



Wisconsin MAPPING BULLETIN

Governor Orders Information Standards

by Ted Koch

1995 will be a year of pivotal change in information technology (IT) for Wisconsin state government agencies. At the state level, a broad range of IT, including Geographic Information Systems (GIS), will be managed through a new and different process. The Wisconsin Land Information Board (WLIB) heard these messages of impending change at its April 6 meeting from Doug King, a Senior Information Technology Coordinator with the Wisconsin Department of Administration's (DOA) Division of Technology Management in Madison.

Speaking as a member of the three-person DOA Information Technology Budget Team in the State Budget Office, King led the Board through the anticipated impacts that Governor Thompson's recently issued Executive Order 242 will have across state government. (See sidebar article on Executive Order 242, page 3).

The governor directed the DOA to plan and administer the state's information technologies on an "enterprise" basis, to focus on state government as a "single corporate entity" and not as a collection of many separate agencies with differing and unrelated needs.

In the past, the state has managed IT on an agency by agency basis, without a coordinated strategy to satisfy the needs of a wide variety of agencies. Executive Order 242 provides a statement of direction for IT, and provides the framework for a strategic path in the 1995-97 biennial budget deliberations. The planned IT approach for 1995-96 is:

- Plan and administer information technologies on an "enterprise" basis,
- Fund only "critical" budget requests, deferring others until 1996-97,
- Conduct a baseline infrastructure needs assessment for all state agencies,
- Recommend a set of minimum IT infrastructure standards to state agencies,
- Prepare a basic IT infrastructure initiative for all state agencies,
- Reorganize state government to better support IT.

In his message, King provided details on the Basic Infrastructure Project, which involves among other things, the setting of several GIS related goals and standards. "We have no basic IT infrastructure standards for agencies", King explained. "State agencies have spent almost \$149 million just on personal computers since 1992, and an additional \$93 million on software, programming, networks, modems, diskettes and maintenance. Overall we're spending about \$250 million annually on IT."

To provide all agencies with a basic IT infrastructure with which all state employees should be equipped while also providing more compatibility and reducing duplication among these types of expenditures, the goal of the Basic Infrastructure project will be to set minimum standards for the state's basic IT infrastructure. These standards will include electronic mail, microcomputer hardware, operating system, office word processing and spreadsheet software, printing, networking, and support services. Once minimum standards are established, the infrastructure budget teams will set funding priorities and lay out an infrastructure implementation plan.

For GIS, King explained that a five member team is currently working on a short-term mission of setting GIS software standards. "By the May 15 deadline, this team will recommend to DOA common enterprise standards for GIS software", King said. The rationale behind this effort is to build a common GIS infrastructure that insures funding for future GIS activities is consistent with GIS standards, and that opportunities for collaboration and support between

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WLIB News

by Ted Koch

Board Meetings

The Wisconsin Land Information Board (WLIB) met on April 6 in Madison. The next meeting, will be the board's tentatively second annual strategic planning retreat, a two-day session set for June 7 and 8 in Wisconsin Dells. Additional meetings are scheduled for August 16, October 17, and December 11.

Grant Awards

At its April 6 meeting, the board approved 23 grant applications to local governments (primarily counties) totaling \$1,878,479. To draw down its reserve of unspent funds, and fund as many applications as possible, the board awarded nearly \$700,000 more this period than the largest amount previously awarded in a single grant period.

Included in the April awards were four counties which had not previously received a grant: Iowa, Vernon, Sawyer and Monroe. 62 of the state's 72 counties have now received at least one grant from the WLIB.

The competition in grant scoring was notable this period in that 6 of the 32 applicants received perfect scores of 100, and 5 other applicants scored 99 points. Only 7 of the 32 grant applications scored less than 90 points.

Grant financing policies

In an effort to speed up the distribution of grant funds, and to lessen the amount of undistributed funds for previously approved grants, the board has changed its grant funding and payment policies. Passing a resolution at its April 6 meeting, the board adopted the following major changes:

The amount of grant funds allocated to future grant application periods will be at the discretion of the Board, without regard to the period in which the revenue was collected.

Grant payments will be made under a new set of procedures:

- *At the signing of a grant agreement and the signing of a purchase order, grant recipients will be paid 65% of the grant award;*
- *At the completion of the grant project and approval of the final report and documentation, the grant recipient will be paid the final 35% of the grant award.*
- *Interest accrued to unused portions of the original 65% shall be used exclusively on land information applications within the grant recipient's jurisdiction.*
- *The new payment schedule can be retroactively applied to previous awards, subject to grant agreements.*

Many of the above policy changes were suggested to the board by the Wisconsin Land Information Association.

Officers Reelected

At its April 6 meeting the board reelected officers John Laub (Chair), Ben Niemann (Vice-Chair), and Les Van Horn (Secretary). These three, along with George Lightbourn, Executive Secretary of the Department of Administration, make up the board's Executive Committee. All board officers serve a one-year term.



Local HARN densification guidelines reviewed at public hearings

by Diann Danielsen

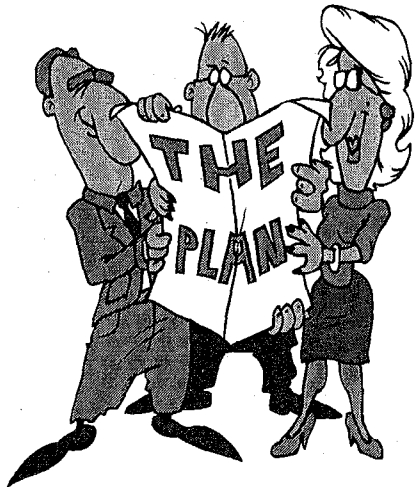
In late March, the Wisconsin Land Information Board held a series of public hearings on a proposed standard entitled *Guidelines to Support Densification of the Wisconsin High Precision Geodetic Network (WHPGN) Using Global Positioning System (GPS) Technology*. Sites included Hayward, Marshfield, and Madison. Each hearing was preceded with an educational session explaining Wisconsin HARN densification, a local county's experience with such a project, and an overview of the proposed standard.

The guidelines outline survey standards and specifications for completing local densification of the Wisconsin HARN and also address several other issues related to densification, such as data reporting and economic and staffing considerations. Based upon the oral (public hearings) and written comments received through April 14, the Wisconsin GPS Standards Work Group, a task force of the WLIB, will revise the proposed standard and return it to the Board for adoption.

The group is currently developing a second, related standard addressing the development of geographic coordinates on PLSS corners. For more information, contact the WLIB or Work Group Co-chairs D. David Moyer (608-266-3919) and Diann Danielsen (608-262-8776).

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agencies is easier to accomplish. Team members include King (Leader); Loren Hoffman, GIS Manager, DOA; William Holland, Executive Director, WLIB; Tom Ries; GIS Manager, DOT; and Paul Tessar, GIS Manager, DNR.

The longer-term mission of this project is to recommend to DOA enterprise standards for GIS hardware and data, including a data model, migration path, schedule and cost estimates. King pointed out that the GIS team for this effort would be expanded to include representatives from local government. The plan on how to address these issues is due to DOA by June 30 this year.

During King's presentation, a question was raised concerning the impact the GIS Project recommendations will have on current state agency GIS positions. Mark Wahl, Division Administrator for DOA's Division of Information Technology Management replied that, "DOA is not going to step into agencies and take GIS positions." He continued to explain that, "DOA recognizes that GIS is an integral part of many agencies' basic IT responsibilities."

In the final remarks of his presentation, King noted that DOA expects the creation of standards will provide for the seamless exchange of data among state agencies and local units of government, and that there will be direct access to GIS data by both state and local agencies.

Following King's presentation with a comment, John Laub, WLIB Chair noted that, "This board has the statutory responsibility for setting data standards and insuring data integration on a statewide basis." He emphasized, "the Board should be involved in all aspects of setting policies that deal with statewide data integration issues." King concluded by noting that the IT planning teams in DOA would welcome the help and cooperation of the WLIB.

Executive Order # 242

On February 1 of this year, Governor Thompson signed Executive Order # 242. Entitled, "Statement of Direction Relating to the Management of Information Technology in the State of Wisconsin", this order will provide guidance for the next two years on the direction of Information Technology (IT) within state agencies.

Beginning with background information for justification, Order 242 states that

- IT is a key to providing better government service at reduced costs,
 - IT serves as a foundation for efforts to re-engineer government,
 - 53 state agencies currently operate IT functions on an independent basis, and
 - the state is a recognized leader in the use of IT.
- With this as a foundation, the order directs the following:

1. Proclaim that it is the intent of the Governor that there will be a current statement of direction on information technology at the Executive Level of the Office of the Governor at all times and that the Statement of Direction will be periodically amended as changes in technology dictate. This executive Order shall be known as the Statement of Direction on Information Technology (IT).
2. It is my intent that the Department of Administration plan and administer the state's information technologies on an "enterprise" basis emulating the management of a private enterprise in that the state's strategic planning efforts will be focused on the Wisconsin state government as a "single corporate enterprise" and not the many separate agencies.

The Order then goes on to direct that the Department of Administration will:

1. prepare an enterprise infrastructure assessment of state agencies and institutions;
2. establish enterprise information technology standards for the components of the state's IT infrastructure;
3. prepare an information technology infrastructure initiative to provide a basic information technology infrastructure for all state agencies and institutions; and
4. take whatever other actions required to operate the state government information technology enterprise as efficiently as possible.

Executive Order # 242 concludes with the following statement, "With these actions, the department will ensure the state government is adequately structured and equipped for efficient and effective use of information technology for the next century."

Bulletin Board Update

Contribute to it, use it

BBS is your community calendar

by Brenda Hemstead

"We need a meeting with Sara, Bill, and Noel to resolve these issues. They'll each need a full day to get to Eau Claire, have the meeting, and return home. I wonder whether any major events will compete with us for their time, either the first or second week next month."

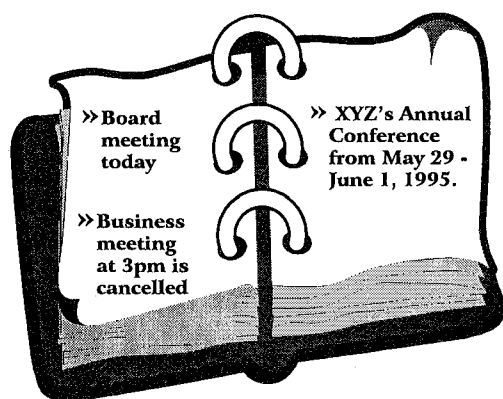
"I'd like to get some GIS software training in this fall, but also want to take a week of vacation. It surely would be handy to see list of meetings and classes around the state for that period."

"Sam mentioned a great idea for a workshop that we should arrange for the people in our region. However, it's possible that someone else has already taken the lead in this area. If we could find that out quickly, it could save us from alot of wasted work."

The BBS calendar can help

Well, the SCO's BBS has a events calendar feature that can help all of these people. At this point, our calendar lists mostly events that are publicized in magazines and newsletters. There are quite a few such events (about 75, typically), and the listing we carry in the *Bulletin* (p. 15) is only a subset of that.

However, there are many, many other events that go unreported, because we simply don't know about them. Sometimes when we do find out about an event, it's only a few days away and we can't effectively inform anyone else in time. This is where we need you to step up and make this events listing a community resource.



Post everything you know about

Even if you aren't seeking to attract people to your upcoming event, having it listed in the BBS calendar means that other people can avoid scheduling a competing event. If enough such events were posted, **the entire land information community would be much better informed.** Listing even small gatherings such as committee meetings can contribute to the smooth functioning of the entire land information community.

Do you want to attract people to your event? By letting us know, we can put it on the BBS, we can inform people who contact us with an inquiry, and we may be able to list your event in the *Mapping Bulletin*.

It's easy to participate

There are several ways to provide information on an event. You can post it directly on the BBS, if you have a modem attached to your computer. You can also call us with the information, fax it to us, or just drop it in the mail. Time is of the essence—get your information to us as far in advance as possible!!

What about a postponement or cancellation? That can be critical information for many people, and we can post that information on the BBS calendar, too. We also have additional ways to call even more attention to this kind of change, if appropriate.

Next time you need to schedule a meeting, class, or conference, try downloading the calendar from the SCO's BBS as a resource to help you choose a good date.

The BBS calendar structure

Actually, the SCO's BBS has three calendars. One lists Wisconsin events. The other two cover national and international events.

When you "dial up" the BBS from your computer, you can view or download any of these calendars. You can also post a new event, and we will move it onto the appropriate calendar.

BBS statistics

Here are some BBS statistics for your consideration (all of these continue to grow)

- Number of registered users: 475 (222 of the 475 total registered users have access to the Internet. Of the remaining 253 users who currently don't have access to the Internet, 201 hope to have access soon.
- Total calls to date: 2439
- Average calls per month: 100
- Most popular file: Files zip
- Other popular files: List.zip, vmap120.zip, pspro200.zip, bigdummy.zip
- Total files on BBS: 247

I am looking forward to see how many of you will actually post your upcoming events for others to view. I would like to report in the next issue of the *Bulletin* the types of events that you posted and/or the types of events that you found useful. Again, if you are unsure of how to post an event, don't hesitate to leave me a message indicating so. **GO FOR IT!**

State Cartographer's Commentary

Framework Data: from concept to reality?

by Ted Koch

Is it possible to develop a common set of digital geographic data themes that will serve the broad needs of the widely diverse GIS data using community? A proposal to develop the concept of such a national "framework data" set has been recently attempted by the Federal Geographic Data Committee (FGDC).

The FGDC has been mentioned often in the *Mapping Bulletin* over the past several years. It is the committee of representatives from 15 federal agencies which works at promoting the coordinated development, use, sharing, and dissemination of geographic data, particularly at the federal government level.

The FGDC, for the past several years, has been promoting an concept called the National Spatial Data Infrastructure (NSDI). As envisioned by the FGDC and others, the NSDI will encompass the technology, policies, standards and human resources needed to acquire, store and distribute geographically-referenced information. Ultimately, the NSDI would provide links between data producers and data users through a clearinghouse approach for providing information on existing and planned data. To provide data that can be the starting point for most applications, the FGDC has begun analyzing the development and maintenance of a "framework" dataset.

In 1994 the FGDC drew together a working group of 24 individuals from a variety of government sectors (federal, state, regional and local), giving them the charge to analyze how geographic data is now collected, maintained and disseminated, and to propose how a national set of framework data might be built.

What is "framework data"?

Their vision of the framework is a base set of information on which to collect, register, or integrate other information accurately. Framework principles require the data be dependable and trustworthy, be created from the "best" data available, and be easy to access and use.

Within this context, the work group has released a final draft document entitled, "*Development of a National Digital Geospatial Data Framework*". This proposal explains the perceived benefits from the framework, its characteristics, the institutional roles necessary to create it, and a proposed implementation strategy.

As proposed in the draft, framework themes will be geodetic control, digital orthoimagery, elevation (Digital Elevation Models), transportation, hydrography, governmental units and cadastre (Public Land Survey System).

In addition to proposing specific data themes, the work group outlined three structures or contexts for the framework. The **technical context** considers the needs to provide data at different resolutions (detail) and time periods, to ease the use of the framework data, and to maintain the integrity of the data contributed to the framework. The **op-**

erational context concerns the ability to process changes through transactions, to access past versions of the framework, and to locate data through the national clearinghouse. To ensure data use, a **business context** is proposed that minimizes financial, organizational, and technical barriers to accessing and using the framework information.

Controversy has surfaced

As the nature of the framework concept has taken shape over the past months, the proposals have not been without their detractors. Many people argue that the list of basic themes is incomplete. Prominent examples have included soils, wetlands, utilities, census data, and ZIP codes.

Of course, soils and wetlands are foundational elements in Wisconsin's Land Information Program (WLIP), and in this state are considered to be vital components of a land-based framework. Other hydrographic features, such as rivers, streams and lakes, are not part of the WLIP's foundational list. If a national hydrographic framework theme were to be built, it would be difficult to have a complete and logical theme without including wetlands. Wetlands and drainage networks are often linked in reality, so to separate their digital representations may lead to unnecessary duplication and confusion.

Making it work

The actual implementation of the framework, once the content details are agreed upon, may prove to be the most intriguing and at the same time daunting task. As outlined by the workgroup, the first step will be to identify existing data sets, data producers, and the metadata documenting this information. The second step, to be completed by 1998, involves establishing institution agreements, developing specifications and procedures, and conducting pilot projects. Starting in 1998, full implementation is envisioned, which includes expanding agreements, with continuing data collection and maintenance.

How and when the national framework data concept moves to reality remains as a big question. A vast amount of useable data documentation (metadata), as well as agreements to produce and share data, will have to be put in place before the framework takes shape. Only modest progress has been made on these fronts. Wisconsin's Land Information Board and Land Information Association can have significant institutional roles in the creation of the framework, acting as integrators to assure that data meets users' requirements for quality, accuracy and access.

Ultimately, WISCLAND (the Wisconsin Initiative for Statewide Cooperation on Landscape Analysis and Data) could provide a successful institutional model for the organization and cooperation necessary to implement the framework concept. WISCLAND has successfully nurtured organizational linkages for funding statewide dataset creation, maintenance, distribution and for providing critically needed education about the data and its effective and appropriate uses.

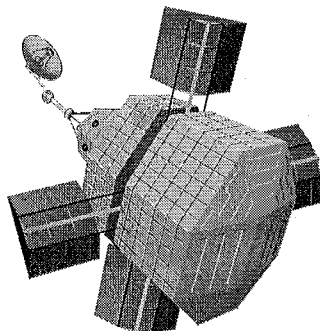
Remote Sensing

Something for everyone

Satellite data choices abound

by Jim Jordan

The amount and variety of satellite remote sensing data available to the public has expanded dramatically in the past several years. Keeping track of who launched what, when, the types of data different satellites collect, and the availability and uses of that data is a continuing challenge. The bottom line is that remote sensing from space is here to stay and we will see increases in its use and application in many aspects of government and industry in the 21st century.



Satellite imagery is augmenting, and in some cases taking the place of, aerial photography in the mapping and earth sciences. In the coming years it will become more economical to obtain, will offer spatial resolution comparable to high altitude aerial photography, and will become an essential source of data for mapping, earth science research, natural resource management, and urban and regional planning.

In addition to these applications, satellite sensors are designed to record phenomena such as atmospheric and sea surface temperature, obtain precise elevation measurements of water and land, and measure pollutant levels and chemical composition of the atmosphere.

Below is a short list of satellite platforms that acquire imagery used in mapping, environmental monitoring and natural resource management. Data acquired by these satellites represents a mix of public and private sector research, development and distribution, most of which is or will be commercially available in the coming years.

Where known, the status of data availability and the spatial (smallest discernable feature) and spectral (wavelength in micrometers -.3 to .7 is visible to humans) resolution of the sensors is shown in parentheses after a short description of each satellite.

Contact the SCO for additional information about acquiring satellite imagery, translating acronyms, or consult the sources listed at the end of this article. Also check out "Satellite Imagery" on the SCO's BBS for more about this technology.

- **ADEOS** - a joint U.S. - Japan project that includes two satellites to be launched in 1996 and 1999, ADEOS will acquire data on global environmental change and will serve as a research and design program for developing future earth observation systems.
- **ALMAZ** - operated by Russia since the early 1970's, this program has demonstrated the potential of radar imaging to monitor ice conditions and oil pollution, and to provide data for geology and geophysics, cartography, and agriculture. (available 20-25m/ SAR)

- **EOS** - an interdisciplinary, international program, EOS is designed to have a network of 6 satellites in orbit by 2000. Operated by the U.S., this project is an element of NASA's Mission to Planet Earth and is the heart of the U.S. Global Change Research Program.
- **ERS** - launched in 1991 by the European Space Agency, ERS obtains imagery of the earth's entire land surface, including Antarctica. Applications include coastal monitoring, agriculture, forestry and environmental protection. (available - 30m/ SAR)
- **GOES** - operated by the U.S., Europe, Japan, India, and China, GOES is a network of geostationary satellites that are used in pairs to provide global weather data.
- **IRS** - this is India's earth resources satellite system, designed to provide environmental monitoring data for natural resources management. (available - 36m/ .45 to .86; available mid-1995 - 30m/ visible to SWIR)
- **JERS** - operated by Japan, JERS is designed to collect global surface data to monitor agriculture, forestry, fisheries and to facilitate surveying and mapping. (conditionally available - 18m/ SAR; 24m/ .52 to 2.4)
- **Landsat** - remarkable for the operational longevity of two satellites and for the number of agencies that have run the program, Landsat continues to be the cornerstone of the U.S. earth remote sensing effort. Increased privatization and funding uncertainties will challenge this status in the near future. (available - 30m/ .45 to 12.4)
- **RADARSAT** - scheduled for launch by Canada in the coming months, this satellite will provide the first operational SAR data for monitoring ice and ocean conditions, agricultural and forest lands, and geology. (available mid-1995 - 25m radar)
- **Small Satellite Program** - ongoing initiative by NASA to support private sector research and development of small, innovative and sophisticated remote sensing platforms. (3m panchromatic and MSS available by 1997 (Worldview Inc.), and various data from projects launched since the early 1970's)
- **Space Shuttle** - NASA maintains an extensive archive of photographs and sensor images obtained during the history of the shuttle program. (available - various resolution color, colorIR, black and white, and radar hand held and shuttle mounted imagery)
- **SPOT** - so far the most widely available of commercial remote sensing data, SPOT is owned by the French space agency but commercial operations and distribution are run by private corporations with 40 distribution centers worldwide. (available - 10m/ .51 to .73; 20m/ .5 to .89)
- **TIROS** - also known today as the NOAA Polar Orbiting Environmental Satellite, this program has a long history under several names, that is committed to obtaining worldwide meteorological and atmospheric data. The Tevised Infrared sensor is one of several that this program now operates.
- **Russia Data** - recently declassified and now distributed by EOSAT, this imagery provides high resolution land surface data valuable for mapping and a variety of natural resource applications. (available - 3m/ visible)

(sources: *GIS World*: February 1995; *Wisconsin Mapping Bulletin*: October 1994; *Earth Observation Magazine*: August 1994).

Orthophotography Update

More added to list

Orthophoto projects move ahead

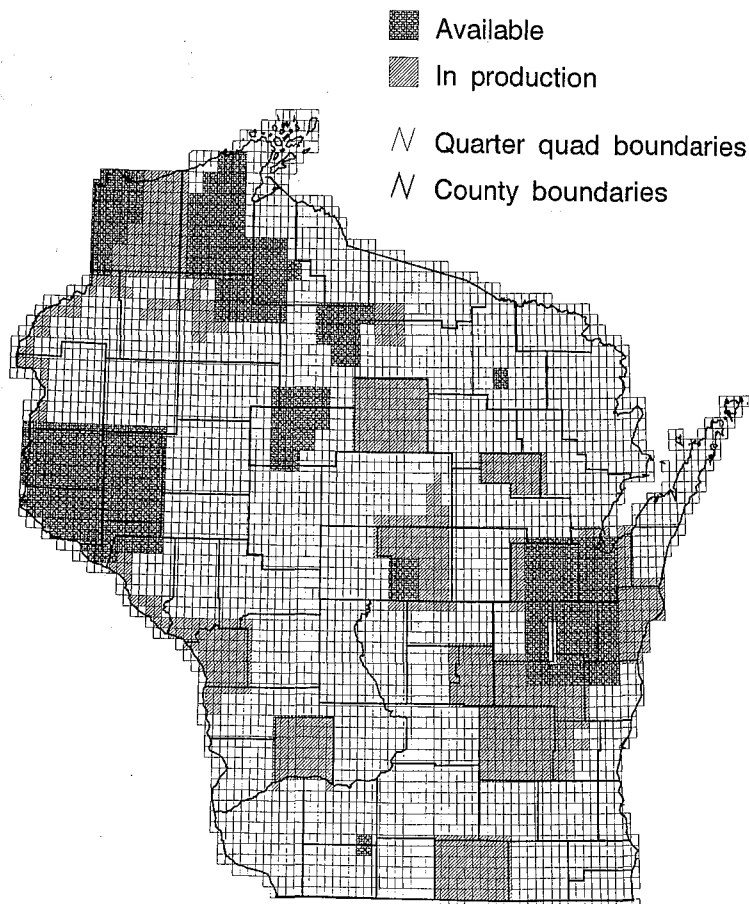
by Bob Gurda

From all corners of Wisconsin, news on digital orthophoto development projects is positive. Deliveries of finished work, funding to solidify planned projects, and expansion of previous commitments all contribute to this rosy picture.

Under the national plan

Basically, the projects fall into two categories. One uses 1992 NAPP aerial photography from the federal government. This imagery, which is acquired from moderately high altitude, supports 1-meter resolution at 33 foot accuracy. Orthophotographs made from these photographs, under a national cost-sharing program, are already available for some parts of the state, with more deliveries scheduled soon. Most of these projects cover approximately a single county, although some funded by federal offices cover specific management areas (e.g., a national forest).

Several new orthophoto projects have been finalized recently under the national program. Lincoln, Dodge, and Forest counties will soon be entering the production pipeline. Remaining portions of Brown and Outagamie counties are also new to the list.



April, 1995 status of the National
Orthophoto Program in Wisconsin

County-based projects

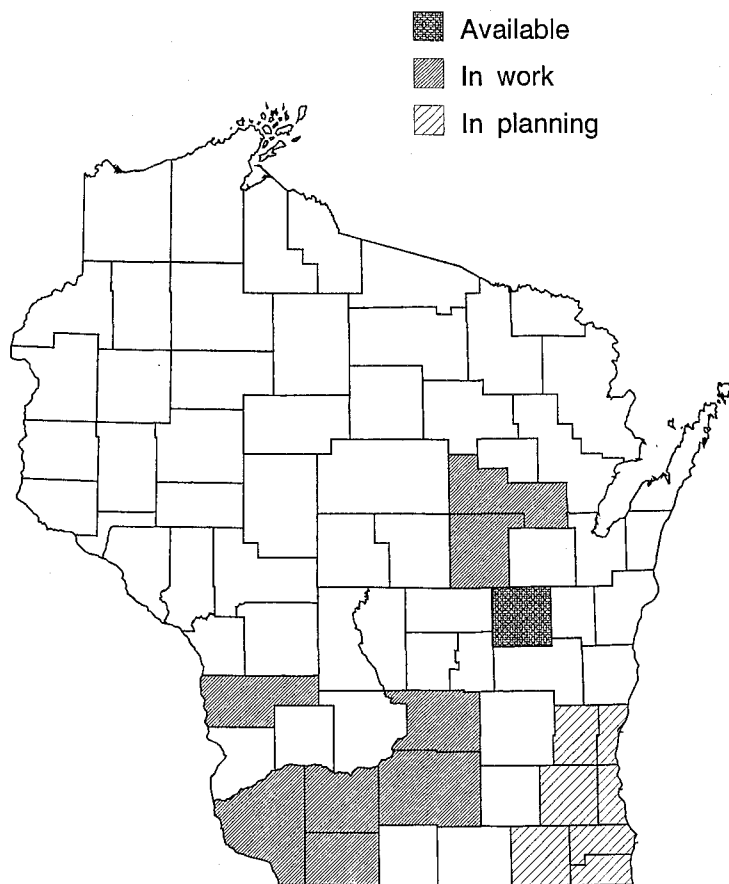
The second type of project uses somewhat lower altitude photographs, the particular flying height depending on the specifics of the project. As a result, similar objects in the images are crisper than on the NAPP photographs, but each depicts much less area. These are usually projects covering one or more complete counties.

Several such projects recently gained support through successful grant applications to the WLIB (see p. 2). In addition, the Southeastern Wisconsin Regional Planning Commission expects to expand its earlier plans, so that all seven counties receive digital orthophoto coverage.

Preparing to use digital orthos

Now that completed digital orthophoto imagery is becoming available on a regular basis, users are scrambling to amass the necessary computer equipment to utilize that data effectively. Higher capacity disk drives, CD-ROM readers, additional RAM, and network access are among the solutions receiving attention.

The Wisconsin DNR's Geo Services Section is continuing its technical investigations in support of the agency's consideration of undertaking a role as a state repository and distribution point for digital orthophoto data.



April, 1995 status of county/regional
digital orthophoto projects

(maps courtesy DNR Geo Services)

Geodetic Control

Minor anomalies uncovered

A report on problematic stations in the Wisconsin HARN

by Diann Danielsen (SCO) and Paul Hartzheim (WiDOT)

The Wisconsin HARN (High Accuracy Reference Network) - formerly called the Wisconsin High Precision Geodetic Network (WHPGN)—has been used extensively by the Wisconsin Department of Transportation (WiDOT) and Wisconsin counties as horizontal geodetic control for local network densification and other projects. The HARN has satisfied or greatly exceeded relative accuracy requirements for these projects.

However, some minor discrepancies have been discovered with a few of the HARN stations. This article presents a brief overview of the problems. A detailed discussion of the HARN problems will be developed for the SCO bulletin board.

We would also like to stress that these discrepancies in no way undermine the integrity of the HARN overall or affect its use for most applications. The problems are generally in the vertical component and have negligible impact on horizontal positions. They would be a greater concern if current technology and methods allowed the direct use of GPS for orthometric heights.

CAZENOVIA GPS and KENOSHA GPS

WiDOT has experienced ellipsoidal height errors in the range of 5-9 cm for these stations. Both stations are located in stable soil and appear undisturbed, though vertical

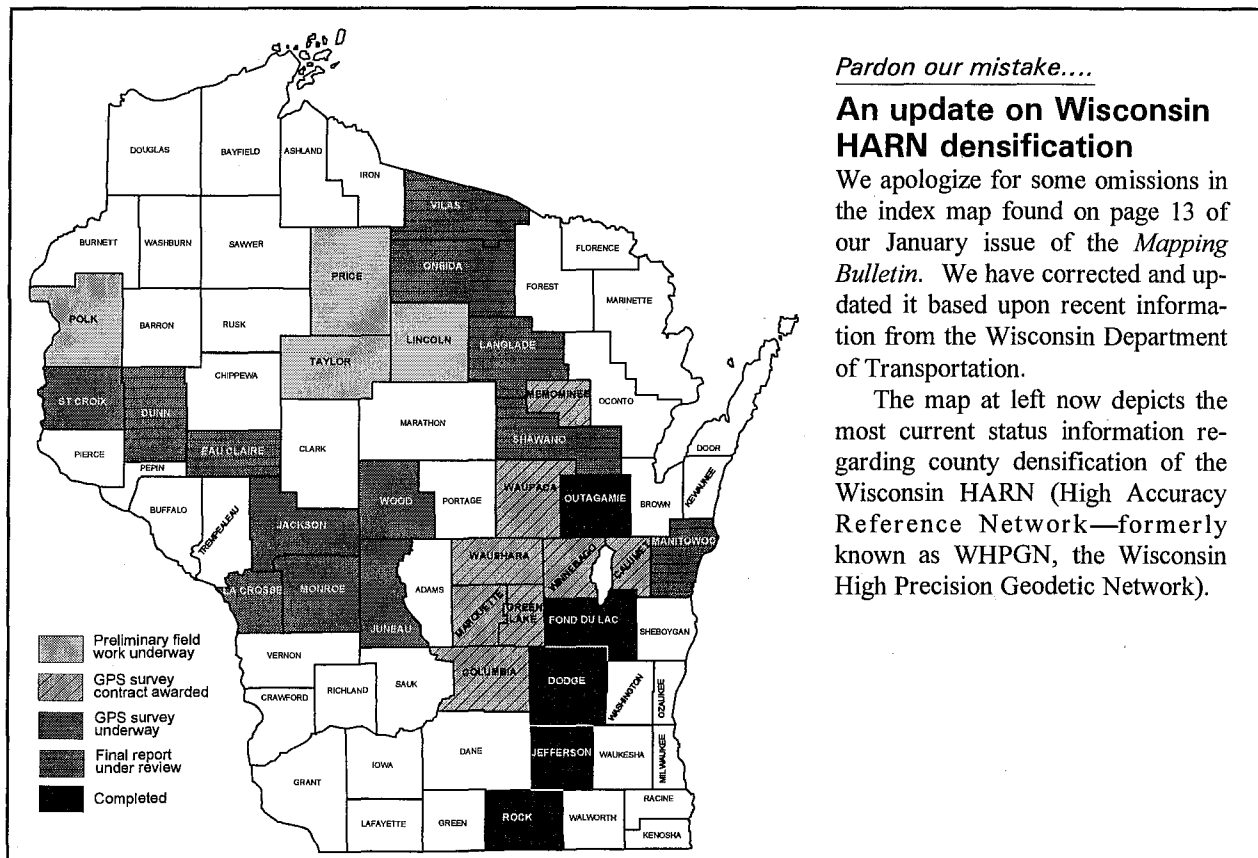
displacement has not been completely ruled out as a cause for the discrepancies. The surrounding HARN stations are in good condition and the ellipsoidal height problems appear to be limited to these specific stations. The published ellipsoidal heights will remain unchanged.

BREED GPS, GREEN BAY GPS, and OCONTO GPS

Discrepancies with these HARN stations were uncovered during a multi-county (Vilas, Oneida, Langlade, and Shawano) densification project. Survey results indicated ellipsoidal height discrepancies during the 1ppm phase of the project, and have been isolated to the southern portion of the project area. Additional observations were performed to satisfy the multi-county project specifications. While the adjustments improved statistically, they did not drastically change coordinate values or fully resolve the original problem. The ellipsoidal height values will not be changed from the published values.

WiDOT has investigated likely causes for these problems, including the original NGS HARN adjustment, contractor adjustments of local densification projects, seismic/crustal movement, etc. Overall, the problem is most likely due to time and technology since the original HARN survey was completed using the GPS equipment and survey specifications of the late 1980's. The specifications have since evolved and together with recent developments in GPS hardware and software, make it possible to uncover discrepancies that were not noticeable in the past.

Anyone experiencing possible problems with HARN stations should call Paul Hartzheim at (608) 267-2462 or fax to him at (608) 267-1859.



Pardon our mistake....

An update on Wisconsin HARN densification

We apologize for some omissions in the index map found on page 13 of our January issue of the *Mapping Bulletin*. We have corrected and updated it based upon recent information from the Wisconsin Department of Transportation.

The map at left now depicts the most current status information regarding county densification of the Wisconsin HARN (High Accuracy Reference Network—formerly known as WHPGN, the Wisconsin High Precision Geodetic Network).

Geodetic Control

Benchmark info going digital

Update on the USGS Transfer Project

by Diann Danielsen

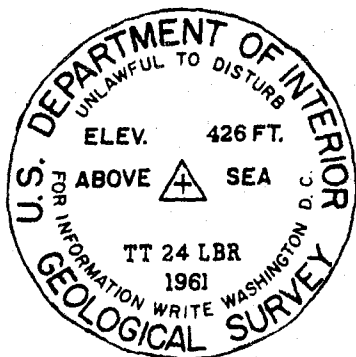
As we reported in our last issue of the *Mapping Bulletin*, support for a federal-state cooperative effort to modernize USGS vertical control information has been overwhelmingly positive. A survey conducted last fall resulted in many offers of support for the project, ranging from labor and equipment to cash and other in-kind contributions.

The project seeks to modernize USGS data by developing an approximate horizontal location for each benchmark, keying in field and other descriptive data, and delivering the information to the National Geodetic Survey for adjustment to the NAVD 88 datum. At that time, the data will become part of the NGS geodetic database where it can be better preserved and made more available to the public.

A WLIB task force has been investigating this project for Wisconsin. Based on survey responses, the task force proposes that the State Cartographer's Office coordinate a test project to address three aspects of the overall project:

- All benchmark locations (approximately 7000 statewide) will be digitized from their plotted locations on 7.5' quad maps.
- A test area will be selected for data entry of field note information, and processing and adjustment by the federal agencies.
- A portion of the state where some data entry has been completed (under an earlier USGS database development project) will be reviewed for incorporation into the project.

The WLIB heard and approved the task force's proposal at its April 6th Board meeting. For more information on the progress of this project, contact the SCO.



Several forms of help are available

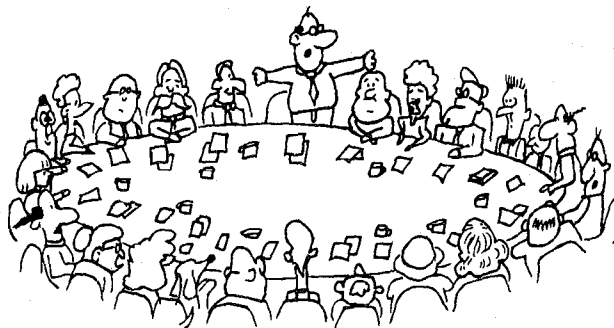
Too many coordinate choices?

by Diann Danielsen

With the redefinition of the Wisconsin Transverse Mercator coordinate system for the NAD 83 datum and the growing use of local county-based coordinate systems, several new products and services have emerged to assist users of these coordinate systems.

One product, a compilation and explanation of coordinate systems currently used in Wisconsin is the **new handbook** available from the SCO, entitled *Wisconsin Coordinate Systems* (see article on page 11).

A coordinate transformation software program called **WISCON** is being developed by the Wisconsin Department of Transportation (WiDOT) to provide all the convenience of CORPSCON (a popular federal software for datum and coordinate transformations) but expanded and customized for the datums and coordinate systems used in Wisconsin. WISCON is currently under early review and testing is expected to be completed in April. The program is scheduled for release this summer and will be available for purchase through the SCO.



Workshops are also planned for early summer. The WiDOT has contracted with Fairview Industries, developer of the Wisconsin County Coordinate System, to conduct educational sessions covering map projections and coordinate systems, the Wisconsin County Coordinate System and its use, a discussion of data transformation methods and issues, and a demonstration of the WISCON software. Two half day workshops are scheduled for June 15 and 16 (the 15th is reserved for WiDOT personnel) at the WiDOT Hill Farms Office Building in Madison. To register for the June 16th *Wisconsin County Coordinate Workshop*, contact Bonnie Stone, WiDOT Office of Engineering Operations, at (608) 261-8605. (Registration is free but limited to the first 30 people.) Other workshops may be scheduled under other sponsorship depending upon response.

For additional information on WISCON, the handbook, or the workshops, contact the SCO.

People & Organizations

Consolidates several offices

DATCP has new state headquarters

The Wisconsin Department of Agriculture, Trade, and Consumer Protection (DATCP) recently moved into its new office building, on Madison's far east side. The new address is 2811 Agriculture Drive (formerly Vondron Road), which runs south off of Plaum Road.

Dubbed the Prairie Oak State Office Building, the new facility is one of several which are planned on a large site located east of Highway 51, west of I-90, and north of Highways 12 & 18. The headquarters for the World Dairy Expo, and several other agriculturally-related organizations, are slated for the construction.

DATCP's primary office was previously on Badger Road on the city's south side, and other office space was on the far west side.

at Mid-Continent Mapping Center

USGS names Asst. Chief in Rolla, MO

Kari Craun has been named as the new Assistant Chief of the U.S. Geological Survey's Mid-Continent Mapping Center (MCMC). Previously, she held various positions at USGS offices in Reston, VA.

Craun has academic background in geology, photogrammetry, and geodetic science. At USGS, she has been involved with program modernization, systems development, and geometronics standards.

The MCMC, located in Rolla, Missouri, has approximately 400 employees. The Center's Chief in recent years, Merle Southern, retired in early January. USGS operates other mapping centers in Reston, VA, Denver, Co, and Menlo Park, CA.

(source: USGS)

Moves from USGS to Census

Joel Morrison switches agencies

by Bob Gurda

We have received word that Joel Morrison, formerly a professor in the UW-Madison's Geography Department, has moved to new high level position in the federal government. He is now Chief of the Geography Division of the Census Bureau in Washington.

Morrison joined the U.S. Geological Survey's National Mapping Division in the early 1980's as head of its Research Division at the national headquarters in Reston, Virginia. As part of recent down-sizing at USGS, the Research Division was eliminated.

Internet "list" for GIS talk

URISA takes over GIS-L

by Bob Gurda

One of the busiest Internet forums in the mapping arena has a new home. GIS-L, a "list" with over 1,000 participants, is now being nurtured by the Urban and Regional Information Systems Association (URISA).

GIS-L is the place where much of the latest, hottest information on GIS is first broadcast. Like other Internet lists, any subscriber receives all of the list's traffic. In the case of GIS-L, this sometimes amounts to 75 messages per day!!

This "list" was initiated by the State University of New York at Buffalo, one of the three nodes of the National Center for Geographic Information and Analysis. Eventually, managing the list became too much of a burden, and URISA stepped in to assume day-to-day management.

Continuing since 1985

DOT retains NGS Advisor position

by Diann Danielsen

The future of Wisconsin's state geodetic advisor has been resolved! The Wisconsin Department of Transportation (WiDOT) has decided to continue funding the state portion of this federal position, which is part of the National Geodetic Survey (NGS).

The current NGS advisor, Dr. D. David Moyer, will continue in this position, which he has held since the inception of the Wisconsin-NGS agreement in 1985. WiDOT will shift responsibility for the agreement from its Division of Business Management to its Division of Highways.

According to John Haverberg, Director of WiDOT's Office of Technical Services, "Following an internal review of this agreement in connection with overall budget determinations, WiDOT is pleased to announce our continued funding support. The services of the NGS state advisor are essential towards defining and implementing the Department's and Wisconsin's land information modernization and integration efforts."

Recent activities of Wisconsin's NGS state advisor include assistance with local geodetic control networks and GIS/LIS implementation. Dr. Moyer serves as an advisory member of the WLIB and is co-chair of the Wisconsin GPS Standards Work Group. He recently completed two terms on the WLIA Board of Directors.

At the national level, Moyer is editor of the FGDC's *Multipurpose Land Information Systems: the Guidebook* and is a member of the Technical Assistance Group of the FGDC Cadastral Subcommittee.

(source: WiDOT)

WISCLINC growing toward on-line service

The WLIP Clearinghouse is born!

by Diann Danielsen

Last September, the Wisconsin Land Information Board (WLIB) received a federal grant to establish a digital spatial data clearinghouse, test and implement the federal metadata standard, and document Wisconsin digital spatial data using the federal standard. The SCO is conducting the work for the WLIB, with cooperation from the Wisconsin Departments of Natural Resources and Transportation, the Wisconsin Geologic and Natural History Survey, the USDA Natural Resources Conservation Service (formerly the Soil Conservation Service), and Dodge, Marathon and Winnebago Counties.

To date, most of the project work has been developmental. This has meant training in the metadata standard and participating in a nationwide Metadata Implementors Meeting, researching available tools to document metadata using the standard, and developing test metadata files. In addition, a Wisconsin "profile" of the federal standard has been developed to customize the standard for more effective use in Wisconsin. We are currently working with our cooperators to identify the actual data sets to be documented and have begun to receive or develop preliminary metadata on sample data sets from each.

On the clearinghouse side, we have installed a UNIX-based workstation at the SCO. This computer, loaned to the project by the Environmental Systems Research Institute regional office in Minneapolis, has been connected to the Internet and configured with the necessary software to enable the machine to act as a Wide Area Information System (WAIS) server.

Our work continues on developing indexing templates and file formats necessary to make the metadata accessible and able to be queried through a computerized clearinghouse. Bucky, Badger, and other favorite names had already been taken, thus we chose WISCLINC (*WISconsin Land INformation Clearinghouse*) as the name of the clearinghouse computer. We have established an "anonymous ftp" account and are developing a project "home page"; these are methods, in addition to WAIS, by which Internet users can reach WISCLINC.

Metadata education has also been a key component of this project, an effort that has been supported by WLIA's (Wisconsin Land Information Association) Metadata Task Force. The SCO and the Task Force arranged for a pre-conference workshop on metadata presented by the Federal Geographic Data Committee, as well as conducting a technical session on the Clearinghouse project, metadata documentation, and WAIS searching at the March WLIA Annual Conference. (The Metadata Task Force also prepared a 4-page educational insert on metadata for the WLIA *Land Records Quarterly* and promoted the metadata theme with a conference button.)

Watch future issues of the *Mapping Bulletin* for information on project developments and making the WISCLINC!

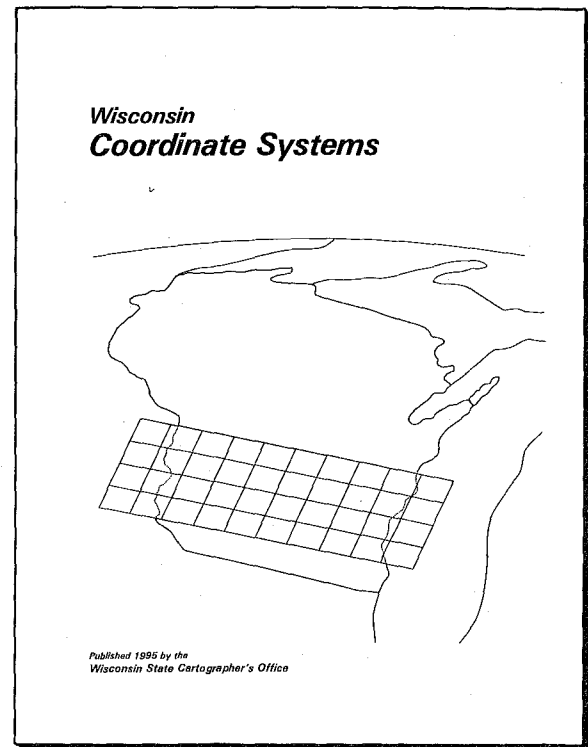
Parameters at your fingertips

New guide to coordinate systems

by Bob Gurda

The SCO has published a new handbook, *Wisconsin Coordinate Systems*. This 91-page document contains both general background information on map projections and coordinate systems, as well as specific coordinate system parameters. It will be useful to people working in surveying, mapping, CAD, and GIS.

In addition to the traditional geographic, State Plane, and Universal Transverse Mercator coordinate systems, this



handbook covers coordinate systems specifically designed for use within Wisconsin. These include the Wisconsin Transverse Mercator Coordinate System, and the new Wisconsin County Coordinate System (an integrated set of local coordinate systems optimized for individual counties.)

The handbook contains listings of the design parameters for each of these coordinate systems. It also explains the rationale for both regional and local coordinate systems, as well as how the new county systems were designed and how they can be used.

Also included is background information on the basics of map projections and coordinate systems, a summary of technical terms, a discussion of geographic coordinate data transformation, illustrations, and a list of suggested readings.

To acquire a copy of this handbook, contact the SCO for an order form. It has a price of \$10.00 plus tax and shipping.

?

I need to collect the geographic position of each of a large number of scattered sites in the field; the feature at each site is visible even on relatively high-altitude photographs. What are the respective positional accuracies I can expect from several alternative techniques: locating on a 1:24,000-scale topographic map; locating on a 1-meter resolution federal orthophoto; and using hand-held GPS in the field?

Each of these methods has its own strengths and weaknesses. For the topo map, you'll only be able to determine a position if the feature is depicted on the map, or if enough adjacent features help provide a clue to location. Well-defined features on the 1:24,000-scale USGS topo maps are typically within 40 feet of their correct position. This is a statistical measure defined under the National Map Accuracy Standards (NMAS), where 90% of such points fall within this tolerance. Your ability to measure accurately and to correctly utilize any of the coordinate grids referenced on the map sheet are additional factors that contribute to the overall error inherent in this method.

The digital orthophotos now becoming available through the national program are made up of pixels (cells with various gray values) representing a ground area of a 1 meter square, controlled (differentially rectified) to achieve NMAS of approximately 33 feet. Since the image will probably show the features you are interested in, overall this approach should yield a more accurate result than the topo map. If you are using the digital file directly with appropriate software, you may be able to record a coordinate from your monitor by selecting a single pixel.

Positioning using GPS can achieve a **wide** range of results. Depending on the receiver(s) and techniques used, results can vary from sub-centimeter to hundreds of meters in positional accuracy. Thus, the simplest GPS receiver used in the simplest mode won't result in as good a position as you can derive from the topo map. Similarly, better equipment and procedures will produce better results.

While GPS provides an opportunity to develop more accurate coordinates, you also have to invest time in the field. If your points of interest are separated by significant distances, or are located away from roads, your time travelling between points will represent a considerable proportion of the data collection cost. On the other hand, if you can't detect the features on the topo maps or on the orthophotos, you may have no other choice but to go to the field.

The entire range of geo-positioning options are discussed and compared in the 1993 booklet *The Geo-Positioning Selection Guide for Resource Management* (65 pages) available free from the federal Bureau of Land Management. See the January 1995 issue of the *Bulletin* for details.

Editor's Note: If you have a question, or had a question for which you found an answer that might be of interest to others, please let us know.

?

We will be acquiring digital orthophotos soon. Our contractor says that something called a digital elevation model is created in the orthophoto mapping process, and that this data can be useful for a variety of purposes. Can you tell me something about digital elevation models, and how we might use them?

Digital elevation model (DEM) is a name given to a collection of points representing the ground terrain. Each point in this collection has a horizontal location (expressed as an x, y value, usually in a known coordinate system such as State Plane or UTM), and an associated vertical elevation value (z) measured in feet or meters. Together, this collection of points provides an approximate representation or model of the earth's surface. With today's automated mapping technologies, these points are typically collected and stored in a computer system.

DEM data are most often compiled from overlapping pairs of vertical aerial photographs referenced to the earth's surface through geodetic control, although they can be collected by other means also. DEM data collection is one of the photogrammetric mapping steps necessary to produce an orthophoto.

While the term digital terrain model (DTM) is often used interchangeably with DTM, many people in the mapping sciences draw a clear distinction between a **DEM** and a **DTM**.

Both a DEM and DTM are digital data sets of x, y, z values approximating the shape of the earth's surface. In a DEM, each point's horizontal location is generally based on a regular sampling interval such as grid. As an example, DEMs prepared for the National Digital Orthophoto Program are based on points collected at a ground interval of 30 meters. These DEMs are compiled from photographs (usually 1:40,000-scale NAPP photos) or from an existing 7.5' (1:24,000-scale) quadrangle map contour separation. DEM accuracy is very dependent upon the horizontal interval spacing, and the quality of the source (photography or map contours).

In a DTM, the set of x, y, z data points are collected in an irregular pattern based solely on nature of the terrain. Two different types of points are collected—**mass** and **breakline**. In areas of rapidly changing terrain, mass points are collected frequently with no set horizontal interval. In areas of flat terrain, points are collected less frequently. In addition to mass points, a complete DTM includes breaklines, or points defining abrupt changes in slope, such as ridges, ditches, curbs and walls. Generally, a DTM method of modeling will provide a better representation of the terrain since mass and breakline points are more sensitive to surface changes than are DEM points collected at a regular horizontal interval.

In addition to being a necessary component of producing an accurately scaled orthophoto, a DEM/DTM can serve a variety of other technical analysis applications. Obviously, this data provides an excellent tool for analysis as well as for displaying computerized map data in its three-dimensional context.

Probably the most common use of DEM/DTM data are for the automatic generation of contours. Many GIS and mapping software packages have this capability. In addition, with proper software, DEM/DTM data are highly useful for determining direction and steepness of slope, developing terrain profiles, calculating drainage runoff and flooding potential, determining terrain profiles between points, and calculating earth volume measurements such as cuts and fills.

Analyzing the GIS Jobs Situation

For this issue, we talked with Professor William Huxhold of the University of Wisconsin-Milwaukee.

Bill, you presented some information on GIS jobs and GIS job seekers at the recent WLIA conference. For the benefit of people who couldn't attend, what were the key points?

Bill—

It's interesting that there appear to be a number of mismatches out there, especially between what employers are looking for as compared to what applicants can offer. This means that either we have to change how we're training students, or we have to hope that the work environment changes.

For example?

Bill—

Employers, based on an analysis of job announcements posted at last summer's URISA conference, appear to be looking for a high level of skill in UNIX administration and relational data base administration, in addition to GIS. This is a rare commodity in the current work force, and few students manage to master all these skills during their college years. It is quite a feat to be good at both!!

...two-thirds of local governments across the country either already have GIS or are seriously considering one.

Is it logical to expect that enough people can be trained with this mix of skills, to meet the demand?

Bill—

Probably not. First of all, a study conducted by the International City Management Institute, published in the *URISA Journal* recently, indicated that two-thirds of local governments across the country either already have GIS or are seriously considering one. That is a huge demand, without even considering other types of organizations. It may be that many governments need a

person who can handle UNIX because they don't support it now as part of other information management; perhaps this will change, so that the GIS people can rely on someone else in that area.

...to remain successful, people have to keep on learning.

What other mismatches are out there?

Bill—

Of the URISA job postings, 64% were from the facilities management/infrastructure sector; however, these employers primarily are looking for people with degrees in Geography/Cartography or Computer Science. Maybe the assumption is that people without experience in the utility business can adapt, given a certain educational foundation.

How important is work experience?

Bill—

All the URISA job announcements required at least 2 years of experience! We don't know, of course, if employers are finding that the pool of candidates meets this level of experience. However, this implies to me that student internships are about the only means available to provide students with a critical path to employment. At UWM, we are seeing an increase in internship opportunities, and they have diversified to include some in industrial and real estate applications.

The GIS field has evolved rapidly. What implications does that have?

Bill—

It means that to remain successful, people have to keep on learning. An employer who fails to recognize this and to provide for it may experience a high rate of staff turn-over. Here, short courses can work well. However, my experience with people who are trying to make a career change on their own, through GIS short courses, is that it is an extreme challenge.

What kind of salaries are showing up in job announcements?

Bill—

Starting salaries often aren't terribly attractive, although potential for growth is significant. Of 161 URISA members who answered a survey last summer, the average years of experience was 12 years, and 70% had annual salaries over \$40,000. About half of these people have degrees in urban planning or geography/cartography, so obviously, they have picked up their other technical skills along the way.

Do you have an over-riding concern in all of this?

Bill—

I'm concerned that employers are placing too much emphasis on the technical skills of computer management, as compared to the skills of understanding and manipulating geographic information in the broad sense. Both types of skills are needed but I'm afraid that it is difficult to find them in one person. Hopefully this situation will take care of itself as GIS operations grow in size and acquire dedicated computer support staff, or as the information systems departments in these organizations become more involved in the GIS operation and therefore provide the much needed technical support.

In our initial Guest Opinion column three years ago, Dave Fletcher advised that "People are the single most important ingredient for success. Make your greatest investment in educating, training and communicating with them". Speaking for the entire GIS community, we appreciate your efforts in helping address the issue.

Bill Huxhold is an Associate Professor of Urban Planning at the University of Wisconsin-Milwaukee. Previously, he managed the City of Milwaukee's GIS system, one of the first in the country. Known as "Hux" to his many friends in the GIS community, he has served as President of URISA, and as a member of the Wisconsin Land Records Committee.

Events

Another successful event!

1995 WLIA Annual Conference

by Diann Danielsen

The eighth annual conference of the Wisconsin Land Information Association (WLIA) attracted over 500 land information professionals to Middleton last month, continuing WLIA's tradition of highly successful annual meetings. Six pre-conference workshops were held on February 28 and attended by 121 people. In fact, the digital orthophoto workshop was literally standing room only!

The conference keynote speaker was George Meyer, DNR Secretary, who addressed attendees on the linkage between land use management and land information.

Conference evaluations noted overall satisfaction with the speakers and technical sessions as well as with the exhibits and business demonstrations. "Breakfast with the Board" was held on the last day of the conference, offering WLIA members an opportunity to ask questions of the Land Information Board's members and staff. The specific challenges currently facing the Board were noted as state-wide public agency integration plans, technical assistance, program benefits awareness, and improvements in program administration. WLIA member questions centered around the status of WLIP guidelines for updating county plans and problems with the WLIP annual survey.

Topics were similar at the WLIA Town Meeting, with more detailed discussion of technical assistance needs and ideas for meeting those needs. Also discussed were updating WLIP Foundational Elements to reflect current GIS implementation and applications, and ideas for dispensing accumulated WLIP funds. There was also an update on Governor Thompson's Executive Order 242 concerning information technology, and the Joint Finance Committee's review of all state Boards and Councils.

Six new (or returning) directors for the WLIA Board were announced at the conference: Diann Danielsen, State Cartographer's Office; Andy Erdman, Jefferson County; Georgia Hopf, WLIP; Lynn Martens, Oneida County; Glenn Meyer, Waukesha County; and Steve Ventura, UW-Madison. WLIA members also chose Mike Hansen, Wood County, as President-Elect.

June meeting to focus on GPS

WLIA to visit Hudson

by Diann Danielsen

The next meeting of the Wisconsin Land Information Association will be held on June 8 and 9 at the Best Western Hudson House in Hudson. The educational theme is focused on the use of Global Positioning System (GPS) technology. Thursday evening plans are for operating stations to be set up outside the meeting facility to demonstrate various types of GPS receivers, ranging from hand helds to mobile tracking systems to geodetic quality equipment. Friday's session will demonstrate post processing software. For more information, contact WLIA at 800-344-0421.

Project Report

Broadening drives subtle name change

WISCLAND becomes WISCLAND

by Bob Gurda

Hydrography. Floodplain mapping. Soil Survey. Wetlands Mapping. Landnet. These are all new aspects of WISCLAND, and other geographic themes of the state's landscape may be added.

WISCLAND, a major collaborative GIS development project, is broadening its scope. As part of this evolution, part of its name is being changed although the acronym will not be altered. Previously, WISCLAND stood for the Wisconsin Initiative for Statewide Cooperation on Land cover ANalysis and Data.

Now, the words "Land cover" will be replaced by "Landscape" to reflect the broader approach. No matter which landscape theme, the goal is to serve multiple needs developing data and analysis tools in a GIS environment by—and then to maintain and enhance these over time.

Land cover data development and related analysis will remain the primary production activity of WISCLAND for the near future; this work is supported by funding commitments from a variety of organizations. WISCLAND has also been addressing the areas of land use information as well as digital orthophotos and elevation data. Like land cover, these efforts will be part of the broadened approach.

By diversifying, WISCLAND hopes to accomplish several things: interesting a larger set of organizations in co-operating; gaining funds for data development and maintenance that are not tied to any one specific landscape theme; improving and publicizing the coordination efforts and data integration among the landscape theme layers.

WISCLAND seeks to include any and every organization interested in one or more of the landscape themes. A work group is being organized for each theme.

The work groups will assess the current situation across Wisconsin in terms of data and user needs, evaluate alternative technical approaches, identify impediments and opportunities for collaborative funding, and work toward an integrated approach amongst each other.

WISCLAND itself does not conduct any development work, and does not maintain any data. For each landscape theme, one or more organizations take the lead, while they and various cooperators will provide resources.

To accommodate the work groups in WISCLAND's operating structure, the Steering Committee will shift to concerns at a more general policy and management level. Changes will be made to WISCLAND's *Articles of Participation* to reflect this evolution, and additional organizations can join WISCLAND by signing the revised *Articles*.

Any organization that wants to benefit from useful data and analysis tools should become involved during this planning and design phase. Contact me at 608/262-6850 for further information.

Selected* Conferences, Technical Meetings, and Classes

May 7-10, **1995 National GeoData Forum** will be held at the Hyatt Regency Hotel, Crystal City, VA. Contact: The Federal Geographic Data Committee Secretariat, 590 National Center, Reston, VA 22092 at 703/648-5755, fax 703/648-5755.

May 9-10, **Introduction to ArcView 2** will be held in Madison, WI. Contact: Tom McClintock at 608/263-5534; fax 608/262-2500.

May 10-12, **Third Annual Pennsylvania GIS Conference** will be held in State College, PA. Contact: Pennsylvania State Harrisburg Office of Continuing Education, 777 W. Harrisburg Pike, Middletown, PA 17057, 717/948-6505, fax: 717/948-6276.

May 15-16, **GIS in Natural Resources** will be held at the Land Information and Computer Graphics Facility (LICGF) on the UW-Madison campus. Contact: Tom McClintock, LICGF, B102 Steenbock, 550 Babcock Dr., Madison, WI 53706, 608/263-5534; fax 608/262-2500.

May 22-23, **Document Management** will be held at the Wisconsin Center, 702 Langdon Street, Madison, WI. Contact: Program Director, Richard Vacca at 608/262-4341 or Program Assistant, Rose Richgels at 608/262-0320.

May 22-25, **Introduction to Workstation ARC/INFO** will be held at the Geographic Information Systems Research and Development Center, UW-River Falls, WI at 715/425-0635, fax: 715/425-4479.

May 22-26, **ESRI 15th Annual User Conference** will be held at the Wyndham Hotel and Palm Springs Convention Center in Palm Springs, CA. Contact: Environmental Systems Research Institute, User Conference Registration, 380 New York Street, Redlands, CA 92373 at 909/793-2853.

May 24-26, **Mobile Mapping Symposium** will be held at the Hyatt on Capital Square in downtown Columbus, OH. Contact: Kathleen R. Wallace, Center for Mapping at 614/292-4897 or write them at mms@cfm.ohio-state.edu.

May 24-28, **Canadian Cartographic Association Conference** will be held in Calgary, Alberta. Contact: Michael R. C. Coulson, University of Calgary, Dept. of Geography, Calgary, Alberta, Canada T2N 1N4, 403/220-5584, fax: 403/282-6561.

June 5-9, **Integrated Imaging Technologies for Geographic Information System (GIS) Data Development** will be held at Engineering Hall, Room 1800, 1415 Johnson Drive, Madison, WI. Contact: Program Director, Robert T. Fey at 608/262-8592.

June 6, **Water Resources Planning and Management: Integration and Partnership** will be held in St. Cloud, MN. Contact: 612/654-5270.

June 7-8, **Wisconsin Land Information Board Meeting and Strategic Planning Retreat** will be held in Wisconsin Dells, WI. Contact: WLIB at 608/267-2707.

June 7-8, **Eighth Annual GIS Conference** will be held in Towson, MD. Contact: John M. Morgan III, Towson State University, Dept. of Geography and Environmental Planning, Linthicum Hall, Rm. 30, 8000 York Rd., Towson, MD 21204-7097, 410/830-2964, fax: 410/830-3888.

June 7-9, **Use of GIS, Remote Sensing and Simulation Models in Watershed Planning** will be held in St. Cloud, MN. Contact: GIS Center, St. Cloud State University, St. Cloud, MN 56301-4498, 612/654-5270, fax: 612/654-5198.

June 8-9, **Wisconsin Land Information Association Quarterly Meeting** will be held at the Best Western Hudson House Inn, Hudson, WI. Contact: WLIA at 800/344-0421.

June 10-15, **The 7th Canadian Conference on GIS** will be held in Ottawa Congress Centre. Contact: Rose Barthe, Conference Manager, 615 Booth Street, Ottawa, Ontario Canada K1A 0E9, phone: 613/996-2817, fax: 613/947-7059.

June 13-15, **17th Canadian Symposium on Remote Sensing** will be held in Saskatoon, Saskatchewan, Canada. Contact: Jeff Whiting, Saskatchewan Research Council at 306/933-5423, Fax: 306/933-7817.

June 19-20, **Introduction to ArcView 2** will be held in Madison, WI. Contact: Tom McClintock at 608/263-5534; fax 608/262-2500.

June 29, The **WISCLAND Steering Committee** will meet in Madison from 1-4pm. Contact Bob Gurda at (608) 262-6850 for details.

July 15-20, **URISA '95 Annual Conference** will be held in San Antonio, TX. Contact: Urban & Regional Information Systems Assn., 900 Second St. N.E., Suite 304, Washington, D.C., 20002, 202/289-1685.

August 6-9, **4th International Symposium on Large Spatial Databases '95** will be held in Portland, ME. Contact: Kathleen Hornsby at 207/581-2149, fax: 207/581-2206.

August 13-15, **AM/FM International 1995 Executive Management Symposium** will be held in Lake Tahoe, NV. Contact: Gayle Burstein at 303/337-0513; fax 303/337-1001.

August 16, **Wisconsin Land Information Board Meeting** will be held in Madison, WI. Contact: WLIB at 608/267-2707.

September 3-9, **17th International Cartographic Conference, "Cartography Crossing Borders"** will be held in Barcelona, Spain. Contact: A. J. Kimberling, fax: 503/737-1200.

September 7-8, **Wisconsin Land Information Association Quarterly Membership Meeting** will be held at the Grand Geneva Conference Center in Lake Geneva, WI. Contact: WLIA at 800/344-0421.

September 16-19, **National State Geographic Information Council (NSGIC) Annual Conference** will be held in Burlington, VT. Contact: William S. Holland at 608/267-2722, fax 608/267-0626.

September 27-29, **1995 Midwest/Great Lakes ARC/INFO Users Conference** will be held at the Chancellor Hotel and Convention Center, Champaign, IL. Contact: Illinois State Geological Survey, 615 East Peabody Drive, Champaign, IL 61820, phone 217/ 333-4085.

October 17, **Wisconsin Land Information Board Meeting**, (Grants to be awarded) will be held in Madison, WI. Contact: WLIB at 608/267-2707.

November 13-15, **PC ARC/INFO Advanced Course(595)** will be held at the Geographic Information Systems Research and Development Center, UW-River Falls, WI at 715/425-0635, fax: 715/425-4479.

November 13-17, **GIS/LIS '95 Annual Conference and Exposition**, (sponsored by AAG, ACSM, AM/FM International, ASPRS, and URISA) will be held in Nashville, TN. Contact: GIS/LIS '95, 5410 Grosvenor Lane, Bethesda, MD 20814-2112, 301/493-0200, fax 301/492-8245.

December 7-8, **Wisconsin Land Information Association Quarterly Meeting** will be held at the Heidel House Resort and Conference Center in Green Lake, WI. Contact: WLIA at 800/344-0421.

December 11, **Wisconsin Land Information Board Meeting** will be held in Madison, WI. Contact: WLIB at 608/267-2707.

1996

March 4-7, **Wisconsin Land Information Association's Annual Conference** will be held at the Oshkosh Hilton & Convention Center in Oshkosh, WI. Contact: WLIA at 800/344-0421.

April 22-24, **ASPRS/ACSM Annual Convention and Exhibition** will be held at the Baltimore Convention Center, Baltimore, MD. Contact: American Congress on Surveying and Mapping, 5410 Grosvenor Lane, Suite 100, Bethesda, MD 20814.

**For much more extensive and/or more current listings, separated into Foreign, National, and Wisconsin, consult the SCO's BBS (see p. 16)*

About the SCO...

The State Cartographer's Office (SCO), established in 1973, is a unit of the University of Wisconsin-Madison. The SCO is located on the 1st Floor of Science Hall.

Our permanent staff consists of five people—Ted Koch, State Cartographer (608/262-6852), Bob Gurda, Assistant State Cartographer (608/262-6850), Diann Danielsen, Outreach Specialist (608/262-8776), Brenda Hemstead, Administrative Assistant (608/262-3065), and Liz Krug, Program Assistant (608/262-3065), plus several part-time graduate and undergraduate students.

The State Cartographer's position and mission is described in Wis. Statute 36.25 (12m). In addressing this role, the SCO functions in a number of ways:

- publishes the *Wisconsin Mapping Bulletin*, catalogs, guides, brochures, and other documents to inform the mapping community.
- inventories mapping practices, methods, accomplishments, experience, and expertise, and further acts as a clearinghouse by providing information and advice in support of sound mapping practices and map use.
- participates on committees, task forces, boards, etc. The State Cartographer is one of the 13 voting members of the Wisconsin Land Information Board.
- develops experimental and prototype products.
- serves as the state's affiliate for cartographic information in the U.S. Geological Survey's Earth Science Information Center (ESIC) network.

About our BBS...

The SCO has an electronic bulletin board system (BBS), as another means of making information available. You can use it to browse standard information, check on late-breaking news and upcoming events, download copies of our files and free software, and to interact with other BBS users on various mapping-related topics as they emerge.

You access our BBS with a telephone call from any remote computer that is connected to a modem and operated through basic communications software. An ordinary personal computer will suffice; a modern modem will give you faster response and reduce the length of your connect time.

The telephone number is 608/265-2807, and your modem settings need to be N, 8, 1; the modem on our end operates up to 14.4 K baud. Don't try calling the BBS directly from your telephone!! If you need help getting started, contact us at 608/262-3065.

On your first call to the BBS, you will enter your name and choose a password, then be briefed on how the BBS works. Then you can go exploring.



Wisconsin Mapping Bulletin

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News is welcome on completed or ongoing projects, published maps or reports, or conferences/workshops. Local and regional information is especially encouraged. The Editor makes all decisions on content. Deadline for the next issue is June 30, 1995

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