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IT HAS BEEN VERY SLOW IN COMING, BUT IT IS FINALLY HERE!

by Kenneth Curtis, Editor, HOOSIER SURVEYOR

I well remember in 1962, when I was editor of the Journal of the Surveying and Mapping Division of ASCE, of encouraging John McEntyre (Kansas State) and his major professor, Art McNair (Cornell) to publish some of their views regarding "land surveying and land registration" and the many shortcomings in the land data system used in most of the states. This was the subject of McEntryre's PhD dissertation and excerpts were published in the February 1963 issue. The thesis had been written in 1952-54 and their plan is discussed in McEntyre's book, LAND SURVEY SYSTEMS (1978). This was one of the very first ventures into suggesting improvements in land data systems.

Another dedicated individual was Robert N. Cook, professor of law, University of Cincinnati, who recognized the pitfalls in our system and sought to remedy these deficiencies and to modernize land data systems. The ABA created a Committee on the Improvement of Land Title Records (1963) hoping to work toward modernization using technological developments in computers and the enactment of needed laws. It was my good fortune to attend the Tri-State Conference on a Comprehensive Unified Land Data System (CULDATA) at the University of Cincinnati in 1966.

Interdisciplinary interest among many persons including lawyers, recorders, clerks, land surveyors, assessors, planners, photogrammetrists, economists, geodesists, computer experts, system analysts, and government officials was evident in the Mackinac workshop in 1966 and a New Brunswick conference in 1968. By 1970, it was evident that the most suitable building block would be the land parcel. The question then was to ascertain the best and most acceptable identifier for land parcels and points. Should it be latitude and longitude, state plane coordinates, UTM coordinates, street address, etc.?

A Conference on Compatible Land Identifiers - the Problems, Prospects, and Payoffs (CLIPPP) was held in Atlanta, Georgia, in 1972 to discuss this subject. Not long thereafter (1974) North America Institute for Modernization of Land Data Systems (MOLDS) was incorporated. This

group sponsored a conference in Washington, D.C. in 1975. Their stated purpose included attracting support, fostering research, conducting courses and seminars and publishing literature, providing results, and disseminating information on model modernization attempts.

Major conferences, seminars, and workshops have been held and include the Forsythe's (County) Information and Retrieval System for Tomorrow-Today (FIRST) held in Winston-Salem, North Carolina, in March 1976 and the Orono Symposium in August 1976. The 1977 annual meeting of ACSM-ASP was dedicated to "Modern Land Data Systems - a National Objective". Subsequent meetings of the two societies have highlighted discussions and developments in modern land data systems.

Two publications of the National Research Council's Panel on a Multipurpose Cadastre should be required reading for everyone involved in GIS/LIS. The initial publication was the NEED FOR A MULTIPURPOSE CADASTRE, 1980, 112 pages, in which the basic components of a multipurpose cadastre were thoroughly discussed (see figure). This was followed by PROCEDURES AND STANDARDS FOR A MULTIPURPOSE CADASTRE, 1983, 173 pages, which covered in even more detail the geodetic reference network, base maps, and cadastral overlays. The need to organize requirements, standards, and budgets was highlighted. Several case studies were discussed.

During the past six years, GIS, LIS, MPC have become buzz words used by everyone associated with land data systems. Along with ACSM and ASPRS, other societies have joined the evolution - Association of American Geographers (AAG), Urban and Regional Information Systems Association (URISA) and Automated Mapping and Facilities Management (AM/FM International). Successful jointly-sponsored conferences have been held in San Francisco (1987), San Antonio (1988), Orlando (1989), and, currently, Anaheim (1990). Proceedings of these conferences and other society meetings are full of papers and case studies of GIS/LIS. Several video tapes are also available.

Graduates of Purdue's land surveying program are well aware of the potential of modernizing land data systems because these topics have been an integral part of the "Land Survey Systems" course since the inception of the curriculum in 1972. Because of land surveyor's unique background and expertise, he should be at the forefront when GIS/LIS systems are inaugurated at the state or local levels. We will discuss this involvement in the Fall issue of the HOOSIER SURVEYOR.

Every land surveyor should provide himself with the Federal Geodetic Control Committee's MULTIPURPOSE LAND INFORMATION SYSTEMS: THE GUIDEBOOK (see page 21) and prepare himself to be a part of the technical team who can provide technical support in the area of coordinate systems, survey measurements, parcel boundaries, and the importance of reliable land records based on the corners of the public land survey system.

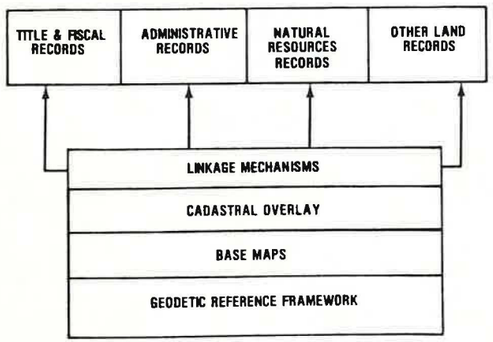
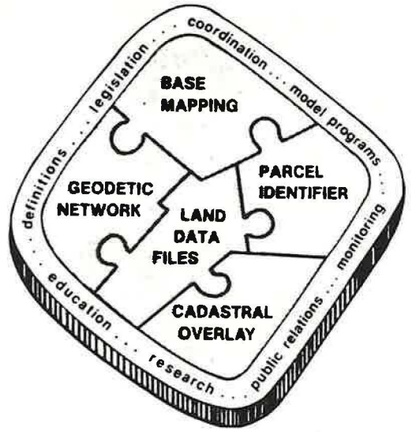


FIGURE 1.1 Components of a multipurpose cadastre.



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McENTYRE RECEIVES ACSM AWARD

The American Congress on Surveying and Mapping (ACSM) has awarded Dr. John McEntyre, professor emeritus at Purdue University, an Honorary Membership. This well-earned award was presented to McEntyre at the Spring Student Dinner by John Dailey (Cleveland) immediate past president of National Society of Professional Surveyors (NSPS), an ACSM Member Organization. The Award is the result of his many years of involvement in surveying education and his leadership role within the profession. He has been instrumental in the education of an entire generation of surveyors and was an early advocate of higher education in a rapidly changing profession.

John McEntyre (left) receives award from John Dailey

NEW STATE OFFICE NEXT STEP FOR INDIANA GIS EFFORT

The State of Indiana moved one giant step closer to the reality of a coordinated, statewide application of Geographic Information System (GIS) technology with the establishment of the State Office of GIS in March, 1990 within the Indiana Department of Administration (DOA). Although presently informally organized, the State Office of GIS continues to effectively function as a central entity for the dissemination of information and technical expertise related to GIS technology. Funding for this new state-level office is expected to be included in the next biennial budget, when approved.

According to Ms. Kathy McCarter, the State GIS Coordinator for Indiana, this initial absence of funding has not prevented the State Office of GIS from aggressively pursuing the goals established for it by DOA.

"Department of Administration (DOA) established the State Office of GIS to study and provide information about how a geographic information system could improve government efficiency at all levels here in Indiana and provide for coordination efforts," said Ms. McCarter.

To address this need for information about the many diverse aspects and requirements of GIS-related technologies and activities, the State Office of GIS is recommending a policy committee and several task forces be developed, including: the GIS Mapping Policy Coordinating Committee (GISMPCC), the Geodetic Technical Advisory Task Force, the Aerial Photography Technical Advisory Task Force, and the County GIS/LIS Policies and Standards Technical Advisory Task Force.

"The GISMPCC would review and approve policies for mapping and geographic/land information systems in Indiana," noted Ms. McCarter. "If a policy issue falls under the purview of the Indiana Data Processing Oversight Commission (DPOC), GISMPCC's role becomes a strictly advisory one, forwarding all recommendations regarding GIS policy issues under DPOC review to DPOC for approval." Ms. McCarter added that the GISMPCC members representing individual departments of State government would also serve as policy liaisons between the State Office of GIS and their respective departments to ensure the effective communication and implementation of GIS and mapping policy decisions within their own departments.

"Through the Geodetic Technical Advisory Task Force we plan on pursuing a Geodetic Advisor for Indiana," revealed Ms. McCarter, adding that such a position can be funded on a cost-share basis with the Federal Government. "Additionally, we are exploring a cost-share program with the federal government for the Geodetic monuments statewide. The percentage of federal funding for this purpose will ultimately be determined by the amount of vested interest the federal government would have in such an endeavor. At present the Geodetic Task Force is determining the geodetic reference system in Indiana."

The Aerial Photography Technical Advisory Task Force is investigating a possible need to obtain, update and/or supplement aerial photography of Indiana through the National Aerial Photography Program (NAPP), a federal program to procure complete aerial photo coverage of the entire 48 contiguous states over the next five years. According to Ms. McCarter, overflights of in entire states can be obtained through NAPP on a cost-share basis between the federal government and the participant state.

"The County GIS/LIS Policies and Standards Technical Advisory Task Force will be busy developing standards and policies to be used as a model for counties developing GIS, " continued Ms. Mc Carter. "Effective policies and standards should eventually tye all of the county systems together as part of a statewide land information system." Additionally, this task force wll evaluate the needs for modernization of land records and relations ships with state-county land information systems as well as identify issues of concern to local entities.

For more information about the Indiana State Office of GIS, you may contact Ms. McCarter at (317)232-4995.

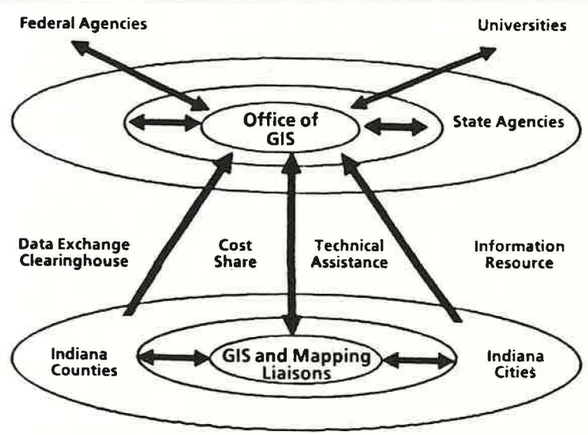

FIGURE 1. Pathways of Communciation for State Office of GIS

INDIANA GIS NEWSLETTER
APRIL, 1990

ISPLS GIS/LIS COMMITTEE FORMED

At the June 23, 1990, ISPLS board meeting, held in Vincennes, a GIS/LIS Committee was named: Roger Fine (Indianapolis) chairman; E. R. Gray (Columbus); Dan Pusey (Lafayette); and Larry Manning (Indianapolis).

A COMPREHENSIVE APPROACH TO INDIANA STATE GIS

A geographic information system (GIS) is an information technology consisting of computerized capabilities for representing the real world information as data about locations, and a tool set to analyze this information in a variety of ways. GIS technology can be used as a decision support tool which can, for example, support site location planning and determination; maintain information for buildings, roads, and facilities as a facilities management tool; or analyze geographic locations impacted by a disaster and determine appropriate emergency response based on predetermined criteria as an emergency response and management tool.

GIS is becoming increasingly important to government as a valuable decision support tool to effectively respond to ever changing public demands with diminishing government resources. GIS technology is maturing at a critical time as government seeks to address issues surrounding limitation of resources and increasing demand,the growing number and complexity of regulations, programs, and policies by government, and the problems of the country's deteriorating infrastructure. In Indiana, there are special and pressing needs for environmental and natural resource management, economic development, human services, and facilities and infrastructure management.

The implementation and use of GIS is proliferating in the United States at all government levels. In Indiana the Indianapolis/Marion City/ County has developed and implemented the first set of a multiple layer, multi-million dollar GIS system known as IMAGES. Many other Indiana counties and cities are following the lead of Indianapolis in the planning and development of GIS. At the state level three major state agencies are developing or planning to develop their own systems: Natural Resources, Transportation, and Environmental Management. Considerable dollars will be spent on hardware and software, systems support and consulting services to acquire GIS capabilities. All of these costs are relatively insignificant when compared to the most significant cost factor associated with a GIS, the cost of producing the computerized digital map representations (the spatially referenced databased or layers). It is estimated that 80% of the cost of a geographic information system is for the acquisition of the digital data map layers.

In reviewing progresses made in other states when developing GIS capabilities it quickly becomes apparent that a number of these digital data map layers are common among most state agencies. This set of common digital data map layers is referred to as the base map. It also became apparent when reviewing GIS programs in other states that these common map layers were redundantly developed by a number of separate agencies and sometimes within the same agency. Additionally, these map layers are as vital to local government entities as they are to other government sectors, the only difference being the level of detail required by the various government sectors.

It seems that the best approach to geographic information systems in Indiana is a comprehensive approach which considers a wide perspective of needs among state agencies and local counties and cities in order to produce a system with the greatest benefit and GIS capability at the overall least cost. By coordinating the development of geographic information systems and digital data map layers, and by building cooperative relationships between federal, state and local levels of government considerable savings of tax dollars can be realized i the elimination of redundancy and the greater sharing of compatible information.

Coordination and management of GIS in the state, the development of a comprehensive GIS strategy, and the exchange of compatible GIS information can best be achieved by a centralized office for geographic information systems which would address the coordination requirements and issues of state agencies, counties and cities, universities, and private companies as required.

The Department of Administration is considering the introduction of legislation to formalize the centralize office for geographic information systems during the 1991 legislative session. The Indiana GIS Newsletter will keep you informed of any new developments.

MARK YOUR CALENDAR:

2ND ANNUAL STATE OF INDIANA GIS CONFERENCE is currently scheduled for November 15 and 16, 1990. Registration information will be made available in next month's issue of the Indiana GIS Newsletter.

GIS WORLD ANNOUNCES 1990 GIS SOURCEBOOK

GIS WORLD magazine will soon publish its second nual *GIS Sourcebook*, the exclusive international S reference book. The first edition, in 1989, was 200 pages in length -- the 1990 issues is expected to double that figure. It is the only reference book worldwide that is dedicated exclusively to GIS technology, and contains extensive technical and price data on most GIS software. "Our first software survey, in 1988, compared 35 systems. The 1989 edition contained 62 systems, and the new survey to be published in this year's GIS Sourcebook will reach 100," said H. Dennison Parker, publisher.

In addition to GIS technical data, the *GIS Sourcebook* will have articles on numerous GIS applications, consultant listings, data sources and firms, GIS educational opportunities, and much more. Still, the price is being held far below levels for comparable works in other fields. "Our primary objective is to provide useful information about GIS technology," said Parker, and our advertisers are helping us do that by making a book like this available to virtually anyone." The book will sell for $59.95 to *GIS WORLD* subscribers, $119.95 to others. A 39% pre-publication discount off both prices is available until July 16. The book will be published and distributed worldwide in August. For more information, contact GIS World, Inc., P.O. Box 8090, Ft. Collins, CO, USA 80526 (303-223-4848).

SECOND ANNUAL INDIANA GIS CONFERENCE

The Second Annual Indiana GIS Conference will take place at the Indianapolis Convention Center (Hoosier Dome Complex) on November 15-16, 1990. The First Indiana Conference was held on February 6, 1990 at the Convention Center and was very successful. Almost 300 registrants were able to learn more about GIS, meet specialists, and discuss hardware and software with vendors.

Selected state agencies and state universities have rapidly developed GIS expertise, but most potential users of this technology are at the information seeking phase, are planning to implement, or are learning about ways to improve their use of GIS and related technologies. It is anticipated that significant funding at the state, county, and city level for GIS is imminent.

INDIANA GIS Newsletter
INDIANA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT
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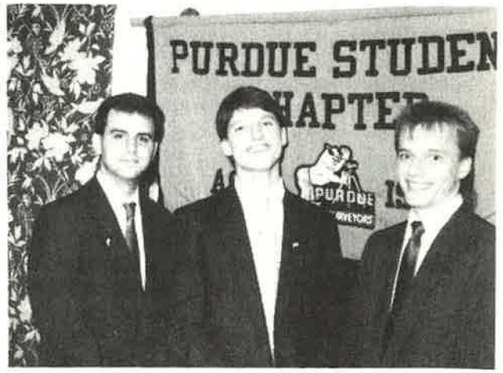
18th ANNUAL PURDUE STUDENT CHAPTER

SPRING SENIOR RECOGNITION DINNER

Saturday, April 7, 1990

Morris Bryant Smorgasbord

Mark Brooks (Peru) on right, chairman of student chapter, presided and introduced the guest speaker, James Weidener (Miami, Florida) immediate past national president, ACSM.

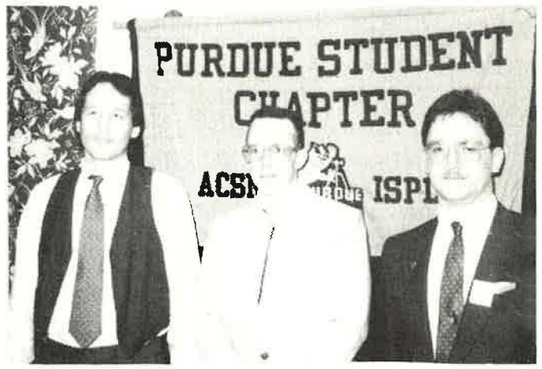


Outgoing student chapter officers include, left to right, Mark Brooks (Peru) chairman; Michael DeVoy (Haubstadt) vice-chairman; and Jeffery Stenger (Sunman) secretary.

Professor Curtis congratulates three award winners, left to right, Michael DeVoy (Haubstadt) "Outstanding Graduating Senior Award"; Mark Brooks (Peru) "Student ACSM Award"; and Robert Sleeper (Highland) "Jud and Betty Rouch Land Surveying Scholarship Award".

Lee Bender (Brookston), center, presents Randell Gann (Reelsville), on right, and Greg Eberle (Lafayette), with the ISPLS John McEntyre Endowment Scholarship Award of $1,000 which they shared. Gann also received the CIC Award of $150.

John Dailey (Cleveland, Ohio) on right, immediate past president of NSPS, presents ACSM Honorary Membership plaque to John McEntyre (West Lafayette).



New incoming student chapter officers include, left to right, Greg Eberle (Lafayette) chairman; Scott Zeigler (Albion) vice-chairman; and Randell Gann (Reelsville) secretary.

PURDUE UNIVERSITY

AN EDUCATIONAL PROGRAM FOR THE LAND SURVEYOR

by Kenneth S. Curtis

After a rather thorough manpower study in Indiana (1968) for the need for land surveyors, a committee of land surveyors and educators was established to prepare a four-year baccalaureate degree curriculum and to propose to the Indiana State Board of Registration the requirement of the equivalent of a four-year degree plus four years of practical experience as a minimum for a professional land surveyors license. Curriculum objectives were formulated with respect to technical competence and general education.

In February 1971, Purdue University initiated a program which has had a far-reaching effect on the land surveying profession in Indiana and across the country. The University's administration agreed to establish a new four-year professional curriculum leading to the Bachelor of Science in Land Surveying. It is believed that this approval and subsequent approval by the Indiana State Commission on Higher Education represent the first attempt in the United States to offer a curriculum specifically designed for educating the upcoming land surveyor.

The program was planned so as to have a full section of each course. Purdue University planned and budgeted the program for one section in each course consisting of an enrollment of twenty-five students for each course. To launch the program, a sizeable amount was budgeted to cover the added faculty and equipment needed the first year to supplement staff and equipment already available. The program was assigned to the School of Civil Engineering for administration and a committee from this School with some members from private practice created an initial curriculum which was subsequently approved.

The program was initiated in September 1971 with a small number of students on campus who were awaiting the new program's approval. The first four students graduated in 1973 and there now have been 222 graduates of the program. At one time the enrollment reached 25-30 in each class and concern was expressed about the increasing size. However, because of the capping of freshman engineering enrollment and the economic situation in small home construction in early 1980s, enrollments in land surveying have dropped off recently. The future outlook appears to be brighter. Freshmen are enrolled in the common freshman engineering program and are not in the various curricula until the sophomore year. Many have come into the program by transfer at the junior level. Currently approximately 50% of the students are using five years in order to complete the requirements of both the B.S.C.E. and B.S.L.S. degrees. The land surveying program requires approximately 34 credit hours of additional course work beyond civil engineering requirements for a "dual degree". Seventy-five percent of the students are from Indiana with the remainder from out-of-state, and no international students are involved.

The curriculum now in effect, although carefully studied and deemed an optimum, should never be considered a static one. In fact several changes were made in 1973, 1980, and 1985 and several additional changes are currently contemplated. It is difficult to satisfy all the ideas concerning the subjects which should be covered in a land surveying curriculum. There is a difference in the profession as practiced by a predominantly rural practitioner with strong emphasis on retracements and by a predominantly urban practitioner involved with considerable subdivision land development. Also, laws regulating the practice of land surveying vary somewhat in different states. Although many land surveyors have reached professional status by apprenticeship and/or self-study programs, without the aid of much formal education, most progressive present-day practitioners generally agree that formal education will be essential for future professionals.

The enrollment has been low, but steady, for several years. Recruitment efforts have had top priority over this period. The faculty has been experiencing extensive turnover due to retirement and other factors. During this critical period, efforts have been made to maintain excellence in course offerings. A strong graduate program of instruction serves to keep faculty current and supports the undergraduate program.

Continued from page 9
Purdue University

Building on a strong basic program of physics, mathematics, statistics, graphics, geology, statics, mechanics, engineering materials, and general education, are eleven courses in surveying. These include basic surveying, route/construction surveying, topographic/cartographic surveying, surveying computations, surveying instrumentation and astronomy, photogrammetry/photo interpretation, geodetic control surveying, land survey systems, property surveys and descriptions, legal aspects of surveying, and culminating in summer surveying field project practicum course of four weeks duration. Because land surveyors in Indiana have, by law, responsibility for the preparation of subdivision plats, a series of courses in materials, hydraulics/hydrology/drainage , roads and streets, urban planning, along with surveying courses, leads to a capstone course in subdivision planning and design. The objective of this course is for the students to design a subdivision (30-50 lots) based on sound engineering and surveying principles and practices in compliance with appropriate governmental regulations.

Although no new courses have been added to the program, every effort has been made to integrate new surveying procedures, methods, and developments into existing courses. Multipurpose cadastre or land information systems has always been a part of the land survey systems course. Doppler satellite surveying and global positioning system (GPS) have been introduced into the surveying instrumentaion course as these developments were forthcoming. The choosing of elective courses (some mini courses) have been encouraged in cadastral surveying, dendrology, right-of-way acquisition, hydrographic surveying, coastal boundary mapping, remote sensing, soils and land use as the demand existed. Although the program was specifically designed for the future land surveyors, the curriculum is very well-rounded in covering most aspects of the broad field of surveying and mapping.

This article was prepared for the 1990 U.S. National Report to FIG (International Federation of Surveyors) and published in Surveying and Land Information Systems, Vol. 50, No.2, June 1990.

LASSI A. KIVIOJA RETIRES FROM PURDUE

Lassi Kivioja, 63, associate professor of geodesy at Purdue University, has retired after 26 years of teaching and research. During this time he has had the responsibility of teaching graduate courses in geometric geodesy, physical geodesy, celestial geodesy, marine geodesy, geodetic astronomy, electronic surveying, map projections, global positioning system, and the undergraduate course in surveying instrumentation and astronomy for land surveyors. Born in Finland, he earned the BS and MS degrees at the University of Helsinki and the PhD at The Ohio State University. He joined the Purdue faculty in January 1964 at the time when graduate programs in geodesy and photogrammetry were initiated. On sabbatical leaves, he has worked as a geodesist with the National Geodetic Survey and the Geodetic Survey Squadron of the Defense Maping Agency. He is highly regarded for his research work on geodetic instrumentation that has brought thousands of dollars worth of geodetic surveying equipment to Purdue. Several of his graduate students have achieved major positions in geodesy and mapping. He will be missed! We wish him and his wife, Emily, who plan to live in Lafayette, an enjoyable and rewarding retirement.

Lassi Kivoija

PURDUE LOSES TWO & GAINS TWO FACULTY MEMBERS

JAMES S. BETHEL JOINS PURDUE FACULTY

In August 1989, Dr. James S. Bethel, 42 joined the Surveying faculty at Purdue University as an assistant professor. His excellent background includes a BA and MS degree from the University of Washington and a PhD from Purdue University. He served several years as a teaching and research assistant at both universities, four years as a photogrammetric systems engineer with Teledyne Geotronics, and five years with Kern Instruments. His special areas of interest are adjustment computations, industrial metrology systems, photogrammetric instrumentation, digital terrain models, and geographic information systems.

Dr. Bethel is currently the Indiana Director of the Western Great Lakes Region of the American Society for Photogrammetry and Remote Sensing, ASPRS. His most recent paper, "Simulation and Analysis of the Bundle Adjustment", appeared in the proceedings of ASPRS annual convention, Baltimore, Maryland, March 1989.

Gerald W. Mahun

PROFESSOR BOB MILES RETIRES FROM CE

On December 31, 1989, Robert D. Miles, 65, retired from the School of Civil Engineering ending thirty-nine years of teaching and research at Purdue University. A native of Bloomfield, Indiana, he served in the OSS in the China, Burma, India Theatre Area during World War II. He earned a BS and MS degree in civil engineering from Purdue and has been teaching since 1950. Bob served in the airphoto interpretation area throughout his career. His research involved airphoto interpretation of landforms, soils, materials of construction, and land use. One major result of this activity was the development of 92 Indiana drainage maps and 84 of the 92 county engineering soils maps. As a member of the transportation area, he served as the coordinator of the senior design capstone course, CE 498, for over 20 years and was the primary teacher of the engineering ethics and professional registration course during the last ten years. He started the Order of the Engineer in 1972. ISPE selected him as Engineer of the Year in 1977. He won an outstanding teacher award in 1979. He and his wife, Margaret, plan to remain in the Lafayette area. We wish them a long and happy retirement.

James S. Bethel

GERALD W. MAHUN TO JOIN PURDUE

This August, Gerald W. Mahun (Jerry), 36, will join the Surveying faculty at Purdue University as a visiting instructor. His background includes BS and MS degrees in civil and environmental engineering (with special emphasis in surveying and photogrammetry) from the University of Wisconsin-Madison. He is currently working toward the PhD at Wisconsin with emphasis on multi-purpose land information systems and datum-to-datum conversion methodology. He is a registered land surveyor in Wisconsin and has recently chaired a WSLS education committee report on LSIT/four-year degree requirements for Wisconsin. Beginning in 1979 he taught surveying at University of Wisconsin-Platteville. His varied experience includes work in the Dane County Land Records Project, development of instructional software for surveying classes, and cadastral consultant with the Cadastral Surveys Branch of Bureau of Land Management, Denver. His latest paper, "Corner Identification Consideration for a Public Land Survey System Data Base", appeared in Surveying and Mapping, Vol. 49, No. 1, March 1989, pages 25-29. His Purdue involvement will be primarily with the undergraduate land surveying program.

Robert D. Miles

GIS/LIS '90

Annual Conference and Exposition
7-10 November 1990

ASPRS/ACSM FALL '90

5-10 November 1990

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Anaheim, California

SPONSORING ASSOCIATIONS

American Congress on Surveying and Mapping (ACSM) is composed of 10,200 members in three organizations: American Association for Geodetic Surveying (AAGS), American Cartographic Association (ACA), and National Society of Professional Surveyors (NSPS). ACSM is committed to the advancement of the profession of surveying, mapping and land information. ACSM, Suite 100, 5410 Grosvenor Lane, Bethesda MD 20814-2122.

American Society for Photogrammetry and Remote Sensing (ASPRS), serving over 8,200 members is devoted to the exchange of ideas and information about applying the art, science, and technology of photogrammetry, remote sensing, and geographic information systems. ASPRS, Suite 210, 5410 Grosvenor Lane, Bethesda MD 20814-2160.

AM/FM International (AM/FM) is an educational organization dedicated to the advancement of automated mapping and facilities management. The association's membership includes 1,600 representatives of utilities, energy and natural resource companies, government agencies, and other organizations. AM/FM, 14456 East Evans Avenue, Aurora CO 80014-1409.

Association of American Geographers (AAG) is a scholarly organization with 6,300 members founded to advance professional studies in geography and to encourage the application of geographic research in education, govemment and business. AAG, 1710 Sixteenth Street NW, Washington DC 20009-3198.

Urban and Regional Information Systems Association (URISA) is a multidisciplinary educational/professional organization of 2,800 individuals concerned with the effective use of information systems technology at the local, regional, state/provincial, and federal levels of government. URISA, Suite 304, 900 Second Street NE, Washington DC 20002.

GIS/LIS '90 CONFERENCE THEMES

CASE STUDIES

Descriptions of successful or unsuccessful projects at single sites or in single agencies or firms, and among or between agencies and firms with multi-disciplinary interests or missions.

DATA CAPTURE AND INTEGRATION

Data base design, development, and management concepts, models, products, techniques and trends; data conversion, quality control, standards, and transfer and translation among systems; map accuracy.

LAND RECORDS

Recent advances and useful experience in dealing with cadastral, tax assessment, and zoning data, and with emergency and growth management, political boundaries, and legislative redistricting.

LEGAL, ECONOMIC, AND INSTITUTIONAL ISSUES

Questions and controversies regarding access, Freedom of Information Act provisions, land information law, and privacy in relation to GIS/LIS use; cost benefit analyses of GIS/LIS applications; coordination and exchange of data among public agencies and private firms.

PROJECT PLANNING AND MANAGEMENT

Methods, issues, and pitfalls encountered in initiating GIS/LIS projects, justifying their costs, planning their expansion, making institutional and organizational adjustments, and managing GIS/LIS applications.

RESEARCH AND EDUCATION

Basic GIS/LIS research and education; NCGIA and URISA research agendas; curricula and methods for educating professionals in academic and other settings; methods for educating non-technical managers and policy makers.

SPATIAL DISPLAY AND ANALYSIS

Concepts and methods for displaying and analyzing geographic and land information in spatial contexts; cartometric, network, and statistical analysis, modelling, and simulation; map design and cognition; spatial search and navigation; visualization research.

TECHNOLOGY

Developments and products that enhance system operations and capabilities such as artificial intelligence, parallel and distributed processing, networking, optical disk storage, scanning devices, user interfaces, and visualization hardware and software.

COMMITTEE NEWS

Ethics Committee Mid-Year Report

by Ross Holloway, Chairman Ethics Committee

ETHICS COMMITTEE MID-YEAR REPORT

So far 1990 has produced a flurry of activity in complaints being filed with the Ethics Committee. As of July 21, ISPLS has received fourteen complaints.

Four complaints concerned firms which had performed surveys or advertised surveying services without having an Indiana Registered Land Surveyor on staff. Letters were sent to these firms informing them that they were in violation of Indiana Code 25-31-1-1 and 25-31-1-1 and 25-31-1-27. A violation of 25-31-1-27 is a Class B misdemeanor.

In a case where an individual had certified a subdivision plat as a professional engineer, the engineer was asked to provide a new plat which was certified by an Indiana Registered Land Surveyor. Copies of our letter to this engineer were sent to the recorder and plan commission of the county where the invalid plat had been recorded.

Eight complaints were filed against Indiana Registered Land Surveyors for practice which did not meet the minimum standards for surveying as found in Title 864, Article 1.1, Chapter 13 of the Indiana Administrative Code, more commonly known as "Rule 13". Letters were sent to five of the surveyors informing them of their violation of "Rule 13". To help the registrant avoid further violations, we enclosed with our letter a copy of the Indiana Registration Act for Professional Engineers and Land Surveyors and Rules of the Board. After a review of the three remaining complaints the Board of Directors voted to file complaints with the Indiana Attorney General. Two of the filed complaints were for violations of "Rule 13", and in the third complaint not only were the standards violated but the evidence indicated to the ISPLS Board that the surveyor was also incompetent.

Out of the fourteen filed complaints, two were either groundless or due to a contractual dispute. In these cases a letter was sent to the complainant informing them that ISPLS could find no violation of standards or ethics.

...continued page 17

ADVERTISING BY SURVEYORS: IS IT ETHICAL

The Ethics Committee has recently received many inquires concerning advertising by Indiana registered land surveyors and with this article we hope to clear the air. There is nothing in the Registration Act for Professional Engineers and Land Surveyors, effective July 1, 1982, or Rules of the Board, effective November 10, 1986, which prohibits advertising by an Indiana registered land surveyor or land surveying firm whose practice is in compliance with Indiana Code 25-31-1-18. However, there are three issues covered by Rules of the Board which would impact the content and tone of a professional services advertisement.

Following are the three Rules of the Board of Registration which would effect a surveying services advertisement:

(a) 864 IAC 1.1-11-19, PAYMENT OF CONSIDERATION TO SECURE WORK
This section prohibits, directly or indirectly, discounts, free gifts, prizes or other inducements to secure work. Under this rule advertising of fee discounts is not allowed.

(b) 864 IAC 1.1-11-20, EMPLOYMENT ON BASIS OF QUALIFICATION AND COMPETENCE
To advertise for work outside of your experience level would be a violation of this subsection.

(c) 864 IAC 1.1-11-21, MISREPRESENTATION OF QUALIFICATIONS PROHIBITED
An advertisement which exaggerated past experience, responsibility, or accomplishments would be in violation of this subsection as would be misrepresenting the size of your firm, number of employees or their level of expertise.

(The opinions expressed above are those of ISPLS and do not necessarily represent an interruption by any branch, board or official of the State of Indiana.)

Advertising for professional services is not unethical. While ISPLS does not advocate advertising for professional services we are well aware that some surveyors will advertise. If you feel you must advertise please keep this article in mind. Remember, you are not only representing your firm but the surveying profession.

Differentiating CAM, AM/FM And GIS

by George B. Korte, P.E. Reston, Virginia

You may well be asking yourself, "There is a lot of press coverage on 'GIS' these days, but how is it different than AM/FM" Or, "How come I can't just use my CADD system as a GIS?" Allow me to offer some explanations that may be helpful.

The commonly accepted definition for a Geographic Information System (GIS) is, "A computer-based system used to capture, store, edit, display, and plot geographically referenced data." Unfortunately, this definition applies to three principal types of computerized, geographically referenced data, each of which has distinctly different characteristics and applications.

CAM

The first is more properly referred to as a computer assisted mapping (CAM) system. This system usually employs computer Aided Design and Drafting (CADD) technology primarily to produce maps. It is a replacement for the traditional manual cartographic process. Data in the system is organized on layers that are conceptually like registered film overlays. The layers are used to organize map features by theme, such as streams versus roads, or by type of data, such as linework versus text. The plotted data rivals scribed cartographic products in quality.

CAM can greatly reduce map production time and save money over the traditional "carto" process. For instance, corrections are much easier to make. To make changes to the map, the manual process requires erasing and reinking or applying opaque and rescribing. A CAM system allows the user to quickly modify a single element without affecting other features. Also, traditional film separates must go to the photo lab to be composited into color separates. This is a costly and time consuming process of combining linework, text, open windows and area fill patterns. A CAM system can produce all of these features on one plot, almost entirely eliminating the trip to the lab, other than to develop the CAM film plot.

However, CAM is not suited for analyzing map data. In a CAM system, map features are associated by theme using layers and they are all referenced to a common geographic coordinate system. But further relationships among data elements are not defined. Thus, the CAM database can describe the geometry of two roads that cross one another. But the fact that they intersect is not necessarily identified because it is not important in the making of a printed map.

Similarly, a group of linestrings placed in a CAM system may describe a fully enclosed area, commonly referred to as a polygon. But once again these linestrings are related to one another only by layer and by reference to a common coordinate system. The fact that they define a closed area cannot be determined without processing the data to inspect for this condition.

Resource planners and managers often ask questions that require the analysis of "spatial" relationships. Questions like "What is nearby?" or "How many of these do we have in this area?" or "What areas are both this type and that type?" A CAM system is not well suited for answering these questions because these spatial relationships are not defined in the data structure. Special processing is required to first inspect for these relationships, then answer the question. But computerized map data can contain thousands of elements, and each element must be compared against all the others to first define these relationships. Thus, the process of analyzing CAM data to answer these questions is slow and cumbersome at best.

AM/FM

The second type of "GIS" in use is more properly referred to as an Automated Mapping/Facility Management (AM/FM) system. This system is also usually based on CADD technology and is used to manage utility system data. While plotting maps is an important function of an AM/FM system, the graphic presentation is usually not as precise or detailed as that of a CAM system. Instead, the emphasis is on data storage, analysis and reporting.

An AM/FM system will use layers to break data down by theme and type, much like a CAM system. However, relationships among utility system components are further defined as "networks". A network identifies which components are somehow connected to each other. These connective relationships are often defined in a datafile separate from the graphics file describing the geometry of the system. Unlike a CAM system, intersections among all system components must be preserved in order to define these connections. Therefore, in an AM/FM system no two lines of the same type of utility may cross except at an intersection.

In an AM/FM system, non-graphic attribute data are linked to the graphic data. These attribute data describe the characteristics of utility system components, such as sizes, capacities, materials, etc. With these two features, networked data and associated attribute data, it is possible to model and analyze a utility system's operation.

GIS

The third type of GIS (that which is most often referred to as a "GIS" today) is best suited for the analysis of geographic data. This system differs from the first two in the fact that spatial relationships among data elements are defined. This convention, known as data "topology", goes beyond merely describing the location and geometry or map features. It also describes how linear map features are connected, how areas are bounded and which areas are contiguous.

To define map topology, a GIS uses a special data base structure. As in a CAM system, all map features are related to a geographic coordinate system. But, unlike a CAM system, which defines map features as lines or symbols, a GIS defines map features as "nodes", "lines" and "areas". (Other terms, such as points, arcs and polygons, are also frequently used.)

Nodes represent the intersection points and the endpoints of lines. Each node is uniquely numbered and is located by a pair of X-Y geographic coordinate values.

Lines are also uniquely numbered. Their geometry is described by a series of coordinate pairs. A straight line is defined by only two coordinate pairs (representing the beginning and the end), while additional coordinate pairs are needed to represent curvilinear features. The more coordinate pairs are used, the more precise will be the geometric definition of the line. Lines are also encoded with their beginning node number and their ending node number as well as the area to their left and the area to their right.

Map features depicted as an isolated symbol, such as a tower or stream gaging station, are referred to as "point" features. In a GIS these are represented as a special type of line element, known as a "degenerate" line. This is a line described by two identical coordinate values. Thus, it is a line having its beginning and end points at the same location.

Each area has a uniquely numbered "centroid", which is a point located anywhere within the area. The centroid has a X-Y coordinate pair to define its location. Finally, area boundaries are defined by the numbers of the lines that form the boundary.

In addition to the above geometric and spatial data, a GIS will also contain attribute data. These are associated with the topologic elements (nodes, lines and areas) and provide further descriptive information about them. For instance, in a GIS used for municipal tax mapping, a tax parcel would be defined as an area, and its descriptive data might include the lot number, owner's name, acreage, zoning, etc. This attribute data is placed in a database separate from the graphics data.

The GIS software is designed to permit the routine examinations of both spatial and attribute data at the same time. The user is able to search the attribute data and relate it to the spatial data and vice versa. For instance, in our municipal tax mapping example, the city planner may ask, "Where are all the lots in the west end larger than one acre that are zoned for industrial use?" The GIS can respond by either listing their lot numbers or plotting their locations on the city street map. This is a capability neither a CAM nor an AM/FM system will normally provide without custom programming.

APPLICATIONS

All three types of computer mapping systems have a specific role to play. For instance, a commercial map atlas company may us a CAM system. Its mapping applications are primarily for cartographic products.

A telephone company will use an AM/FM system to support its telephone system operations and maintenance. It must be able to quickly trace a cable network and retrieve its attributes.

On the other hand, a wood and paper products company will use a GIS to manage its timber reserves. It needs to conduct many types of spatial analysis, asking questions like, "How many acres, by tree species, do we own within 200 feet of this proposed power line?"

Some organizations find they need all three capabilities. A state Department of Transportation, for instance, needs to make highway maps, manage utility data, and analyze relationships among resources. One major challenge still facing the computer mapping system vendors today is to develop systems that will support all three functions equally well.

George B. Korte, P.E. is a consultant in geographic information systems (GIS), automated mapping and facility management (AM/FM) systems and computer aided design and drafting (CADD) systems. He can be reached at P.O. Box 3547, Reston, VA 22090, (703)435-6783.

Permission to reprint this article was given by the author and CIVIL ENGINEERING NEWS where it was originally published in the February 1990 issue.

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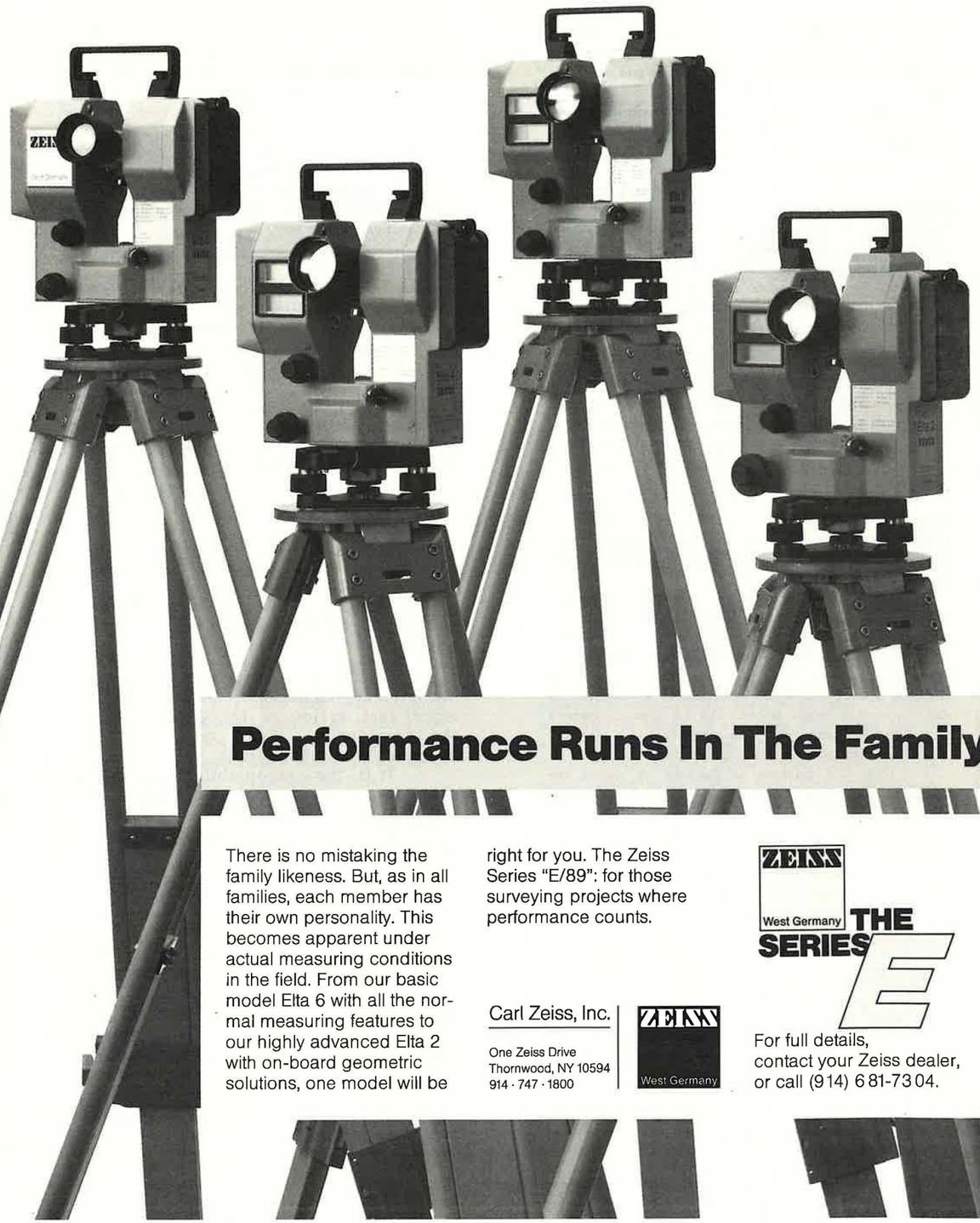
Continued from page 15

ETHICS COMMITTEE

On the two complaints filed with the Attorney General in 1989, I'm happy to report that action is being taken against the individuals. ISPLS will continue to monitor these proceedings.

It is the responsibility and obligation of each registered land surveyor in this state, under Title 864 IAC 1.1-11-23, to report violations of Indiana Code of Rules of the Board of Registration. Our goal is to educate the registrant and help him or her to improve their practice. Only in the case of repeated or blatant violations of the registration act will we proceed with filing an action with the Attorney General. After all the ultimate duty and purpose of our society is to safeguard the life, health and property of the citizens of the State of Indiana. a necessary part of this responsibility is the policing of ourselves.



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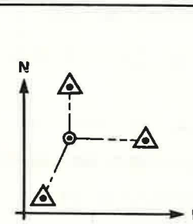

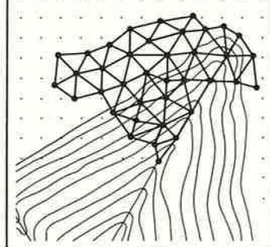

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C&GS Update

LAND

National Geodetic Survey Division

NGSD Distributes State Plane Coordinate System Conversion Tables

NGSD has developed Lambert projection tables for the State Plane Coordinate System of 1983 (SPCS 83). These tables use the Lambert Conformal Conic projection and allow users with a minimum of computing resources to compute state plane coordinates from geographic coordinates. For each minute of latitude, the tables give the corresponding mapping radius and the grid scale factor. With the values tabulated for the mapping radius, users can compute plane coordinate values using elementary formulas and a 10-digit calculator.

States using the Lambert projection include; Arkansas, California, Colorado, Connecticut, Iowa, Kansas, Kentucky, Louisiana, Maryland, Massachusetts, Michigan, Minnesota, Montana, Nebraska, North Carolina, North Dakota, Ohio, Oklahoma, Oregon, Pennsylvania, South Carolina, South Dakota, Tennessee, Texas, Utah, Virginia, Washington, West Virginia, and Wisconsin. The states of Florida and New York use both Lambert and transverse Mercator projections. Alaska uses the oblique Mercator, transverse Mercator, and Lambert projections. NGSD has not yet developed coordinate conversion tables for states using the transverse Mercator projection.

The table method of computing coordinates supplements other methods and material given in NQAA Manual NOS NGS 5, State Plane Coordinate System of 1983. This manual defines the symbols used within the tables and is available for $10.00. The cost per table (one coordinate zone) is $7.00. Please specify which state(s) and zone(s) are desired.

Inquiries: Information Services Section
Telephone: 1-301-443-8631

NGS Provides Geodetic Data by Telephone

NGS provides point-specific information by telephone for the horizontal and vertical control stations of the National Geodetic Reference System. Horizontal control information is available for NAD 27 and NAD 83. Vertical control information is available for the National Geodetic Vertical Datum of 1929 (NGVD 29).

This information includes adjusted and unadjusted control point positions, elevations, azimuths, station descriptions, recovery reports, reference mark information, and distance and direction values from field observations. NGS also provides adjusted lengths and location descriptions for calibration baselines that NGS has established throughout the United States. For the recently completed NAD 83, NGS provides coordinate data. For each station these data include: station identifier, station name, latitude, longitude, northing, easting, coordinate zone, convergence of the meridians at each station, scale factor, elevation, geoid height, and position quality.

NGS charges $6 for every 15 minutes used to provide geodetic information. Users may pay by either VISA, American Express, or MasterCard. These charges do not apply to geodetic data orders placed by telephone.

If an information request is extensive, we recommend that the customer purchase printed or digital geodetic information as outlined in the current listing of NGS products and prices. NGS will continue to provide, at no charge, general information concerning the availability of its products and services, as well as flyers, brochures, and its publications catalog.

Inquires: Ms. Vicki Davis
Telephone: 1-301-443-8631

NAD Conversion Software (NADCON)

The National Geodetic Survey (NGS) announces improved datum transformation software for converting geographic coordinate data between the North American Datum of 1927 (NAD 27) and the North American Datum of 1983 (NAD 83). The program and method, known as NADCON (North American Datum Conversion), should provide users with large holdings of coordinate data with an extremely efficient and accurate method of datum conversion. No other data or program is necessary in order to transform between datums. In addition, the software is straightforward, compact, and requires no particular expertise to operate.

NADCON is the method of datum conversion (e.g., NAD 27 and NAD 83) within NGS. It is recommended for use by anyone requiring the conversion of coordinate data for mapping, low-accuracy surveying, or navigation. Data bases of shift information have been computed using a technique known as "minimum curvature." Simple bilinear interpolation is used on the shift data for determining correctors. Results indicate that this method has an expected accuracy of 0.15 meter for the majority of the conterminous United States. Regions of sparse geodetic control, including the areas far offshore, may yield less accurate results, but seldom in excess of 1.0 meter.

NADCON is available for use on IBM-compatible personal computers. A harddisk with at least 1.5 Mbytes storage is highly recommended. The program is distributed on either 1.2 Mbyte or 360 kbyte floppy disks (please specify your preference when ordering). NADCON (Version 1.0) allows for conversions within the conterminous United States. Subsequent versions will increase the capability to include Alaska, Puerto Rico and the Virgin Islands, and Hawaii.

NADCON cost $30.00 per copy. NGS requires prepayment for this product. Please make your check or money order payable to: NOAA, National Geodetic Survey. Payment may also be made by VISA, MasterCard, or American Express. A 25% surcharge, covering postage will be added to orders sent outside the United States. To order, please write or call:

National Geodetic Information Branch
N/CG174, Rockwell Building, Room 24
National Geodetic Survey, NOAA
Rockville, MD 20852
Telephone: 1-301-443-8631

MULTIPURPOSE LAND INFORMATION SYSTEMS: THE GUIDEBOOK

The Federal Geodetic Control Committee has prepared a guidebook for developing multipurpose land information systems (multipurpose LIS or MPLIS). The guidebook builds on the National Research Council's publications on the multipurpose cadastre and focuses on local government's role in developing the multipurpose cadastre. It provides guidance to states, counties, cities, and regional planning bodies, and presents theoretical and empirical information currently available on how to develop land information systems.

The guidebook is intended for those who must evaluate, plan, and implement land information system development. The guidebook is specific, particularly for local applications. If the reader has to perform a particular task, the book describes how--or how to find out how--to do it. If the reader has to make a decision concerning LIS, it provides background information to use in making the decision, as well as a discussion of the implications of the decision. The guidebook also covers the planning process, institutional context, organizational models, operating procedures, standards, pitfalls, and other issues.

The guidebook is sold by subscription for $36. Organized in five sections and bound in a looseleaf notebook, The guidebook's first four sections will be released over a one-year period. The looseleaf format accommodates the additions, revisions, and updates inherent in this rapidly evolving field. Section 5 is reserved for technical bulletins, issue papers, updates, additions, and other revisions.The guidebook is available through the National Geodetic Survey.

NGS Publishes Geodetic Glossary

NGS sell a glossary of geodetic terms, comprising 274 pages and containing nearly 5,000 definition. In addition in geodetic terms, the glossary includes related material in geophysics, space science, mathematics, astronomy, photogrammery, and land management. The glossary costs $13.00 and is an excellent reference for anyone wishing to keep pace with modern geodetic practices and innovations.

Inquiries: National Geodetic Info. Branch
Telephone: 1-301-443-8631

COMPLETED CAREERS

VINCENT J. SCHNEIDER, 73, Life Member, Dies;

Services for Vincent J. Schneider, 73, Indianapolis, professional engineer and registered land surveyor, were held on Tuesday, June 19, 1990, at Leppert & Hurt Mortuary and at the St. Luke Catholic Church.

Mr. Schneider founded Schneider Engineering Corp. in 1962. In the 1970s he developed land survey software for use on programmable calculators. The software, Coordinate Geometry, simplified the calculation of coordinates and helped with construction layout.

Mr. Schneider was an Army veteran of World War II. He was a member of St. Luke Catholic Church.

He was a 1950 Purdue University graduate.

Memorial contributions may be made to the St. Meinrad Seminary, St. Meinrad, Ind.

Survivors: wife, Beatrice Gutgsell Schneider; son, John V. Schneider; daughter, Bonnie Barbick; sister, Marcella Schutz; brothers, Edward and James Schneider; six grandchildren.

HERMAN MOENCH, 81 was Rose-Hulman Teacher

Terre Haute, Ind. - Herman Moench, who retired in 1986 after a distinguished 56-year career as a teacher and engineer at Rose-Hulman Institute of Technology is dead at 81.

He was a Terre Haute resident. Known foremost as a master teacher of electrical engineering. Mr. Moench also was recognized nationally for his work to create national standards of ethics that are used today as guidelines for the registration of professional engineers.

Mr. Moench, a 1929 graduate of Rose Polytechnic Institute, joined the college's faculty one year later. In his years at the institute, he progressed from an instructor of electrical engineering to a full professor. He was named honorary doctor of engineering in 1971. He was instrumental in Rose-Hulman's development while serving in several leadership roles that ranged from acting president to senior vice president, dean of engineering and chairman of the Department of Electrical Engineering.

In addition to his work at the institute, Mr. Moench was active in several engineering organizations. For more than 30 years, he served as president and vice president of the National Council of Engineering Examiners that coordinates the activities of 40 board of registration nationwide.

Mr. Moench also served several times as chairman of the Indiana State Board of Registration for Professional Engineers and Land Surveyors.

Mr. Moench won many awards throughout his career. He was listed in Who's Who of Engineering and in American Men of Science. He was named outstanding teacher by the American Society of Engineering Education and engineer of the year by the Indiana Society of Professional Engineers. He received the distinguished service award and the award of merit from the National Council of Engineering. He was also a fellow in the American Association for the Advancement of Science.

He was a member of Immanuel Lutheran Church, Terre Haute. Memorial contributions may be made to Rose-Hulman Institute of Technology, care of the Herman Moench Memorial Fund, or to the church.

LEO J. STRACK, 64 Life Member, Dies

LEO J. STRACK, 64, of Indianapolis died Saturday, July 14, 1990, and services were held at Holy name Catholic Church, Beech Grove.

Leo, a long-time member of ISPLS, had been head of the Surveying and Mapping Section, Division of Water for the Indiana Department of Natural Resources. A twenty-five year employee of DNR, he had retired in 1979 because of ill health. He was a Purdue University graduate and a Navy veteran of World War II. His wife, Rosemary, three daughters, two sons, and six grandchildren survive.

CALENDAR

August 21, 1990
Central Indiana Chapter
"Dealing With People"
Speaker: Carl Schoemer
Board Room Indpls Airport Authority

September 11, 1990
Initial Point Chapter-Dinner Meeting
Joint Chapter Meeting with Falls-of-the-Ohio Chapter of KAPS
Speaker: Mr. Curt Bynum
Louisville/Jefferson County, KY
Metropolitan Sewer District
"GIS/LIS Presentation"
Contact Rollyn Blankenbeker for details

September 20, 1990
Northwest Chapter, Joint meeting with National Association of Women in Construction. At Jonathan's in Griffith, IN. Dinner at 6:30, cocktails before

September 26, 27 & 28, 1990
Association of Indiana Counties Annual Conference, Evansville, IN

September 26, 1990
County Surveyors Association meeting at Indiana Counties Annual Conference Evansville, IN

October 11, 1990
Northwest Chapter
Site & Topic to be announced

October 19, 1990
ISPLS Fall Workshop
"Wetlands"
Indianapolis

October 24, 1990
Central Indiana Chapter
Site & topic to be announced

November 7-10, 1990
GIS/LIS '90 and ACSM/ASPRS Fall Convention, Anaheim, California

November 8, 1990
Northwest Chapter
Site & Topic to be announced

November 15-16, 1990
2nd Annual Indiana GIS Conference

December 13, 1990
Central Indiana Chapter
Election of Officers
Site to be announced

December 13, 1990
Northwest Chapter
Site & Topic to be announced

January 16-18, 1991
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March 24-29, 1990
ACSM/ASPRS Annual Convention
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