HOOSIER SURVEYOR

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INDIANA SOCIETY OF
PROFESSIONAL LAND SURVEYORS, INC.

VOLUME 16
NUMBER 1
SUMMER 1989

AFFILIATED WITH THE
AMERICAN CONGRESS ON
SURVEYING & MAPPING

Purdue Land Surveying Seniors Survey Boundaries of the Hoosier 4-H Leadership Center near Lafayette.

HOOSIER SURVEYOR

VOLUME 16 NUMBER 1 SUMMER 1989

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Deadlines for copy for various planned issues of the HOOSIER SURVEYOR are as follows:

Winter issue - January 31 Summer issue - July 31 Spring issue - April 30 Fall issue - October 31. The HOOSIER SURVEYOR is composed and reproduced by Midtown Printing Co., Indianapolis, IN.

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Ken Curtis
Editor

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President's Message

Gary R. Kent

Although Standards and Rule 13 continue to be in the spotlight, a number of other exciting things are happening to our Society and our profession.

At the July 22nd ISPLS Board meeting, approval was given on a petition presented by Rollyn Blankenbeker for the formation of a new chapter of ISPLS - the **Initial Point Chapter.** For more information on this development, see the article elsewhere in this issue.

Plans for the January 1990 ISPLS Convention to be held in Fort Wayne are progressing. This convention promises to be another great celebration of surveying in Indiana with a wide variety of presentations, programs and exhibits. Be sure to mark your calendar for January 18- 20, 1990.

The ISPLS Minuteman Program is in the development stages. If you are interested and did not volunteer to help at the Annual Meeting this past January, contact Dianne at headquarters.

ISPLS has added a new fax machine at headquarters. To telecopy a message to headquarters simply dial our regular number (317/546-0188). If your fax is automatic, your message will be sent. If you have a manual machine, respond to the taped message as directed by saying "fax" or making any other sound, and placing your receiver in your machine. Your message will then be sent. Should you wish to speak to Dianne, remain silent after the taped message and your call will be answered.

In addition to the fax machine, we have purchased a new copy machine and will soon have a new computer at headquarters. These purchases provide us with the means to help us serve our members in the most efficient manner possible.

Regarding ISPLS headquarters itself, the Board is currently studying a number of proposals and hopes to announce a new headquarters location soon.

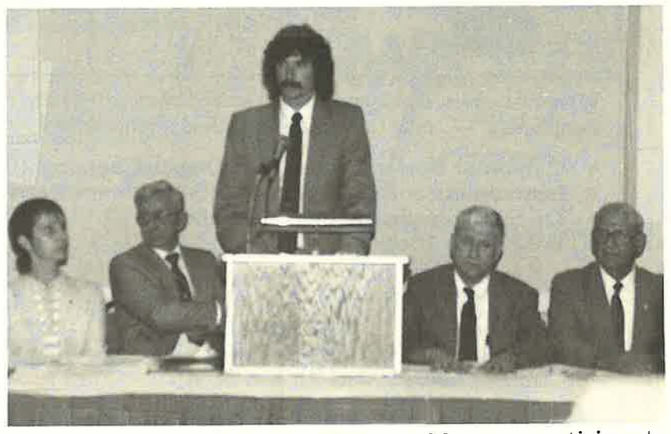
With regard to Rule 13, the Board of Registration has scheduled a hearing on August 17th to discuss amendments to the Indiana Survey Standards. The ISPLS Standards Committee and an Ad Hoc Committee on Rule 13 are currently studying a number of issues and proposed changes and will be making a presentation to the Registration Board on the 17th.

The ISPLS Board has voted to file several complaints with the Attorney General's Consumer Complaint Division on the basis of surveying which is not in compliance with Rule 13. As I mentioned in my last letter to you, recordation is now statute law. ISPLS intends on seeing that the Indiana Survey Standards are enforced.

Should you have specific problems with Rule 13 or wish to have a speaker come to your area or chapter to discuss the Standards, contact ISPLS headquarters and we will try our best to address your needs. Please read the article on Rule 13 elsewhere in this issue.

Surveying in Indiana is in a constant state of change. The Indiana Society of Professional Land Surveyors is prepared to assist you in adapting to this change.

Gary Kent poses with Luther Condre (left), registration board member, and Wesley Day, ISPLS standards committee chairman.



ISPLS President, Gary Kent, addresses participant in the State Registration Board's certificate presentation program May 5, 1989.

Some Misconceptions Regarding Rule 13

As we head into our second year of 864 IAC 1.1-13 (Rule 13 - the Indiana Survey Standards), I continue to hear many surveyors saying many things about the Standards that are just plain wrong.

Whether this is due to people repeating rumors without verifying the facts themselves or merely reflects a difficulty in understanding the Standards due to their complexity is uncertain. Regardless, this misinformation begs attention and I will address several aspects here.

New Tax Parcels

Perhaps the most common piece of misinformation is that a survey must be performed if a new tax parcel is to be created. This is simply untrue.

The Rule 13 applies only when a survey has been performed. If a survey involves what will become a new tax parcel, then the survey must be recorded according to Rule 13. Nowhere in the standards; however, is there any wording *requiring* a survey when a new tax parcel is involved.

The decision you as a surveyor must ask is *"can I prepare a proper description for the new parcel without a survey?"* The answer must be based on your professional judgement.

In many cases a cut-out can easily be described without a survey. A simple example of this would involve a 5 foot strip off the south side of Lot 5 to be taken for a right of way widening. There is no reason whatsoever that a survey has to be performed in order to prepare a description for such a parcel. And the Standards do **not** *require* a survey.

On the other hand, a client may contract with you to cut her farm into several parts based upon the location of a creek and several fencelines. In such a case you must perform a survey to ascertain the locations of the fences and creek in order to prepare accurate descriptions. To prepare such descriptions without the benefit of a survey is non-professional and unethical at the very least.

Survey of the Remainder ?

Is is commonly reported that if a portion of a parcel is being cut out, the remainder of the parent parcel must be surveyed (and described).

Proper professional practice requires that **if** you perform a survey related to the creation of a new tax parcel, you must locate the related lines of the parent parcel. On the other hand, there is no requirement in Rule 13 to survey - or describe - the *remainder* of the parent parcel unless you have been contracted to do

Recordation

Most of the County Recorders have set up new procedures, books and/or indexes to handle the recordation of surveys. If you are not aware of the procedures in your county, you need to contact your Recorder.

For those in areas represented by an ISPLS Chapter, scheduling a Chapter meeting with the Recorders in your area would be an excellent way to educate each other about the process. Otherwise, you may wish to schedule a special meeting with the Recorders and Surveyors in your area.

After having spoken to the Recorders Association twice in the last eight months, I can state with more than a little trepidation and embarrassment that the County Recorders in the State of Indiana may very well be better educated and prepared on survey recordation than most of the Surveyors.

"Mortgage Inspections"

At the Standards Workshop held following the ISPLS Annual Convention in January, Luther Condre of the Board of Registration expressed the intent of the Board of Registration regarding the so-called "Mortgage Inspection".

Mr. Condre stated that it was the intention of the Board that only the **Indiana Surveyor Location Report** may be used in situations that formerly called for the non-descript "Mortgage Survey", "Mortgage Inspection" or whatever else you might want to call it.

It is my opinion that the basis for this interpretation is that a "Mortgage Inspection" is, in reality, a type of retracement survey and as such must meet the requirements for such - except that Rule 13 allows for the use of the **Surveyor Location Report.** No other exception is given which could be interpreted as allowing the continued use of the non-descript "Mortgage Inspection".

As always, the ISPLS Standards Committee members are available for presentations regarding Rule 13. Should you wish to discuss the Standards or schedule a meeting or seminar, contact Society headquarters.

Indiana Society of Professional Land Surveyors Conference.

January 18-19-20, 1990

Place: Grand Wayne Center, Fort Wayne, Indiana

Contact: Jim Russell, J.L. Russell Associates, 4930 Illinois Road, Fort Wayne, Indiana 46804; (219) 436-4930.

NEW ISPLS SOUTHERN INDIANA CHAPTER FORMED

On July 22, 1989, the ISPLS Board of Directors approved a petition from sixteen southern Indiana land surveyors to form a new chapter to be named the "*Initial Point Chapter*" principally centered in the eight-county area of Clark, Crawford, Floyd, Harrison, Jefferson, Orange, Scott, and Washington counties.

Six meetings are planned annually on last Tuesday of month at revolving locations. The next meeting will be held at the Holiday Inn, New Albany, on September 26 at 7:30 pm. The charter member dues are $10.00 and the business address is Initial Point Chapter, P. O. Box 157, Jeffersonville, Indiana 47131. One future goal is to host a Bi-State annual meeting.

The 1989 elected officers are:
President - Vic McCauley
Vice President/President Elect - Rollyn Blankenbeker
Secretary/Treasurer - Dave Ruckman

Officers of newly-formed Initial Point Chapter are President, Vic McCauley, on right; and Vice President/President Elect, Rollyn Blankenbeker.

Land surveyors attending the organizational meeting at the Jefferson County Courthouse, July 18, 1989, were (clockwise from far left) Rollyn Blankenbeker, Robert Isgrigg, Frank Ballintyn, David Blankenbeker, Mark Gardner, Ronald Vuckson, Barry Stewart, Marvin Stoner, Paul Moffett (far right), Scott North, Bill Saegesser, Victor McCauley, Dallas Montgomery, Elbert Grosskopf, Tom Boofter, and David Ruckman (not pictured).

Surveying Business for Sale

Getting out of the surveying business and desperately need to sell: Nikon EDM total station, external battery, tripod, prism & rod, level rod, walkie talkies, tapes, misc. supplies, etc.. Equipment is in very good condition. Contact: David Brown, 5257 North Tacoma Ave. #6, Indianapolis, IN 46220, (317) 255 8191.

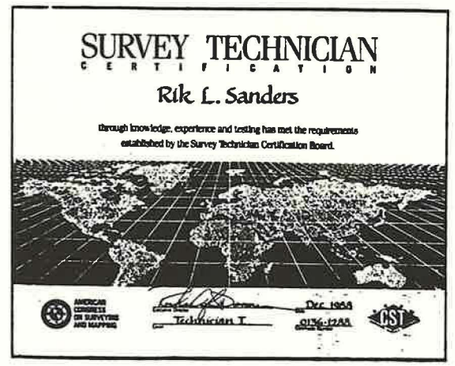
CONFERENCE AND EXPOSITION
SEPTEMBER 17-21, 1989
CLEVELAND, OHIO

ACSM-NSPS SURVEY TECHNICIAN CERTIFICATION PROGRAM CONTINUES WITH SUCCESS

The ACSM-NSPS Survey Technician Certification program was launched in November, 1988. In November and December, 100 applicants were tested, and 92 percent passed the examination to achieve certification at Level I. Testing for level I continues, and testing will begin in July for Level II.

At level II, a technician must indicate a preference for specialty, either boundary, construction, drafting or computer operator. The certification board is looking at a new fee structure, which will allow applicants to take additional specialties at a reduced charge. The fee for application is $25, and the examination is $70.

Testing is conducted at many major universities, vocational-technical institutions and community colleges all over the United States. A free packet of information containing sample test questions, schedule of test sites and dates and a suggested bibliography is available by writing to ACSM-Survey Tech/210 Little Falls Street/Falls Church, VA 22046.



EIGHT FROM INDIANA AWARDED SURVEY TECHNICIAN CERTIFICATES

ng the past year the following from ana have received certificates:

Daniel Eshelman
Kevin Lautner
Jeffrey Lucas
Michael Reckelhoff
Kevin Rowland
Rik Sanders
Craig Williams
Donald Wimmer

SURVEY TECHNICIAN I
Covers basic elements of the following:

- ☐ Boundary
  Construction work
  Computer Operator
  Draftsperson

SURVEY TECHNICIAN II
- ☐ Boundary Instrument Operator
  Construction Instrument Operator
  Computer Operator
  Draftsperson

SURVEY TECHNICIAN III
- ☐ Boundary Party Chief
  Construction Party Chief
  Computer/Systems Operator
  Chief Draftsperson

SURVEY TECHNICIAN IV
- ☐ Chief of Parties
  Office Manager

ACSM NSPS CST CERTIFIED SURVEY TECHNICIAN

GET CERTIFIED
SURVEY TECHNICIAN CERTIFICATION PROGRAM

INCREASE YOUR OPPORTUNITIES BY BECOMING A CERTIFIED SURVEY TECHNICIAN

Designed to meet the needs of both employers and technicians, ACSM-NSPS continues to offer this multi-level program which will help you increase your skills and enhance your career opportunities.

Study according to provided guidelines and earn certification through examinations offered nationwide throughout the year. Your certification will provide you with nationally acceptable skill levels and enable you to get ahead in the workplace.

In addition to Survey Technician I, ACSM-NSPS now offers Level II testing. Beginning in July, this level is geared to the technician with at least 18 months experience. Level I testing is on-going. Program Fees: $25 Application; $70 Exam.

For more information, applications and test dates, please write Survey Tech Certification, ACSM, 210 Little Falls Street, Falls Church, VA 22046.

This program is registered by the U.S. Department of Labor.

Other levels under development:

Survey Technician III
- Boundary Party Chief
- Construction Party Chief
- Computer/Systems Operator
- Chief Draftsperson

Survey Technician IV
- Chief of Parties
- Office Manager

Clip and mail for more information

Return to: ACSM SURVEY TECH
210 Little Falls Street
Falls Church, VA 22046 FAX: 703/533-9614

Please mail information on:
☐ Level I ☐ Level II

Name _____

Organization _____

Address _____

City, State, Zip _____

Daytime Phone (____) _____

Baltimore Hosts ASPRS/ACSM
Agenda for the '90s

ASPRS/ACSM/Auto-Carto 9

Baltimore

John E. Dailey, (left), Cleveland, Ohio, is president of the National Society of Professional Surveyors, and James P. Weidener, Florida, is president of the American Congress on Surveying and Mapping.

Walter S. Dix, secretary-emeritus and a founding member of ACSM, was honored by friends in celebrating his 90th birthday.

Baltimore

Several delegates attended the icebreaker reception held at the B&O Railroad Museum.

1989 PURDUE SUMMER SURVEYING FIELD PROJECT HELD IN TIPPECANOE COUNTY

After holding the four-week summer surveying field project course at the Future Farmers of America (FFA) Leadership Training Center near Trafalgar in southern Johnson County the past seven years, the course returned to the Purdue University campus and work involved several surveying projects at the Hoosier 4-H Leadership Center on the Wabash River about ten miles southwest of the West Lafayette campus. The 4-H Club staff as well as the County Surveyor, were very cooperative. A boundary survey of the 200 acre camp was executed; a GLO survey was uncovered, retraced, and several monuments found; all primary and secondary traverses were tied to state plane coordinates; a calibrated EDM base line was measured; a 1958 photogrammetrically-compiled topographic map was updated; most survey stations were permanently monumented for future users; and the students presented their results at a client-report meeting. Old timers will recognize the 4-H Club Center as the former Ross Summer Surveying Camp used for civil engineering students from 1928 to 1960. The staff consisted of Curtis, Holderly, and Tait (a GTA). Pictured in foreground are, left to right, Mike DeVoy, Haubstadt; Jeff Stenger, Sunman; Mark Brooks, Peru; Curtis; second row, Brian Rodgers, Chicago, Illinois; Scott Sumerford, Shelbyville; Percy Harding, Lafayette; third row, Holderly; J. Ross Drapalik, Martinsville; Bryn Fosburgh, Wisconsin; and Graham Tait, Scotland.

AN APPEAL TO PRACTICING LAND SURVEYORS

Since the inception of Purdue's land surveying program in 1972, there have been over 220 graduates of the four-year degree curriculum, Bachelor of Science in Land Surveying (B.S.L.S.). It is the belief of many that only through a professional degree will land surveying survive in the future as a profession. Purdue's enrollment has currently hit an all-time low. If the program is to continue, there must be students! You must encourage our youth to pursue this goal! **The Purdue program needs your cooperation and referrals!**

Tim Hanson, (Kokomo), on right, chairman of student chapter, presided and introduced the speaker, John Schneider (Indianapolis) past president of ISPLS.

Dan Pusey (West Lafayette), on left, presents Scott Zeigler (Albion) with the ISPLS John McEntyre Endowment Scholarship award of $1000.

Prof. Ken Curtis, on right, presents the Jud and Betty Rouch Land Surveying Scholarship of $100 to Randell Gann (Reelsville).

New initiates in April 1989 were, left to right, Greg Eberle, Lafayette; Mark Brooks, Peru; and J. Ross Drapalik, Martinsville. They joined active members Mike DeVoy, Haubstadt; Tim Hanson, Kokomo; Percy Harding, Lafayette; Doug Wilcox, Mercer, Pennsylvania; and Steve Ollo, Highland.

17th ANNUAL PURDUE STUDENT CHAPTER SPRING SENIOR RECOGNITION DINNER

Saturday, April 8, 1989
Morris Bryant Smorgasbord

Five of the seven 1989 graduating seniors are, left to right, Steven Ollo, (Highland); J. Ross Drapalik (Martinsville); Tim Hanson (Kokomo); Hans Musser (Goshen); Percy Harding (Lafayette). Not pictured are Douglas Wilcox (Mercer, PA) and Jerry Christoph (Buffalo Grove, IL). Hanson received the "Outstanding Graduating Senior Award" and Drapalik received the Student ACSM Award.

New incoming student chapter officers include, left to right, Michael DeVoy (Haubstadt) vice-chairman; Jeffery Stenger (Sunman) secretary; Mark Brooks (Peru) chairman; and Randell Gann (Reelsville) director.

LAMBDA SIGMA INITIATION

In April 1989 three undergraduate land surveying students were initiated into the Purdue University land surveying honorary, Lambda Sigma, which was founded in April 1978 on the Purdue campus in West Lafayette. The honorary is open to distinguished land surveying students in the top quarter of the junior class and the top third of the senior class. Professor Kenneth Curtis serves as faculty advisor.

Report of Great Lakes Regional Council

I attended the GLRC meeting held in the Gibson Room of the Stouffer Hotel, Baltimore, Maryland on April 2nd representing ISPLS. We exchanged packets of information from our state societies. I have now scanned this data and recommend the following distribution:

1. A draft of the North Dakota law requiring Professional Development to the proper committee. (Gary Kent's article on certification had been reprinted in North Dakota's newsletter.)
2. A Wisconsin salary study contained much information on pricing. Perhaps copies should be studied by the ISPLS board or a professional practice committee to determine what activity should be developed by ISPLS in that area.
3. The draft of the "Minimum Standards for Mortgage Location Surveys" in the State of Ohio should be forwarded to our Standard Committee. (Ohio's delegate to GLRC is now Alden McGhee.)
4. Michigan requested a copy of our standards. I have already sent Don Gilcrest a copy. Later in the meeting the council voted to exchange copies of standards. Our staff should send copies of our standards to all the other states represented on the council. As we receive the other states' standards perhaps we should start a three-ring binder for our standards committee or the library.
5. In the Minnesota packet is a copy of their "Recommended Procedures for the Practice of Land Surveying".

New G.L.R.C. officers were elected as follows:

Chairman - Russel Kastelle - North Dakota
Chairman-Elect - Donald Wall - Iowa
Secretary-Treasurer - Roger Brand - Minnesota

The minutes of the September 11, 1988 meeting were approved as distributed and the chairman reported a balance of $783.72. It was determined that the Great Lakes Regional Council was adequately funded, and there would be no assessment from the affiliates for 1989 operations.

It was reported that Martin Menk was working with a "Big 10" education committee that might recommend in-state tuition fees between Big 10 schools for specialized programs. Details were not available. The survey program at Purdue might qualify.

Candidates for NSPS Board of Governors President, Art Griffin and Jim Boyer, made brief presentations. No endorsement followed.

A resolution recommending that NSPS investigate organizing surveyors in local government on a nationwide basis was endorsed.

A resolution recommending that NSPS investigate the Canadian Free Trade Agreement for its impact on surveyors was endorsed.

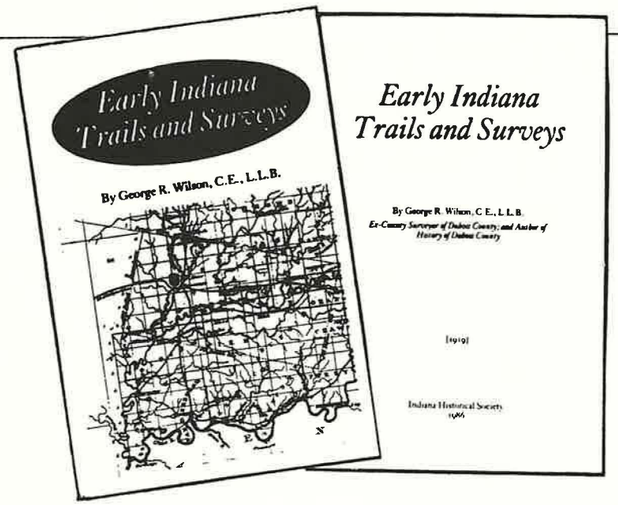
Harold Charlier informed the council that laws effecting surveying (or any other subject) can be researched by state. In our case we would ask for:

"Callaghan's "Indiana" Digest"
Callaghan & Co.
3201 Old Glenview Road
Wilmette, Illinois 60091

This service is supposed to be excellent, but the work is copyrighted and not cheap. The books are to include attorney general opinions, trial court decisions, and appellate court decisions.

GLRC still supports Minnesota's effort to hold the 1994 ACSM convention. Ed Miller thanked GLRC affiliate newsletter for printing his P.O.B. Salary Study, but he fears that he does not have adequate return for an accurate sample.

By Roger Woodfill, Alternate



ISPLS Headquarters Office has the book "Early Indiana Trails and Surveys" by Wilson in stock. They sell for $7.95.

Surveying Business for Sale

Complete Field and Office Equipment, Equivalent of five four-drawer Cabinets with 38 years of Surveys in South-Central Indiana, Quadrangle maps of all of Indiana, State Highway plans for all state highways in Lawrence County, and some in other counties, Copies of all Deeds in 1970 in Lawrence County, Ownership maps of all of Lawrence County. All of this for $15,000.

Owner is too old to cut the mustard in the field, but will be available to assist in finding and interpreting the notes in the office at no charge.

Call or Write: Nelson L. Prall
410 Citizens National Bank Building
Bedford, Indiana 47421
Phone: (812) 279-2773
OR
2743 Washington Avenue
Bedford, Indiana 47421
Phone: (812) 275-7333

GPS APPLIES TO THE PRACTICAL SURVEYOR

Robert W. Foster, PE, PLS, Framingham, Massachusetts

COMPARISON
GPS Measurements Vs. Calibrated Base Line*

Base Line Distance (feet)	GPS Distance (feet)	DIFF (GPS-Base Line) (feet)	Apparent Accuracy	Observation Time (minutes)
492.123	492.105	-0.018	1:27,340	19
918.658	918.660	+0.002	1:459,329	67
2952.680	2952.679	-0.001	1:2,952,680	42
3871.332	3871.329	-0.003	1:1,290,444	42
4593.190	4593.185	-0.005	1:918,638	38

*Marlboro base line established by the National Geodetic Survey in conjunction with the Massachusetts Geodetic Survey in 1979. GPS observations made by Schofield Brothers, Inc., Geodetic Survey Division in December 1988.

It is not too early in the evolution of the global positioning system to examine some of its practical applications. In the surveying profession GPS has progressed from prototype to appliance. Many of the large surveying engineering firms have invested in the equipment, of which there are several models and manufacturers to choose from.

Much has been written about the use of GPS in grand and dramatic applications. Mountains have been measured, the earth's crustal deformation has been calibrated, and regional geodetic networks have been established. What about GPS use for the more pedestrian surveying applications?

My company has purchased four Trimble 4000SL receivers which read the civilian L1 beacon signal from the Global Positioning System NAVSTAR satellites. The receivers automatically acquire and track up to five satellites, precisely measure the carrier and code phases and store them in an internal, solid state, battery backed-up RAM memory. Data is processed on Trimvec Plus GPS software. To date our experience indicates an unprecedented speed of positioning and a precision of measurement that meets or exceeds other surveying and mapping systems.

There is a subtle difference in the positioning and measuring functions as recognized by surveyors and mappers. Whereas in mapping the professional is interested in position relative to the earth's surface, or national or regional boundaries, the local surveying engineer may be more interested in measuring the relativity of features within his neighborhood of interest. Whereas the mapper may have latitude and longitude concerns, the local surveyor must relate a structure to a property line, or a property line to a highway layout.

The original objective in the development of GPS was to allow the United States military to track their planes, ships, and personnel. Towards this end most early research and implementation was for point positioning where a single satellite receiver could be used to determine fairly accurate (+/- meters) geographic position. The receivers track several satellites transmitting coded radio signals. any precise positioning in this mode depends upon certain data that the U.S. military holds as classified.

It is possible, however, to use the signals to determine precise relative positions without the use of classified codes, and in this mode the application is recognizable to any surveyor. GPS receivers may be used to measure a direction and distance between two points. When two receivers are used a routine traverse procedure applies beginning at a known point, establishing new stations along a traverse route, and ending at another known point. Additional receivers allow more new stations to be established in a given time period and more redundancy for a stronger survey. In this mode GPS makes it possible for the surveyor to do what he has always done - measure direction and distance - without regard to visibility or distance between points.

The first thing we did after unpacking the boxes last Fall was test our new equipment against a calibrated baseline. As the accompanying chart indicates the only question was whether the baseline itself was of an accuracy commensurate with the precision of the equipment.

Note that the shortest line was measured in the shortest observation time. This was unplanned; the vehicle battery powering the receiver went dead after only 19 minutes of observation. And yet the apparent accuracy of this observation was over one in twenty-seven thousand (1/27,000). The longer lines, with longer observation times, yielded apparent accuracies of from one in a half-million (1/500,000) to one in nearly three million (1/3,000,000). We find no precision-related reasons to doubt the applicability of the global positioning system for normal surveying work.

One of our first practical applications of GPS surveying was in establishing the location of a town line. A cartographer was having trouble positioning a housing subdivision on a parcel map being prepared for the town. The question was raised as to the method by which the town line - a boundary of the subdivision - had been determined. In Massachusetts a town line may only be determined by occupying the town corner monuments. There are road stones which purport to show where the town line crosses roads, but these are good for showing a snow plow operator where to turn around - and not much more. The Massachusetts Department of Public Works publishes coordinate data for town corners but these are not considered legally reliable for establishing town line locations.

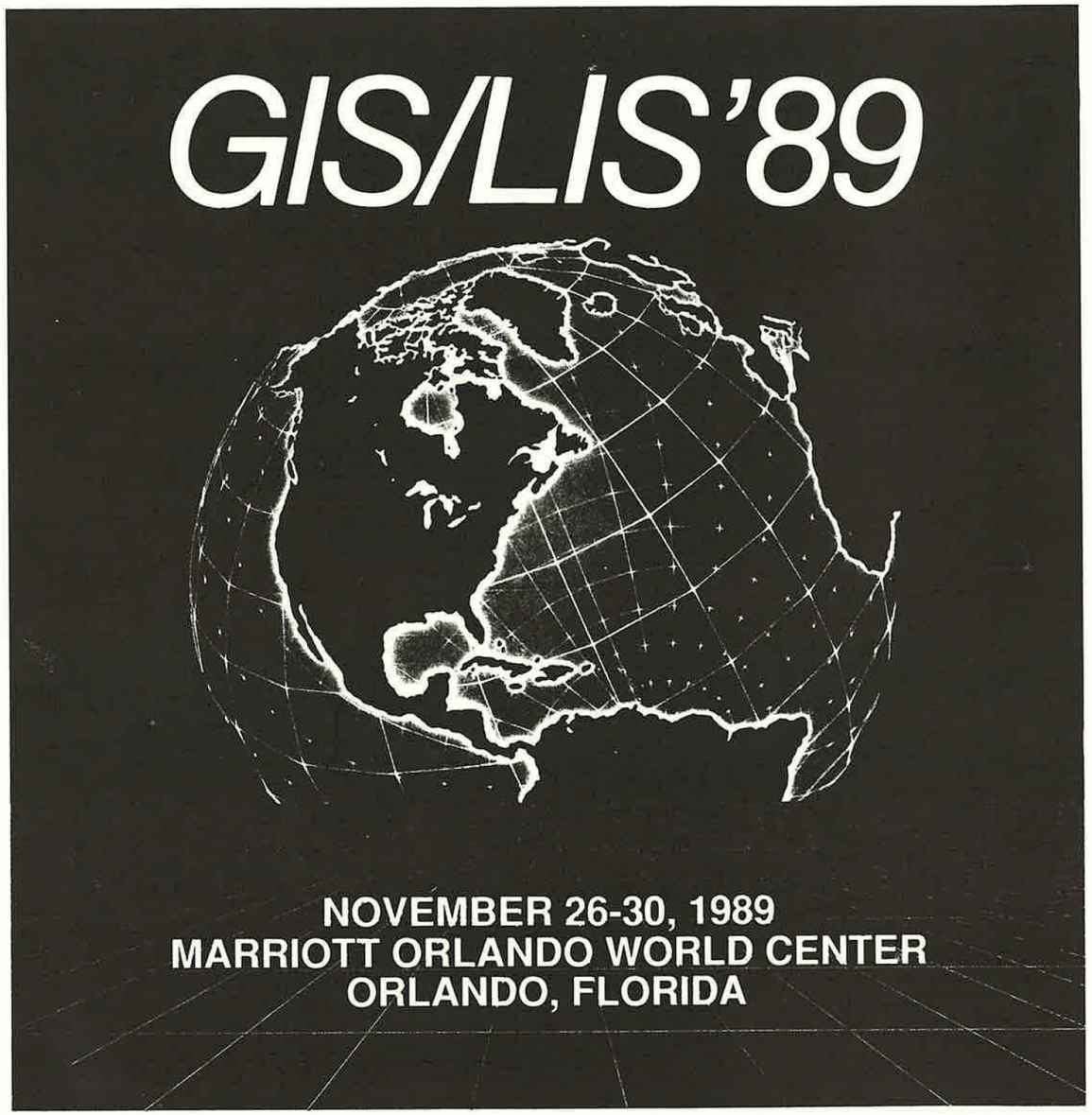
Since the housing subdivision in question was several thousand feet from the town corners in each direction, our solution was to relate several points within the subdivision to the town corner monuments by GPS survey; an application of the global positioning system was a natural for this problem. The results of our survey showed that the town line was seventy feet from where the developer thought it was. As a result large portions of five house lots are in the wrong town; one house is totally over the line. The legal and political solution to that problem must be found by methods other than GPS.

There is no longer a question of the practicability of GPS surveying methods for the difficult and unusual applications. More to the point, GPS is a practical solution to the normal surveying problems facing the practitioner. Consider establishing ground control for aerial photogrammetry, an exercise common to many surveyors in private practice. Evaluation of the GPS alternative is a simple matter of time and cost: how long will it take, and at what cost, to establish control by conventional methods as compared to GPS survey.

Conventional methods, defined as tape and transit or electronic distance measuring and theodolite, are limited by crew efficiency, labor requirements, weather and visibility conditions, and access to control. The major limiting factors in GPS surveying are number of receivers used and access to the satellites. Because the government has not yet launched a full constellation of satellites, the window of access is only about five hours each day, occurring at different times of the day at different times of the year. In a GPS survey application where four receivers are used a reasonably well-trained crew can establish six to nine control positions per day given a five hour window of access. It is not difficult to compare production by GPS survey to production by conventional survey. Allowing for manpower and equipment costs the applicability of GPS surveying to control work for a specific project can be determined. On certain projects a production rate of six to nine control points by conventional survey methods is not attainable due to local conditions, accessibility of existing control, and so on. GPS is a method of survey whose time has come, even without a full array of NAVSTAR satellites.

Robert W. Foster is Executive Vice President of Schofield Brothers, Inc. of Framingham, MA. Foster is also Treasurer of ACSM and serves on the Board of Direction of that organization. Additionally, he is Chairman of the ACSM Public Relations Committee and NSPS Professional Liability Committee..

Permission to reprint this article was given by the author and CIVIL ENGINEERING NEWS where it was originally published in the June 1989 issue.



Mark your calendars now so you won't miss the GIS/LIS '89 technical meeting and exposition to be held at the beautiful Marriott World Center resort only 4 minutes from Epcot and Disney's Magic Kingdom.

Over 3,000 attendees are expected for this exciting and informative event. The week's program will include one day of workshops and three days of technical sessions. The exposition will feature over 32,000 square feet of exhibit space filled with the latest in GIS/LIS technology and equipment.

Special golf and tennis tournaments have been arranged for early arrivals. Come early and enjoy a weekend at Walt Disney World and Epcot. Visit Sea World and downtown Orlando's Church Street Station along with all the other attractions that the area has to offer.

Sponsored by: American Congress on Surveying and Mapping
American Society for Photogrammetry and Remote Sensing
Association of American Geographers
Urban and Regional Information Systems Association

Yes, I am interested in receiving more information about GIS/LIS '89 to be held in Orlando, Florida.

Name_____

Address _____

City_____ State _____ Zip _____

Telephone ( ) _____

Return this form to : GIS/LIS '89
210 Little Falls Street, Falls Church, VA 22046

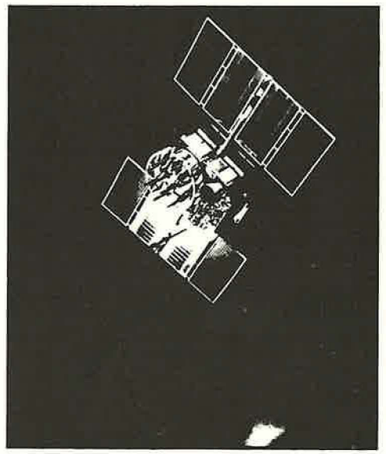
(703) 241-2446
FAX (703) 533 9614

GPS: A TECHNOLOGY WHOSE TIME HAS COME

There is likely to be a post-collision surveying engineering profession with a totally new look

Robert W. Foster, PE, PLS, Framingham, Massachusetts

Navstar, GPS and the Surveyor



The greatest improvement in the science of surveying since the (EDM), the Navstar Global Positioning System (GPS). With its constellation of satellites, it will allow surveyors to calculate their position with unprecedented accuracy. By the mid 1990's, 21 GPS satellites will be orbiting the earth in 6 planes, providing around-the-clock access. The window of access at the present is only about five hours each day.

The Global Positioning System was originally developed to allow the United States military to track their planes and ships. But it also offers enormous potential for civilian applications, such as air traffic control, search and rescue operations, and of course, land surveying. With their own GPS receivers, surveyors can access and use these same signals without the use of the military's classified codes.

The Navstar Global Positioning System consists of three segments: 1) the orbiting satellite constellation, 2) the ground control and processing facilities, and 3) the user equipment sets that receive positioning information from the satellite(s). The user equipment typically includes an antenna, signal receiver/processor, and a control/display unit. Once these little black boxes capture GPS signals, they automatically compute latitude, longitude, altitude, velocity and precise time. They can be used in the air, on land, at sea, at any time (once the full array of satellites are in place) -- and in any weather.

The key to the Navstar accuracy, according to Rockwell International who builds them, is a set of atomic clocks that lose or gain only one second in 300,000 years. Ground stations track the satellites to correct their positions and synchronize their clocks.

The latest series of Rockwell's GPS satellites are designed for compatibility with two launch systems: the Space Shuttle and the Delta II booster..

Development of the global positioning system has introduced a new activity in the surveying profession: futurology. Futurology is "a system or method of stating the probable form of future conditions by making assumptions based on known facts and observations," (Webster's New World Dictionary, 2nd College Edition).

The facts of the global positioning system being utilized by surveyors have been roundly reported. Not only in geodesy but in boundary survey as well, GPS is making its mark and practitioners are finding new applications every day (e.g. "GPS Applies to the Practical Surveyor," Civil Engineering News, June, 1989).

People in the surveying profession are making observations about GPS: It is a technology whose time has come. It has practical applications in nearly every branch of surveying. Its speed of use and accuracy of measurement surpass other surveying systems. It is as applicable for relative measurement as for absolute positioning. And so on.

The real fun begins when we start predicting the "form of future conditions." At least three currently developing conditions create what I think of as the GPS collision course. First, the U.S. government is committed to putting in place a full array of GPS/NAVSTAR satellites which will give us 24-hour access to the system. Second, the manufacturers of GPS hardware "muscle" and the writers of the software "brains" continue to advance the technology and provide the user systems at an even lower cost. The third track of the collision course is the expanding awareness of the surveying engineering community of the wonders of this new technology and the possibilities of application in everybody's backyard. Each of these three developing conditions feeds the other. As we near the point of collision, there will be even greater velocity of the elements, and in the near future - probably the mid 1990s - there is likely to be a post-collision surveying engineering profession with a totally new look.

Consider the possibilities.

It has been predicted that a GPS receiver will soon be available in a comfortable carry-around form for about $5000. That puts GPS in the category of the ubiquitous EDM (electronic measuring device), standard equipment in the back of nearly every surveyor's truck. Add to that a tracking ability allowing a surveyor to set out points in the field to predetermined positions, and real time readout of measured positions and vectors, and every small town small office surveyor will be in the GPS business.

Whether laying out roads and lot corners in a new subdivision, staking buildings in an industrial park, or resetting Mrs. Murphy's property corners, GPS will be the equipment of choice. In fact, it is quite possible that the old rules of priority of monuments may change in time. Surveyors normally recognize physical monuments at property corners over calls (distances recited in deeds of record). It seems possible - even likely - that at some time in the future the record coordinates of a property corner will take precedence over a marker that a surveyor may find at a corner. Before rejecting this suggestion as heretical consider the following scenario: A large tract of land is surveyed using GPS equipment. The corners of the tract are recovered to everyone's satisfaction; by GPS measurement coordinates are established for the corners to one part in a million precision, on the NAD 83 system. A subdivision of the tract is computed generating coordinates for every lot corner in the subdivision. Two or three decades later what evidence is likely to take precedence for lot corner positioning: iron pipes and pins found or the record coordinates of the corners? A local surveyor of the future will pre-compute any corner in the subdivision before leaving the office, walk directly to the property corner with his real time, tracking, hand held GPS receiver and show Mrs. Murphy precisely where her corners are. No longer will the surveyor have to stand there scratching his head over the fact that there are a wooden stake and two iron pipes within a six inch circle. The point will be where the record says it is, and the record will include the coordinates of the point. This should come as good news to the lawyers who have been mystified for years over the apparent inability of surveyors to agree on the position of the point.

Of course some other things will have to happen before we reach this surveying paradise. In order to accomplish accurate relative measurements and relate the results to a published system like NAD 83 we will require a thoroughly monumented geodetic network. For years surveyors have been calling for densification of the monumented network in their respective states. It appears to this writer that what is needed is not densification but purification of the network.

NAD 83 is a mathematical adjustment of the network but many of the monuments which provide access to physical position were set decades ago. Their actual, physical location must be redetermined using modern positioning methods for surveyors to deliver millimeter accuracy in positioning.

Presently surveyors are reluctant to relate their property surveys to a geodetic network if they have to traverse more than a few thousand feet to the nearest set of monuments. For this reason we have been calling for densification to support publicly established and maintained land information systems. But with GPS a surveyor will not need access to monuments within a thousand feet of the site; the surveyor will find that monuments within several miles of the site are within practical reach.

In the early stages of GPS development the surveyor may send a couple of GPS receivers to monuments miles from the office while work is performed locally. But an even better system will be in place when receivers are set permanently over several known points in a system allowing public and private surveyors equipped with their own GPS receivers to do their thing 24 hours a day, seven days a week, relating everything to the accepted geodetic network. In the best of all worlds government would provide and maintain these receivers but we don't live in the best of all worlds. It may be necessary for the profession itself to provide the equipment, either in a cooperative effort, or as a commercial venture if a way can be found to provide proprietor security.

Who will perform the necessary purification of the monumented network? Again, this would be best done by a public body - the geodetic section of the state department of public works, for instance. But considering the glacial pace of government bureaucracies in such matters, and the reluctance of legislatures to provide funds for projects that lack popular appeal, a cooperative effort on the part of professionals may be required.

As GPS equipment proliferates in the private sector it may prove practical for a state surveyor association to organize a state-wide network survey. Surveyors would occupy principal recoverable monuments with their privately owned equipment for one massive observation of positions. The nearest university surveyor or geodesy department, or a student eager to perform the operation as part of a graduate thesis, might perform the needed adjustments.

A similar effort will be required to establish local geoid modeling enabling the surveying community to provide orthometric elevations by GPS methods. Once again the cooperation of surveyors in private practice may be necessary to accomplish this basic task if we are to be as progressive in our practice as are the events of the GPS collision course.

See how much fun a little futurology can be? One is only limited in assumptions of future conditions by the limit of one's imagination - the wilder the better.

Robert W. Foster, PE, PLS is Executive Vice President of Schofield Brothers, Inc. of Framingham, MA. Foster is also Treasurer of ACSM and serves on the Board of Direction of that organization.

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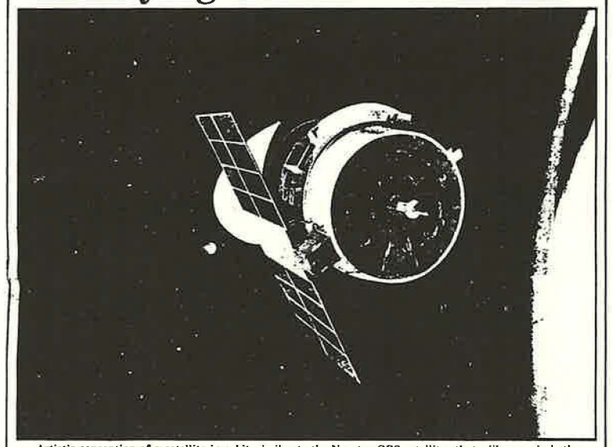
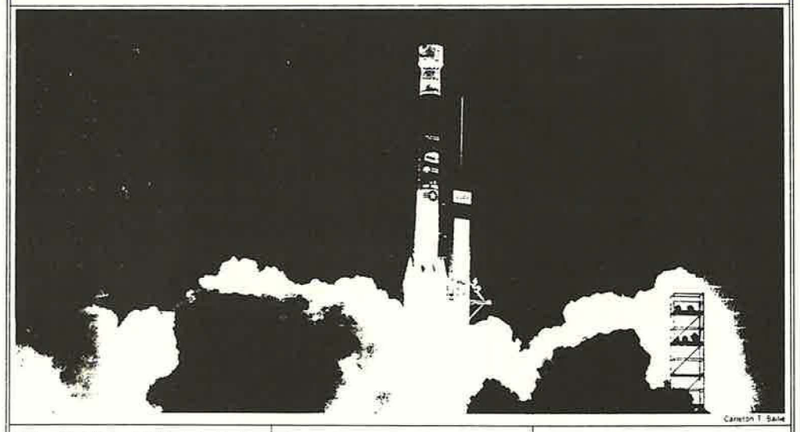
Surveying Enters A New Era



Artist's conception of a satellite in orbit, similar to the Navstar GPS satellites that will soon circle the Earth in six different planes, changing the form of future conditions for the surveying profession. But little do these satellites know, they are on a collision course!

Third Defense Dept. Delta 2/GPS Satellite Launched Successfully as Navigation System Grows

CAPE CANAVERAL



Carleton T. Bailie

The third Delta 2/Global Positioning System satellite was successfully launched here at 1:58 a. m. EDT on Aug. 18 after the mission was delayed three times because of thunderstorms.

USAF plans to launch Navstar/GPS satellites at intervals of 60-90 days until the complete 21-spacecraft constellation is in operation. The Rockwell satellites will provide pinpoint accuracy to military and civilian users anywhere in the world.

The 3,000-lb. GPS was boosted into an 11,000-naut.-mi. orbit by an apogee kick motor about 44 hr. after liftoff. It will undergo testing and checkout over the next 2-3 months before it will be considered operational.

McDonnell Douglas, which is actively marketing the Delta 2 to commercial customers, said it will have the capability to launch a Delta 2 every month next year. □

AVIATION WEEK & SPACE TECHNOLOGY/August 28, 1989

ISPLS SCHOLARSHIP FUND RAISER

It Makes Economic Sense to Give!

With an endowment now in place at both Vincennes University and Purdue University, now is the time for ISPLS Members to donate to the scholarship fund of their choice.

When the facts are analyzed, it can be shown that a $100.00 donation actually costs only about $22.00 to give.

The 50% Indiana tax credit for donations to state universities automatically cuts your out-of-pocket expenses in half. The entire donation is then also a deductible expense on your federal tax form. If you are in the 28% tax bracket, then the $100.00 donation breaks down as follows:

$100 (initial donation) minus $50 (Indiana tax credit) minus $28 (28% of $100 donation - deductible expense) equals an actual cost of $22.

Consult with your accountant for your particular case. The Indiana tax credit is good up to a maximum credit of $100. per person or $200 for couples filing a joint return.

Those wishing to donate to the Purdue University Endowment should make their checks payable to:

Purdue University
For: ISPLS - John McEntyre Endowment

Those wishing to donate to the Vincennes University Endowment should make their checks payable to:

Vincennes University
For: ISPLS - Peggy Archer Memorial Endowment

If you have no preference, you are encouraged to split your donation between the two endowments.

Please send your donations to: ISPLS Headquarters
5355 East 38th Street
Indianapolis, Indiana 46218.

ACSM-ALTA-ABA SYMPOSIUM, CLEVELAND, OHIO, SEPTEMBER 21, 1989

The Cleveland Chapter of the Professional Land Surveyors of Ohio will sponsor a symposium to be held at the Stouffer's Tower City Hotel in Cleveland, Ohio on Thursday, September 21, in conjunction with the Fall ASPRS-ACSM Convention. The symposium will be run concurrently with the Convention and will open with remarks by the participants, a break for lunch, then an open panel discussion with questions from the floor. Subjects to be discussed will include an explanation of the ALTA-ACSM Land Title Survey Specifications adopted in 1986 and revised in 1988 and how these specifications impact on title insurance, necessary surveys and legal ramifications of the real property transfer. The hotel is easily accessible by rapid transit from Cleveland Hopkins International Airport. Cost of the symposium is $30.00 which includes lunch and [illegible]outs. Send your check payable to "Cleveland Chapter, PLSO" to Joh[illegible]oy, 4558 West 130th Street, Cleveland, Ohio 44135. Contact Hoy at (21[illegible]3600 for more information.

Purdue University

University News Service
Engineering Administration Bldg.
West Lafayette, IN 47907
317-494-2096

Hometown News

5-26-89 For immediate release

West Lafayette, Ind. -- A sophomore in land surveying at Purdue University has been awarded the first John G. McEntyre Endowment scholarship by the Indiana Society of Professional Land Surveyors.

Scott Zeigler, the son of Mr. and Mrs. Paul Zeigler of Albion, Ind., was awarded the $1,000 scholarship at an awards banquet honoring senior land surveying graduates.

The scholarship honors McEntyre, a retired professor emeritus of land surveying at Purdue.

The award is based on scholarship, financial need, and a desire to pursue a career in land surveying, says Larry G. Holderly, assistant professor of civil engineering and adviser of the Purdue student chapter of the Indiana society.

The Purdue student chapter is active in promoting interest in land surveying as a career and serves as a link between the students and land surveyors in Indiana.

Scott D. Zeigler
R.R. #4, Box 298
Albion, Indiana 46701
April 18, 1989

Indiana Society of Professional Land Surveyors Inc.
5355 East 38th Street, Suite 209
Indianapolis, Indiana 46218

Dear ISPLS:

During the recent 17th Annual Recognition Dinner for the Purdue Student Chapter of the ACSM-ISPLS, I was awarded the John G. McEntyre Endowment Scholarship. I am very proud and pleased to have received this award. Please pass my sincere thanks to EVERYONE who made this scholarship possible. THANK YOU.

Sincerely yours,

Scott D. Zeigler

Scott D. Zeigler

JOHNSON COUNTY RECORDER

Jacqueline E. Keller
P.O. BOX 475
FRANKLIN, INDIANA 46131
PHONE 736-3718

June 26, 1989

MEMORANDUM

TO: Surveyors of Johnson County

FROM: Johnson County Recorder

RE: Recording of Surveys

Thank you for your patience as we have established a system for filing recorded surveys. I appreciate the time and advice many of you have given, after administrative rule 13 was signed into law. It is our hope that this system accomplishes the goals your organization is trying to reach.

Our INDEXES are set up with a page for each quarter section in the less populated townships, and a page for each quarter/quarter section in the more populated areas. Surveys will be indexed in the Grantor Book by name of land owner. In the Survey Index on those pages of the quarter or quarter/quarter sections listed in the Title Block on the Survey.

Our FILE has been set into place and we now have a separate filing system for surveys. There is a file drawer for each (Twp-Range). One drawer for all surveys up to 42" in length.

I am attaching a list of the things we will be looking for at the time of recording. I hope this will serve as a reference during preparation of the surveys. Please distribute this throughout your firm to all surveyors.

Your knowledge and perspective as civil engineers have helped to create this system, it is our hope that it establishes a useable data base, benefiting both professionals and the general public.

Fees will be charged as per our regular fee schedule, set by state statute (information of same on reference page). If you have any questions please feel free to call our office.

Sincerely,

Jacqueline E. Keller

Jacqueline E. Keller
Johnson County Recorder

JEK

JOHNSON COUNTY RECORDER

Jacqueline E. Keller
P.O. BOX 475
FRANKLIN, INDIANA 46131
PHONE 736-3718

PREPARATION

1. Any size up to 42" width will be acceptable
2. Title Block (in top left corner)
3. Prepared for_____.
4. Record owner_____. (to be verified at Auditor's Office on day recorded)
5. Location notation (by ¼ or ¼ ¼ section) (this will specify as to where it should be indexed in the survey register, it may be indexed more than once but the copy of survey will be filed in the township/range listed first) (This applies to Subdivision Divided Parcels also)
6. Description of land
7. Drawing
8. Date of Survey (in lower right corner)
9. Name of Surveyor, signature, and Surveyor seal (lower right)

RECORDING

1. Please bring original and two copies to record. (If you wish a copy for your customer, to be time stamped, please bring another) 1 copy for Auditor
   1 copy for Assessor
2. Stop at Auditor's Office to verify current owner at time of recording (while verifying in transfer book, they will note N.S. for future reference, and change any area amount the survey may indicate)
3. After recordation we will make a copy for filming and one for our flat file.
4. You will take your original with you as well as any copies for your customer, etc.

NOTE: The location of Title Block, Date, and Surveyor's signature/seal will be important on those documents that have to be filmed in sections. The first frame will contain the title and the last will contain the signature (since we film from upper left to lower right, on large documents).

FEES

Document not exceeding 9" x 15"	$ 5.00
Each Additional Page, not exceeding 9" x 15"	1.50
Document exceeding 9" x 15"	10.00
Each Additional Page, exceeding 9" x 15"	3.00
Each Cross reference of a recorded document	1.00

CORRECTIVE SURVEYS

1. Will be recorded in survey record
2. Same fees apply
3. Must note reference to original recorded survey being corrected

INDIANA SOCIETY OF PROFESSIONAL LAND SURVEYORS, INC.

5355 EAST 38TH STREET, SUITE 209
INDIANAPOLIS, INDIANA 46218
317-546-0188

Form 6/89

ISPLS
APPLICATION FOR MEMBERSHIP

(Type or Print all Information - check box for mailing address desired)

NAME_____ AGE_____
Last First Middle

☐ HOME ADDRESS_____ PHONE_____
Street and Number City State County Zip

☐ BUSINESS ADDRESS_____ PHONE_____
Street and Number City State County Zip

PRESENT OCCUPATION_____
Firm Name Position

SCHOOL ATTENDING_____
School Name Grade

_____
Degree You Are Pursuing Expected Month/Year of Graduation

REGISTRATION STATUS_____
L.S., P.E. OR S.I.T. Number State

MEMBER OF AMERICAN CONGRESS ON SURVEYING AND MAPPING? Yes_____ No_____

MEMBER OF LOCAL CHAPTER OF I.S.P.L.S.? Yes_____ No_____ Chapter_____

STATE BRIEFLY REASONS FOR SEEKING MEMBERSHIP_____

_____

TYPE OF MEMBERSHIP DESIRED

- ☐ MEMBER.....$120.00
- ☐ JUNIOR.....$50.00
- ☐ ASSOCIATE.....$50.00
- ☐ STUDENT.....$10.00
- ☐ LIFE.....NO CHARGE

ISPLS DUES ARE NOT DEDUCTIBLE AS A CHARITABLE CONTRIBUTION FOR FEDERAL TAX PURPOSES, BUT MAY BE DEDUCTIBLE AS A BUSINESS EXPENSE.

REFERENCES

Name	Address	Phone

PLEASE FURNISH COMPLETE ADDRESSES, INCLUDING ZIP CODES

I hereby certify the above statements are true and correct and that I will abide by the Constitution and By-Laws of the Indiana Society of Professional Surveyors and will promote and uphold its principles and objectives.

_____ _____
Signature **Date**

MEMBERSHIP CLASSIFICATIONS

Member: A Member of this Corporation shall be limited to Registered Land Surveyors in good standing with the Indiana State Board of Registration. A Member shall be eligible to vote, hold office and to participate fully in the affairs of the Corporation.

Junior: A Junior Membership will be granted to those non-registered individuals who are endeavoring to make Surveying their chosen career. A Junior Member is entitled to vote and participate fully in the affairs of the Corporation but shall not be permitted to hold office.

Associate: An Associate Membership will be granted to any who is associated or affiliated with the Land Surveying profession but is not otherwise pursuing registration. Any non-resident who is registered and in good standing as a Land Surveyor in their own State may also be an Associate Member. An Associate Member is not entitled to vote or hold office but will receive Society correspondence and be invited to participate in meetings.

Student: A Student Member shall have the same eligibility requirements as those of a Junior Member, except that this class of Membership shall apply for a period of four (4) years only. A Student Member is not entitled to vote or hold office but will receive Society correspondence and be invited to participate in meetings.

Life: Any person holding Member Status who has reached the age of 65 and has been a member of this Corporation for at least 20 years and has further been approved by the Board of Directors shall be eligible for Life Membership. Life Members shall not be subject to payment of dues, but shall enjoy all the rights and privileges of full Membership in this Corporation.

Firm Members

VEYOR
sional Land Surveyors, Inc.
209

Form 6/89

Bulk Rate
U. S. Postage
PAID
Indianapolis, Ind.
Permit No. 4056

COMPLETED CAREER

The latest issue of *P.O.B.* reports the death, on June 1, 1989, of J. David Johnson the founder and owner of Harrison Marker and Instrument Company in Anoka, Minnesota and developer of its popular cast iron monuments. He has been a sustaining member and exhibitor at Indiana conferences for many years. We will miss him!