



Wisconsin MAPPING BULLETIN

SCO's Bulletin Board Debuts

by Jim Lacy

Are you looking for information on the next WLIB meeting? Need some basic information on GPS base stations? Perhaps you would like to acquire an updated version of the NADCON software? For answers to these and many more questions, turn to the SCO's newest service.

On March 1, 1994, we will debut an electronic Bulletin Board System (BBS). With your personal computer, a modem, and basic communications software, you will have on-line access over your telephone line to much of the information we collect, maintain, explain, and distribute. In addition, you will be able to join an interactive community of people who want to learn from each other about mapping-related topics.

Electronic bulletin boards have sprouted all around the world, now numbering nearly 50,000 in the United States alone. They are designed to facilitate communication and the exchange of information between users. The subject matter of these Boards varies from special interest topics such as astronomy and ham radio, to general purpose "chat" boards. Many businesses now maintain a BBS for customer technical support and product update information.

Contents will be diverse

We believe that a BBS is an efficient, and cost-effective means to provide you with better, and more up-to-date information. What types of information will we post on the BBS? Examples include:

- late breaking news
- calendars (upcoming events)
- brief technical background on mapping topics (aerial photography, base maps, surveying, digital data, etc.)
- status of various projects
- lists of learning resources (textbooks, periodicals, classes, videos, etc.)
- background on professional organizations (WLIA, ASPRS, URISA, et al)
- description of SCO products and services (catalogs, brochures, software, demos)

Beyond the information we post, the BBS will provide a means for individuals in the GIS, surveying, and mapping fields to communicate with one another. Through the use of public message "bases," you can post questions and comments regarding any mapping topic. Just as with a traditional thumb tack-and-paper bulletin boards, these messages are posted for everyone to see. Other people are then free to respond with their own comments. We hope everyone will take advantage of this excellent opportunity to communicate with their peers!

Many BBS's, including the SCO BBS, offer libraries of shareware ("try it before you buy it") and public domain software. A user may "download" a file from the bulletin board to his/her own computer. On the SCO BBS, we will make available several federal software packages available in addition to our own demos on orthophotography and digital elevation models. Users may also "upload" their own shareware or public domain packages to add to the software holdings of the BBS.

Getting Started

The SCO BBS runs 23 hours a day, seven days a week. (The Board is "down" between 3 and 4 a.m. every day for routine maintenance.) There is no charge to use the BBS; you pay only for your telephone connect time (assuming a long-distance call).

To log on, set your communications software for eight data bits, no parity, one stop bit (8,N,1) and dial the Board at (608) 265-2807. The BBS supports speeds up to 14,400

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STATE LAND INFORMATION NEWS

WLIB News

by Bob Gurda

County participation now 100%

In December, the Vernon County Board voted to join the the Wisconsin Land Information Program, and since that time has been retaining 2/3 of the program fees collected. All 72 counties are now participating in the program.

Board Meetings

Since our previous report, the Wisconsin Land Information Board has met twice: November 18 and January 10. Upcoming meetings have been scheduled for March 23 (afternoon hearing), April 18, and June 13-14 ("retreat").

Staff expansion

Effective this fiscal year, the WLIB received authorization to increase its staff from 2.5 to 4.0 "full-time equivalents". Sue Simons was converted to full time from half-time, and the remaining position allocation has been under consideration but as of yet no hiring has taken place.

As we reported in the previous issue, the WLIB staff has had a change in its administrative location within the state Department of Administration. Its new home, the Division of Finance and Program Management, has a new administrator, Kathy Hertz, who previously headed the same division's Bureau of Information Technology Management.

Revised contact information

As part of its shift in administrative home, the WLIB staff has relocated from the 6th to the 8th floor of the State Administrative Building, 101 E. Wilson Street, Madison, 53707-7844. The telephone number remains 608/267-2707, but the fax number is now 608/267-0626.

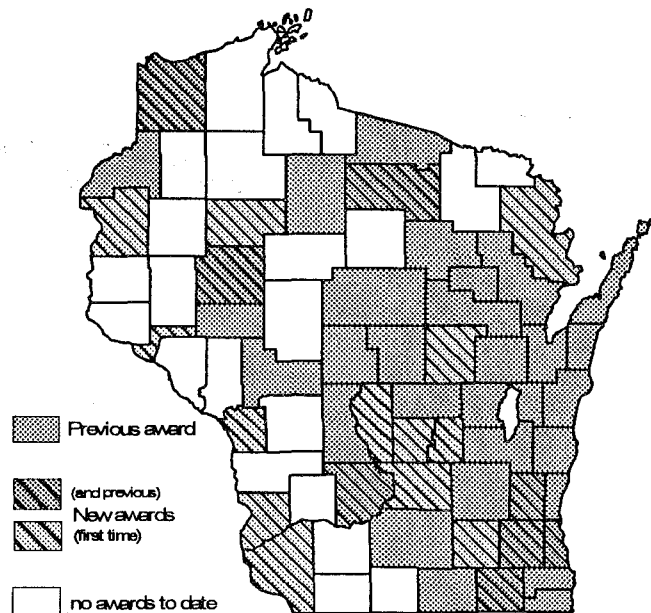
Membership update

Governor Thompson has reappointed, for six-year terms, the three WLIB members whose terms expired in 1993: John Laub, Les Van Horn, and Michael Hasslinger. State Representative Bob Welch, who was appointed to the WLIB for a two-year term in 1989 and reappointed to a six-year term in 1991, resigned from the board in November, 1993; a replacement has not been appointed. Welch is campaigning for election to the U.S. Senate this autumn.

The board has several new members representing state agencies: Nick Neher (DATCP), Terry Mulcahy (DOT), Ron Semmann (DNR), George Lightbourn (DOA) and John Bilotti (DOR). These members were designated by their respective department secretaries to replace previous designees, in response to a call from Department of Administration Secretary James Klauser for agencies to have high level staff as WLIB members.

State agency integration plans

To help state agencies develop effective and consistent land information integration plans, the board's Integration and Clearinghouse Committee sponsored a full-day workshop on February 1. Eleven agencies need to meet a statutory requirement to submit plans to the WLIB this spring.



Counties of new and previous WLIB grants awards, as of December, 1993.

Grant awards

On November 18, the WLIB awarded a total of \$1,440,200 in grants to 23 applicant organizations (primarily counties). Grant amounts varied between \$35,000 and \$100,000.

Fifty of the state's 72 counties have now received at least one grant award from the WLIB. Thirteen of these 50 recipients won their first grant in the most recent application period. The index map above illustrates the geographic distribution of grant awards to date.

Combining the latest awards with the previous four grant award periods, the WLIB has allocated a grand total of almost \$5 million in slightly more than two years.

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STATE LAND INFORMATION NEWS, *continued*

Since many grant requests include co-funding from other sources, and since local governments can utilize their retained program fees for similar activities, the actual amount being invested in land information modernization activities across the state far exceeds the \$5 million in grants.

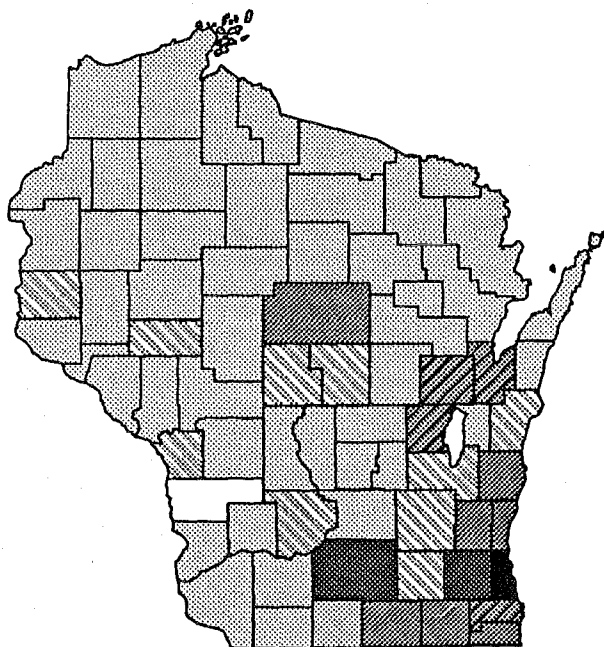
The next set of grant awards will be made this spring, drawn from 19 applications received during January. The total amount of these requests is almost \$1.79 million. There are a number of first-time applicants.

Funding legislation advances

The legislature has continued to consider AB 662, the bill that would remove the June, 1996 "sunset" on the state land information program's funding. After passing successfully through the Assembly and the Joint Committee on Finance, it reached the Senate in late October. Recently, a Senate committee approved the bill by an unanimous vote (5-0). Achieving a positive vote by the full Senate now remains the only step prior to a decision by the governor to either sign or veto the bill.

Retained fees analysis

For the last full state fiscal year (July '92 - June '93), counties participating in the state's land information program retained a record total of \$4,884,934. The amount collected by a given county depends on the number of documents recorded at its Register of Deeds office, which in turn depends on factors such as the rates of real estate transfers, mortgage refinancings, and land subdivision.

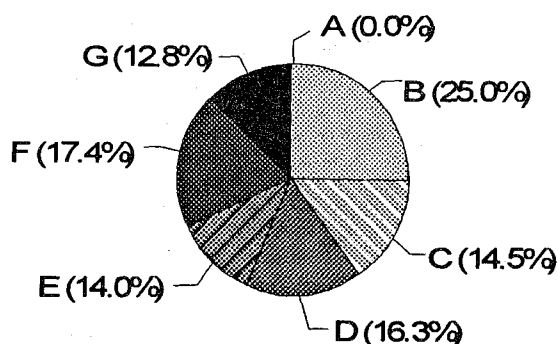


Generally, urbanized counties (more parcels, plus higher rates of sales) far exceed the more rural counties in program revenue collections. (Note: since Vernon County was not yet participating in the program, it could not retain any of the fees it collected).

The high level of document filings of last fiscal year appears to be continuing so far this year. Continued low mortgage rates and high real estate activity are mostly responsible for this effect.

Over the first three full years of document fee collections (July 1990 through June, 1993) counties together retained over \$10.7 million. The pie chart, table, and map below illustrate that the amount of fees retained by counties varies across a wide range, and that there are some obvious regional differences. There are several natural groupings of counties based on the level of fees retained, which we have used to form the categories shown.

Group	no. of counties in group	dollar amount (in thousands) retained per county	
		Range	Average
A	1	0	0
B	47	5-116	57
C	10	134-189	155
D	7	215-298	248
E	4	322-467	375
F	2	899-965	932
G	1	1368	1368



Distributions of Wisconsin Land Information Program revenues retained by counties, July, 1990 - June, 1993.

Bulletin Board Debuts, *continued from page 1*

14.4K) baud. Slower modems (e.g., 2400 baud) will work fine, but a higher speed modem is recommended.

The first time you connect, you must enter some basic user information (your name, the password you wish to use, where you are calling from, etc.) Remember your password! You will need it for future calls. You will also be asked to supply your preferences for screen length, colors, and several other technical options.

Structure of the SCO's BBS

Our BBS is logically organized using a series of menus and submenus. Initially, the range of choices may seem confusing, but after a few calls the process becomes routine. The holdings and functions of the BBS can be categorized into four sections: SCO information and services, public message bases, private e-mail, and files.

The SCO information and services section provides access to broad topics including information about the SCO, technical briefs on mapping topics, learning resources, upcoming events, SCO products and services, non-profit organizations and the Wisconsin Land Information Program.

Using submenus, each of these areas is further subdivided into more specific topics. For example, the technical briefs submenu allows you to view information on aerial and satellite imagery, surveying and geodesy, maps and mapping, digital data, GIS/LIS, metadata, and legal issues. Look for the information and services section to grow quickly in the coming months as new information is added!



Join our "virtual community"

You may post comments in a variety of public message bases by selecting the (M)essage base option from the main menu. We currently have ten message areas that include topics such as new job postings, equipment for sale, WLIA, and WLIB,

and user-to-user help. To post a message, first select an (A)rea, then choose (P)ost. You will be prompted to specify another user as the "receiver" (type 'all' to send a message to all users), and to identify the message's subject. Note: a message entered in a public message base is visible to all users, even if it is addressed to a specific individual.

If you wish to send private e-mail to another user, select the (E)-mail option from the main menu. To send an e-mail message, simply select (S)end from the E-mail menu. You will be prompted for a receiver and a subject.

If you plan to read/post messages frequently, you may wish to use an off-line mail reader software package (we

have a shareware version on the BBS that you can download, called `bwave212.arj`). An off-line mail reader reduces your on-line time (and long-distance phone bill!) by allowing you to upload prepared messages and download posted messages for later viewing and/or printing.

You may also access a variety of shareware and public domain software packages, including the SCO orthophotography and MicroDEM demo diskettes, by choosing (F)iles from the main menu. There currently are 13 file areas from which you may choose. To browse an area, select (L)ist files. While viewing the list, you may (T)ag files for later download. After you are finished browsing the files, simply select (D)ownload from the files menu to begin the download. We also encourage our users to upload any shareware or public domain mapping/GIS packages that others may find useful!

As always, we welcome your comments and questions! If there are any additional topics or features you would like to see, leave a message for the system operator (Sysop) or give us a call at the SCO.

Looking for the right modem?

The best advice to anyone shopping for a modem? Don't even consider anything slower than a 14,400 baud! The prices of high-speed modems have dropped dramatically over the last six months. Prices for new, high quality "14.4K" modems typically start at \$150.

The technical jargon associated with modems can be overwhelming for the novice. The main features you want are "V.32bis" and "V.42bis/MNP 2-5 error correction/data compression." Briefly, V.32bis is a protocol that determines how your modem communicates with other modems; error correction allows your modem to handle noisy phone lines, and data compression allows your 14.4K modem to achieve effective speeds (throughput) of up to 57,600 bits per second. (That's 48 times faster than your old and dusty 1200 baud modem!)

You must also decide whether you want an "internal" or "external" modem. Internal modems plug into a slot inside your computer, whereas an external modem connects via a cable to a serial port on the back of your computer. One word of caution regarding high speed external modems: check if your serial card can support high speeds (ask your computer dealer if you're not sure). If it doesn't, a fast serial card is about \$50.

Most modems come packaged with basic communications software, and in addition, many modem manufacturers now include trial memberships to national on-line services such as CompuServe and Prodigy.

Need help?

As the SCO BBS "sysop" (system operator), I will try to help you make best of this new resource. Look for my messages on the BBS, or if you're having trouble getting connected, call me at the SCO. Good luck, and we hope to see you "on-line" with us soon!

The Wisconsin Land Information Journey

by Nancy von Meyer*

The keynote speaker at the recent GIS/LIS conference in Minneapolis was Anne Bancroft. She talked about her trip to the South Pole with the Women's Polar Expedition. One of her observations about the carefully planned, arduous trip reminded me of the work we are doing in Wisconsin.

"The South Pole belongs to no one, but the Journey belongs to us all."

If we think of this in terms of land records modernization, we are on the Wisconsin Land Information Journey. The data, the processes, the association, the boards, the computers, the grants, the soft-

Technology will come and go, administrations will come and go, but the data will persist.

ware don't really belong to anyone. It is the Journey of making government better, improving land records, and changing our offices that is our legacy.

This Journey belongs to those who have committed to experience it. That means all of you who have wrestled with the problems, who have come up with the ingenious solutions, who have tried and failed and then tried and succeeded, who stuck with it even when it seemed like all was lost, and who have brought others along with them.

By participating in the Journey, you are empowered to make the decision about where it will go next. This is your Journey. Some of the things we have experienced so far give us direction on where to go next. I think there are three clear lessons that will help us choose well.

We know for sure that this is about data. At least 85 percent of the resources we spend in time, in education, and in dollars is on data. This is the longest lived aspect of land records. Technology



will come and go, administrations will come and go, but the data will persist. Data content standards will serve us long after administrative procedures have expired.

We also know that specific funding mechanisms will not determine the Journey's success. We have made sufficient progress in building community and establishing the Journey so that we can not be held hostage to any particular funding procedure. Certainly if we have to find new ways to go forward it will slow us down a bit, but it will not stop us. The momentum of what you have started is too great to be stopped.

Lastly, we know that community established procedures and standards make policy. The things that we do will become the policy for those who come after us. John Naisbitt, the author of *Megatrends*,

The procedures and standards we establish will be used by people, who today, don't even know what land information systems are.

says that once fifteen percent of the people are doing anything, it is no longer a trend, it is a done deal. That means that five to ten percent set the stage. The procedures and standards we establish will be used by people, who today, don't even know what land information systems are.

The early settlers of the West stopped from time to time to establish settlements for those who would come behind them. We have done the same. We have paused and settled guidelines, standards, documentation, completed projects, and a Land Information Program. The legislation efforts and the continuous education and outreach are all settlements from our Journey. But we must continue ahead.

Like those before me, as President of WLIA I have been amazed, energized, and impressed with all the people and the work that is quietly and competently getting done in this state. I am looking forward more than ever to the next stage. Thanks for bringing me along.

*Nancy von Meyer is completing a year as President of the Wisconsin Land Information Association, following several earlier years on its board. Holding a PhD from the University of Wisconsin-Madison, she is a private consultant in the GIS/LIS arena, operating from a home base in Middleton. Beyond her service to WLIA, several national professional organizations including ACSM and URISA have benefited from Nancy's extensive volunteer efforts. She is currently a candidate for election to URISA's board of directors.

PROJECT REPORTS

Land use and DOQQs added

WISCLAND reaches further

by Bob Gurda

The WISCLAND Project is expanding its scope to cover compatible land use mapping in urban areas statewide, and statewide digital orthophotos from NAPP photography.

The project's initial focus was limited to land cover mapping statewide from satellite imagery. Funding for most of this Phase 1 activity has been identified or committed, allowing consideration of additional phases.

Phase 2, urban land use mapping, will utilize existing local mapping and local initiatives where possible. Orthophoto base maps will be developed to ensure that the mapping can be integrated with other information layers. Various aerial photography resources may be used to interpret land use where no recent mapping exists. Mapping and compilation work will be contracted with local or regional organizations. A long-term goal is to develop a continuing program of compatible land use mapping that will satisfy the needs of numerous cooperators.

Phase 3, orthophotos, will build on existing projects in a number of counties as well as the entire Fox River Valley and Chequamegon National Forest. NAPP photography, acquired in 1991 and 1992, will be converted to digital form and corrected to remove distortion.

Both of the two added phases of WISCLAND will require significant funding over several years. Because total costs are estimated at several million dollars, collaborative funding will be necessary. This type of cooperative model has worked well for WISCLAND's Phase 1, although additional numbers and types of cooperators will be needed to achieve the second and third phases.

WISCLAND will be covered in several talks at the WLIA Annual Conference, March 21-23 in Stevens Point. For further information on any aspect of the project, contact Bob Gurda at 608/262-6850.

Four more counties covered

Orthophoto development expands

by Bob Gurda

At least four more counties are headed for digital orthophoto development. Portage, Fond du Lac, Rock, and St. Croix counties are next in line.

The Soil Conservation Service is coordinating and partially funding these projects. Work will not begin immediately, since other projects are already in the pipeline. Final product delivery dates will be announced later.

With these latest additions to the list of areas for which orthophoto development from NAPP photography is being done, about 30% of the state is now scheduled. Products from some areas should begin appearing by early this summer. The WISCLAND Project (see related article above) has added a Phase 3 which is designed to accomplish the completion of statewide digital orthophoto mapping.

UGGS abandons 15' map series

by Ted Koch

The U.S. Geological Survey has announced that it is officially abandoning all remaining publication and sale of its 15-minute, 1:62,500-scale (1' = approx. 1 mile) topographic quadrangle maps. This is not a terribly startling announcement since UGGS has not revised or reprinted 15-minute maps for years. The 15-minute series was replaced by the more detailed, larger scale 7-1/2-minute, 1:24,000-scale topographic map series in the 1950's. When production ceased at that time, approximately 30% of Wisconsin's 15-minute map sheet coverage was not completed.

The biggest impact of the abandonment notice is that the 15-minute paper map sheets will no longer be available for sale from USGS. Up to June 1 this year, USGS will offer map dealers exchange or credit for old 15-minute sheets, and it will also attempt to sell-off all of its remaining stock for \$0.50 per map in minimum quantities of 100 maps per title. After June 1, 15-minute paper copies will no longer be available from USGS. However, reproducible film copies of the original color separates will still be available for sale, and descriptive reference materials will be maintained.

(source: USGS published notice, 2/94)

Executive Order pending

Babbitt takes reins of FGDC

by Bob Gurda

U.S. Secretary of the Interior Bruce Babbitt has surprised some observers by choosing to chair the Federal Geographic Data Committee (FGDC). There had been speculation in the fall that a designee of the U.S. Geological Survey would be replaced as chair by someone higher in the Interior Department's hierarchy. Babbitt's decision to move the chair all the way to the top of the department should raise the visibility of the FGDC, which includes several representatives from Interior sub-units as well as a number from other federal departments and agencies.

The small staff supporting the FGDC's initiatives remains within the USGS. However, an Executive Order is being drafted for President Clinton's signature that would make further changes in the role and administration of the FGDC. Secretary Babbitt reportedly has been an advocate of such changes.

(source: FGDC)



Questions & Answers

?

I recently read in another publication that the NAD 27 datum may be preferable because the spheroid it is based on fits our region better. If this is so, why are some people changing to the newer NAD 83 datum?

The North American Datum of 1927 (NAD 27) is based on the Clarke Spheroid of 1866. This spheroid (actually an ellipsoid) was in fact designed to "best fit" the North American continent. The GRS80 (Global Reference System of 1980) ellipsoid, upon which the NAD 83 datum is based, is intended to "best fit" the entire globe. (The surface to which the ellipsoid is "fit" is the geoid, a level reference surface approximating mean sea level).

The term "best fit" means that the geoid heights (the difference between the geoid and the reference ellipsoid) are minimized for the area of concern. The Clarke Spheroid attempted to minimize the geoid heights for the North American region so that they could be ignored in subsequent computations. This was in an age when those calculations could only be done with laborious long-hand methods.

The GRS80 ellipsoid has resulted in greater geoid differences throughout our region - ones that are not negligible in the formulas. However, this is no longer an issue since we have computers that can perform intricate computations for us. More importantly, using geoid heights in computations, rather than ignoring them, is one contributor to the greater accuracy of results using the GRS80-based NAD 83 datum.

A complete answer to this question involves current surveying and measurement technology as well as reference datums. More and more of today's surveying and mapping is being done using observations based on the Global Positioning System (GPS). Since these satellites' orbits have the same earth-centered definition as the GRS80 ellipsoid, GPS observations can produce highly accurate measurements. According to the National Geodetic Survey, tying GPS measurements to the NAD 27 datum degrades this higher quality work to fit a less accurate network. In other words, the NAD 27 datum simply can't accommodate the higher quality work produced using GPS technology.

When many maps and/or large amounts of data already exist referenced to NAD 27, a conversion of those records to the NAD 83 datum can be costly and time-consuming. However, considering the lower accuracy of the NAD 27 datum, the inconsistencies in that control network, and the new demands placed on the national network in recent years, it is understandable that many in the surveying, mapping, and land information fields are willing to go through the process of switching to the new datum so that they can fully realize the benefits offered by GPS and NAD 83.

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.

?

Where can I buy a satellite image poster of Wisconsin?

We are not aware of any published poster showing primarily Wisconsin as "seen" by satellite. A number of magazines (such as the *National Geographic*) and books have carried images covering part, all, or more than Wisconsin, but these are not available as single poster-sized prints.

The WISCLAND Project (see page 6, this issue) hopes to produce such a map. A number of smaller area image maps are also potential products, perhaps developed for a range of educational purposes.

Using a mosaic of satellite images (such as from Landsat) to cover an entire state is a challenge, since different dates are usually involved (most satellites don't collect images of the entire state on the same day). Images from different dates often vary in color or contrast. This effect is obvious on a Great Lakes satellite composite view that is available in various stores in postcard form. The producers of a handsome mosaicked satellite image map of Illinois that was printed in the 1980's used a painstaking density balancing of film images derived from satellite data to minimize this effect.

Single-date satellite image posters are available commercially for most of the major cities of the U.S. A Milwaukee area image (24 X 35 inches) is available for under \$20 from EOM Inc., in Aurora, CO (call 303/690-2242 for details). EOM indicates that the poster covers all of Milwaukee and Ozaukee Counties, extending west to the cities of Fond du Lac and Watertown. Scale is approximately 1:100,000 (1.6 miles per inch). Some major features are labelled. The color scheme is similar to color infrared film (vegetation red, pavement blue, water black, etc.)

In cooperation with the UW-Madison's Environmental Remote Sensing Center, the SCO published a 1986 satellite image map of the greater Madison area, at a scale of 1:62,500. It sells for \$2 (folded, medium weight paper) or \$5 (flat/rolled, heavy weight paper) including shipping, plus sales tax.

Chippewa County has a new image map, at a scale of 1:110,000. Copies are available for sale. See page 12 for details.



PROJECT FOCUS

Three counties cooperate

Dodge, Jefferson, and Rock integrate GPS networks

by Diann Danielsen

Two years ago when Dodge County saw a need for further densification of the Wisconsin High Precision Geodetic Network (WHPGN), County Director of Survey and Description, Rich Leaver, also saw an opportunity for multi-county participation. "Since the Land Information Board promotes integration and cooperation in the Land Information Program, I thought I'd check with my neighbors." Of the 7 counties contacted, the timing was right for Jefferson and Rock Counties to join Dodge in a local densification project.

DOT provides advice

The tri-county group also began a long term relationship with the Wisconsin Dept. of Transportation, which has an interest in local densification of the WHPGN network. The DOT supported the effort by helping to prepare and review the counties' Request for Proposal, which has since become the de facto standard for countywide densification networks in Wisconsin. The agency also assisted by reviewing contract submittals and verifying the integrity of data supplied by the contractor.

The project has produced nearly 300 GPS-observed control stations spaced at approximately 4-mile intervals across the three county area. Survey control was established at three levels of accuracy: 1 ppm (B Order) for primary stations, 2 ppm for secondary stations, 5 ppm for tertiary stations, and 10 ppm (First Order) for azimuth marks. This level of accuracy is expected to support county surveying and mapping needs well into the future.

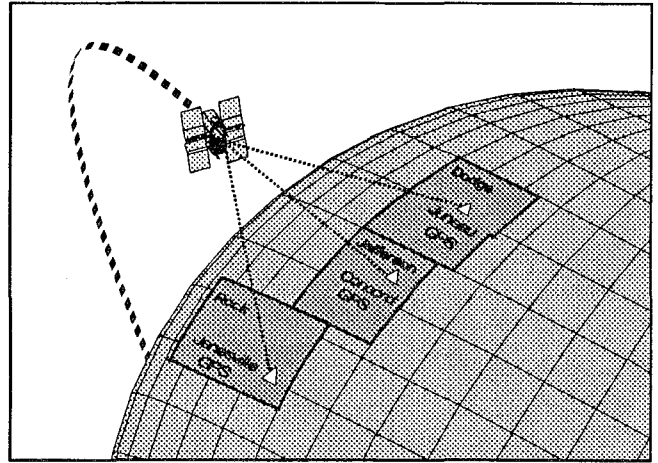
Cooperative benefits noted

While the participants noted that the project may have taken longer because of the greater number of participants, the result has been a strong regional survey control network. The counties can be certain of their data's integrity across the region and are well positioned for future data sharing. "This project has established a good foundation for future work together," notes Leaver.

Other project benefits included a better price from the contractor due to the larger volume of work, the mutual benefit of learning from each other, and a sharing of the burden between the counties and the DOT. The counties all expressed appreciation for being allowed to take advantage of the DOT's expertise in this area, rather than being forced to develop that level of expertise individually to accomplish the project.

Coordination has drawbacks

Andy Erdman, Jefferson County Director of Land Information, notes some of the difficulties of the multi-county approach: "One disadvantage was waiting for everyone to be on the same page at the same time. For example, all three



counties had to have their monuments in place before the contractor could come in and take the GPS observations. The project required a firm commitment on the part of each county to allow the extra time it took to coordinate efforts."

Despite these factors, Erdman notes that the results have been very satisfactory. Stringent project specifications produced high quality work that has built confidence in the densification project and that is able to support Jefferson County mapping and LIS work. Jefferson County is currently tying their Public Land Survey System corners to the control network to support other county projects.

Paul Clayton, Rock County Real Property Lister, definitely recommends a similar approach to GPS control densification for other Wisconsin counties. "The project was a good opportunity for counties to share in the implementation of GPS and to coordinate efforts. It resulted in a significant cost savings."

WLIB sets the tone

Clayton also commends the support the counties received from the WLIB, and its goal of cooperation between all levels of government and the public and private sectors: "This approach gives everyone an opportunity to learn and share together, well into the future."

Dodge County is currently publishing its final documentation for the densification project, including the station descriptions and coordinate values (in latitude/longitude, State Plane South Zone, and Dodge County coordinate systems). Dodge and Rock Counties have recently begun implementing local county coordinate systems based on the statewide design developed by the Dept. of Transportation. (See the related article on page 10).

STATE CARTOGRAPHER'S COMMENTARY

Metadata: a key to future value

by Ted Koch

At the State Cartographer's Office (SCO), we receive numerous inquiries each week (usually by phone) from people searching for a particular digital data set or map that can be used in a geographic information project.

In reviewing my phone notes for just the past three days, I notice questions requesting information about the availability of parcel maps for Price County, two-foot contour maps for a small area that straddles the Jefferson/Waukesha County line, a map of Wisconsin showing loss of farmland and increase of suburbanization over the past ten years, and two-foot contour data for a short highway corridor near the City of Wausau.

Because we often don't have adequate access to the necessary information, questions such as these are often difficult to answer quickly and precisely. In some cases we know that the data or map requested simply does not exist, which is usually the case for the two-foot contour data in a mapped form. Often when we do know that a particular product exists, we may still lack specific detailed information about the data or map, such as who produced it, when, what is the quality and accuracy, who is responsible for updates, what organization should be contacted for obtaining copies, etc.

The critical information we are often missing, the summary data about data, is known as metadata. Metadata can be developed and used in various forms, and it is becoming increasingly important as the quantity of geographic information increases dramatically.

Metadata is the concise documentation of the data we have produced, can be used to inform others about access to data, and allows us to compare data or decide if it fits our needs. Anyone, the SCO included, can attempt to collect and organize metadata; on a large scale, this is a daunting and never ending task. The most logically effective method would be for the producer or custodian—who knows the data best—to make the metadata available as a routine activity.

In the past three years grant funds generated by our state land information program have helped fifty counties and a dozen municipalities plan, design and begin projects that are creating new and complex data. Counties are carrying out additional projects

with their retained program fees. All of these projects are intended to be sound investments with a substantial future payoff.

However, without adequate and well structured documentation (metadata) much of the investment could be lost. Ten years from now, or perhaps twenty or thirty, who in county or municipal government will be acting as custodian for the records about the new GPS-observed concrete control monuments that are being installed across the state in the 90's? Will such a person have all the records they need, in updated form, and easily accessible?

The land information program is currently committed to funding more than 2500 such control points, with a combined value of several million dollars, yet there are no explicit requirements specifying that anyone maintain and preserve structured and accessible metadata about these monuments. We need to get land information metadata recorded so that it is permanent and usable. This is a critical component of building our spatial data infrastructure.

Good metadata is part of the investment that we have to make in data and records modernization. It is one of ways that we preserve the value of the investments we are making today so that tomorrow others can use and build upon what we have started.

FGDC set to approve in March

Standard proposed for metadata contents

by Bob Gurda

A standard for contents of metadata has been proposed for approval by the Federal Geographic Data Committee (FGDC) in March. FGDC staff have been coordinating the development of this standard for the last several years.

Upon approval by the FGDC, federal agencies will be required to use the standard to document their data holdings. Staff will support this effort by developing templates, workbooks, and other implementation aids.

"Content Standards for Spatial Metadata", dated January 25, 1994, is also intended to be forwarded to the Department of Commerce to initiate its approval as a Federal Information Processing Standard (FIPS). Copies of this 55-page document are available from the FGDC Secretariat c/o USGS, 590 National Center, Reston, VA 22092.

Note that these standards are for the contents of metadata only, and do not prescribe particular formats or structures. There are a number of software tools that might be used to hold metadata, or to search metadata files.

(source: FGDC)

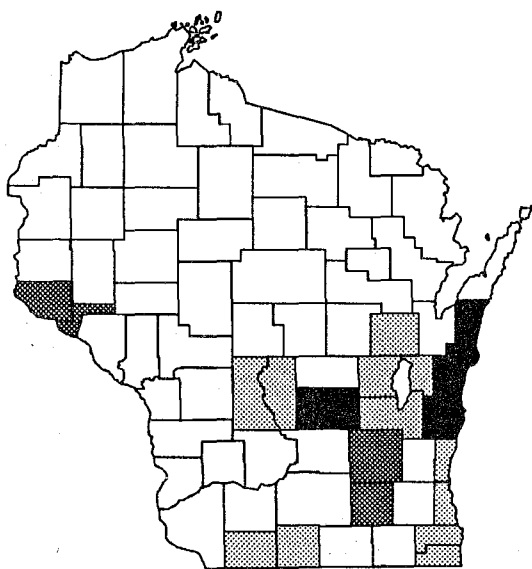
GEODETIC CONTROL

New coordinate systems designed for county use

by Diann Daniels

Last July we reported the development of a statewide set of local county coordinate systems for Wisconsin. The project was done for the Dept. of Transportation in an effort to provide the agency with a uniform set of precisely relateable coordinate systems that could be used by DOT personnel and contractors.

This set of 59 coordinate systems provides 51 single-county systems and 8 for groups of contiguous counties where design criteria permit. The statewide set incorporates a number of previously existing county coordinate systems such as those in Brown and Oneida Counties. The in-



Single and multi-county coordinate systems developed for DOT

The map below shows the grouped counties (various tints) and those with their own coordinate system (no tint).

These county coordinate systems are currently under review by the DOT Location Control Policy Committee which is making policy recommendations concerning the larger issues involved in the management and use of geographic data within the agency. Until this review is complete, the DOT will not make a decision as to the adoption or use of these coordinate systems for their purposes.

Whether or not the coordinate systems are adopted by the DOT use, they are available for use by others. A number of local governments have expressed an interest in using a local coordinate system because it offers the convenience of minimal differences between ground and projected grid distances. To date, Dodge, Polk, and St. Croix Counties have received the necessary design parameters and software, and are beginning to implement their county coordinate systems. For more information, contact Gene Haferman (DOT) at 608/266-0112.

Formalizes growing relationship

SCO and NGS sign coop agreement

by Ted Koch

The SCO is pleased to announce the completion of a signed cooperative agreement with the National Geodetic Survey (NGS). The agreement recognizes the SCO as the principal public contact and data center for the distribution of NGS geodetic data, software and publications in Wisconsin. Under terms of the agreement, the SCO will obtain the data and products from the NGS for distribution and resale to SCO customers. Also, the SCO will assist the NGS in maintaining information about the National Geodetic Reference System (NGRS) network by receiving and forwarding monument condition and recovery notes to David Moyer, the NGS state advisor to Wisconsin.

To comply with the terms of the cooperative agreement, the SCO has recently revised and expanded the scope of available NGS items. In addition to the control point data sheet files on 3-1/2" diskettes by county, the same information is now available on CD-ROM for all of Wisconsin and twelve other states in the upper mid-west. In addition to control point data, the SCO has available for sale three datum transformation software packages (NADCON, CORPSCON, and VERTCON), and a variety of publications covering geodetic network and accuracy standards, datums, coordinate systems, and information on the development of Wisconsin's high precision network.

All of the geodetic control information and products currently available from the SCO are listed and described in a newly revised 4-page order form. In addition to ordering information, the form provides brief descriptions of all products. To obtain an order form contact the SCO by phone or mail. See page 16 for phone and address information.



GEODETIC CONTROL

New NGS product

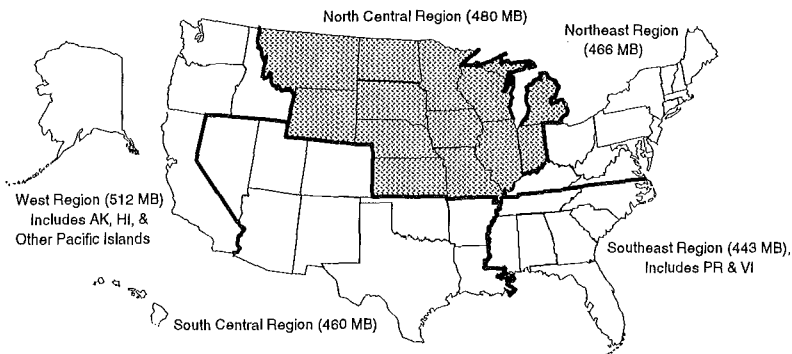
Geodetic data now on CD-ROM

by Diann Danielsen

The National Geodetic Survey (NGS) has announced the availability of geodetic datasheets for the North Central United States on a single CD-ROM. The datasheets included on this compact disc were extracted from the NGS database in August 1993 and cover Wisconsin and 12 other states including all of those contiguous to Wisconsin. Datasheets for other regions of the country will be available by July, 1994. All CD-ROMs will be updated on an annual basis.

First demonstrated at GIS/LIS '93 (Minneapolis, MN) in November, this is the first geodetic information product that NGS has offered using CD-ROM (compact disc - read only memory) technology. CD-ROM's can be accessed via a CD-ROM reader attached to a PC computer.

The NGS datasheet contains horizontal control (position) and vertical control (height) information in a single



published format. The CD-ROM contains the same information as that distributed on diskettes since June 1992, including reference datum, method of coordinate and/or height determination, modeled geoid height, ellipsoidal height, modeled gravity, Laplace correction, State Plane and Universal Transverse Mercator coordinates, and station description.

The CD-ROM also includes text files explaining datasheet items, master index files for all points contained on the CD, and the *DSX* software program used to retrieve information for individual control points. The datasheets are stored on the CD in state directories, with county data files named using the state and FIPS (Federal Information Processing Standards) code. For example, the Dane County data set is found in the WI directory named WI025.dat. An additional text file cross lists the county names with their FIPS code.

While the datasheets are now being published in CD-ROM format, it is still advisable to download the data into county directories on a PC hard drive for speed and ease of access. Since this requires data preparation time, the CD-ROM will be a more affordable alternative to the purchase of individual county diskettes only when a user needs many counties worth of data.

The CD-ROM, titled "National Geodetic Survey Datasheets North Central" is available for \$50 from the SCO (608-262-3065) or the NGS Information Center (301-713-3242). Call for details on ordering.

Important Information for Purchasers of SCO Geodetic Data

At the SCO, we will use the CD-ROM product as a basis for our maintenance and distribution of NGS geodetic data. We will update datasheet information annually from the CD-ROM and make it available on 3.5" diskettes for purchase on an individual county basis.

NGS provided us with updated diskettes for 10 counties in September 1993 (Adams, Crawford, Dane, Lincoln, Manitowoc, Milwaukee, Richland, Rock, Taylor, and Trempealeau). These county diskettes will remain with that update. All other county data files have been updated to reflect the August 1993 CD-ROM information. Beginning in 1994, all 72 Wisconsin counties will be updated annually based on the issuance of a new NGS CD-ROM for the North Central U.S. region.

The SCO will not generally update the datasheet file on our 98-station WHPGN diskette, since we believe its contents to be relatively stable.

A new SCO Geodetic Control Information and Products order form is also available, reflecting these updates and additional products now available from this office.

PUBLICATIONS AND PRODUCTS

New TIGER data released

by Ted Koch

A newly revised version of the popular TIGER computer map files, developed by the U.S. Bureau of the Census, is now available. These new 1992 TIGER/Line Files are updates and replacements of the 1990 TIGER/Line Files which were used to record information collected in the 1990 nationwide census. The TIGER files form a computer-readable map data base that can be used for a wide variety of geographic information system (GIS) applications.

TIGER files consist of a string of computer-stored codes that describe three major types of geographic objects: line features—such as roads, rivers, railroad tracks, boundaries, power and pipe lines, etc.; point features—such as schools; and area features (polygons)—such as census blocks and tracts. To be useable as a viewable map, TIGER data has to be accessed through special GIS computer software programs.

It should be noted that the TIGER Line files do not contain census data. That data, which is available separately, can be linked to the Line Files for each census block.

The 1992 Tiger/Line Files feature several major improvements over the 1990 version. Most significant is the greatly expanded address range coverage, particularly in urban areas. No ranges exist for rural and post office box addresses. Other additions to the files are codes identifying congressional districts, public school districts, designated urbanized areas, and incorporated areas that have changed since 1990 due to annexations.

TIGER/Line files are available from the Census Bureau on three different media. The first two are 9-track tape and tape cartridges that are designed for use on mainframe computers, not desktop microcomputers. The third available medium is compact disk (CD-ROM) which can be used with a variety of computers that are connected to a CD-ROM reader. All files for Wisconsin fit on one compact disk, available from the Census Bureau for \$250.00.

Included on the CD-ROM is an MS-DOS compatible public domain software program called LandView. This program allows a user to perform a number of elementary mapping functions and basic GIS applications. This program can be loaded onto a computer's hard drive to display line and landmark features. Performing more sophisticated functions, such as creating thematic maps, address matching, and emergency vehicle routing requires the use of more powerful GIS software produced by private vendors.

1992 TIGER/Line Files of Wisconsin are also available in Arc/Info coverage format. Arc/Info is a commercially available GIS software program produced by ESRI, a private GIS software development company. These files are available from UW-Madison—either the Land Information and Computer Graphics Facility (LICGF) or the Applied Population Laboratory (APL). These files were developed for Wisconsin legislative redistricting purposes.

For further information on TIGER/Line Files contact the U.S. Bureau of the Census Customer Services at 301/763-4100. For the ARC/INFO version contact Jerry Sullivan at the LICGF at 608/263-5534 or Tom Albright at the APL at 608/265-2553.

Chippewa county produces satellite image map

The Chippewa County Land Conservation Department has developed and printed a poster-sized image map of the county, derived from Landsat satellite data. A limited number of copies are available for sale to the public.

Titled "Chippewa County Land Use and Land Cover", the map has the look of false-color infrared photographic film, typical of Landsat satellite images comprised of bands 4, 5, and 3. An extensive amount of text helps explain the origins and appearance of the county's land cover, and its primary land uses. The image itself is enhanced only with a county boundary; there is no text identifying settlements, roads, etc.

The map shows the entire county plus several miles on each side, at a scale of 1:110,000 (approximately 1.7 miles per inch). The entire city of Eau Claire is included on the southern edge. This land area covers a map space of about 22.5 X 23 inches. Along with its border areas and explanatory text, the entire poster measures 24 X 36 inches.

Image processing and cartography for this project were performed by Geocode, Inc., of Eau Claire.

Copies are available from the Chippewa County Land Conservation Department, County Courthouse, 711 Bridge Street, Chippewa Falls, WI 54729 (Attn: Nick Stadnyck). The price is \$10.00 (over the counter); for handling and shipping in a mailing tube, add \$2.00.

Update on in-state plat book sales

Milwaukee Map Service has notified us that they carry a full line of county plat books for the state. This information is an update to the question/answer we carried on page 12 of the October '93 issue. Milwaukee Map Service is located at 959 Mayfair Road, Milwaukee, WI 53226; telephone (414) 774-1300.

New county plat books

The following Wisconsin County Land Atlas and Plat Books are now available for 1994 for \$25.00 plus tax and shipping: Oneida, St. Croix, Sauk, Trempealeau, and Vilas Counties. For ordering details contact: Rockford Map Publishers, Inc., P.O. Box 6126, Rockford, IL 61125, phone (orders only) 800/321-1MAP; for customer service information call 815/399-4614.

SCO staff news changes

by Bob Gurda

Several of our student staffers finished their degrees in December and are moving on to full-time positions. Suzanne Fliege graduated with her bachelor's degree in cartography and quickly found employment with a small firm in the Twin Cities. Diann Danielsen earned her master's degree in Civil Engineering, and is exploring several different employment niches in Wisconsin. Readers of the *Bulletin* and other SCO publications have seen have seen much of both of their fine work.

We have hired Monique Melum, an undergraduate geography/cartography major from Madison, to replace Suzanne. The disposition of Diann's graduate assistantship position has not been finalized. Also, Rajendra Bajracharya, a graduate student who has been working on the automation of some of our geodetic control information, will be completing his tenure at the SCO at the end of February.

From the Editor's Desk

by Bob Gurda

Where's the annual index?

For years we have published as part of our January issue a full-page index to the previous year's stories. Don't search for such an index to 1993 in this issue, because there isn't one.

With every quarterly issue we struggle to fit a range of newsworthy and useful topics into the available space, and in readable form. As part of this process, we have decided to drop the annual index. Each recent issue in your collection carries an index to topic areas; this is an alternative way to help locate a particular story.

Let us know if this action causes you significant problems. There may be other ways that we can help you locate previously published information (or even better, replacement information that is more current).





State Cartographer's Office

One of a series of guides covering various mapping topics in Wisconsin

Wisconsin

GPS BASE STATION DEVELOPMENTS

October 1993

October 1993

INTRODUCTION

Precise navigation and location have traditionally relied on methods requiring complex measurements and stringent techniques. Today we are in the midst of a technological revolution which is changing these techniques and at the same time, making measurements easier. New technology has the capacity to provide accurate positions at almost the touch of a button.

The technology that has revolutionized navigation and positioning in the past 20 years is the Global Positioning System (GPS). With GPS, positions can be determined anywhere on the planet within a few meters or less. GPS technology is finding new applications daily, in dozens of fields.

The applications of GPS technology are endless - from positioning natural resource features and boundaries in land-use planning, to mapping highway facilities to monitoring snow plows and emergency response vehicles. Most of these applications, however, require a more accurate method of GPS positioning known as Differential GPS (DGPS). Before discussing DGPS, it is necessary to understand some general GPS concepts and operational techniques.

WHAT IS GPS?

The Global Positioning System (GPS) is a satellite positioning system developed by the U.S. Department of Defense (DOD). Signals sent by the GPS satellites are available to civilian users within certain limits of accuracy and reliability. The GPS is comprised of a constellation of 24 satellites orbiting the Earth twice a day at a very high altitude. (See Figure 1) This constellation of satellites was established by DOD beginning in the 1970's for military purposes, but has since been adopted by the civilian sector for many uses.

The positions of the GPS satellites are very accurately monitored, allowing them to act as reference points from which we can establish ground positions. This concept is illustrated in Figure 2. The distance to a satellite is measured by timing how long its signal takes to reach the ground receiver. Calculating the distances from four satellites is enough information to mathematically solve for latitude, longitude, altitude, and clock synchronization information at a single point.

SOURCES OF ERROR IN GPS

To appreciate the need for the Differential GPS technique, it is necessary to understand the errors in standard GPS measurements. Errors are caused by many factors, in particular the earth's atmosphere. GPS signals, which travel at the speed of light, will vary in speed depending on the medium through which they travel. Thus, GPS signals are delayed as they move through the charged particles of the ionosphere and the water vapor of the troposphere (the upper levels of the earth's atmosphere). These delays cause errors in distance calculations, which in turn introduce errors in GPS derived positions.

Another source of error in GPS positioning comes from the satellites themselves. Even though they are synchronized by highly accurate atomic clocks, the clocks do have slight inaccuracies. The satellites themselves are able to drift from their predicted orbits, which also introduces additional error.



Figure 1: Planned GPS Constellation (from Wolf and Brinker, 1993). Shows satellites orbiting Earth, with lines indicating signal paths to a ground receiver.

GPS Base Station Task Force

The GPS Base Station Task Force was established in September, 1992 under the direction of the Wisconsin Department of Administration for the purpose of exploring and coordinating issues involved in GPS Base Station technology. In support of that group's efforts, this guide is intended to provide a brief summary of the technology. Recommendations of the Task Force with regard to Base Station implementation and use in Wisconsin are included. Participating agencies and parties of interest for the GPS Base Station Task Force included representatives from the following organizations:

- Federal
 - National Geodetic Survey
 - U.S. Fish and Wildlife
 - U.S. Forest Service
 - U.S. Environmental Protection Agency
- State
 - Dept. of Administration
 - Dept. of Transportation, Chair
 - Dept. of Natural Resources
 - Dept. of Agriculture, Trade and Consumer Protection
 - University of Wisconsin-Madison Dept. of Civil and Environmental Engineering
 - Wisconsin State Cartographer's Office
 - Wisconsin Land Information Board
- Private
 - Wisconsin Society of Land Surveyors

GPS Base Stations

New GPS guide available

GPS Base Station Developments is the title of the latest mapping guide published by the SCO. This 4-page guide offers a brief summary of the global positioning system (GPS) and the concepts of GPS base station technology. Copies of the guide can be obtained free-of-charge from the SCO.

This guide was prepared in support of the Wisconsin Department of Administration's GPS Base Station Task Force. This group was established in September, 1992 to explore and coordinate statewide issues concerning GPS base station use. Task force members represented both federal and state agencies and the private sector.

In addition to the task force recommendations, the guide briefly covers the basics of GPS operation, error sources, differential GPS, the base station concept, real-time vs. post-processing methods, and federal plans for GPS base station networks.

Correction...

We inadvertently cut off the tail end of last issue's article on Vice President Al Gore's report advocating creation of the National Spatial Data Infrastructure. The article, in the left-hand column of page 3 of the October '93 issue, should have concluded with this full sentence: "Outside advocates have also proposed specific ways by which the non-federal constituency could participate more directly".

PEOPLE & ORGANIZATIONS

Jim Clapp is on the mend

by Alan Vonderohe

As many of you probably know, Professor Jim Clapp of the UW-Madison Civil and Environmental Engineering Department suffered a heart attack during November. Fortunately for us all, he was already at the hospital (because of lesser symptoms) when the "big one" hit.

Dr. Clapp served as Chair of the Wisconsin Land Records Committee (WLRC) throughout its two years of work, 1985-1987. That group's Final Report formed the basis for the establishment of the state's Land Information Board as well as the formation of the Wisconsin Land Information Association.

Jim was out of commission until right before the end of the semester, when he returned just in time to share the joy of final exams with his students. He has been on the job on a part-time basis since. Jim is expecting to return to full-time duties when the spring semester begins. We all hope that "full-time" now actually means "full-time" to him instead of "triple-time" like it used to.

Heads back to U of Georgia

Usery's leaving thins UW-Madison ranks

Bob Gurda

UW-Madison's Geography Department has lost its primary GIS and remote sensing expert. As of this month, Assistant Professor E. Lynn Usery joined the University of Georgia in a similar capacity. Usery developed several new courses on the Madison campus and has been conducting research on pattern recognition from aerial and satellite related to automated map compilation. He has also been the department's liaison to the campus-wide Spatial Information and Analysis Consortium.

In joining the Georgia faculty, Lynn will be returning to the campus where he earned his Ph.D. Prior to arriving in Madison, he was on the staff of the U.S. Geological Survey's Mid-Continent Mapping Center in Rolla, Missouri. As of yet, it is not know whether the Geography Department will be able to hire a replacement for Usery. The campus is undergoing a structured down-sizing over the next several years.

EVENT PROFILES

500+ expected for March event

WLIA conference set for Stevens Point

by Ted Koch

"Integrating Data, Technology and Organizations" will be the theme of annual conference of the Wisconsin Land Information Association (WLIA) to be held on March 21-23, 1994 at the Holiday Inn Convention Center-Stevens Point. This event is expected to attract more than 500 people.

The conference will officially open with a noon luncheon on Monday, followed over the next two days by 26 different presentations in four concurrent technical session tracks. During the same time, seven WLIA business members will present hour-long demonstrations of their newest products and services.

Business exhibitors also will sponsor an opening reception on Monday evening. A public open house in the business exhibit area will occur on Tuesday evening. We will have a SCO booth in the exhibit area.

The conference will also feature both a paper and electronic poster session on Tuesday afternoon, and will conclude with an annual membership meeting and member forum on Wednesday morning.

For more details on the meeting, and registration information, contact the WLIA at 800-344-0421.

Data transfer standard explained

SDTS workshop scheduled in Minnesota

Converting geographic data between software systems is one of the more time consuming and difficult aspects of working with geographic information systems (GIS). The Spatial Data Transfer Standard (SDTS) is a new federal standard designed to alleviate many of the data conversion problems faced by users of GIS. But what exactly is SDTS and how will it work?

To answer these and other related SDTS questions, the Minnesota Governor's Council on Geographic Information and the Land Management Information Center (LMIC) are sponsoring a two-day workshop on the details and workings of SDTS. A team of SDTS experts from the U.S. Geological Survey will conduct the meeting on Tuesday and Wednesday, April 12 and 13, 1994 at the Earle Brown Continuing Education Center on the St. Paul Campus of the University of Minnesota. The workshop is open to all with a modest registration fee to cover the cost of the meeting facility. A final meeting agenda and registration information will be available after March 1. For more information contact LMIC at 612/296-1211.

(source: Christopher Cialek, LMIC)

CONFERENCES, TECHNICAL MEETINGS, and CLASSES

March 7, **Introduction to Remote Sensing** will be held in Lincoln, NB. Contact: Workshop Coordinator, CALMIT, 113 Nebraska Hall, Univ. of Nebraska-Lincoln, Lincoln, NB 68588-0517, 402/472-8197; fax 402/472-2410.

March 13-17, **Ninth Annual GRASS GIS User's Conference and Exhibition** will be held in Reston, VA. Contact: Pamela Cashman, Conference Coordinator, Open GIS Foundation, 1 Kendall Sq., Bldg., 200, Ste. 2200, Cambridge, MA 02139, 617/621-7025; fax 617/621-7174.

March 14-17, **AM/FM International Annual Conference XVII** will be held in Denver, CO. Contact: Laurel Bolender, AM/FM International, 14456 E. Evans Ave., Aurora, CO 80014, 303/337-0513; fax 303/337-1001.

March 21-23, **Wisconsin Land Information Association's Annual Conference** will be held in Stevens Point, WI. Contact: WLIA at 800/344-0421.

March 21-24, **AM/FM International Annual Conference XVII** will be held in Denver, CO. Contact: Paula Delie, AM/FM International, 14456 E. Evans Avenue, Aurora, CO 80014-1409, 303/337-0513; fax 303-337-1001.

March 28-30, **Introducing ArcCAD** will be held at the Land Information and Computer Graphics Facility (LICGF) in B102 Steenbock Library, UW-Madison, Madison, WI. Contact: Tom McClintock at 608/263-5534; fax 608/262-2500.

March 29-April 2, **Association of American Geographers 90th Annual Meeting** will be held in San Francisco, CA. Contact: AAG, 1710 16th St. NW, Washington, DC 20009-3198, 202/234-1450; fax 202/234-2744.

March 30-April 1, **Seventh Annual GIS Conference** will be held in Baltimore, MD. Contact: Michael Bachman, Dir. of Prof. Development Programs, Towson State Univ., Baltimore, MD 21204-7097, 410/830-3126; fax 410/830-2006.

March 31, **Introduction to ArcView** will be held at the LICGF in B102 Steenbock Library, UW-Madison, Madison, WI. Contact: Tom McClintock at 608/263-5534; fax 608/262-2500.

April 1, **Building ArcView "Views"** will be held at the LICGF in B102 Steenbock Library, UW-Madison, Madison, WI. Contact: Tom McClintock at 608/263-5534; fax 608/262-2500.

April 5-8, **Introduction to Global Positioning Systems (GPS)** will be held in Room 1610 Engineering Hall, 1415 Johnson Drive, Madison, WI. Contact: Robert T. Fey at 608/262-8592; fax 608/263-3160.

April 10-13, **American Water Works Association Computer Conference** will be held at the Westin Bonaventure in Los Angeles, CA. Contact: AWWA-Computer Conference, 6666 W. Quincy Avenue, Denver, CO 80235, 303/347-6159, fax 303/794-7310.

April 10-13, **GIS-T 1994, Annual Symposium on GIS for Transportation** will be held in Norfolk, VA. Contact: Jim Dolson, 605 Suwannee St., MS43, Tallahassee, FL 32399, 904/922-6918.

April 13-15, **GIS Data Management Capture and Conversion** will be held in Madison, WI. Contact: 800/462-0876, fax 608/263-3160.

April 13-16, **Engineering Surveying, '94** will be held in Keele, England. Contact: Keele University at 44 (61) 928-8074.

April 17-21, **MapWorld '94** will be held in Albany, NY. Contact: Map-Info Corp., 1 Global View, Troy, NY 12180-8399, 518/285-7425; fax 518/285-6060.

April 18-20, **Introducing pc Arc/Info** will be held at the LICGF in B102 Steenbock Library, UW-Madison, Madison, WI. Contact: Tom McClintock at 608/263-5534; fax 608/262-2500.

April 19-22, **GIS and Civil Engineering** will be held in Fort Collins, CO. Contact: GIS World, Inc., Training Division, 155 E. Boardwalk Dr., Suite 250, Fort Collins, CO 20525, 303/223-4848; fax 303/223-5700.

April 23-28, **1994 ASPRS/ACSM Annual Convention** will be held in Reno, NV. Contact: ACSM '94, 5410 Grosvenor Lane, Bethesda, MD 20814-2122, 301/493-0200; fax 301-493-8245.

May 2-4, **1994 Mid-America GIS Symposium** will be held in Kansas City, MO at the Hyatt Regency Hotel at Crown Center. Contact: Urban and Regional Information Systems Association at 202/289-1685, fax 202/842-1850.

May 9-11, **Advanced pcArc/Info** will be held at the LICGF in B102 Steenbock Library, UW-Madison, Madison, WI. Contact: Tom McClintock at 608/263-5534; fax 608/262-2500.

May 9-12, **10th Thematic Conference of Geologic Remote Sensing** will be held in San Antonio, TX. Contact: ERIM Conferences at 313/994-1200 ext. 3234, fax 313/994-5123.

May 9-13, **GPS/GIS '94** will be held at the Ritz-Carlton (Tysons Corner) near Washington, DC. Contact: GPS/GIS '94, Conference Coordinator, c/o GeoResearch, Inc., 115 North Broadway, Billings, MT 59101, 406/248-6771, fax 406/248-6770.

May 23-27, **14th Annual ESRI Users Conference** will be held in Palm Springs, CA. Contact: User Conference Coordinator, ESRI, 380 New York Street, Redlands, CA 92373, 909/793-2853; fax 909/793-5953.

June 5-8, **GIS in Business '94 Conference and Exposition** will be held at the San Francisco Hilton and Towers in San Francisco, CA. Contact: GIS World 303/223-4848.

June 6-8, **GIS in Natural Resources** will be held at the LICGF in B102 Steenbock Library, UW-Madison, Madison, WI. Contact: Tom McClintock at 608/263-5534; fax 608/262-2500.

June '94, **The Fourth International GPS/GIS Conference** and training program will be held in Washington, D.C. Contact: Conference Coordinator, GPS/GIS '94 at 202/434-8910, fax 202/434-8911.

June 16-17, **Wisconsin Land Information Association (WLIA) Quarterly Membership Meeting** will be held in Oshkosh, WI. Contact: WLIA at 800/344-0421.

August 8-12, **URISA '94, Urban & Regional Information Systems Assn.**, will be held in Milwaukee, WI. Contact: The Urban & Regional Information Systems Assn., 900 Second St., N.E., Suite 304, Washington, DC 20002, 202/289-1685.

August 10-13, **North American Cartographic Information Society (NACIS) 14th Annual Meeting** will be held in Ottawa, Canada. Contact: NACIS, c/o American Geographical Society Collection, P.O. Box 399, Milwaukee, WI 53201.

August 15-19, **U.S. Army Corps of Engineers Symposium on Surveying, Mapping, Remote Sensing and GIS** will be held in New Orleans, LA. Contact: Leonard P. Halphen, US. Army Engineer District, New Orleans, ATTN: CELMN-ED-SS, P.O. Box 60267, New Orleans, LA 70160-0267, 504/862-1841; fax 504/862-1850.

August 20, **Maryland Geographic Information Systems Committee** meeting will be held at the Advanced Technology Center, Hagerstown Junior College. Call: 410/830-2964, fax 410/830-3888.

September 8-9, **Wisconsin Land Information Association (WLIA) Quarterly Membership Meeting** will be held in Rhinelander, WI. Contact: WLIA at 800/344-0421.

October 23-28, **GIS/LIS '94 Annual Conference & Exposition & ACSM/ASPRS Fall Convention** will be held in Phoenix, AZ. Contact: GIS/LIS '94, 5410 Grosvenor Lane, Suite 100, Bethesda, MD 20814-2122 at 301/493-0200; fax 301/493-8245.

December 8-9, **Wisconsin Land Information Association (WLIA) Quarterly Membership Meeting** will be held in Madison, WI. Contact: WLIA at 800/344-0421.

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 three people—Ted Koch, State Cartographer (608/262-6852), Bob Gurda, Assistant State Cartographer (608/262-6850), and Program Assistant Brenda Hemstead (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.

The Office answers a wide range of inquiries ranging from simple to complex, in the following general categories:

1. Geodetic Control—Requests for surveying information which has been established by some office or agency, and upon which the requestor wishes to base a survey or map.
2. Aerial Photographic Coverage—These are requests for information about existing or planned aerial photographic coverage which can be utilized for a variety of projects. These requests, in many instances, are motivated by the desire to avoid the exceedingly more costly option of acquiring specifically flown photography.
3. General Map Coverage—The requestor is seeking map coverage to fulfill a specific need, from utilization as a base map upon which other information can be compiled, to determination of location or extent of a resource such as wetlands, to use as a recreation guide.
4. Specific Unique Data—These types of requests change as various programs are implemented. Examples include magnetic declination (for land surveying), and latitude/longitude (federal requirement for placement of sending satellite dishes or radio towers).
5. General Requests—Such as size of an area, height of a particular feature, location of a named feature, explaining contours, digital methods, software, hardware, etc.
6. Activities of Other—This provides access to publications, news, anecdotal information, and referrals to appropriate agencies, programs, organizations, or individuals who may be able to provide the information being sought.

For more information, call the SCO at 608/262-3065. You can request a free brochure profiling the SCO in more detail, and listing available publications.

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 April 8, 1994

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