

# NACIS XVI



## North American Cartographic Information Society

Sixteenth Annual Meeting

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October 2 - 5, 1996  
Menger Hotel  
San Antonio, Texas

Welcome to

# NACIS XVI

The Sixteenth Annual Meeting of the  
North American Cartographic Information Society

October 2 - 5, 1996  
Menger Hotel  
San Antonio, Texas

## ***Welcome to San Antonio and San Marcos!***

*The NACIS XVI Local Arrangements and Program Committees have put together a program that we hope you will find both enjoyable and stimulating. A focus of this year's meeting is the distribution of maps through the Internet, particularly the World Wide Web. We begin with a Plenary session on Thursday morning entitled Cartography and the Internet. Two concurrent sessions follow this for the remainder of Thursday morning and all day Friday.*

*We are fortunate to have our convention in a downtown setting with easy access to attractions and restaurants. We have planned a series of self-guided walking tours for Thursday afternoon following our luncheon. Walking tours include: the Alamo, San Antonio River Walk (Paseo del Rio), Institute of Texan Cultures, Mexican Cultural Institute, the Tower of the Americas, HemisFair Park, Majestic Theatre, IMAX Theatre, La Villita, Rivercenter Mall, the Alamodome, and the Esquire Bar. Maps will be available, of course, to help find the various destinations. You won't need a map to find the most famous attraction in the city – the Alamo is directly across the street from the hotel. We hope you will take the opportunity to explore San Antonio.*

*Concurrent sessions will continue all day on Friday. Our Banquet speaker that evening is Dr. Kenneth Foote from the University of Texas at Austin. The topic for his talk is related to the Internet - keeping with the focus of the conference.*

*The last day of the conference will be the best day of your life!*

*Perhaps a small exaggeration but you should give special consideration to the four excellent workshops scheduled in San Marcos on Saturday, October 5, 1996. Coupled with the workshops are mini-tours (run by the Department of Geography and Planning, Southwest Texas State University) of the San Marcos region including Aquarena Springs, the San Marcos River, the historic district, nearby outlet shopping malls, and the adjacent "Hill Country."*

*An evening barbecue at Highpoint Manor in the Hill Country will be catered by "Bubbas," a local establishment specializing in lightly smoked turkey, beef brisket, and sausage. If you are staying over Saturday night then come to San Marcos (even if you don't participate in the workshops) — buses from and back to San Antonio are provided.*

*Of course, we begin our conference with the Opening Session on Wednesday evening. Our speaker this year is Dr. Ron Eyton from Southwest Texas State University who will be presenting an overview of the state of Texas. A reception follows with a poster session and exhibits.*

***Michael P. Peterson***  
***Vice President and Program Committee***

***Dennis Fitzsimons***  
***Local Arrangements Committee***

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## WEDNESDAY, OCTOBER 2

- 2:30 pm - 7:30 pm    Registration** (Ballroom Lobby)
- 3:00 pm - 5:30 pm    NACIS Board Meeting** (Cavalier Room )
- 7:30 pm - 9:00 pm    Opening Session** (Minuet Room)  
Keynote Speaker: J. Ronald Eyton,  
Southwest Texas State University  
*Texas for Beginners*
- 9:00 pm-11:00 pm    Poster Session/Exhibits & Reception**  
(Patio Room)

Organizer: Donna G. Schenström  
University of Wisconsin-Milwaukee

**Poster Session Participants:**

James Anderson, Jr.  
Florida State University

Harold C. "Boke" Bowker  
HC Bowker, Denver, CO  
*Steps Along the Way*

Gregory Chu  
University of Wisconsin-LaCrosse  
*Cartography & GIS Lab, Univ. of Wisconsin-LaCrosse*

Will Fontenez  
University of Tennessee

James Fryman  
Bonnie Sines  
University of Northern Iowa

Laurie Garo  
University of North Carolina at Charlotte

Carol Gersmehl  
Macalester College  
*Minnesota Studies—Maps and Activities for 4th  
through 8th graders and their teachers*

Elaine Hallisey  
Jeff McMichael  
Georgia State University,  
*Digital Relief Map of Georgia*

John Hill  
Omaha, NE  
*Using Dorling's Circular Cartogram as a Basemap  
for Census Statistics*

James Meacham  
University of Oregon  
*Mapping the University of Oregon Campus*

Donna G. Schenström  
University of Wisconsin-Milwaukee

Joseph Stoll  
Claudia James  
University of Akron

Barbara Trapido-Lurie  
Arizona State University  
*Recent Cartographic Activities at Arizona State  
University*

Ellen White  
Michigan State University

## THURSDAY, OCTOBER 3

**7:30 am - 3:30 pm    Registration** (Ballroom Lobby)

**8:00 am - 12:00 pm    Poster Session Open** (Patio Room)

**8:00 am - 10:00 am    Session A (Plenary)** (Ballroom C)  
**Cartography and the Internet I**

*Chair:* Michael P. Peterson,  
University of Nebraska - Omaha

*Cartography and the Internet: Implications  
for Modern Cartography*

Michael P. Peterson,  
University of Nebraska-Omaha,

*The Internet and the National Atlas of  
the United States*

Stephen C. Guttill, U.S. Geological Survey

*New Approaches to Data Delivery*

Timothy Trainor, U.S. Census Bureau,  
Washington, D.C.

*Virtual Worlds: Impacts of Information  
Technology on Cartographic and  
Geographic Education*

Charles P. Rader,  
University of Wisconsin - River Falls

**10:00 - 10:30 am    BREAK**

**10:30 - Noon**

**Session B (Ballroom C)**

**Cartography and the Internet II**

*Chair:* Jeremy Crampton,  
George Mason University

*USGS Cartographic Data Available Online*

John Faundeen, Hughes STX, Reston, VA, and  
Hedy Rossmessl, U.S. Geological Survey,  
Reston, VA

*The Census Bureau's Geographic Data  
on the Web*

Leo B. Dougherty, U.S. Census Bureau,  
Washington, D.C.

*The Internet - Effects and Changes  
for Cartography*

Georg F. Gartner, Univ. of Technology Vienna

**Session C (Ballroom B)**

**Cartography and GIS Education**

*Chair:* Charles P. Rader,  
University of Wisconsin-River Falls

*Learning Advanced Mapping Methods in the  
"Applied Cartographic Design" Course  
at Penn State*

Cynthia A. Brewer, Penn. State University

*Life After Lectures: Using the Internet in a Senior  
Undergraduate GIS Course*

Janet E. Mersey, University of Guelph

*Teaching Multimedia Map Design & Production: A  
Comparison of Techniques & Theory*

Keith Rice, Univ. of Wisconsin-Stevens Point



***Thursday continued***

**Noon - 2:00 pm      Luncheon & Annual Business Meeting**  
(Minuet Room)

**2:00 pm - 6:00 pm      Self-guided Tours**

*The Alamo*  
*San Antonio River Walk (Paseo del Rio)*  
*Institute of Texan Cultures*  
*Mexican Cultural Institute*  
*Tower of the Americas*  
*HemisFair Park*  
*Majestic Theatre*  
*IMAX Theatre*  
*La Villita*  
*Rivercenter Mall*  
*Alamodome*  
*Esquire Bar*

**7:30 - 9:00 PM      Cartographic Conversations**  
(Hospitality Suite- Room 2076)

*hosted by:*  
**George McCleary, University of Kansas**  
**Dennis Fitzsimons, Southwest Texas**  
**State University**

## FRIDAY, OCTOBER 4

**8:00 - Noon**

**Registration** (Ballroom Lobby)

**8:00 am - 5:00 pm**

**Poster Session Open** (Patio Room)

**8:00 - 10:00 am**

**Session D** (Ballroom B)  
**Developing Spatial Concepts  
Through Education**

*Chair:* Valerie W. Krejcie

*Mapping the Perceived Geopolitical Importance of  
the Countries of the World*

J. Clark Archer, University of Nebraska-Lincoln,  
Fred M. Shelley, Southwest Texas State Univ.;  
and Jonathan I. Leib, Florida State University

*Map Reading Across the Curriculum: Linking  
Geography to Children's & Adolescent Literature*  
Joan Maier, University of Houston-Clear Lake

*The Effectiveness of Reaction Time & Open-Ended  
Questions with Early Elementary Subjects*  
Karen M. Trifonoff, Bloomsburg University

*Put the Horse NEXT to the Lake and FAR from the  
Water Tower: the Development of Locative Under-  
standing in Large-Scale Model Spaces*  
Scott M. Freunds Schuh,  
University of Minnesota, Duluth

**Friday continued**

**8:00 - 10:00 AM**

**Session E (Ballroom C)**  
**Cartographic Animation and Visualization**

*Chair:* Terry A. Slocum , University of Kansas,

*Amazon Forest Fragmentation Pattern Analysis  
With the Use of Remote Sensing, GIS and  
Statistical Measures*

Michael Routhier, Salem State College

*Software for Exploring Temporal Data Associated  
with Point Locations*

Terry A. Slocum and Stephen C. Yoder,  
University of Kansas

*Symbolizing Isarithmic Map Data Reliability:  
Which Visual Variables are Most Effective?*

Keith Rokoske, University of Colorado-Boulder

*A Neural Network Approach to Cartographic  
Visualization*

David K. Patton,  
Slippery Rock University of Pennsylvania

**10:00 - 10:30 am**

**BREAK**

**10:30 - Noon**

**Session F: (Ballroom B)**  
**Maps, Internet and Multimedia**

*Chair:* Barbara P. Battenfield, University of  
Colorado - Boulder

*Genesis of a Map: Portland, Oregon's  
"Trees of Couch Park."*

Joseph Poracsky, Portland State University

*Conceptual Design of an Interactive Cartographic  
Multimedia Information System of Austria*  
Robert Ditz, University of Technology Vienna

*The Human Component of an Internet Digital Map  
Library: Re-Thinking User Interface Evaluation*  
Barbara P. Battenfield,  
University of Colorado - Boulder

**Session G (Ballroom C)**  
**Small Business Cartography in an Era  
of Downsizing and Outsourcing**  
*Chair: Alex Tait, Equator Graphics*

*Opportunities for the Small Business Cartographer*  
Martin von Wyss, Hybrid Designs

*Don't Sell the Store! Maximizing Value Through  
Use and Reuse of Maps for Sale to Multiple Clients*  
Alex Tait, Equator Graphics

**12:30 pm - 1:30 pm CP Editorial Board Meeting**  
(Hospitality Suite - Room 2076)

**1:30 - 3:00 pm**      **Session H (Ballroom B)**  
**Map Design and Production**  
*Chair: Dennis McClendon,*  
Chicago CartoGraphics

*The Design of Transit Maps*  
Dennis McClendon, Chicago CartoGraphics

*MAPSCO Transitions to Digital  
Cartographic Production*  
David D. Halliday and Wayne J. Baird,  
MapSCO Inc., Dallas, TX

*The Impact of Automated Cartography and Prepress Operations on Future Cartographers*  
Ronald M. Bolton, Aeronautical Chart Division,  
NOAA

**Session I (Panel ) (Ballroom C)**  
**Changing Roles of University**  
**Cartography Labs**

*Moderator:* Gregory Chu,  
Univ. of Wisconsin-La Crosse

*Observations in the Increasing Complexities  
in the Management of University  
Cartography Labs*  
Gregory Chu, Univ. of Wisconsin-La Crosse

*Panelists:*

James R. Anderson, Jr., Director, Florida Re-  
sources and Environmental Center, Florida  
State Univ., Tallahassee, FL  
Barbara Trapido-Laurie, Cartography Lab,  
Arizona State Univ., Tempe, AZ  
Donna Schenström, Cartography Lab., Univ. of  
Wisconsin-Milwaukee  
James E. Meacham, Univ. of Oregon

**3:00 - 3:30 pm**

**BREAK**

**3:30 - 5:00 pm**

**Session J (Ballroom B)**  
**Map Use, Production, and Availability**  
*Chair:* Carolyn Weiss, Statistics Canada

*The Use of Maps in Art: A Preliminary Survey*  
Ren Vasiliev, State University New York -  
College at Geneseo

*Orienteering in the United States: Geographic  
Patterns of Participation.*

Elisabeth S. Nelson, San Diego State Univ.

*What Can They Do for You?*

Harold C. "Boke" Bowker, Denver, Colorado

**Session K (Panel ) (Ballroom C)**

**PostScript Mapping Round Table**

*Moderator:* Dennis McClendon,

Chicago CartoGraphics

**NACIS Board Meeting (Cavalier Room)**

**6:30 - 10:00 pm**

**ANNUAL BANQUET (Minuet)**

*Speaker:* Kenneth E. Foote,

University of Texas, Austin

*Mercator's Laptop: Cartographic Frontiers in  
Cyberspace?*

**SATURDAY, OCTOBER 5**

## **WORKSHOPS**

All workshops will be held at the Department of Geography and Planning, Southwest Texas State Univ., San Marcos, TX. Transportation to / from the Menger Hotel will be provided. Buses will leave the hotel starting at 7:30 AM.

**9:00 am - 5:00 pm    Workshop A**  
**Digital Terrain Modeling Workshop**  
*J. Ronald Eyton, Southwest Texas State University*

**9:00 am - 12:30 pm    Concurrent Workshops B, C, & D**

**B. A Hands-on Introduction to  
Internet and Web Resources  
for Cartography and GIS**  
*Kenneth E. Foote, University of Texas at Austin*

**C. Stop the Insanity: GIS Import/High  
Quality MAP Graphics Made Easy —  
with MAPublisher**  
*Roger Fradgley, Avenza Software Inc.*

**D. Creating New Worlds —  
3D Cartography with KPT Bryce 2**  
*Tom Patterson, National Park Service,  
Harpers Ferry, WV*

**Afternoon**

**Mini tours of San Marcos area**

(transportation provided):

*Aquarena Springs*

*San Marcos River*

*Historic District*

*Outlet Shopping Malls*

*Hill Country*

**5:30 - 8:30 pm**

**Barbecue at Highpoint Manor in the Hill Country**

Catered by "Bubbas"- a local establishment specializing in lightly smoked turkey, beef brisket, and sausage.

Bus returns to the Menger Hotel at 10:00 pm



## **ABSTRACTS**

**Wednesday, Oct. 2, 1996  
9:00 - 11:00 PM**

### **Poster Session/Exhibits**

#### **Minnesota Studies—Maps and Activities for 4th through 8th graders and their teachers.**

*Carol Gersmehl, Geography Dept., Macalester College,  
GERSMEHL@macalstr.edu*

The design of maps and activities for such a range of experience was the main cartographic challenge. Transfer of digital files to the printer in Chicago was an interesting technological challenge.

#### **Using Dorling's Circular Cartogram as a Basemap for Census Statistics**

*John Hill, Omaha, Nebraska*

The main advantage of using circular cartograms is that a large amount of social-geographic information can be compressed into a small map area. The mapping method is ideal for depicting social changes that occur in areas where the most people live.

#### **Steps Along the Way**

*Harold C. Boke Bowker, Denver, Colorado,  
HCBowker@Rmmc1.cr.usgs.gov*

Documenting some of the mapping changes that have occurred on two Colorado 1:24,000 scale maps: McCurdy Mountain and Morrison. Covering a collection of information: from recoverable archives, through what is currently available to the public (graphic, photographic, and digital) and what is now being worked on for the future.

### **Digital Relief Map of Georgia**

Elaine Hallisey and Jeff McMichael, Georgia State University,  
gegjm@gstusgi2.gsu.edu,  
<http://www.gsu.edu/~gegejh/home.html>

The Cartography/GIS Research Lab is in the process of producing a digital relief map of Georgia. The map will have shaded relief features, hypsometric tint elevation contours, and cultural features. Our poster will detail the progress of our work and (hopefully) present a final product.

**Thursday, Oct. 3, 1996  
8:00 - 12:00 PM**

### **Session A (Plenary): Cartography and the Internet I**

#### **Cartography and the Internet: Implications for Modern Cartography**

*Michael P. Peterson, University of Nebraska-Omaha,  
[geolib@cwis.unomaha.edu](mailto:geolib@cwis.unomaha.edu)*

The number of maps that are currently distributed through the Internet is phenomenal. A single World-Wide-Web site operated by the Xerox Palo Alto Research Center in California processes over 90,000 Internet requests for maps every day and the number of web sites that contain maps is into the tens of thousands. A major reason for the increase of map distribution through the Internet is cost. It is simply less expensive to distribute color graphics through the web than it is to print and distribute maps on paper. A second reason is time. Maps on computer networks are delivered in a fraction of the time that was previously required. A third reason is the potential for interaction. Users can interactively choose a location to map and the features to include on the map. The implications of the Internet for cartography are examined through a World Wide Web home page at <http://maps.unomaha.edu/NACIS/paper.html>.

## **The Internet and the National Atlas of the United States**

*Stephen C. Gupstill, U.S. Geological Survey, [sgupstill@usgs.gov](mailto:sgupstill@usgs.gov)*

The U.S. Geological Survey (USGS) is planning and designing a new National Atlas, using electronic technology. USGS plans for the project to be a joint government/industry venture by initiating partnership agreements with private firms to participate in creating the National Atlas in a variety of formats, such as printed maps, CD-ROM, and World Wide Web editions. The National Atlas project will provide a showcase for earth science data and mapping technology and illustrate, at a national level, the concepts of a national spatial data infrastructure and a geospatial data framework.

This project highlights a large number of design decisions that must be addressed. These include product media, GIS functionality, user interface, content themes, and potential customer groups. But perhaps the most significant issue involves the use of the Internet. The rapid growth of World Wide Web applications makes it alluring to focus on developing a web-based atlas. However, before proceeding in this direction, we need to evaluate not only the technical capabilities of web servers to deliver the content of a National Atlas, but also the capabilities of target user groups. Will there be an adequate bandwidth to the home or school? Should users have to download relatively stable geographic reference data sets such as county boundaries? These and other factors could lead the development to proceed along the lines of a CD-ROM based application, or a mixture of CD-ROM and WWW capabilities.

### **New Approaches to Data Delivery**

*Timothy Trainor, U.S. Census Bureau, Washington, D.C.,*

*[ttrainor@census.gov](mailto:ttrainor@census.gov)*

As part of its effort to dramatically expand access to official demographic, economic, and geographic information, the Census Bureau plans to expand electronic dissemination of its data via the Internet through development and implementation of the Data Access and Dissemination System (DADS). Users will access all Census Bureau data sets, such as those from the 2000 Decennial Census, the American Community Survey, and the Economic and Agricultural Censuses, through one system. Geography is the integrating principle for the data.

DADS will provide timely data (including maps) in an innovative manner while meeting requirements of customer responsiveness. It will be accessible to the widest possible user-base through the Internet as well as through intermediaries such as State Data Centers, libraries, universities, and private firms. Products such as reports and files will be

prepared on demand. Disclosure protection will be built into the system design. Output will be available in all forms of electronic media. Display options include base maps, thematic maps, graphs and charts. Boundary files to support customer mapping needs will be available. DADS will be completed in time to serve as the vehicle for disseminating data from the Census 2000.

### **Virtual Worlds: Impacts of Information Technology on Cartographic and Geographic Education**

*Charles P. Rader, University of Wisconsin - River Falls,  
Charles.P.Rader@uwrf.edu*

Information technologies, such as the Net, have begun to radically restructure space and place. William Mitchell has suggested that our interactions that 'normally' occur in space and place have been replaced by the Net, which is in his words "profoundly antispacial." The creation of a virtual world obviates the need for space and place and has significant impacts on how we structure and represent space. In this paper, the impacts (and challenges) of these changes are explored in the context of how we teach and learn about space and place using examples from both cartography and geography.

**Thursday, Oct. 3, 1996  
10:30 - 12:00 AM**

### **Session B: Cartography and the Internet II**

**USGS Cartographic Data Available Online**

*John Faundeen, Hughes STX, Reston, VA,  
jfaundee@resdgs1.er.usgs.gov; and Hedy Rossmeyssl,  
U.S. Geological Survey, Reston, VA, hrossmei@usgs.gov*

The U.S. Geological Survey (USGS) was created in 1879 and the first topographic map the agency produced was dated the same year. Millions of maps later, the USGS is striving to deliver better quality cartographic products to more people. Today's products include digital line graphs (DLG's), digital elevation models (DEM's), digital raster graphics (DRG's), digital orthophoto quads (DOQ's), National Aerial Photogra-

phy Program (NAPP) and satellite imagery as well the traditional paper maps offered in scales series ranging from 1:24,000 to 1:34,000,000.

Describing and distributing these vast cartographic holdings are a priority within the USGS. Information systems built to facilitate metadata and data access are continually being expanded and updated to better serve the needs of cartographic data users. The USGS Global Land Information System (GLIS) is designed to allow users to search and select cartographic data online. The GLIS features extensive documentation for each type of cartographic data that can be E-mailed, faxed, or mailed back to the user for reference.

The USGS also provides many data files to be "grabbed" freely through Internet anonymous FTP access. On the average, around 94,000 cartographic files are downloaded to users per month. The amount of data being served is more than 25,000 megabytes per month. The USGS plans to expand and improve these data access methods based upon customer satisfaction, usage, and business partner agreements.

The USGS is the nation's principal agency developing product standards and information systems for cartographic data. Making quality cartographic data easily available will continue to be a key element of the USGS mission.

(Work performed under U.S. Geological Survey contract 1434-92-C-40004.)

### **The Census Bureau's Geographic Data on the Web**

*Leo B. Dougherty, U.S. Census Bureau, Washington, D.C.,  
ldougher@census.gov*

Geography is the integrating factor for all of the Census Bureau's data products. As part of the Bureau's efforts to disseminate data using the latest technologies it is building a strong geographic presence on its Internet Web site (<http://www.census.gov>). The Internet provides us with an unprecedented opportunity to reach a broad, new audience that essentially didn't know that we existed. The inclusion of the Census Bureau on "Hot Web Site" lists has brought a visibility surpassed only by the actual taking of the population census.

The goals of the geographic presence are three-fold: to increase public awareness of census data and its geographic perspective, to promote and support our geographic products, and to enlist partners in our cooperative programs.

There are two components of our site that have a special appeal among the general public: the TIGER Map Service and Data Map. The first displays street-level geography on a map of an area of the user's choosing and the second allows the user to access summary census data

and create their own thematic map using selected statistical data. These are the components that draw in the non-geographer /non-cartographer (the majority of our visitors) to the site.

Other components of the site, while less interactive, are the real core of our geographic Internet offerings. They provide a comprehensive coverage of census geography, programs, and products.

As many other organizations have found, the Web is profoundly changing how we serve our public. It is creating, or maybe rekindling, an interest in geography in large numbers of census users and secondly, it is allowing the Census Bureau to serve that interest with new technical capability to access information that would not have been possible in the past in the traditional paper environment.

### **The Internet - Effects and Changes for Cartography**

*Georg F. Gartner, University of Technology Vienna,  
gartner@krms1.tuwien.ac.at*

The increasing importance of the Internet as a tool for information, presentation and communication can't be denied. But, which of the benefits and advantages are useful for a field like cartography? Cartography in Europe still includes questions of aesthetic value, graphic presentation and map style. Some answers to questions like "Which of the Internet-possibilities are really useful for cartographers?" or "Which specific developments for cartography can be triggered by the Internet" will be examined here. From a "meta" point of view the existing cartographic applications at the internet, from clickable maps to geographic information retrieval, will be focused. The main topic we have to deal with is the question "Which effects and changes we can expect from a new technology?" Can a new technology give more possibilities, for instance for multimedia integration, presentation or integration of spatial distributed applications? First of all, a definition of tasks, functions and methods of a modern cartography is necessary. An analysis of cartographic internet-applications have to be followed. Finally, the paper will focus on the main topic, trying to give some special notes to the European situation.



**Thursday, Oct. 3, 1996  
10:30 - 12:00 AM**

## **Session C: Cartography and GIS Education**

### **Learning Advanced Mapping Methods in the "Applied Cartographic Design" Course at Penn State**

*Cynthia A. Brewer, Pennsylvania State University,  
cbrewer@essc.psu.edu*

The focus of this course is computer-assisted map production methods with emphasis on geographic information design and color use. Students produce a full-color map on a topic of their choice. Faculty and graduate students are offered the opportunity to suggest project ideas. The course utilizes FreeHand illustration software (used in the prerequisite introductory course) with an emphasis on highly structured organization of layers and styles within digital map files. The final map products are suitable for publication-quality process printing.

For additional exercises, students design overhead transparencies for in-class presentations of interviews they conduct with employees of mapping companies identified through web searches. They also gain experience designing for CRT displays by compiling a presentation of information from the National Climate Data Center web site.

Lectures on color use, digital typography, and the nuances of trapping and overprinting, complement their map-production challenges. Students frequently make use of existing digital data in these projects, and thus we discuss terrain shading, projections, graphic file formats, and commercially available data sources. Group critiques and in-depth edits of other student maps provide experience interacting with colleagues. Field trips to a local printing company and an all-day tour of GeoSystems also expose students to real-world cartography.

### **Life After Lectures: Using the Internet in a Senior Undergraduate GIS Course**

*Janet E. Mersey, University of Guelph, jmersey@uoguelph.ca*

This paper explores potential uses of resources available on the Internet to assist students with a course-related GIS project, and to prepare them for continuing involvement with GIS after the classroom. A Homepage was constructed for a new fourth year applied GIS course at the Univer-

sity of Guelph (<http://www.css.uoguelph.ca/geo/home448a.html>). This 12-week course required students to plan and execute an individual GIS project focusing on a real-world problem in any area of geography.

The course Homepage and assignments were designed to integrate information that students could use for their projects and, recognizing that many of the students were in their final semester at university, to investigate opportunities available after graduation. To assist students with their projects, the Homepage included links to sites containing GIS bibliographies, digital maps and images, and information about the software used in the course. The use of newsgroups and listservs for obtaining technical advice from GIS experts was also encouraged. Post-graduation options in GIS could be explored from the course website with the links to job sites, graduate schools, conferences, scholarly associations, government agencies, and private companies.

The students evaluated the Homepage at the end of the course, and indicated that they found the Internet was an excellent way to become aware of the broader GIS community, and they particularly appreciated the recognition this course gave to their career goals.

**Teaching Multimedia Map Design & Production:  
A Comparison of Techniques and Theory**  
*Keith Rice, University of Wisconsin-Stevens Point,  
krice@uwspmail.uwsp.edu*

The mercuric rise of computer technology has not only drastically changed our map production methodology, but also our approach to their design and application. Paper copy is being supplanted by interactive animated maps. Map reading is shifting from textbook viewing to scanning the World Wide Web (WWW) and the Internet. These changes have also created transformations in our cartographic teaching paradigm, since guidelines for paper copy are quite different than WWW screen display. This paper details a teaching methodology for contrasting design and production between paper copy and the animated screen display. A strip map of one segment of the Wisconsin Ice Age Trail is used to demonstrate how students can compare the design and production of a paper copy to screen animated copy. Using Macromedia FreeHand, ESRI's ArcView, and Macromedia Director students are compelled to experiment with modifying the same base information within different presentation platforms. Examples will be provided for discussion along with animations available on a WWW page.



**Friday, Oct. 4, 1996**  
**8:00 - 10:00 AM**

**Session D: Developing Spatial Concepts through**  
**Education**

**Mapping the Perceived Geopolitical Importance of  
the Countries of the World**

*J. Clark Archer, University of Nebraska-Lincoln, jarcher@unlinfo.  
unl.edu; and Fred M. Shelley, Southwest Texas State University; and  
Jonathan I. Leib, Florida State University*

In light of the end of the Cold War, which countries do Americans now regard as most important geopolitically? The research presented in this paper addresses this question analytically and cartographically. During the 1995-96 academic year, undergraduate students in upper division political geography classes at the University of Nebraska, Southwest Texas State University, and Florida State University were asked to rank the 55 most populous countries of the world in the order of their "geopolitical importance." The students' rankings were then analyzed using principal components analysis, following procedures adopted from those pioneered by Peter Gould and Rodney White in their classic book on Mental Maps. Atlas\*GIS was used to further analyze and to cartographically display the results.

For the most part, the students ranked the United States, Japan, Russia and the counties of Western Europe as most geopolitically important. Less developed nations and more distant countries were regarded as less geopolitically important. Students in all three institutions were strikingly consistent in their views, despite substantial locational, ethnic and cultural differences among the three student populations. This suggests that the resulting composite or summary map may be a reasonably accurate collective portrait of how the typical American regards the relative importance of different nations of the world. The composite perceived geopolitical importance map shows similarities with as well as differences from the classical geopolitical cartography of Sir Halford Mackinder and other noted political geographers of the Cold War era or before.

## **Map Reading Across the Curriculum: Linking Geography to Children's and Adolescent Literature**

*Joan Maier, University of Houston-Clear Lake,  
Maier@uhcl4.cl.uh.edu*

This presentation discusses methods for linking geographic information on maps with children's and adolescent literature. It is assumed that map reading is a comprehension process as explained by schema theory. A schema-theoretic view of map reading means that humans do not learn geographic information from maps a bit at a time until each bit comes together as understanding. Instead, humans make sense of whatever they know about maps from the very beginning. Thus, without substantial prior knowledge, comprehending maps is likely to be superficial and quickly forgotten. Linking maps with literature enhances both the comprehension of written discourse and maps.

## **The Effectiveness of Reaction Time and Open-Ended Questions with Early Elementary Subjects**

*Karen M. Trifonoff, Bloomsburg University,  
trifonof@planetx.bloomu.edu*

Over the years cartographers have used a variety of research designs and questions to evaluate the effectiveness of maps and map symbols. Cartographers have studied the legibility of type, the perception of symbols such as graduated circles, the arrangement or sequence of colors, cognitive processes, and the use of maps as a communication tool. Measurement techniques have included estimating sizes and distances, measuring eye movement, recording accuracy and reaction times, and asking open-ended questions about spatial distributions.

A map experiment was performed with first graders to evaluate the appropriateness of thematic maps for early elementary geographic instruction. This experiment used two types of questions. First, students were asked to identify specific areas on a set of maps with accuracy and reaction times being recorded, and second, open-ended questions requiring verbal responses were asked. The accuracy and reaction time questions addressed the students ability to perform the task and provided information related to the use of a map to obtain specific information. The open-ended questions provided information on the use of thematic maps to obtain general information or to explain geographic distributions.

One factor which can influence the type of questions is the experimental setting. This experiment was developed in HyperCard on the Macintosh and this interactive computer environment provides cartographers with the opportunity to change the type of questions asked. It provides us with new opportunities to determine how maps and symbols are interpreted and how students acquire spatial information.

### **Put the Horse NEXT to the Lake and FAR From the Water Tower: The Development of Locative Understanding in Large-Scale Model Spaces**

*Scott M. Friendschuh, University of Minnesota, Duluth,  
sfriends@d.umn.edu*

Locatives are phrases or words which denote place location, and in English include terms such as in, under, near, far, through, front and back. Locatives are essential for descriptions of space—it is impossible to describe the relationships between places without locatives. Understanding any spatial information (directions, maps, geographical descriptions, etc) depends on an appreciation of the spatial terms used in the description. Despite their importance, the way that locatives are used and understood, especially in large-scale space, has hardly been investigated. In this study, we examined the development of locative understanding from age 3 to adults in both a small-scale table-top space and a large-scale model landscape space. The table-top space (17" x 22") contained 7 unrelated toy objects, and the large-scale model was a town (scale of 1:500) with roads, houses, a main street, a lake, a park and other features typically found in a town.

Child (3, 4, 5, 7 and 9 years-old) and adult (control) subjects placed, according to various instructions, objects within one of the two model spaces. Locatives used in this study were (1) instructions involving reference to a single object or landmark—'put the car in front of the school'; (2) instructions requiring reference to two or more objects or landmarks—'put the car between the house and the gas station'; (3) instructions involving reference to a place and distance—'put the car far away from the house'; and (4) instructions necessitating reference to distance and at least two landmarks—'put the car near the fire station and far away from the school'. Between group (different ages) comparisons of subject responses indicate some significant changes in the understanding of locatives in large-scale model spaces. Preliminary results seem to indicate by age 5, children recognize constraints in landscape spaces (such as cars are placed on roads), and respond accordingly.

*Friday, Oct. 4, 1996  
8:00 - 10:00 AM*

### **Session E: Cartographic Animation & Visualization**

#### **Amazon Forest Fragmentation Pattern Analysis with the Use of Remote Sensing, GIS and Statistical Measures**

*Michael Routhier, Salem State College, Mike.Routhier@unh.edu*

The environmental impact caused by deforestation of the Amazon forests is presently a well documented but disputed topic. Until recently, much research has concentrated on the total amount of forest area which has been cut and the rate at which it has been cut relative to a variety of political and environmental concerns. This presentation will discuss the use of remotely sensed data sets, appropriate statistical measures and the use of geographic information systems (GIS) to specify which forest types within the whole of the Legal Amazon have been modified to the greatest extent by the effects of deforestation and by the subsequent effect of forest habitat fragmentation by the mid 1980s. In addition, general insight will be given into how patterns of forest and non-forest play a role within the biological diversity of the region.

#### **Software for Exploring Temporal Data Associated with Point Locations**

*Terry A. Slocum and Stephen C. Yoder, University of Kansas,  
slocum@falcon.cc.ukans.edu*

Efforts at establishing a framework for thinking about visualization in cartography have contrasted the use of maps for the purpose of presenting research results (at the conclusion of the project) with those used to investigate a spatial phenomenon (early on in the research sequence). Maps used for the latter purpose are typically impermanent electronic images created by a scientist to visualize the spatial nature of a data set. The degree to which scientists incorporate cartographic visualization into their research depends in large part on how easy it is for them to create and interact with such images. Recent releases of commercial software (e.g., ArcView 2.1) have made great strides in this regard and certainly will serve to promote cartographic visualization as a research tool.

The advances attained thus far are inadequate, however, for the scientist investigating a phenomenon that is not only spatial in nature, but temporally dynamic as well. To support exploration of temporal data associated with point locations, we have developed user-friendly Windows-based software that displays data values as unclassified proportional circles. Three schemes for facilitating temporal analysis are provided: windowing permits map comparisons by juxtaposing maps; "change maps" depict mathematically derived data comparing two moments in time; and interactive cartographic animation depicts temporal change dynamically. Sample data sets included with the software demonstrate the utility for exploring spatio-temporal data.

### **Symbolizing Isarithmic Map Data Reliability: Which Visual Variables are Most Effective?**

*Keith Rokoske, University of Colorado-Boulder,  
keith.rokoske@colorado.edu*

Within geography there is a new paradigm emerging called geographic visualization (GVIS). In GVIS the emphasis of map production has shifted from the "communication" paradigm to one of facilitating spatial thinking through visual exploration of multiple views of a data set or relationships between variables. This paper explores and evaluates various representations of isarithmic map data reliability using unique visual representations of statistical surfaces.

For this study a human-subject experiment was carried out where volunteer subjects from varied undergraduate backgrounds evaluated the effectiveness of several unique data reliability representations on isarithmic maps. Each map used a unique symbology of the visual variables style (shape), tone (value), saturation, clarity (focus or fuzziness), and color (hue) alone and in four combinations, shape and value, shape and saturation, and shape and clarity, both in black & white and in color (red). Test subjects' biases were minimized by making the geographic area of each map unidentifiable and by mapping real yet unmatching climatological statistical surfaces.

To assess the quality and effectiveness of each representation, questions were asked pertaining to each individual map, to the maps as a whole, and to gather general information about each of the subjects. These questions yielded both quantitative and qualitative results which were analyzed for each of the different data reliability representations.

## **A Neural Network Approach to Cartographic Visualization**

*David K. Patton, Slippery Rock University of Pennsylvania,  
dkp@sruvm.sru.edu*

Cartographic visualization is rapidly becoming a central theme in the field of cartography. The evolution of computer technology towards sophisticated graphical displays, interactive applications and user-friendly interfaces has presented cartographers the opportunity to re-evaluate the role that maps can play in our lives. Towards this end, cartographic visualization has been described as a shift in emphasis from traditional communication centered maps to maps that are a means of spatial data exploration. Of course, maps have always been utilized as tools for both communication and exploration of geographic information. However, in the world of computer mapping, where the map user can actively participate in the selection and manipulation of map information, the potential for maps as exploration tools has never been greater. It has been suggested that an important role for cartographers in this arena is to contribute to the development of cartographic visualization tools. Therefore, this paper presents a neural network approach to exploring data within a cartographic display. The particular model discussed is known as an interactive activation network. The appeal of this type of neural network is that it can retrieve both specific and general knowledge, arrive at non-linear solutions, and accept single or multinode queries initiated from entity nodes, attribute nodes, or both. These qualities of an interactive activation network, coupled with a map display, will allow a map user to explore spatial data in a manner that is more intuitive and that is not possible through traditional statistical means of data abstraction.



**Friday, Oct. 4, 1996**  
**10:30 - 12:00 AM**

## **Session F: Maps, Internet and Multimedia**

### **Genesis of a Map: Portland, Oregon's "Trees of Couch Park."**

*Joseph Poracsky, Portland State University, poracsky@geog.pdx.edu*

In the 150 years since the founding of Portland, Oregon, the landscape of present-day Couch Park has changed from mature forest, to clear-cut, to fashionable residence, to city park. These changes have resulted in the site having an unusually diverse set of tree species for an inner city park. A map, "Trees of Couch Park," was published in May, 1996. The story of the map begins four years earlier with two high school students interested in how land surveying is performed. From there the project slowly developed through a unique set of partnerships between education, government, business, and individuals. The culmination was a four-color brochure and map highlighting the trees and providing a brief history of the land use of the site. The series of fortuitous connections through which the project evolved provides an interesting case study of how a map may come into being and suggests creative partnerships that University cartographers might pursue.

### **Conceptual Design of an Interactive Cartographic Multimedia Information System of Austria**

*Robert Ditz, University of Technology Vienna,  
ditz@ekrms1.tuwien.ac.at*

Since the technology of computers had completely changed the production of maps and atlases we also have to reflect upon their use. As a result of computer-aided production, the spatial data already exist in machine-readable form. It is now a great challenge to use this new media for cartographic visualization of topographic and thematic data on screen. The Institute of Cartography at the University of Technology in Vienna started to develop an Interactive Cartographic Multimedia Information System of Austria. This should not be meant as a Geographic Information System rather than as a National Atlas on a Personal Computer with an enlarged set of functionalities.

The visualization of spatial data is based on rasterized high quality maps of different scale and generalization, with vector data in the background for the access of thematic data. The approach to the geographical information is possible via cartographic visualization on screen as well as by thematic themes. The latter is realized by an index or user guided database queries. The multimedia concept of this information system allows the user to display additional information of selected cartographic elements in form of text, statistics, remote sensing data, pictures, videos, animations etc., and enables the user the display of original data for thematic topics. There should also be a possibility for simple analyses, e.g. the distance between two cities, not derived from the geometric data but based on a space matrix with the exact values.

The new technologies of telecommunication open new perspectives offering cartographic products via World Wide Web. It is therefore a possibility in the future to bring this Information System to a variety of interested users.

### **The Human Component of an Internet Digital Map Library: Re-Thinking User Interface Evaluation**

*Barbara P. Battenfield, University of Colorado - Boulder,  
babs@colorado.edu*

In conventional user interface testing sessions, users complete pre-defined tasks in a controlled (lab) environment. Task performance may be subsequently decomposed into quantifiable variables of time-on-task and performance measures, and into descriptive variables gleaned by entry- and exit- interviews. Videotaping can augment these data with observed behavior patterns. These methods have been applied with success in numerous published studies, and used to evaluate early interface versions of the Alexandria Digital Library, an internet-based catalog-and-retrieval system to deliver maps and satellite imagery, digital spatial data and metadata.

However, the assumptions which form a basis for these methods do not strictly apply when the product under evaluation is on the Internet. First, Internet use is not epitomized by attention to single task streams over extended periods of time. Users may run multiple Internet sessions concurrently. They may start and stop a task stream periodically in response to distractions on the Internet or within their local environment. This invalidates the "structured work pattern" assumption. Second, Internet users are not necessarily local, and testing a local subject pool may be non-representative. This creates problems for conventional observation (by videotaping, for example). Third, entry- and exit- interviews may be ignored. Internet users characterize an ideal



access route as one that is unimpeded by prerequisite self-identification. And the incentive to describe a Web site experience diminishes once the Web site has been visited. The Internet effectively distances the users, the evaluators and the system designers.

This paper will discuss these impediments to user interface evaluation on the Internet, in the specific context of the Alexandria Digital Library Project. Once recognized, the research team responded to these impediments by adopting a "double-loop" testing paradigm, by creating an entirely new theoretical framework, and by restructuring the evaluation team and interface design teams. Data on use patterns and user error patterns will be presented, as well as the insights gained about how to do user-centered evaluation on the Internet.

*Friday, Oct. 4, 1996  
10:30 - 12:00 AM*

### **Session G: Small Business Cartography in an Era of Downsizing and Outsourcing**

#### **Opportunities for the Small Business Cartographer**

*Martin von Wyss, Hybrid Designs,  
HybridDsns@aol.com, <http://users.aol.com/hybriddsns/>*

In my role as map coordinator at a large Boston publisher, I have served as house cartographer, map editor, and liaison between out-of-house cartographers and in-house graphic designers, artists, editors, and production specialists. Working on a social studies textbook series for the grade school levels has been a unique opportunity to study the relationship between a large educational publisher and the cartographers it hires. I will share tips about which maps designers like and why, possible production pitfalls, how to retain creative control, and how independent cartographers can position themselves to remain competitive.

## **Don't Sell the Store! Maximizing Value Through Use and Reuse of Maps for Sale to Multiple Clients**

*Alex Tait, Equator Graphics, ATAIT@aol.com*

A well executed digital map has value beyond the initial project for which the artist created it. In this paper I will track the creation, use, revisions, and reuse of basic maps of downtown Washington, D.C., and the metropolitan Washington area. I will focus on the importance of maintaining copyright of an image, conveying only the minimum necessary use rights to a client, and maximizing the utility of the maps for a broad range of applications. In addition, I will discuss various tips and hints for creating and recreating digital map files in Macromedia Freehand.

**Friday, Oct. 4, 1996**

**1:30 - 3:00 PM**

### **Session H: Map Design and Production**

#### **The Design of Transit Maps**

*Dennis McClendon, Chicago CartoGraphics, dmc@ais.net*

Transit system maps present unique cartographic challenges; these challenges occasionally lead to inspired designs like the London Underground Diagram. Transit maps offer severe tests of legibility under poor conditions, of symbolizing abstract concepts such as transfers, and of the limits to generalization and simplification. The speaker, who produces the Chicago Transit Authority system map, will discuss some of the challenges of symbolizing complex systems for a general audience with few map skills, and look at what solutions have been tried by systems around the world.

## **MAPSCO Transitions to Digital Cartographic Production**

*David D. Halliday and Wayne J. Baird, Mapsco, Inc., Dallas, TX*

Mapsco, Inc., a regional map publisher headquartered in Dallas, Texas, is transitioning from manual cartographic production to digital cartographic production. The first step in Mapsco's transition, a pilot project, was recently completed with the successful publication of 25 map pages of the 1996 Dallas Street Guide. This paper reviews Mapsco's transition, including objectives, the pilot project and implementation, and some lessons learned.

Mapsco had been interested in moving to a digital cartographic production system for over ten years. Previous investigations resulted in the cost of entry being too expensive. However, as computer power rose and computer prices dropped, Mapsco looked again at moving to the digital arena. Mapsco has decided to move forward with two long-term objectives: 1. to convert from a manual cartographic process to a digital cartographic process; 2. to develop an integrated geographic information system (GIS) capability.

To begin the conversion, Mapsco elected to do a classic pilot project implementation. The benefits of conducting a pilot project are well recognized. Specifically, you can develop and test your workflows with familiar data, complete a representative project quickly, learn as you go, and then build on success. The pilot project geographic area was southern Dallas County. The pilot project data would be output as 8-page signatures of the Dallas Street Guide in four color-separated (CMYK) Postscript files written to film. The pilot project began October 18, 1994, and was completed in September 1995 with 25 pages of the 1996 Dallas Street Guide produced digitally.

The purposes of the pilot project were:

1. To identify data capture and storage strategies for the seamless graphics data;
2. to develop data retrieval strategies for constructing a Mapsco Street Guide.

The pilot project consisted of six phases with some of the phases being accomplished concurrently: PHASE 1 - Data Requirements Identification; PHASE 2 - Schema Definition; PHASE 3 - Source Data Definition; PHASE 4 - Data Capture Workflow Definition; PHASE 5 - Lithographic Requirements Identification; PHASE 6 - Data Extraction Workflow Definition;

During the pilot project not only were several keys for success reinforced, but several lessons were learned: 1. Executive management support and commitment; dedicated personnel; 2. Consulting support; 3. Time required for initial planning; 4. Think GIS versus cartography; 5. The importance of projections and datums; 6. Don't depend on software applications which are being developed to be released when scheduled, especially if the functionality is critical to your success.

Mapsco has begun moving down the road in converting from a manual cartographic process to a digital cartographic process. We have successfully completed the pilot project. However, Mapsco is still very much in a learning mode. We must now continue by completing the data capture effort for the entire Dallas - Fort Worth Metroplex, transitioning more cartographers to the digital process, and educating the entire Mapsco organization and our customers about our new capabilities.

**The Impact of Automated Cartography and  
Prepress Operations on Future Cartographers**  
*Ronald M. Bolton, Aeronautical Chart Division, NOAA*

There is no way of stopping or even slowing the technical revolution of everyday life and, particularly, of the cartographic and printing industries. Its pace relentlessly and continually increases. Since the introduction of cartographic workstations, scanners, digitizers, plotters and relational databases, automated cartography has developed and matured to a point that older manual production processes cannot compete in the marketplace. Just go into any major chart or mapmaker's plant and you will see the trend to move to a digital system.

As the chart and mapmakers have increased the speed for creation of final artwork/overlays, they found production bottlenecks and soaring costs in prepress operations blocking cost effective competitive production operations. Both government and private sector cartographers looked to the leaders of the printing industry for solutions to their problem. The solution was the Color Electronic Prepress System (CEPS). All cartographic input is in digital form which is utilized by CEPS/desktop workstations which pass the graphic data to film recorders/image setters via Raster Image Processors Systems (RIPS). These CEPS produce composite films, film separates, or plates. These systems are most cost effective and faster than conventional systems.

The impact of automated cartography and prepress operations are significant. The future cartographer will have the challenge of exercising the expanding computer power in the workplace, utilizing sophisticated hardware, and applying the capabilities of available software to produce charts and maps. The cartographers will be required to know cartographic theory, hardware/software technology, and CEPS. This will be necessary because formerly divided tasks have been integrated and greatly time compressed. The education of future cartographers will be ever more difficult and the scope broader. This education will be a great challenge to colleges and universities.

**Friday, Oct. 4, 1996**  
**1:30 - 3:00 PM**

**Session I (Panel): Changing Roles of University  
Cartography Labs**

**Observations in the Increasing Complexities in the  
Management of University Cartography Labs**

*Gregory Chu, Dept. of Geography, Univ. of Wisconsin-La Crosse,  
chu@mail.uwlax.edu*

As more university cartography labs are converting to digital methods in map design and production, several other managerial aspects arise that may change the daily workflow and future directions of the lab and responsibilities of the lab manager. More importantly, the traditional role of university cartography labs may be changing due to the new and additional needs of faculty members which the labs serve. This paper and session examine some of these changing roles and raise further questions about the future operations of cartography labs.

**Friday, Oct. 4, 1996**  
**3:30 - 5:00 PM**

**Session I: Map Use, Production, and Availability**

**The Use of Maps in Art: A Preliminary Survey**

*Ren Vasiliev, State University New York - College at Geneseo,  
vasiliev@uno.cc.geneseo.edu*

Being graphic objects, maps are of interest to artists and have been used by them as visual language metaphors. Some artists are adamant that they are cartographers, although their works might not resemble anything a working cartographer would call a map. Other artists have used

maps as maps within paintings to make some statement about time or space. For cartographers and geographers, these uses of maps present an interesting departure from the normal and expected definition of a map.

This paper is an exploration of the different uses of maps in and as art, and, therefore, into the evolving definition of "map." Art, here, is meant as those imaginative objects that are created to interpret reality. Maps are initially defined as those graphic objects that represent spatial relations (that portray reality) in a classically recognizable cartographic way. This survey of maps in art and maps as art may serve as a point from which cartographers could move to define as maps objects not previously considered as such. However, this examination could lead to a more definitive adherence to that definition of map as the two-dimensional graphic object that shows locations of places. Or it could result in a continuum of meaning.

This preliminary survey will present the "maps" in question and explore the notion that art maps and cartographic maps may or may not be one and the same, that interpretation and portrayal of spatial reality might co-exist, no matter which is being created, art or map.

### **Orienteering in the United States: Geographic Patterns of Participation.**

*Elisabeth S. Nelson, San Diego State University*

Orienteering is an international sport that involves navigating a set course using a map and compass as guides. Each competitor is responsible for determining the most efficient means of course traversal, with the winner of the event being the person who completes the course correctly in the shortest amount of time. It is easy to see that route selection, and consequently the competitors' geographic and cartographic abilities, are the core of orienteering. Although orienteering has been a recognized sport for nearly a century, relatively few people in the United States are skilled in it. Why have some areas adopted this sport while others ignored it? The purpose of this study was to portray, using a series of maps, the geographic distribution of orienteering participation in the United States, and to identify factors that may explain these patterns. Several key variables were first identified as possibly influencing the locations of orienteering clubs in the United States. A series of maps was then created for detailed visual analysis. A regression analysis of the data was used to confirm the statistical significance of the resulting patterns. The evidence gathered from this study indicated which of the several tested variables most influenced the pattern of orienteering participation.



## **What Can They Do For You?**

*Harold C. Boke Bowker, Denver, Colorado,  
HCBowker@Rmmcl.cr.usgs.gov*

The wide variety of mapping information available in graphic and digital format from the National Mapping Division of the U.S.G.S. Historic pen and ink mapping to the latest multimedia data bases for the future.

### ***Saturday, Oct. 5, 1996*** **WORKSHOP DESCRIPTIONS**

**9:00 AM - 5:00 PM**

#### **A) Digital Terrain Modeling Workshop**

*J. Ronald Eyton, Southwest Texas State University, JE09@SWT.EDU*

A digital terrain modeling workshop will be conducted at the Department of Geography and Planning, Southwest Texas State University, San Marcos, TX in conjunction with the annual convention of the North American Cartographic Information Society meeting in San Antonio. The workshop, which will be held all day Saturday October 5, 1996 will be comprised of four "hands-on" laboratory sessions consisting of 1. DEM Mapping (masks, grayscale maps, color maps, contour maps, projections), 2. DEM Transformations (slope, azimuths, relative radiance and hill shading, curvatures), 3. DEM Measurements and Modeling (basin delineation, morphometrics, flow paths, erosion, insolation), and 4. DEM 3D Visualization (color stereoscopic effect, parallax stereo, satellite images and DEMs, perspective views and drapes). Approximately 32 different maps will be made by each participant.

The laboratory exercises will be completed using Terra Firma, a display and analysis package for raster data such as digital elevation models and satellite images stored as a grid. The package is written in Microsoft Fortran 77-90 for PCs with co-processors and SVGA displays; no special hardware is required. Input parameters are screen prompted and output can be directed to files, screens, slide writers, and black and white or color Postscript printers. There are no restrictions on grid size (most programs require memory for up to a maximum of only three data records). The package consists of 50 programs divided into the 10 modules listed on next page:

#### **Terra Firma Modules (# programs)**

1. Grid Data (5)
2. Scaling (3)
3. Mapping (7)
4. Display (4)
5. Transformations (6)
6. Statistics (7)
7. Measurements (4)
8. Classification (4)
9. Azimuthal Grids (5)
10. Arc-Data Grids (4)

The package, although copyrighted, is available to academic users at no charge. The documents and programs can be both be freely distributed to other academic users including students in labs as long as no charge is made (other than the cost of duplicating) and the package is distributed in its entirety. Interested users can request an uncompiled version of the source code for the cost of duplicating and mailing disks.

Each workshop participant will be given a complete copy of Terra Firma, the package documentation, the workshop tutorial, and the digital data sets. The cost of the workshop includes the cost of duplicating the materials, and honorariums paid to graduate students who will assist participants with their laboratory exercises. No previous experience with DEMs is required, however, some familiarity with PCs and DOS is expected. Further information including the workshop syllabus, a complete description of the Terra Firma package, and a list of the digital data sets can be obtained from: J. Ronald Eyton; Southwest Texas State University; Department of Geography and Planning; 601 University Drive; San Marcos, Texas 78666-4616; 512-245-8847 (phone); 512-245-8353 (fax); JE09@SWT.EDU (email)

9:00 AM - 12:30 PM

#### **B) A Hands-on Introduction to Internet and Web Resources for Cartography and GIS**

*Kenneth E. Foote, University of Texas at Austin,  
k.foote@mail.utexas.edu*

This hands-on workshop will cover the basics of finding and using GIS and cartographic resources in the Internet and Worldwide Web. After a brief overview of Internet terms and concepts, participants will explore local, state, national, and international Web resources. Overviews will be provided of the GeoWeb, Geographer's Craft, and Geography Virtual Department Projects, how to connect to the Internet, and the basics of Web publishing.



9:00 AM - 12:30 PM

**C) Stop the Insanity: GIS Import/High Quality MAP Graphics  
Made Easy — with MAPublisher**

*Roger Fradgley, Avenza Software Inc.,  
roger@avenza.com, <http://www.avenza.com>*

This hands-on workshop introduces cartographers to an effective, time efficient desktop mapping system that links GIS technology with graphics/publishing technology to assure quality output results. Incorporating the MAPublisher Desktop Mapping System, the user will import raw GIS data, with all attributes intact, directly into PostScript compatible high-end graphics software where graphics management tasks are best performed. Many data management tools are embedded in the MAPublisher suite of filters. Resulting files are ready to publish. Say good-bye to frustration.

Attendees can choose to work with either Windows/MAPublisher/Macromedia Freehand; or Macintosh/MAPublisher/Adobe Illustrator (Workshop split 60/40). MAPublisher imports ARC/INFO, MapInfo, USGS DLG/SDTS, AutoCad DXF and geo-referenced JPEG/TIFF files. Take home your own laser printout.

Who should attend: Anyone serious about the art of digital mapmaking - the desktop-oriented individual interested in facilitating the process of producing maps with high cartographic integrity, while maintaining GIS functionality.

Prerequisites: Computer literacy. An open mind to change.

9:00 AM - 12:30 PM

**D) Creating New Worlds — 3D Cartography with KPT Bryce 2**

*Tom Patterson, National Park Service, Harpers Ferry, WV,  
T\_Patterson@ccmail.itd.nps.gov*

The workshop will introduce KPT Bryce 2, a \$199.00 Macintosh terrain modelling application, as a tool for the creation of still images, QuickTimeVR navigable scenes, and QuickTime animations. Working from provided data sets, the participants will learn how to harness the powerful special effect of KPT Bryce 2 to create geographically accurate images with a graphical quality that rivals images produced on high-end workstations.

Participants will be led through a series of tasks that demonstrate the cartographic/multimedia applications of KPT Bryce, while at

the same time learning the subtleties of ray-traced rendering and the conceptualization of three dimensional space.

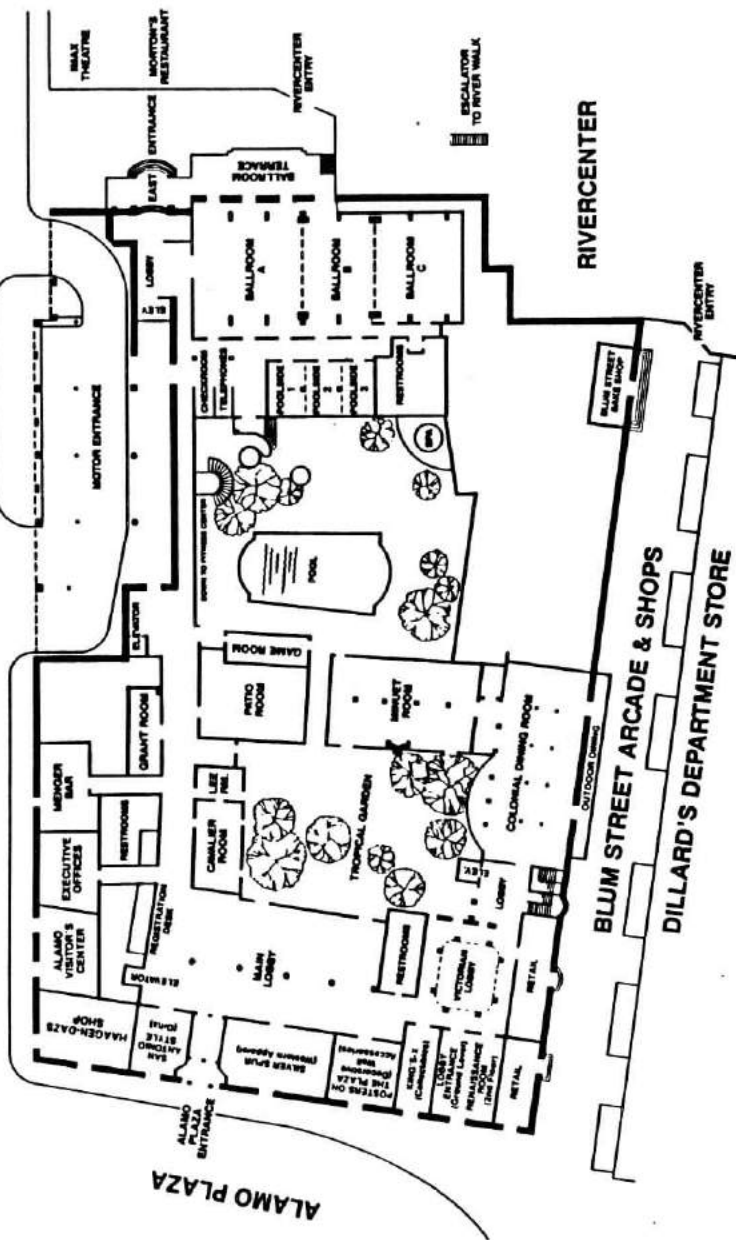
Tasks include:

- 1) Importation of a grayscale-to-height DEM, extrusion of the model, adjustment of global lighting, and rendering a planimetric shaded relief.
- 2) Viewing a DEM as a 3D model, adjusting vertical exaggeration, camera placement, adjusting lighting and shadows, draping a two-dimensional aerial photograph onto the DEM, and creation of a texturized bump map.
- 3) Projecting a two-dimensional map onto a DEM, without pixel distortion, using parallel spot lights.
- 4) Wrapping a satellite image of the earth onto a sphere and use of the texture editor to simulate the atmosphere of the earth against the black backdrop of outerspace.
- 5) Manipulation of environmental settings including cloud cover, sun position, atmospheric haze, water reflexivity, and terrain textures. Rendering a scene as a 360 degree image for conversion to a navigable movie using QuickTime VR Panotool, an Apple freeware application.
- 6) Use of the terrain editor to create a clipping path to truncate a landform at sea level, and then modify the landform to simulate erosion, mountain building, and other geomorphological processes.

During the periods when images are rendering, which should average 5 to 10 minutes, concepts will be discussed, questions answered, and the next task introduced. Participants will be given handouts that detail step-by-step procedures, and they will receive several floppies containing resource materials such as a sample DEM with registered low-res image for draping, QuickTime VR software, and a sample Bryce scene for later dissection. Participants are asked to provide blank floppies to save Bryce images created during the workshop.

# THE ALAMO

## CROCKETT STREET



### *A Few End Notes:*

*Please feel free during the conference to stop by the NACIS Hospitality Suite, Room 2076 in the Menger Hotel. There, you will usually find some colleagues to talk to and something to quench your thirst.*

*Special Thanks: We would like to extend a special thanks to Dan Selden from Indiana University. Again this year Dan has graciously volunteered his services to take care of the set-up and operation of the audio visual equipment for the conference.*



# NACIS XVII

Lexington, Kentucky

October 1997

*We hope you can join us*

*check out the NACIS web site for conference dates& information:*

<http://leardo.lib.uwm.edu/nacis/nacis.html>