsinki University of Technology

Timo Nieminen
The Helsinki Metropolitan Area Council

IV.1 URBAN DATA MANAGEMENT WITH A HYBRID 3-D GIS

With the development of modern cities, 3-D spatial information systems (SIS) are increasingly required for spatial planning, communication systems and other applications. The geometric information to be used in a spatial information system usually includes two types: vector data (such as buildings, traffic ways, waterways, trees, DTM, etc.) and raster data (such as orthophotos, original images from aerial or still video cameras, etc.). It is an important task to develop an information system, which can integrate vector and raster data for the purpose of spatial data operations, queries, and analysis.
In this paper, a self-developed 3-D data structure (V3D) is presented, in which the geometrical, topological, texture and thematic information is defined. Also, the configuration and implementation in a relational database will be investigated and we will report about a prototype system, the CyberCity Spatial Information System (CC-SIS).

Accurate and complete data is the most valuable component of any information system. We will address a new method of semi-automatic photogrammetric data acquisition for the generation of 3-D city models. CyberCity Modeler (CC-Modeler) is a software which fits planar faces to photogrammetrically measured weakly structured point clouds of objects, thus generating CAD-compatible objects, like buildings, trees, waterways, roads, etc. Thus, CC-Modeler allows generating major components of 3-D city models at very high production rate.

Armin Gr
Institute of Geodesy and Photogrammetry
Swiss Federal Institute of Technology (ETH) Z

Xinhua Wang
Institute of Geodesy and Photogrammetry
Swiss Federal Institute of Technology (ETH) Z

IV.10 THE IMPACT OF NEW TECHNOLOGIES IN LOCAL ADMINISTRATION

Brazil is a country with 8,5 million square kilometres; 160 million people and is politically organised in 5 regions, 27 states and 5507 municipalities. Although the global population growth has decreased in the last decades, reaching 1,38% a year, urban population dynamics has a completely different behaviour. 90% of local governments have up to 50 000 people and the country has 11 cities with over one million people, including Sao Paulo which will be, in the next millennium the second largest city in the world. The country also has 181 cities with the population between 100 thousand and 500 thousand people. The average of population growth in these cities is 3,3% a year. Besides this, some cities, mainly those, which are located in metropolitan areas, reach the incredible percentage of 7% a year. This situation means that there is a continuous migration flow towards cities of a population who is looking for jobs and urban services, which do not exist in rural areas. This paper intends to describe the solution developed by a group of Brazilian companies, using GIS related technologies, to support local governments to face the challenging reality of demographics growth and behaviour through the increase of local revenues.

Mirna Cortopassi Lobo
TESE ? Tecnologia em Sistemas Espaciais Ltd

Rodrigo Cortopassi
TESE ? Tecnologia em Sistemas Espaciais Ltd

IV.11 A CITY GIS - Building Spatial Information Infrastructure in Bydgoszcz

In 1991 building of a digital map was commenced in Bydgoszcz. Both City Council and infrastructure companies were engaged in the process. After the map had been accomplished in 1997, the applications aiding the city management within the scope of city roads and transportation as well as urban planning were prepared. In 1996 an emergency system equipped with modern updated GIS as well as other technical and organisational solutions was initiated.

The complicated process of application of new technologies in management in Bydgoszcz proceeds successfully opening new possibilities to the city ? building infrastructure of information aiding functioning of the city and designing urban development plans.

Janusz Kwiecie
Academy of Technology and Agriculture
Faculty of Civil and Environmental Engineering
Department of Resource Economics and Spatial information

Ladyslaw Milancej
City of Bydgoszcz

Zdzislaw Mathia
Academy of Technology and Agriculture

IV.2 ACCESS TO SPATIAL DATA IN EUROPE

Europe has spatial data of high quality, a long history of surveying, a wealth of data sources, large organisations that maintain data. But for local administrations and private users this data is just difficult to obtain and use. There are many data formats; many regional data standards; and there are more concurring data owners than a customer might want to inquire. These difficulties amounted to information gaps for the users in Europe, while providers of geodata on the other hand had difficulties to reach a wide market. And above all it is highly expensive to access the data even though most of the data is public owned.

GeoServe, a research project that is co-financed by the European Commission under the Telematics for Administrations Programme (TAP) has build a demonstrator for a brokering network that shows how, in the long term, public users and professionals will be able to shop for European geographic information just as they buy other goods. Via secure Internet techniques they are choosing a selection of geographic goods, which are then checked, priced and delivered. In an efficient and timely manner this data is made accessible throughout Europe for public administrations, local government, business and private individuals enabling to integrate geo-referenced data into a wide variety of applications.

To facilitate the business of selling and distribution of data within this heterogeneous user group a Clearinghouse Infrastructure was implemented.

The just completed demonstrator project with partner organisations from several European countries - Denmark, Finland, France, Germany, Greece, Ireland and Italy - managed to build and demonstrate a technical solution for European clearinghouses for spatial and other data types that can cope with European transborder data exchange and meet regional peculiarities.

But there remain political and legal issues to be addressed to turn the solutions provided into efficient operation of European clearinghouses for spatial and other data types.

Ronald Klebe
SICAD GEOMATICS

J
Kommunedata A/S

C. Leyh
SICAD GEOMATICS

O. Rehbinder
SICAD GEOMATICS

IV.3 GIS AND TELEMATICS: The Co-operative Approach to Urban Management

Digital GI-technology offers new possibilities to handle complex local and regional relationship in urban areas. Analogue site maps and other cartographic products as the former main geo-data storage are replaced by flexible digital models of the urban landscape. Such digital models can be seen not only as a geographic description but also as reference systems and as geocoded object inventories, offering links to the geographic position together with geometry and attributes of objects.
Telecommunication enforces these features of geocoded models. The direct handling of spatial analysis and the visualisation of geo-related information can be transferred within seconds over far distances. The availability of recent data and of powerful software functions on the working place in the network has a lot of impacts on internal and external workflows of urban management. The City of Vienna has built up a wide spread Geographic Information System?s (GIS) network, which introduced new ways of internal and external co-operation.

Erich Wilmersdorf
ViennaGIS Coordination
City of Vienna

IV.4 VISUALIZATION OF URBAN GEOGRAPHIC INFORMATION WITHOUT A GIS: The Geolib Experience

Geographical information systems (GIS) are now of common use in many bodies interested in the use of spatially referenced data. The new challenge concerns the extension of the use of GIS data in client-server environments, particularly through the Internet or within Intranet networks.
One of the main objectives addresses the possibility for a large public to access geographical information, e.g. for finding tourist or practical information. This will give raise to new GIS applications through the Internet that will democratise the use of GIS data.
GIS tools are still too complex, and consequently there is a need for new very simple tools for accessing / visualising geographical information. It is yet already possible to access raster based geographical data as GIF or JPEG images, but their use is limited to map visualisation, and interaction is limited since buttons and links must be explicitly established by the author of hypermedia applications or Internet pages.
It would then be interesting to allow the user to click on a vector-based map, e.g. for having access to any kind of geographical entity, e.g. for knowing the availability of places in a theatre or a parking.

The aim of the GEOLIB project was to develop a library of geographic functionalities, portable and interoperable with application development environments, database management systems (DBMS), multimedia / hypermedia ?authoring systems? as well as external GIS, and also exploitable in an Internet / Intranet environment.
Consequently, it can be used either in standalone, or in client-server and Internet / Intranet environments.
A Java version of GEOLIB is also under development, to be used with Microsoft-based platforms, but also with UNIX and CORBA based ones.

Patrice Boursier
Universit

D. Kvedarauskas
Universit

F. Ligeard
SILOGIC

X. Culos
SILOGIC

IV.5

UTILIZATION OF GPS TECHNOLOGY IN URBAN ASSESSMENT MANAGEMENT: Creation and Updating of Data Bases

GPS technology is gaining ground among local authorities as the fastest and most economical system to build sophisticated databases and to update existing ones. Specialised GIS data logging systems and growing real-time. Differential infrastructures around Europe now allow non-specialised users to focus on data capture, instead of electronic devices, increasing the quality of the fieldwork and resulting GIS data.

This paper describes the state of the art of GPS technology relevant to GIS data capture for the purposes of creating new database or periodically update the currently used ones, with examples.

Vincenzo L. Lanza
Trimble Navigation Italia

IV.6 INTELLIGENT, LOCATION-DEPENDENT ACQUISITION AND RETRIEVAL OF ENVIRONMENTAL INFORMATION

We are proposing the integration of an existing environmental information system with techniques for intelligent processing of geographical information and mobile computing, to support location-dependent on-site acquisition and analysis of environmental impacts. The state of Bremen environmental information system BUISY organizes environmental information in several strands. One of the most important of these strands is the geographical position of the object. To enable intelligent access to information contained in the BUISY system different dimensions will be given a formal semantic in terms of ? dimension ontologies?. These ontologies will define possible concepts and relations, which will allow the information to be organized in a certain dimension. We will outline an ontology example. Two main points will illustrate our proposal: A descriptive ontology that can automatically trigger a retrieval and an acquisition of environmental information for a given location during an on-site analysis. A description of how the retrieved information can be directly accessed via wireless communication on a Wearable Computer connected to a Geographical Information- (GIS) and a Global Positioning System (GPS).

Heiner
TZI - Center for Computing Technologies
University of Bremen

Ubbo Visser
TZI - Center for Computing Technologies
University of Bremen

IV.7 A CASE TOOL FOR URBAN APPLICATIONS BASED ON VISUAL DESIGN

The customisation of Geographical Information Systems (GIS) products is one of the heavy tasks regarding Geographical End-User Applications (GEUA). These applications could vary from socio-economic applications, urban planning to energy distribution network. There are many aspects to this customisation. The user interface of the application may be tuned in order to be adapted to an end-user with little knowledge in computing. The query language for extracting and updating database should be user-friendly and standardised for portable applications. The design and maintenance of the application?s data model have to be specifically dedicated to GIS technology.

To address these problems a visual CASE (Computer Aided Software Engineering) tool named AIGLE has been developed for automatic generation of geographical end-user applications on several GIS platforms. This CASE tool uses an object-oriented approach. A code generator and a specific GUI (Graphical User Interface) generator have been introduced. Remember that it is mostly difficult and time-consuming to implement a customisable GUI on commercial GIS. Moreover, when implemented on a specific GIS, it is a difficult task to move the same GUI to some other GIS.

The user interface development is a repetitive task and it has to be adaptive and extensible enough to allow end-users to develop their own presentation of their applications. The problem of portability leads us to develop an intermediate functional language. The goal of this language is to involve a portability interface. The designer specifies the GUI by using a visual programming context. The GUI is translated into an intermediate language before being translated into a target GIS using a specific driver. This driver is generated by means of a meta-language tool, which contains the description of grammar rules of the target GIS language.

The main advantages of such a solution are (1) the independence of target GIS, (2) automatic code generation, (3) an incremental system design, and (4) integration in a CASE tool. The independence of target GIS is fundamental to guarantee the portability of the applications. The benefits of the automatic code generation is that the developers no longer have to worry about implementation details; they can concentrate on other aspects of the project which are very important in GEUA (design of process on spatial analysis). Such a tool offers an incremental system design. The integration in a CASE tool guarantees the management of the application from design to implementation and maintenance.

In order to validate the proposed approach a first version of AIGLE has been developed and tested with an automatic generation of several geographical applications on MapInfo ?. This version has been marketed since July 1998. Operational applications range from land management, municipal building management, assignment of children to schools to election management, and so on.

Ahmed Lbath
Laboratory of Information
System Engineering
INSA Lyon & CIRIL SA

IV.8

DESIGN AND IMPLEMENTATION OF ADAPTATIVE SEARCHES IN URBAN AREAS

Many urban geographical information systems (GIS) provide users with a set of functions to search for the shortest path between two given points. Most of them associate the resultant path with the shortest distance. Modern GIS are designed to help disabled people to find paths in their movements around the city. In this paper we describe the definition of a new approach to support adaptive searches, which are suitable for disabled people, based on a modification of Dijsktra?s shortest path algorithm. The algorithm allows general users to select the desired urban transport, besides the source and destination points and another features of the route they want to follow, so that users can study the proper path.

Jos
Universidad de Castilla-La Mancha,
Inst. Desarrollo Regional
Secci

Jes
Universidad de Castilla-La Mancha,
Inst. Desarrollo Regional
Secci

Jos
Universidad de Castilla-La Mancha,
Inst. Desarrollo Regional
Secci

Juan Peralta Malvar
Universidad de Castilla-La Mancha,
Inst. Desarrollo Regional
Secci

IV.9 SPHERICAL INSTRUMENTATION FOR THE URBAN MORPHOLOGY ANALYSIS

Urban morphology consists in the study of urban space shape and structure. A number of approaches have been developed by past in order to address this issue. Most of them were based on the typological analysis of urban space material components, namely buildings, blocks and eventually built areas. For interesting this may be, such analyses often fail to address the urban form itself, which constitutes an important part of our experience of a space. In a short, take the same components, put them in a different way, and the result will look entirely different. It is currently acknowledged that the urban form quality, as a whole is not equal to the sum of its different constituent qualities. Whatever their individual excellence may be.

Considering this, we advocated for another approach, directly targeting the open spaces themselves. Open space, for continuous it is, is nevertheless structured along quite distinct entities, streets, places and so on. These entities are associated with a shape traditionally delineated by buildings. It is the empty shape itself that we intend to characterise through proper ratios.

Such a perspective shift involves much more than a theoretical challenge. It may provide helpful instruments for regulating the built environment production. Actually, most present regulations are prescriptive by nature. They tend to regulate the architectural design through a constraining specification of 'admitted products', in terms of height, density etc. Targeting the open space itself would allow for a more performable regulation. It is no longer the buildings themselves but their effects on the open space that would be constrained. This would leave a much greater freedom to the designers in those areas where they should stay capable (buildings aesthetics, functional trade-offs, etc.).

A first option for qualifying open spaces shapes is to apply them 'Euclidean ratios'. Once the virtual shape of desired or existing space as been settled, it is very possible to characterise it through a number of volumetric studies we know from traditional geometry. Compacity, extension, directionality are described examples of such ratios. A limitation of these parameter applications being that they require the open space shape to be defined beforehand, which is not always that simple.

Another option consists in using spherical projections for quantifying open space properties. Spherical projections are computed in two different steps: 1) projection forms the world to a sphere and 2) projection from the sphere to a plane. It is this second step that characterises the different projection properties: e.g. 'isoaire' projections respects visible solid angles, "equidistant" projections respects angular altitudes and so on. We explain how it is possible to exploit these properties in order to calibrate the spherical projections as an instrument for quantitative morphological analyses. Interestingly, such an instrument would no longer require any a priori definition of the open space. At the opposite, spherical projections are always computed into discrete points. Which means these points should be selected to be representative of the space, or at least computation should be repeated in a large number of points for these analyses to be meaningful.

Jacques Teller
LEMA - Universit

V.1 WATERS: Water Data Acquisition in Real Time for Coastal Ecosystems Research and Services

Co-ordinates Main purpose of the WATERS project is to set up an innovative system for integrated monitoring of environmental parameters in the water body of the Venice lagoon, allowing ? with limited investment and low operating costs ? a sharp improvement in the environment survey and restoring practices. For this aim, 15 boats from AMAV?s operating fleet, daily travelling over wide areas of the territory for normal refuse collection service, shall be equipped with special monitoring and data transmission devices.
The research, to be carried out in tight co-operation with the appointment local authorities, shall be performed as follows:
l Testing and development of special monitoring equipment to be installed on the foreseen 15 AMAV?s boats;
l Installation and testing, on the same boats, of GPS-NAVSTAR high-precision differential positioning system, integrated with available navigation instruments through a Kalman sequential filter. This system shall allow a to tag each sample with precise time and position reference marks;
l Set up of a data processing and transmission system, from AMAV?s boats to a Central Control Station;
l Development of a suitable Geographical Information System (GIS) specific to the Coastal Environment, receiving the continuous flow of environment monitoring data, open to new software applications and created on the basis of existing historical and scientific documents;
l Design and development of a laboratory boat for supplementary hydrodynamic and physic-chemical data, for taking samples of water, sediment and biomarkers, and for detailed in situ analysis of phenomena through the on-board equipment;
l Validation of the correlations found among physic-chemical, biological and hydrodynamic environmental variables and determination of critical environment matrices.
As final result, the research will define a real management strategy for coastal environments, a widely applicable model derived from the strategy to be adopted for Venice, a very complex ecosystem affected by many phenomena and many sources of possible pollution (anthropological, agricultural, industrial etc.), in presence of particular tidal variations capable of producing significant impacts on the environment.
The project team (AMAV, Comune di Venezia, CNR, Archimedes Logica) is pleased to invite the UDMS Commission, the participants to the 21st Symposium and any other interested people at the WATERS CONTROL STATION (Cannaregio, Venice) to see the result achieved at 18 months from project?s start.

Tullio Cambruzzi
Project Co-ordinator AMAV

Luca Novelli
Archimedes Logica s.r.l.

V.10 SASI: An Automated RealTime System for Hydrological Monitoring

The National Hydrological Service is formed by the General Headquarter, located in Rome at the Department for National Technical Services and ten Compartmental Offices spreadout all over the Italian territory. More precisely, the ten Compartmental Offices are: Venice with its three Separated Sections in Udine, Padova e Stra; Parma with its three Separated Sections in Torino, Milano e Sondrio; Catanzaro with its Separated Section in Potenza; Pisa with its Separated Section in Firenze; Bologna, Pescara, Bari, Napoli, Roma, Genova.

The Hydrological Service?s institutional task is that of territory monitoring through a telemeasuring net, called ?Surveying and Monitoring National Net?, made up of about eight hundred among pluviometer, thermometer and hydrometer stations in order to make available, as soon as possible, all about concern rain fall, river hydrometrical height and any other kind of information that can be deduced from the measurements transmitted from the Stations to the Department of Civil Protection or to other institutions interested in civil protections, like Prefetture, Comuni and so on.

As we already have said, the ?Surveying and Monitoring National Net? makes mainly pluviometer, thermometer and hydrometer measurements, but it also takes wind velocity and direction measurements, as well as air humidity measurements and atmospheric pressure. All of this is done by special equipment, called DAS, located at the Compartmental Office, which the Station refers to, that calls the station through etere. The measurement set taken from the Stations is coded into one or more than one files and memorised inside an NT Server, placed at the same Office. The total of the ten NT Servers, one for each Compartmental Office, are networked through the ITAPAC geographical net to an NT Server at the General Headquarter.

The General Headquarter has developed a program, named simrs32, which is able to read, decode, interpret, organise into tables and memorise the text file realised by the Compartmental Offices computers and another program, called real-time, that creates a user interface so that it can give a real time evaluation of the hydrological events.

The real-time program works as follows: it creates a vectorial geographical map on which is put each single station and the measurements from each station are presented both in a numerical format and as a graphic, may it be a line or an histogram and the memorised data are in addition visualised as a table. The program gives at last information on the connection status between the peripherical NT server and the central one, in terms of data updating.

Nicol
Presidenza del Consiglio dei Ministri
Dipartimento dei Servizi Tecnici Nazionali
Servizio Idrografico e Mareografico Nazionale

Attilio Colagrossi
Presidenza del Consiglio dei Ministri
Dipartimento dei Servizi Tecnici Nazionali
Servizio Idrografico e Mareografico Nazionale

Giordano Di Toma
Presidenza del Consiglio dei Ministri
Dipartimento dei Servizi Tecnici Nazionali
Servizio Idrografico e Mareografico Nazionale

Franco Guiducci
Presidenza del Consiglio dei Ministri
Dipartimento dei Servizi Tecnici Nazionali
Servizio Idrografico e Mareografico Nazionale

V.11

QUESTIONS OF INTEGRATION OF SOME ECOLOGICAL MODELS INTO GEO INFORMATION SYSTEMS

Many elements of urban database are ecological factors. A power tool for data capture, data proceeding and data transmission is ecological process-oriented prediction models integrated with geo-information systems (GIS).
Integrating ecological models into GIS extends the field of GIS applications. In this case the opportunity are arisen to keep, to visualise, and to analyse spatial-distributed information but to supplement missing data and to predict they-self values.
Existing models using in urban ecological management can not directly be adapted to the real GIS. Their structure and data structures are not compatible with the requirements of GIS. A new models, that it are created with these aims, have to take into account of the requirements of GIS Therefore, it is necessary to develop a methodology describing, how to make harmony of models with GIS.
Models may be classified according to it self ability to be in harmony with GIS as a first approximation by three classes:
1. Full integration into GIS
2. Connection with GIS
3. In association with GIS
In a very general sense, the operation of model integrated into GIS can be thought of as the process of combining a set of input maps with a function to produce an output map.
In the last few years some ecological models have been integrated to GIS. The first results of use these models for study of ecological factors affecting on processes urban management was obtained.

Dmitry Kurtener
Agrophysical Research Institute

V. Badenko
St. Petersburg State University

V.2 TURBAN: A Software based on GIS for Assessment of Pollution caused by Traffic on Urban Networks

TURBAN software has been developed to give administrators of traffic policies in urban areas a tool for estimating quantities of pollutants emitted by vehicles moving on road networks. Its purpose is to provide estimated amounts of pollutant emissions during a time period for given traffic data.

It is based on emission models resulting from European group studies, for example CORINAIR study (Eggleston & al. 1991), which provide values of pollutant emissions according to speed for specific categories of vehicles. From these emission models, the method used in TURBAN is based on the "average speed" approach. For one category of vehicle, the elementary quantity of emitted pollutant per unit of travelled distance is a function of the vehicle speed. So, the total quantity of pollutants emitted by a fleet of vehicles, during a time period, is the integral of all elementary quantities.

We make the "time integration" by a sum on the range of time samples along total time period, and the "space integration" by geographical aggregations on located vehicular flows, link by link or on two dimension areas.

The GIS is the central technical element of the system, which supplies, first, the disintegration of global traffic data, for example given by traffic simulation models, second the geographical aggregations of results, and third, the display of pollution maps. GIS will be used to assign traffic capabilities to each link of the network, according to its type, its number of lanes, its global use. Results of TURBAN calculations are assigned to each link involved and GIS will also be used to store these geo-referenced results and to provide all geographical operations the user could need to aggregate these results. GIS will, at last, give the ability to display on maps, readable by experts or by common people, representation of quantities of emitted pollutants, on the lines or areas where they are produced.

Brigitte Lejeune
INRETS

P.-O. Flavigny
INRETS

J.-P. Hubert
INRETS

V.3 A PROTOTYPE OF A SYSTEM FOR URBAN SOUNDSCAPE

Sounds are very important in our daily life with a twofold attitude for any citizen. In one hand, when music, sounds are considered as enhancing the quality of life, but in the other hand, traffic noise deteriorates the quality of life. Due to those contradictory characteristics, the new concept of soundscape tries to combine both positive and negative aspects of the auditory environment. Presently, and more and more in the future, any urban planning activities try and must try to diminish noise levels everywhere in the cities and perhaps outside, for instance at the vicinity of airports.
Local authorities daily receive complaints regarding noise. But they generally come from very quiet precincts, and practically never from very noisy zones such as along busy highways. So, it is very important to provide the urban decision-makers an objective tool to compare not only noise levels but also soundscape, and to simulate the auditory impacts of any new urban developments.

The goal of this paper will be to give the first elements of the design of an information system dedicated to auditory information for cities.

We will successively describe the importance of urban soundscape, the structure of the information system, some elements for the visualisation of sounds.

Sylvie Servigne
Laboratory for Information System Engineering
Claude Bernard University of Lyon /
National Institute for Applied Sciences of Lyon

Robert Laurini
LIRIS ? INSA de Lyon

Myoung-Ah Kang
Laboratory for Information System Engineering
Claude Bernard University of Lyon /
National Institute for Applied Sciences of Lyon

Olivier Balay
CRESSON
Ecole d'Architecture de Grenoble

V.4 ADAGE, A NEW TOOL FOR ENVIRONMENTAL DECISION-SUPPORT

In the frame of a European consortium ADAGE, we have developed an innovative project in the field of decision support for environmental management (ADAGE stands for Aide

Nadine Fran
ADAGE Project Manager at Alcatel Space Industries

Laurent Polidori
Remote Sensing Expert Alcatel Space Industries

Jacques No
Chef de projet ADAGE (Eureka 1299)
Institut de Recherche pour le D

V.5 SUSTAINABLE DEVELOPMENT, URBAN ENVIRONMENT MANAGEMENT AND MONITORING IN CUBA

Sustainable development, urban environment management and monitoring in Cuba are a main topic thoroughly discussed about in scientific literature and meetings everywhere. But it is scarcely considered in relation to the tourism settlements systems. Applying the Geographic Information System (GIS) to deepen the diagnostic, define strategies, corroborate hypothesis and strengthen knowledge of urban environment design, requires the adjustment of the methodological scheme.

This paper presents a search of solutions environmentally sound taking into account those concepts and principles to guide not only planning and tourism design, but also urban data management systems, according to the environmental sustainability and the environment monitoring concepts, at such a design scale in tourism zones in Cuba.

Lourdes Ruiz Gutierrez
Cuban Center for Environmental Management
Agency for Environment of Cuba
Ministry of Sciences

V.6

ENVIRONMENTAL MANAGEMENT INFORMATION SYSTEMS: A Proposal for Benchmarking Sustainable Community Development

The proposed paper will review a demonstration project titled, ?Benchmarking Sustainable Communities? (?BSC?). This is a process for measuring the impacts of sustainable community plans and initiatives through application of a formal benchmarking process applied to seven municipalities of similar demographic composition located in the United States. By including seven municipalities in the benchmarking process, data from similar programs and services can be compared. Intense interaction among peers participating in the process would provide a thorough understanding of the ?how, why and why not? in addition to the ?what.? Increasingly local authorities and US municipalities are incorporating policies that confirm an entity?s commitment to the continued integration of the tenets of sustainable development into both planning and operations. A shift in planning and economic development policies has led the way for municipalities to include environmental impacts in their information systems for decision-making. In order for a municipality to continue to improve and move forward with its integration of sustainable development in its operations and policies, it must have data on its existing programs. To accurately obtain feedback on municipal programs and services (e.g., solid waste and recycling services, air quality, public transit ridership, etc.), a systematic process for measuring effectiveness must exist. The proposed BSC uses a unique approach in the benchmarking process. Rather than measuring a municipality?s current programs and results against previous years, it will use ?sustainability indicators? applied to other demographically similar cities as a basis for comparative analysis. Participants in the benchmarking exercise will benefit immensely since the process will extend beyond traditional methods that rely primarily on surveys (questionnaires and telephone interviews) and will bring participants to the same table to discuss implications of their benchmark databases. This will result in tangible data useful for management decision-making, statistical and quantitative comparison, as well as an expanded understanding of strategies, solutions and failures that other municipalities have experienced. The proposed BSC paper will review a number of processes for measuring and using environmental information in an urban context. In short, the proposed BSC paper will review the benefits to participating municipalities and communities domestica11y and internationally striving to meet the increasing demands and mandates of environmental protection, as well as examine data based solutions to common problems through the interaction between participating municipalities. Also, the benchmarking process reviewed in this paper will demonstrate how municipalities can quantify and measure their environmental ?costs.? This is beneficial for environmental management information systems, budgeting and forecasting, as well as comparative analysis to other, similar municipalities.

Michelle Wyman
Special Partner
Reed Smith Shaw & McClay LLP

Sherman Wyman
School of Urban and Public Affairs

V.7 DATA FUSION OVER URBAN ENVIRONMENTS

The aim of this paper is to show how the use of different sensors other than pho-togrammetric ones, could help in characterising urban environments in better de-tail. To this aim, a building extraction procedure based on interferometric radar measurement is proposed, together with a three-dimensional road network detec-tion that exploits 2D measurements (like polarimetric SAR, or panchro-matic/hyperspectral sensors) and 3D information, again by interferometry. Results are very interesting, and promise more as soon as these sensors are able to provide higher resolution measurements.

Paolo Gamba
Dipartimento di Elettronica,
Universit

V.8 INTERDISCIPLINARY AND MULTIDISCIPLINARY APPROACH TO ENVIRONMENTAL MONITORING OF THE LAGOON AND THE GULF OF VENICE

In recent years sedimentological, ecological and geochemical studies have been conducted on the coastal environments. Most of these studies have been done in isolation and without a cross-reference process.
During the last ten years a major research program on the sedimentology, ecology and sediment geochemistry of the Lagoon and the Gulf of Venice has been conducted and the results linked. The interdisciplinary nature of this comprehensive approach has revealed a number of important additional informations; many of these are vital for an effective environmental management. The present day ecology of the benthic foraminifera and the distribution of sedimentary provinces have been recognised through analysis of 737 samples collected in the Lagoon and adjacent parts of the Gulf of Venice. Geochemical analysis of the samples have revealed that within the Lagoon of Venice there are areas where the sediments, according to present protocols, may be regarded as highly polluted.
While the sediment characteristics tend to reflect the water energy distribution, the associated geochemistry gives an indication of the origin and of the amount and direction of the sediment transport. The sediment distribution, in particular, does not suggest the existence of substantial clastic transport from the Lagoon to the Gulf, although some intense but localised sediment movement occur at the Lagoon's entrances. These findings, vital in any attempt to improve and stabilise the Lagoon of Venice, are further supported by the lack of diffusion plumes around the localised concentrations of those chemical elements linked to anthropogenic sources. Further work on the rate of sediment deposition and transport has being conducted using, among other methodologies, the 137 Cs technique.
A comparison of the distribution of benthic foraminifera and sediment type indicates that there is no interdependence of one with the other; they are both controlled, although in different way, by the characteristics and behaviour of the water masses. Furthermore the geochemical nature of the substrate does not appear to influence the distribution of the benthic foraminifera, but they are strongly affected by any pollutants which may be present in the water column, thus making these organisms highly suitable to monitoring programs and coastal assessments.
A correlation between geochemical composition of the bottom sediment and distribution of selected benthic fauna leads to an understanding of the origin of the pollutants and of their potential release in the water column. Only by adopting an interdisciplinary and multidisciplinary approach, a more comprehensive understanding of any complex environment, characterised by high spatial and temporal variations, can be obtained.

Alberto D. Albani
Centre for Marine and Coastal Studies
School of Geology, University NSW

Rossana Serandrei
Istituto per lo Studio della Dinamica delle Grandi Masse, C.N.R.

V.9 DECISION SUPPORT SYSTEM FOR WETLAND MANAGEMENT

The MANHUMA project (Utilisation of Earth Observation for the Management and Conservation of Humid Areas) is funded by CEO (European Community Centre for Earth Observation) and is produced by a team of experts. SPOT Image is the project manager and furnishes satellite data, Esys Limited has collected and analysed customer requirements and will promote a demo version of MANHUMA across Europe, Planetek (Italy), SERTIT (France) and IPF (German) will develop a system supported by local users.

MANHUMA addresses to those who have the duty to preserve natural humid areas in Europe, according to Nature 20001 directives, Ramsar2 convention and agricultural and environmental local and national laws. The project includes three phases of territory management: planning of protected areas management, control of the same areas and estimation of the effectiveness of undertaken measures. Both intercontinental and coastal humid areas are examined in the project. In the frame of the project, Planetek, in cooperation with the Architecture Institute of University of Venice, is developing some products for the management of humid areas based on integration of satellite data in a GIS. Besides optical data (SPOT, LANDSAT) radar data (SAR) will be used in order to take advantage of the possibility to obtain information in presence of cloud cover but also of radar data potentialities to retrieve information about soil moisture. Moreover, a landscape model will be integrated in a GIS environment in order to support wetland managers.

Daniela Iasillo
Planetek Italia

Sergio Samarelli
Planetek Italia

Giovanni Sylos Labini
Planetek Italia

Luigi Di Prinzio
IUAV Diploma in SIT

VI.1 ADDRESS QUALITY AND ITS IMPACT ON GIS APPLICATIONS

Direct georeferencing of information is becoming easier to get as the use of portable digital maps is diffused world-wide, GPS receivers go cheaper and wrist-held, Automatic GSM positioning grows and portable phones with GPS ships arrive; in spite of the revolution in location methods, indirect georeferencing, as it is provided by the address, naturally linked with Postal Delivery, is still the only mean to locate information on commercial, administrative and fiscal registers.

In the growing information Market geocoding huge data sets of registers on individuals, buildings, parcels and business, is becoming a primary need, in a time where spatial datawarehousing is expected to be the basis for decisions in commerce and new services in the information society.

Also the re-engineering of statistical data production, making use of data integration and administrative data, needs to be supported in the address as primary localiser and spatial integrator.

However, the real address, as it appears in letters and business or in administrative files, is far from being structured, standardised and complete, making difficult automatic geocoding by the address; so, the need for a better address persists; the address mess is analysed and its main errors and pitfalls are typified. An assessment of AQ is proposed, using indicators to evaluate AQ components.

The impact of an improvement in the Quality of the Address all over Europe may be evaluated integrating the social benefits in the space of applications that may result from the use of GI, namely that which is produced with a complete and normalised address. Important application areas, like emergency dispatch, service delivery, geomarketing as well as the simplest social uses, like to meet friends; all rely naturally on the address as primary localiser, resulting in tangible and intangible savings.

These savings justify macro-economically the inclusion of Address Referencing in the European Geographical Information Infrastructure Initiative (EGII), discussed in GI 2000, which needs to include basic data sets to allow automatic geocoding of any address in Europe.

However, to build that part of the GI Infrastructure, many efforts must be made, at various levels and institutions, from the generation of the address at local level to a number of final uses, in order to improve the address quality (AQ) needed for quick and reliable location.

The use of address standards, to allow for the building and updating of National Toponymic Databases, and wide implementation of measures for the improvement of AQ are the primary recommendations to National Authorities, to allow for the widely spread use of direct location and its full use, benefiting all citizens from currently available GI Technology, through precise location and better informed spatial decisions.

Antonio Morais Arnaud
Computer Science Department
College of Science of Technology
New University of Lisbon

VI.2 GEO-QUALITY AS PART OF METADATA

Recently, CEN and ISO standardisation bodies have issued proposals for the standardisation of quality in order to convey quality information to third parties. Often these are seen as a basis for quality models to be applied in practise. The impact of these proposals is beyond the intention of publishing a quality standard. These documents also include attempts to make a complete inventory for quality parameters for Geographic Information, so both for geometric as well as non-geometric data. The models developed for this purpose apply the same rules as are used in Information Technology. This is a pre requisite when quality data is stored in the same types of databases as IT applies. In order to interpret the effectiveness for the use of the data a quality report must be available as part of the metadata. However, the contents of the metadata will increase rapidly when following the complete set of possibilities. Practise has to decide what is necessary and what can be avoided. In this presentation an over view of the quality parameters is given and their relation to a practical set for metadata.

Henri J.G.L. Aalders
Delft University of
Technology
Faculty of Civil Engineering
and Geosciences
Department of Geodesy

VI.3 QUALITY CONTROL: Inconsistency Checking and Correcting of an Urban Database

In any Information System, the reliability of the results of queries highly depends on data quality (accuracy, consistency). In geographical Information Systems (GIS), the spatial attributes of objects (their shape and their location) must be taken into account, bringing specific problems.
The aim of this paper is to present a general methodology for consistency checking of spatial attributes of geographical data sets, in order to improve quality and consistency of existing geographical databases in vector format.
Three kinds of spatial errors are identified in such data sets, depending on which part of the objects is considered: structural errors (coming from storing structures), geometric errors (properties on the shape of the objects) and semantic errors (topological relationships).
Then for each kind of error, principles of checking and correcting processes are proposed.
After all, in order to ensure the consistency of the corrections and to avoid appearance of inter-layer problems, we also propose geometric tools to allow the propagation of the corrections to the neighbouring objects.

Alain Puricelli
Laboratoire d'Ing

VI.4 STEPS TOWARDS A DATA WAREHOUSE FOR THE LAGOON OF VENICE

Data sharing issues in the context of the Lagoon of Venice are discussed. The hypothesis of the constitution of a data warehouse is suggested. After the review of the authorities having data concerning the Lagoon of Venice, some outcomes carried out by the Research Unit 4.4.2 at the IUAV within the Venice Lagoon System Program are shortly presented:
? Metadata set for describing data
? Web-site for resource discovery
? Tools for an integrated environment through Internet
In conclusion some points necessary to create the conditions for the data warehouse constitution are made.

Alberta Bianchin
GEDDeS Laboratory, DP -
University IUAV of Venice

VI.5

A GRID-ORIENTED ANALYSER FOR AUTOMATIC CADASTRAL RECOGNITION

The first part of this paper presents a brief overview of a new approach for invariant pattern recognition using neural networks (ISN). Invariances to 2D affine transformations are built into the net architecture by using mathematical properties and the network is simulated by equivalency classes. This allows a much easier and smaller network. An ISN trained on a single view of each object can achieve 100% accuracy on noise-free test images. In the second part a French cadastral map analyser is presented. Hierarchical agents, ISNs and a blackboard architecture are the basis of this system. A 95% successful recognition of crosshatched patterns can be achieved. The detection of inkblots and numerical fields in hatched patterns as well as many other classic difficulties are easily solved. The techniques developed here are also applicable to other areas of shape recognition and document analyses.

Hamid Shahbazkia
VISION LABORATORY
UNIVERSITY OF
ALGARVE, UCEH

J.M.Hans du Buf
VISION LABORATORY
UNIVERSITY OF
ALGARVE, UCEH

VI.6 REPRESENTING THE TEMPORAL EVOLUTION OF SPATIAL DATA IN GIS

It is widely recognised that the management of the temporal evolution of data is important in Geographical Information Systems.
In particular, the possibility of integrating a GIS package into the operating urban information system (typically, but not only, the administrative system) depends on the capability of dealing correctly with the problem of multi-user updates, constraints management and transaction; therefore, the representation of different states of the system during its temporal evolution is necessary.
Past states of spatial data are required both for the purpose of (transaction) recovery and for the sake of applications, which need to analyse the ?history? of spatial objects (e.g. cadastral systems, urban planning, etc.).
However, the introduction of time in spatial data may produce an unacceptable growth in database size depending on both the granularity of the time axis and the type of information for which the temporal evolution has to be stored (meta events, transaction events and real events). Moreover, since many applications focus on the last version of the database and need to rebuild a situation of the past only rarely, most of this added data is scarcely used.
In this paper we propose a framework for the representation of temporal evolutions of spatial data in a Geographical Information System. Our approach is based on the differential representation of the spatial objects? evolution, i.e. only the modifications to an object are represented and not the complete object states. However, this representation is not convenient for the majority of the users, who operate on the current version of the object and should not bother with its ?history?. Therefore, these users are provided with a ?current view? of the object. They perform all update operations on this ?current view? and the effort of performing the necessary differential updates is left to the system.
In summary, this approach has the following advantages:
(i) it admits fine or coarse granularity of temporal snapshots,
(ii) (ii) it makes the management of the temporal aspects completely transparent to the user,
(iii) (iii) it does not require particular tools to store and query the temporal component,
(iv) (iv) it permits to rebuild snapshots of the past or the temporal evolution of any spatial object.

Alberto Belussi
Dipartimento Scientifico Tecnologico - Universit

Mauro Negri
Dipartimento di Elettronica e Informazione - Politecnico di Milano

Giuseppe Pelagatti
Dipartimento di Elettronica e Informazione - Politecnico di Milano

Guido Zuliani
Dipartimento di Elettronica e Informazione - Politecnico di Milano

VII.1 PRICE DETERMINATION FOR GEOGRAPHIC DATA

To set the optimal price for geographic data, which are used by other agents, is an important, but very difficult question. In this paper we review the current understanding of pricing geographic information.

To set prices for geographic data in a rational manner, a surprising array of possibilities are used. Most of the current methods apply to selling raw data, and are based on the quantity of data provided and the length of time the data can be used. Prices relate to the costs of collection and maintenance of the data. These methods lead to high prices, which does not correspond to the intended use of the data and the value the user can draw from it. This is not economically rational and does not lead to maximum income, but also not to maximum use of the data. Another extreme case are public domain data or data sold at a cost of reproduction.

We develop the concept of Geoinformation Product (GIP), which satisfies the needs of a particular part of a market (target users). Setting an optimum price for GIP requests from the producers an additional effort in analysing market opportunities, estimating demand for the product and competitors. Only if the product is specific for a particular use, the value to the user can reasonably be approximated. We identify the concept of product differentiation and expose the quality as an important basis for differentiation of Geoinformation Product. We concentrate on the methods used to set a price as they are used by a single agency ? be it a public or private company. In a comparable paper we have considered a policy position and argued for solutions that are optimal for national economy.

Alenka Krek
Institute of Geoinformation
Technical University of
Vienna

Andrew U. Frank
Institute of Geoinformation
Technical University of
Vienna

VII.2 COMMERICALIZATION OF GEO-INFORMATION IN EUROPE: Challenges for the Public Sector, the Private Sector, the Science Community and the European Commission

In my presentation I will show that the commercialisation of government information has set in motion a process of co-operation and communication. This co-operation has created opportunities in the Netherlands, in other European countries and at the level of the European Commission. In Europe this co-operation has led to the development of a European Geo Information Infrastructure, now laid down in the GI 2000 document. The working out of this document has led to opportunities for the public and private sectors and the academic world. In the presentation I will set out the preconditions which have to be met to give this favourable position form and substance.
The Geo-information sector is currently undergoing turbulent development. The use of Information and Communication Technology is increasing rapidly. National Government programmes encourage the use of ICT and Geo- information. Within the European member states policy plans have been developed to explore ways in which government institutions can exploit this modern technology to improve the extent and the quality of their service provision. In the Netherlands for example, on 18 December of last year the government paper ?Electronic government? was published; it focuses on the development of electronic government services for citizens. The conclusion can also be drawn that Geo-information is playing an increasingly important part in electronic government, participatory policy formation and the solution of important social issues. An example is the initiative taken by the American Vice President Al Gore. In a speech to the Brookings Institution in Washington he presented a stimulation programme amounting to about 120 million dollars to start up illustrative projects where GI plays an important part in the fight against crime. A similar trend can be seen in the Netherlands. ? Electronic-government,? the government paper mentioned above, stressed the importance of a national Geo-Information Infrastructure. Stimulation projects to set up an authoritative countrywide register of buildings were announced and the Ravi was requested to develop an authoritative register of geographic core data. The Ravi is a consultative body involving all government organisations and institutions playing an important part in the provision of real estate and geographic information. In the Netherlands, the Minister of Housing is responsible for the co-ordination of Geo-Information. The relationship between the Minister and the Ravi is laid down in a memorandum and the Ravi is now perceived as a leading neutral consultative body.

Bas Kok
Faculty of Civil Engineering
and Geosciences
Department of Geodesy
Delft University of
Technology

VII.3

IMPACT OF COMMUNICATION AND INFORMATION TECHNOLOGY ON PUBLIC PARTICIPATION TOOLS FOR LAND MANAGEMENT: The New Brunswick Land Gazette

The revolution of the communication and information technologies (CIT) has traced quantitative and qualitative impacts on society and polity throughout the developed world during the last decades [Drucker, 1994]. This revolution has created new social challenges [McLaughlin J., 1998] affecting both governmental and societal institutions. Consequently, governments, community organizations, and citizens have to face new values, commitments and problems. Accordingly, structures designed for an age of organizational hierarchy need to be adapted to the new age of information and shared authority [Thomas, 1995]. As a result, the following questions arise: What are the impacts of CIT on public participation techniques? What are their new advantages and challenges? How CIT expand and constrain public participation? Can CIT eliminate the hierarchical barriers between policy makers and citizens and promote equal involvement and two way learning processes?

This paper will present a theoretical framework describing the alternative impacts of CIT on public participation methods and techniques. Since Geographic Information Systems (GIS) are being introduced into public participation settings in increasing numbers, a taxonomy of ongoing research into ?Public Participation GIS? (PPGIS) and its related areas will be presented. Then, the authors will discuss the impact of the CIT on land information system development in New Brunswick and its modernization from land data bank to an integrated, Internet-based, land information system (Land Gazette).

The implementation of the Land Gazette is the result of a collaborative effort between Service New Brunswick and the users of property-related information in the province?s public and private sectors. The vision of Land Gazette is to develop new communication tools between government and the public in order to provide electronic public notice about land and land use, and an information and feedback mechanism that improve public participation into the land management processes. After evaluating the potential impact of the Land Gazette, the authors will discuss its future improvements and trends in order to achieve better public participation in land management.

Rima Ammouri
Department Geodesy and Geomatics Engineering, University of New Brunswick

David J. Coleman
Department Geodesy and Geomatics Engineering, University of New Brunswick

John D. McLaughlin
Department Geodesy and Geomatics Engineering, University of New Brunswick

VIII.1 ONLINE COLLECTION AND AUTOMATIC EVALUATION OF EMPIRICAL DATA IN URBAN PLANNING

Information technology can be used to facilitate and stimulate public participation in urban planning. Empirical data can be gathered with the help of interactive internet-based questionnaires in an efficient and cost-effective way. Through the application of formalized expert-knowledge, tools like the exupro data-evaluation and decision-support system can be used to effectively process and evaluate large amounts empirical data.

A prototype of such a system (exupro-PLANS) was implemented as part of the local Agenda 21 initiative in Bremen, Germany. exupro-PLANS is an interactive discussion forum for sustainable development in the city of Bremen. The project participated in the Global Bangemann Challenge 1999. In exupro-PLANS, interactive online-questionnaires and automatic data evaluation with exupro are used to help define meaningful local indicators for sustainable development.

Thomas J. V
Intelligent Systems Group
Center for Computing Technologies
University of Bremen

Gabriele Heepen
white balance ? projects
pool agency GmbH

VIII.2 NEW MODELS OF PARTICIPATION ? NEW TOOLS FOR INFORMATION

The public service, which manages the relations between the State and the citizen, is today submitted to contradictory forces: on one hand, inertia of the institutions, of legal frame, of heavy administrative organisations; on the other hand, the evolution of the socio-economic context, the new demand of users and the very important influence of new technologies on the environment of work and professional practices.

The administrations in charge of city planning do not escape from the constraints of this context in mutation: from quantitative and normative to qualitative approach, from sectoral (city-planning/transport/environment) to global management, from job division to job integration.
In the field of the participation of citizens in the planning process, the legal and formal frame is today inoperative. Faced with new demands from citizens, who are sensitive to environmental problems and living surroundings, it is necessary to propose other models of participation.
Negotiated implication presents a different approach in so far as it involves an interactive process between the actors, right from the first step in elaboration of urban project.
Such process demands a high transparency from political authorities and public services.
The new information systems answer this demand: they give all actors a facilitated access to a considerable number of data. The interactive communication platforms widen dialogue possibilities with users.

The implementation of these tools helps the approach and the management of new complexities.
It leads to new partnerships and common use of traditionally "reserved fields". It forces to de-partitioning and modifies practices, skills and relationships between administrations and citizens.

Philippe Brun
State of Geneva
Department of land and
urban planning,
infrastructure and housing