California Surveyor

Winter 2005/06 Issue #146

Mapping the Course for Future Surveyors

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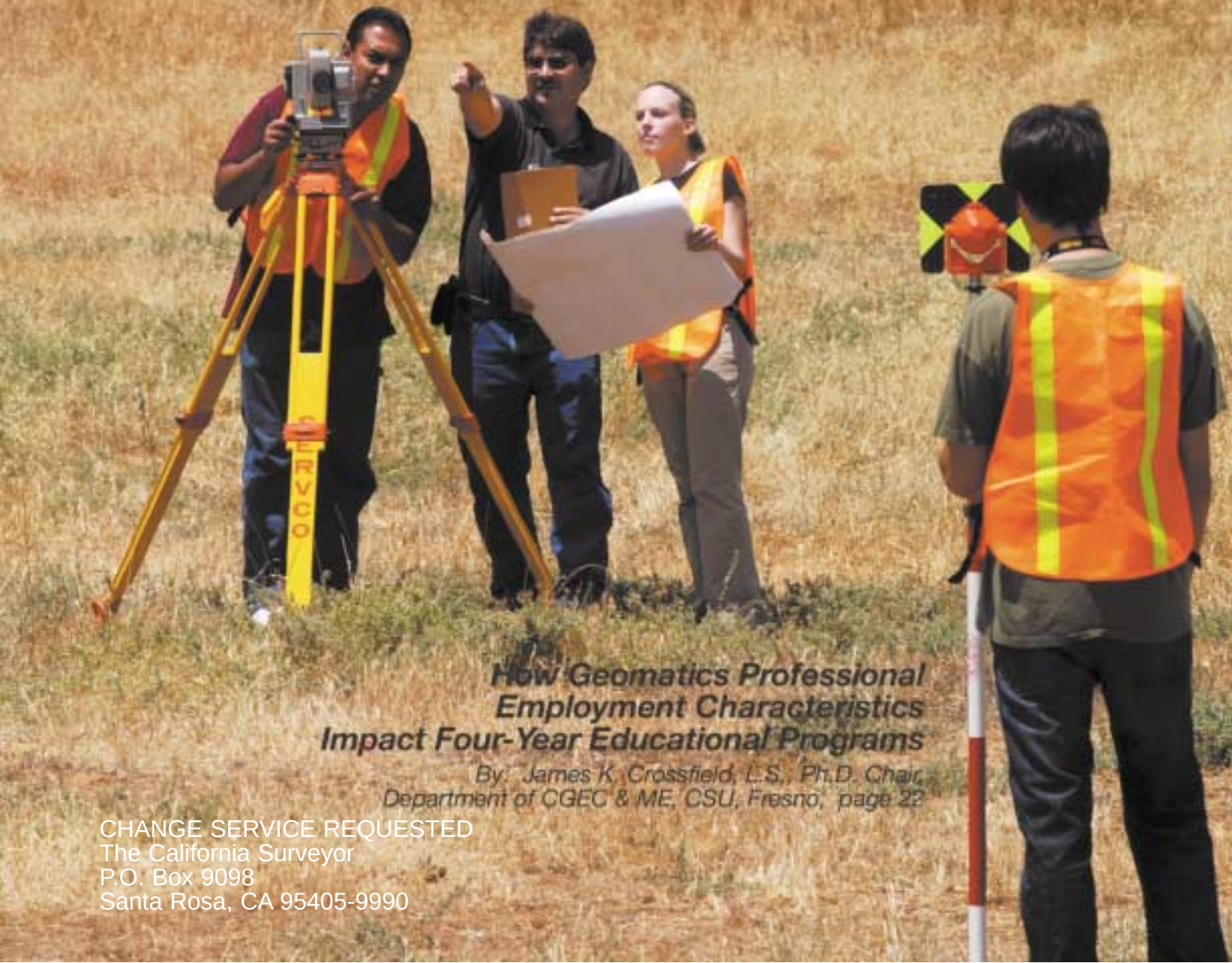

How Geomatics Professional Employment Characteristics Impact Four-Year Educational Programs

By: James K. Crossfield, L.S., Ph.D. Chair, Department of CGEC & ME, CSU, Fresno, page 22

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"Recognizing that the true merit of a profession is determined by the value of its services to society, the California Land Surveyors Association does hereby dedicate itself to the promotion and protection of the profession of land surveying as a social and economic influence vital to the welfare of society, community, and state."

"The purpose of this organization is to promote the common good and welfare of its members in their activities in the profession of land surveying, to promote and maintain the highest possible standards of professional ethics and practices, to promote professional uniformity, to promote public faith and dependence in Land Surveyors and their work."

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Spring . . . . . .January 10	Summer . . . . . .April 10
Fall . . . . . .July 10	Winter . . . . . .October 10

Articles, reports, letters, etc., received after the above mentioned date will be considered for the next edition.

Opinions expressed by the editor or individual writers are not necessarily endorsed by the California Land Surveyors Association Officers or its Board of Directors. Original articles may be reprinted with due credit given to the source and written notification to the California Land Surveyors Association, unless otherwise noted.

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Santiago Canyon College surveying students in the field

By: Carl C. deBaca, PLS - Editor

From the Editor

Well, it's that time of the year again – autumn. Autumn means football, leaves turning color and for California surveyors, fall means agonizing over the results of the L.S exam. Fall and winter have always been time for reflection and we have much upon which to reflect.

Consider our dwindling numbers and how we might bolster our ranks by recruiting the young. CLSA is working with teens via TrigStar, Scouting programs and before long we should be reaching them through Operation Spotlight. You should all try to find a way to be involved in one of these programs.

Consider GPS and machine control. Much like the avulsive loss of purview over GIS a few years back, surveyors are rapidly losing control of many day-to-day uses of GPS. Who is currently providing adequate and accurate site control for machine control? Is it a licensed surveyor? I'd say not always. And who is developing the digital site models used by machine control, a licensed surveyor? I'd say the answer is somewhere between rarely and sometimes. I'd like to see this issue corralled before it's too late, though I suspect it might already be.

Consider the LS exam. Where to start? 9% pass rate…45% cut score…46 new licensed land surveyors in a state growing in every corner at an astounding rate. Surely close to that many are dying, retiring or moving away. How can we bolster our depleted ranks with a single-digit pass rate? There are those who think that a shortage of LS's just makes us that much more valuable and we can therefore charge more for our services. That is a debate for another day. However, I would suggest that the last passenger pigeon was probably well-fed and well thought of…and then he died. CLSA is very concerned, as is the Board of Professional Engineers and Land Surveyors, according to BPELS executive director, Cindi Christenson. CLSA is pressing BPELS to release a recent test so that we can both evaluate it and use it to help candidates to be more prepared.

Personally I question whether we are really testing for minimal competency or do we and the test graders somehow expect perfection in order to secure a license? (See letter to the editor in this issue.) I find the term 'minimum competency' to be a nasty little phrase much like "material discrepancy" for which meaning is in the eye of the beholder. Anyway, this is a key issue because if we are testing beyond minimal competency then we need to make sure that everyone knows that going in. And if we are testing to some level above min/comp, does that affect your assessment of readiness for those who have used you as a reference? Not that you can do anything about that once the reference is given… Expect more discussion (and more intelligent discussion) in the next issue of this magazine.

You know, I wanted to work up a great lather about this spring's bone-headed decision by our U.S. Supreme Court regarding Eminent Domain. You remember, the one allowing any use that generates increased taxes being sufficient for a government taking. But events are overtaking my anger and it looks like our Congress is going to give the Supreme Court the rebuke they so richly deserve by putting forth legislation that limits such taking. No use beating on that one… ❖

Letters to the Editor

Re: Closing thoughts.

I very much enjoyed your last issue of the California Surveyor and was made to think about your Closing Thoughts article.

I respect Walt Robillard tremendously and would never take his comments lightly. When I was a young(er) lad and learning land surveying I too thought wouldn't it be nice to have a class in boundary retracement, as I really had no idea of the process. Since I have aged, I have changed my opinion about that.

To me, two of the primary professional aspects of land surveying are understanding measurement error and boundary analysis. Measurement error, for the most part, can be broken down to specific mathematical rules. Although the rules can be quite complex, they are by their nature consistent. This is an area of land surveying that can best be taught in a classroom environment. This is true even more so today, as the propagation of error is not as obvious as it use to be when we measured with theodolite and tape.

Boundary retracement, in my experience, is another story. I was taught the rules of public land surveys in a classroom. I even read, on my own (at the urging of the land surveyor I was working for) Boundary Control and Legal Principles, Evidence and Procedures for Boundary Retracement and Writing Legal Descriptions. I felt I gained some understanding of the technical aspect of boundary retracement. Once I actually had to perform a boundary retracement, I realized did not know anything about this subject. It took a look of work, discussion and turmoil along with all sorts of help from Land Surveyors before I understood what the process was.

Many can argue successfully, that of course, that was because it was me. However, I have never been successful in sending a young aspiring surveyor out for the first time to locate the monuments necessary to establish a boundary. It takes a solid understanding of the process before you can determine what you need in the field. When do you hold a monument, when do you reject it? When do accept the work of another surveyor? When do you decide you have searched long enough? These are all questions that come from experience and guidance.

I still believe that education excels in exposing students to many facets of a discipline and trains them in how to research, study and analyze a problem where experience increases the depth of knowledge of a specific facet.

Therefore, I believe that experience is the best school for boundary retracement and school is the best experience for understanding all of land surveying. I could be wrong but my experience suggest otherwise.

Sincerely
Tom Mastin, PLS

The issue raised by Carl C. deBaca in the California Surveyor is interesting, and timely. I have felt for a long time that this is something that should be allowed under certain circumstances.

What's wrong with this scenario? Surveyor Jones decides, up front, that she cannot (for whatever reason) do the field work on a certain project that her client wants her to handle. She has no way to locate the land net monuments at the beginning of the job, and likewise cannot set the new monuments at the end of the job. Instead, surveyor Smith will handle all the field work and Jones will do all the office work, including the research, the boundary analysis and the preparation of the map. They will work closely together, applying their professional knowledge and experience to take the project from beginning to end.

As long as each of the two surveyors take "responsible charge" for their respective portion of the work, how is the public harmed?

Maybe a licensed surveyor is on the staff of an engineering company that does not normally do parcel map surveys, but an important client needs one done. What's the problem with them finding a survey firm to take responsibility for the field work, and leave the rest for them to do in house?

In my view, as long as each surveyor performs their own work professionally, and in conformance with state law, there is no inherent, necessary conflict in a simple division of duties. As a matter of fact, this sort of responsibility-sharing goes on all the time within offices all around the state. Typically, larger firms will have a Project Surveyor, or Project Manager, take full responsible charge for a project, but it is not at all uncommon to share the work load when conditions make it necessary, or efficient to do so.

It comes down to a disconnect between the defacto reality of how work is actually done, verses the de jure wording of state law. Again, I do not see any inherent problem with a division of responsibilities. Why can't the law reflect this?

Personally, I think the burden falls on current law to argue the case for single stamping. I've been told that, in Germany, there are three places for signatures on maps: one for the party chief, one for the technician who does the calculations and one for the surveyor in charge. This makes perfect sense, doesn't it?

Take the L.S. who wants to retire from full time work. Why couldn't he or she advertise among the engineering and surveying firms in their area that they specialize in research? I can imagine a surveyor subcontracting to collect all the deeds, maps and documents that relate to a particular survey. They would go to all the public and private agencies, run copies of all the maps and deeds, in short, do all the leg work for this phase of a project. Being licensed, they would not merely run copies, however. No, they would study each recorded map, or deed, to look for secondary references to other maps or deeds that might be pertinent. They would follow up on all possible leads, in the very same way that the lead surveyor would. They would then present the research package to the firm and, if necessary, do follow up research should the need arise.

Take a second, semi-retired licensed surveyor who likes to do boundary resolutions. He or she could be presented with a research package, together with all the field notes and adjusted, final, digital data from the field survey and then begin the boundary analysis. They could visit the site to become familiar with the conditions in the field, the character of the found monuments, etc., and commence to analyze all the data and come up with a boundary resolution for the parcels involved.

A third, natural division of duties involves field work. We all know about survey firms that specialize in construction staking. Would it be so bad if they subcontracted under another firm to do the land net survey for a subdivision, parcel map or record of survey, and then, at the end of the job set the monuments for the surveyor in charge? Of course not.

Most survey projects can be naturally divided into these three basic phases: research, analysis and field work. In the real world we know that firms assign these three phases to different professionals all the time. I think it's time that the law recognize this and not just allow, but encourage, separate signatures on maps.

It's all too obvious that the demand for licensed surveyors far exceeds the supply, and that new surveyors are not entering the profession in sufficient numbers. Also, many of us that are licensed would like the freedom and opportunity to spend the later part of our careers still involved in the work, but not being obligated by law to do all of the work. Let's kill two birds with one stone and change the law to allow multiple stamping. Different professionals work together on a single project all the time. The burden of proof--that this is not possible (or desirable)--in my opinion falls on side of those who don't agree with this position.

R. Lee Hixson, PLS

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By: Armand A. Marois, PLS - President

President's Message

Support Your Local Chapter

Recently I was asked to attend a "revitalization" meeting of the Lake/Mendocino Chapter and talk about the benefits of chapter membership. Earlier this year CLSA received notice that the Chapter had voted to dissolve. CLSA was ready to remove it's listing when the Central Office received a phone call from Frederic Clark of the Central Valley Chapter indicating that there was still interest in continuing the Chapter. A meeting was set up with the help of Art Colvin and Keri Rynearson of Mendocino County. Frederic, the driving force behind this effort, gave me a phone call to speak at the meeting.

Since I had really never given a thought about why I belong to my local chapter, I always felt it was the right thing to do; this assignment got me to thinking. Why should a State member also belong to their local chapter? The number one reason I came up with is networking. Where else can you meet your fellow surveyors, get to know their concerns, discuss issues and have a good time. For example, I was recently given a grading plan by a client and was requested to provide staking in order to bring the site up to design grade. First thing I noticed was that the plan had been prepared by a local company and I knew the principle surveyor from attending local chapter meetings. I gave him a call, and asked if he could provide me with any information that would assist in staking the site. Not only did he send me an AutoCAD drawing of the site, he also included surveying control points in the area to help expedite the staking that needed to be done. Would he have done this had he had not known me personally? Possibly, but I would like to think that our interaction at the chapter level helped influenced his decision.

Representation at the State level. Chapter representatives are elected to participate as members of the Board of Directors of CLSA. The Board of Directors is the decision making body for all issues that are brought before CLSA. And local chapters are the mainstay for bringing any issues/concerns, which could affect surveyors, to the state level. Without chapter representation the state would not be aware of the problems occurring in a particular community. If you are a state member, without belonging to a local chapter, who will speak for you at the Board of Directors meetings?

Several chapters have established Professional Practice Review Committees. These are committee where members of the local chapter work in unison with the County Surveyor(s) to help educate local surveyors about the requirements of filing the proper records, i.e. Corner Records, Records of Survey. This could not be done by a committee at the state level.

Public Outreach. Local chapters are where programs such as Trig-Star and the new Scouting Merit Badge are initiated. The state office can always assist local chapters in getting these programs started, but only through the local chapters can these programs be effective.

A number of chapters have established LS exam review courses. And CLSA is in the process of developing a set of guidelines for a chapter to utilize in starting its own review course. Review courses are usually run by members of the chapter who are already licensed, over several weeks, to help our future surveyors prepare for the exam.

I have listed a few things that I feel are the strengths of chapter membership but I am sure there some that I have missed. If you don't already belong to a chapter, sign up and if there isn't one in your area contact the Central office to find out how to establish a new chapter. All you need are nine other licensed surveyors, who are state members of CLSA, to start a chapter. ❖

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Do you have a topic you would like to share with the land surveying profession? Or, are you involved in a project that would be of interest to our readers?

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ABOUT THE MAGAZINE

The California Surveyor is a quarterly magazine written and edited specifically for land surveying professionals. Quarterly, it provides in-depth articles on issues affecting the profession as well as current events, and general interest articles. Our readers are members and non-members of CLSA. They are Land Surveyors in private practice and public employees, Land-Surveyors-in-Training, employees of title companies and other related industry professionals.

FINDING THE MINDSET

Personal experience is probably your best source of article ideas. As a Land Surveyor, you have encountered problems, made mistakes and found solutions that can be shared with your colleagues. Have you worked on a unique project you would like to share with the profession? Do you have a fresh approach to an old problem or a cost-effective solution to a new one?

Examine back issues of *The California Surveyor* to get a feel for the kinds of articles that are published and the way they are written. Visit the California Surveyor page on the CLSA website at www.californiasurveyors.org/files/calsurv.html

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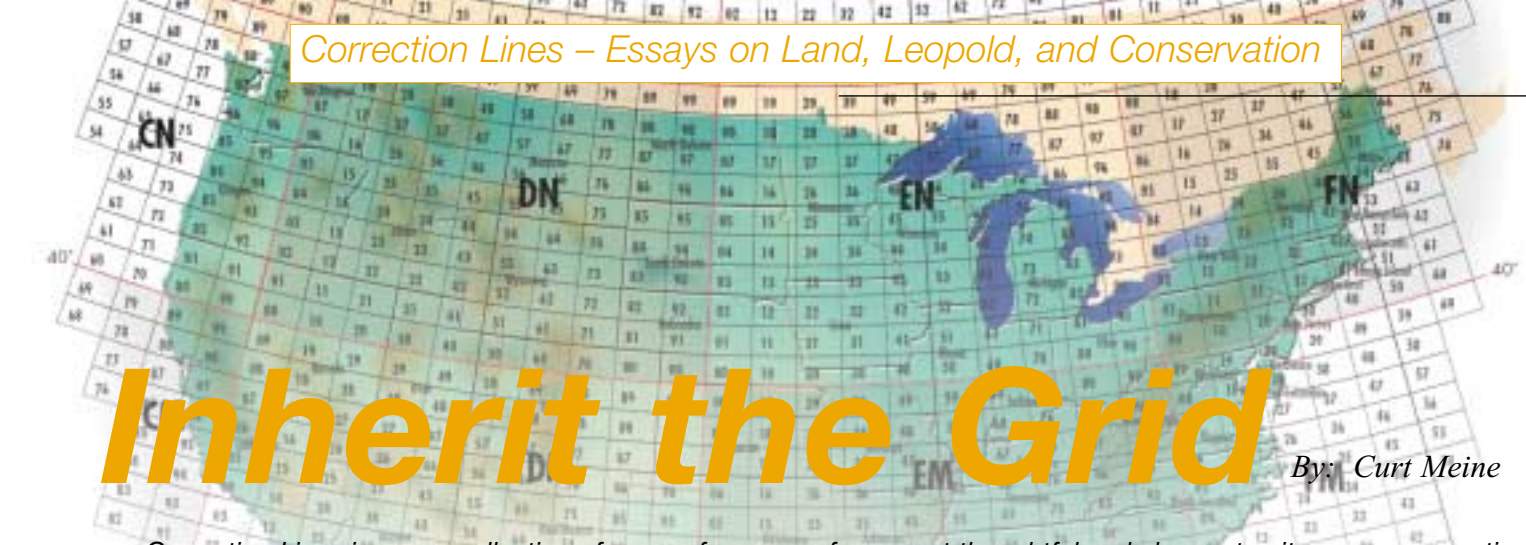

Inherit the Grid

By: Curt Meine

Correction Lines is a new collection of essays from one of our most thoughtful and eloquent writers on conservation. The essays explore interrelated themes: the relationship between conservation's biological and social dimensions: the historic tension between utilitarian and preservationist approaches; the integration of varied cultural perspectives; the enduring legacy of Aldo Leopold; the contrasts and continuities between conservation and environmentalism; the importance of political reform; and the need to 'retool' conservation to address twenty first century realties.

The following excerpt, "Inherit the Grid,' illustrates the far reaching impact of the land survey system while also explaining the title Correction Lines. In weaving together the book's 11 essays, Meine finds a symbolic thread in the image of 'correction lines.' For Meine, 'correction lines' as a phrase captures the conceptual core of the essays, as they stand for the larger question of how to better understand the landscape we have inherited by claiming the past in order to look to the future. "Inherit the Grid" appears in Chapter 9.

The lenses through which we see landscapes, and ourselves within them, vary from place to place and culture to culture. In much of North America, we perceive – and modify – the landscape through the superimposed system of rectangular land surveys, with its grid of township and range lines, that was instituted in the late 1700s. Where the grid system predominates, it has profoundly shaped landscapes and the patterns of life within them. "It is the grid," writes geographer John Brinkerhoff Jackson, "not the eagle or the stars and stripes, which is our true national emblem."

Yet the very pervasiveness of the land survey system can hinder our appreciation of it. As Hildegard Binder Johnson notes in her book Order upon the Land, "most Americans and Canadians accept the survey system that so strongly affects their lives and perception of the landscape in the same way that they accept a week of seven days, a decimal numerical system, or an alphabet of 26 letters – as natural, inevitable, or perhaps in some inscrutable way divinely ordained." In our efforts to devise more sustainable land-management and landscape design practices, we need to grasp fully the historic impacts of the survey system, and the constraints and opportunities they entail. To factor in the grid – what it signifies, the impact it has had- we first need to gain some perspective on it.

About seventy percent of the land in the continental Untied States – all but the thirteen original states, plus Maine, Vermont, West Virginia, Kentucky, Tennessee, and Texas – is delineated according to the land-survey system. The system was developed originally under the Land Ordinances of 1784 and 1785, the Northwest Ordinance of 1787, and the Land Act of 1796, and modified through later acts and policies. Under the survey, all lands in the nation's public domain were to be measured and divided along survey lines whose coordinates would, in Johnson's words, "always run north-south and east-west with complete disregard of the terrain. This unconditional rule (made) it possible for the survey to be continuous not only in concept but in practice over thousands of square miles – the most extensive uninterrupted cadastral system in the world." Eventually, the survey's grid would cover more than three million square miles of land.

Developed under the influence of eighteenth-century European rationalism and Enlightenment-era science, drawing upon (or at least resembling) diverse precursors, applied and polished according to Thomas Jefferson's political vision, the survey system was well suited to its central task: the efficient distribution of lands whose indigenous peoples were being dispossessed of their tenure, among newly arrived inhabitants for whom individual land possession was a bulwark against the inequities of European land tenure and a stabilizing keel for the embarking democracy. "It is not too soon," Jefferson wrote from France in 1785, "to provide by every possible means that as few as possible shall be without a little portion of land. The small landholders are the most precious part of a state." Among the "possible means" was the land survey system.

So began the process that would transform the face of the continent. "Across the public lands," Wallace Stegner writes, "the General Land Office imposed a grid of surveys upon which the small freeholds of the ideal agrarian

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democracy could be laid out like checkers on a board." With strict Euclidean geometry and Cartesian coordinates in mind, and compasses, stakes, and Gunter's chains in hand, the government surveyors began laying their lines at the "Point of Beginning" in the uncharted wild lands of eastern Ohio. The work that began along the banks of the Ohio River on September 30, 1785 would continue to the shores of the Pacific. "The result," John Hildebrand observes in his book *Mapping the Land*, "was the landscape as a work of political imagination."

Not, that is, as a foundation for social, economic, and environmental sustainability. The sciences behind the survey, after all, were mathematics and geometry, not geology, botany, zoology, the natural sciences of the day – much less in the integrating natural sciences of ecology, biogeography, and evolutionary biology, which were only faint premonitions in the Age of Enlightenment. The survey, in abstracting the earth, might indeed extend across the continent to the far Pacific. Despite "insuperable obstacles," nothing would stop it – not the continent's great rivers, or thick forests, or mucky wetlands, or treeless prairies, or sweeping plains, or abrupt plateaus, or high deserts, or bold mountains. For that matter, not native uprisings, or civil wars, or land speculators, or corrupt officials, or land rushes, or lumber and railroad barons. All fell before, within, and under the grid. In the laying on of lines, order and perfectibility, precision and control – or at least the illusion of these things – could be maintained.

Up to a point.

For the methodology of the land survey contained an inherent, original flaw. The survey aimed to render square townships on the land, with their eastern and western boundaries laid out along parallel north-south longitudinal meridians. But the meridian lines are not in fact parallel. They converge as they move away from the equator and toward the Earth's poles, where they intersect. In reality, the survey's squares are not (and cannot be) squares at all. Technically, they might be

Continued on next page

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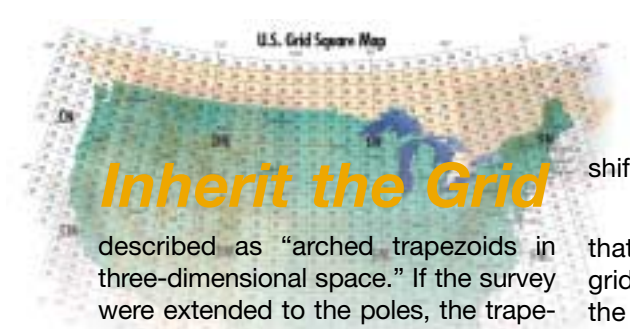

Inherit the Grid

Continued from previous page

described as "arched trapezoids in three-dimensional space." If the survey were extended to the poles, the trapezoids would become triangles. In short, one simply cannot construct and stack identical, flat, square townships on a round earth. Or as Rob Nurre, a student of the survey system put it, gridding the round earth, is "like trying to wrap a grapefruit with graph paper; there has to be a fold somewhere."

The convergence of the meridians could not be ignored. The grid might extend unencumbered by climate, geology, hydrology, slope, aspect, soil type, flora, fauna, and native tradition. Resurveying might be required when waves washed away sandbars, rivers gained and lost oxbows, landslides reshaped hills, or volcanoes created new land. Corners might be cut through the fatigue, error, or bribery of the surveyors. None of these called into question the attempt to fit an artificial order upon the natural order. But this one ultimate "natural feature" – the curvature of our earthly orb – could not finally be dismissed.

In the beginning, nonetheless, it was. The Land Ordinance of the 1780s did not address the problem. Nor did the Land Act of 1796. Not until 1804 did Survey General Jared Mansfield and his stalwart surveyors begin to work…not exactly a solution, but a technique to cope with the flaw. The problem was addressed not by reconstituting the survey or reconsidering its basic principles, but through a series of pragmatic steps described in the surveyors' field manuals over the first half of the 1800s. The key innovation was the establishment of regular "correction lines" that allowed the grid to be adjusted slightly by shifting its lines. The General Land Office's 1855 manual instructed the surveyors to establish correction lines "at stated intervals to provide for or counteract the error that otherwise would result from the convergency of meridians . . . . . " The technique could not solve the unsolvable problem; all it could do was shift the gridlines to compensate for it.

Hildegard Binder Johnson notes that, while most deviations from the grid are invisible to casual observers, the hard corners produced by correction lines are more readily seen. Across the broad landscape of the American earth, one may find what she calls "this right-angled curiosity." Offsets through correction lines . . . can be seen from the air because of the sharp angles they produce on north-south running section roads. On the ground they make for awkward driving, even in the twentieth century . . . On good modern roads, corners have often been replaced by a curve."

The convergence of the meridians could not be ignored. The grid might extend unencumbered by climate, geology, hydrology, slope, aspect, soil type, flora, fauna, and native tradition.

We might wish to protect some of these anomalies. They might remind us of our own imperfectability. They might show us that the earth remains, despite the order we impose upon it, whole, round and essentially wild – beyond, in the end, the willful impulse of immodest human intentions.

The flaw in the survey was not fatal. For all practical purposes, the surveyor's makeshift correction lines sufficed. The grid triumphed. Where the grid was laid, we now live the world through it. It orders the streets of our cities, towns and suburbs. It turns in on itself in our subdivisions and cul-de-sacs. It dictates how we walk to school and drive to work. It guides buses, trucks, limousines, ambulances, and hearses. It shows our neighbors where to stop and tells our politicians where to campaign. It directs our backhoes, tractors, manure spreaders, plows, and combines. Our cows lie down in its green pastures. It drains water from some lands, spreads it out over others. It fixes the borders of lands we deem special enough to include in parks. It bounds our public forests and wildlife refuges. It delimits Indian reservations. Ironically, even wilderness came to be defined by the grid: when in 1924 Aldo Leopold and his colleagues in the Forest Service first raced the boundaries of the Gila Wilderness Area, they did so along survey lines.

Although the grid's influence was and is ubiquitous, its triumph was not absolute. Johnson's *Order Upon the Land* is an extended study of one region, the intricately dissected coulee country of the Upper Mississippi River, where one may view "the tension between the efforts of surveyors to put a conceptual order upon the land and the country's natural configuration of hills and valleys" Close examination of the grid's deviations in such places might reveal just what angle of slope, what curve of river, what depth of wetland mud, was required to give the surveyors pause and nature precedence.

One can observe other manifestations of the "tension" Angles street corners where Chicago's diagonal thoroughfares, following ancient beach ridges, game trials, and Indian paths, intersect the city's post-settlement latticework of streets. Center pivot irrigation systems on the high plains that, due to some wrinkle in local topography, leave pie-wedges of unwatered land during their circumambulations. The weird artificiality of the Four Corners of Arizona, New Mexico, Colorado and Utah. The way Camelback Mountain blots out the otherwise uniform nighttime grid of bright Phoenix streetlights.

Such places underscore the point. The triumph of the grid, and the tenacity of the surveyors, remains mind boggling. The consequences, for ecosystems and human communities alike, are pervasive. In organizing the way Americans have defined, distributed, possessed, exchanged, and used land, the grid has thoroughly modified the gene flows, populations, species, and communities of life in the land

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9/15/05 PROPOSED REVISIONS TO:

MINIMUM STANDARD DETAIL REQUIREMENTS FOR ALTA/ACSM LAND TITLE SURVEYS

as adopted by American Land Title Association and
National Society of Professional Surveyors
(a member organization of the American Congress on Surveying and Mapping)

It is recognized that members of the American Land Title Association (ALTA) have specific needs, peculiar to title insurance matters, which require particular information for acceptance by title insurance companies when said companies are asked to insure title to land without exception as to the many matters which might be discoverable from survey and inspection and not be evidenced by the public records. In the general interest of the public, the surveying profession, title insurers and abstracters, ALTA and the National Society of Professional Surveyors, Inc. (NSPS) jointly promulgate and set forth such details and criteria for standards. It is recognized and understood that local and state standards or standards of care, which surveyors in those respective jurisdictions are bound by, may augment, or even require variations to the standards outlined herein. Where conflicts between the standards outlined herein and any jurisdictional statutes or regulations occur, the more restrictive requirement shall apply. It is also recognized that title insurance companies are entitled to rely on the survey furnished to them to be of an appropriate professional quality, both as to completeness and as to accuracy. It is equally recognized that for the performance of a survey, the surveyor will be provided with appropriate data which can be relied upon in the preparation of the survey.

For a survey of real property and the plat or map of the survey to be acceptable to a title insurance company for purposes of insuring title to said real property free and clear of survey matters (except those matters disclosed by the survey and indicated on the plat or map), certain specific and pertinent information shall be presented for the distinct and clear understanding between the client (insured), the title insurance company (insurer), and the surveyor (the person professionally responsible for the survey). These requirements are:

1. The client shall request the survey or arrange for the survey to be requested and shall provide a written authorization to proceed with the survey from the person responsible for paying for the survey. Unless specifically authorized in writing by the insurer, the insurer shall not be responsible for any costs associated with the preparation of the survey. The request shall specify that an **"ALTA/ACSM LAND TITLE SURVEY"** is required and shall designate which of the optional items listed in Table A are to be incorporated. The request shall set forth the record description of the property to be surveyed or, in the case of an original survey, the record description of the parent parcel that contains the property to be surveyed. Complete copies of the record description of the property (or, in the case of an original survey, the parent parcel), any record easements benefiting the property;; the record easements or servitudes and covenants burdening the property ("Record Documents"); documents of record referred to in the Record Documents; and any other documents containing desired appropriate information affecting the property being surveyed and to which the survey shall make reference shall be provided to the surveyor for notation on the plat or map of survey.

2. The plat or map of such survey shall bear the name, address, telephone number, and signature of the professional land surveyor who performed the survey, his or her official seal and registration number, the date the survey was completed, the dates of all of the surveyor's revisions and the caption "ALTA/ACSM Land Title Survey" with the certification set forth in paragraph 8.

3. An "**ALTA/ACSM LAND TITLE SURVEY**" shall be in accordance with the then-current "Accuracy Standards for Land Title Surveys" ("Accuracy Standards") as adopted, from time to time by the National Society of Professional Surveyors and the American Land Title Association and incorporated herein by reference.

4. On the plat or map of an "**ALTA/ACSM LAND TITLE SURVEY**," the survey boundary shall be drawn to a convenient scale, with that scale clearly indicated. A graphic scale, shown in feet or meters or both, shall be included. A north arrow shall be shown and when practicable, the plat or map of survey shall be oriented so that north is at the top of the drawing. Symbols or abbreviations used shall be identified on the face of the plat or map by use of a legend or other means. If necessary for clarity, supplementary or exaggerated diagrams shall be presented accurately on the plat or map. The plat or map shall be a minimum size of 8? by 11 inches.

5. The survey shall be performed on the ground and the plat or map of an "**ALTA/ACSM LAND TITLE SURVEY**" shall contain, in addition to the required items already specified above, the following applicable information:

(a) All data necessary to indicate the mathematical dimensions and relationships of the boundary represented, with angles given directly or by bearings, and with the

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length and radius of each curve, together with elements necessary to mathematically define each curve. The point of beginning of the surveyor's description shall be shown as well as the remote point of beginning if different. A bearing base shall refer to some well-fixed line, so that the bearings may be easily re-established. The North arrow shall be referenced to its bearing base and should that bearing base differ from record title, that difference shall be noted.

(b) When record bearings or angles or distances differ from measured bearings, angles or distances, both the record and measured bearings, angles, and distances shall be clearly indicated. If the record description fails to form a mathematically closed figure, the surveyor shall so indicate.

(c) Measured and record distances from corners of parcels surveyed to the nearest right-of-way lines of streets in urban or suburban areas, together with recovered lot corners and evidence of lot corners, shall be noted. For streets and highways abutting the property surveyed, the name, the width and location of pavement relative to the nearest boundary line of the surveyed tract, and the width of existing rights of way, where available from the controlling jurisdiction, shall be shown. Observable evidence of access (or lack thereof) to such abutting streets or highways shall be indicated. Observable evidence of private roads shall be so indicated. Streets abutting the premises, which have been described in Record Documents, but not physically opened, shall be shown and so noted.

(d) The identifying titles of all recorded plats, filed maps, right of way maps, or similar documents which the survey represents, wholly or in part, shall be shown with their appropriate recording data, filing dates and map numbers, and the lot, block, and section numbers or letters of the surveyed premises. For non-platted adjoining land, names, and recording data identifying adjoining owners as they appear of record shall be shown. For platted adjoining land, the recording data of the subdivision plat shall be shown. The survey shall indicate platted setback or building restriction lines which have been recorded in subdivision plats or which appear in Record Documents which have been delivered to the surveyor. Contiguity, gores, and overlaps along the exterior boundaries of the surveyed premises, where ascertainable from field evidence or Record Documents, or interior to those exterior boundaries, shall be clearly indicated or noted. Where only a part of a recorded lot or parcel is included in the survey, the balance of the lot or parcel shall be indicated.

(e) All evidence of monuments shall be shown and noted to indicate which were found and which were placed. All evidence of monuments found beyond the surveyed premises on which establishment of the cor-

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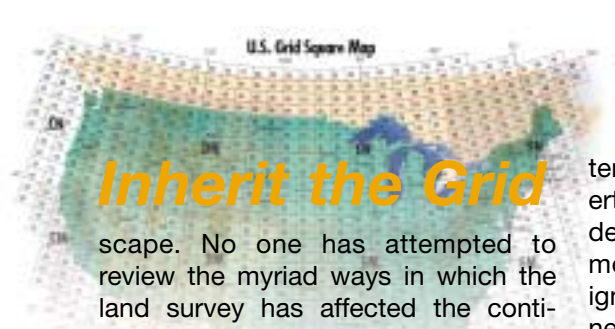


Inherit the Grid

Continued from page 14

scape. No one has attempted to review the myriad ways in which the land survey has affected the continent's flora and fauna. Even listing the mechanisms of influence would be an exhausting exercise. Just the broader categories would include: encouragement of rapid agricultural development and urbanization; facilitation of habitat conversion and fragmentation; construction of roads, highways, fences, and other artificial barriers and corridors; the segregation and concentration of particular land uses; various direct and indirect effects on the quality, quantity, and distribution of water; and the division of land onto multiple, exclusive jurisdictions.

What can we say, in sum, of the enduring effects of the land survey and its grid? The very extent of the survey and its impact on American history, ideas, and land trivialized any list of attributes. Let us mention, however, a few over-arching consequences.

A tentative inventory would include the grid's many positive and long celebrated features. Jefferson and his contemporaries devised the system with the best of intentions. The efficient process of surveying provided foundations for the nation's burgeoning wealth and its experiment in self-government. The survey gave definition to millions of freehold farms. The yeoman farmer, keeping fertile the ground of American democracy was, in Wallace Stegner's words, "a kind of Jeffersonian hope more than he was a Jeffersonian fact." Nonetheless, the availability of land opened opportunities for individual enterprise on an unprecedented scale and grounded the very idea of democracy. The beneficiaries included not only innumerable waves of farmers and other immigrant settlers, but veterans of the nation's wars, beginning with Revolutionary War.

Concentration of land ownership, wealth, and political power might have been far worse without the survey. Had the older metes and bounds system of surveying been followed, property disputes might have been pandemic in the new land. Setting aside momentarily that which cannot be ignored – the alienation of the continents native inhabitants – Americans have generally been able to avoid conflicts over land possession through the survey's clear definition of property. Through the setting aside of the 'school reserve' sections and the eventual establishment of land grant colleges under the Morrill Land Grant Act of 1862, Americans enjoyed extraordinary access to public education. From a conservative perspective, the original survey notes and maps, however imperfect, provided invaluable records of the land at the time of European settlement and now serve as an essential source for mapping, ecological analysis and restoration.

On the other side of the ledger are the forces that the grid directed, and with which conservationists, architects, landscape architects, economists and planners (among others) must now contend. The survey abstracted reality. Its standardized treatment of land overwhelmed the particularities of place. It promoted land fraud, speculation, and exploitation across the continent. For generations, it encouraged the adoption of the hard utilitarian view of land as commodity rather than (in Johnson's words) " a common good under the stewardship of its owners" or (in Aldo Leopold's words) " a community to which we belong."

The land survey magnified and deepened the distinction between public and private land, and hence between public and private interest in the use of land. For our inability to bring into harmony these interests – not to mention the interest of the prior inhabitants, future generations, and other species – we continue to pay mightily. Too much rectilinearity, tied to efficiency, in our daily environment has been an American misfortune," Hildegard Binder Johnson concluded. The grid, of course, did not breathe these forces into being. Economic doctrines, land policies, and traditions of faith, philosophy, commerce, and science contributed as much, if not more, over many centuries. But the grid did give these forces exceptional opportunity to express themselves.

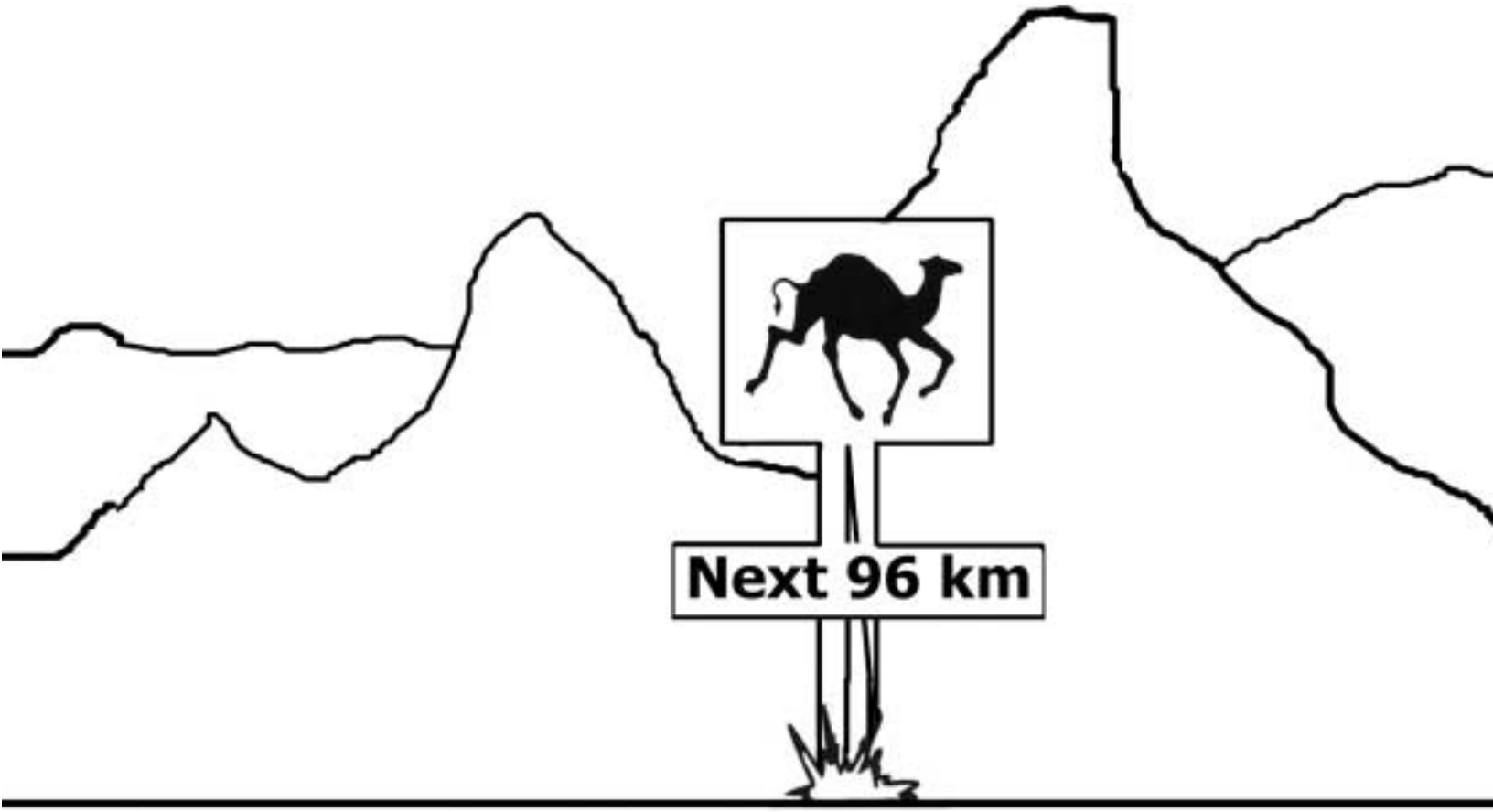
We inherit a grid that is simultaneously real and metaphorical. It has shaped materially our system of land use and our way of thinking about land – about the natural, the wild, the humanized, the civilized. It holds our memories and our lives and our plans. At the same time, it signifies our adherence to, and the imposition of, an abstract construction of the human mind. We have looked to the lines first, not to the land upon which the lines were laid. In this light, we can see that one of the functions of an evolving land ethic is to help us now to read in between - and across - the lines. ❖

About the Author

Curt Meine

is a writer and conservation biologist. He is author of the biography Aldo Leopold: His Life and Work (University of Wisconsin Press 1988), editor of the collection Wallace Stegner and the Continental Vision (Island Press, 1997), and co-editor with Richard L. Knight of the Essential Aldo Leopold (University of Wisconsin Press,1999). He has served on the board of governors of the Society for Conservation Biology and sits on the editorial boards of the journals Conservation Biology and Environmental Ethics.

Dr. Meine is a Senior Fellow at the Aldo Leopold Foundation. Senior Fellows are selected by the Foundation because of their important contributions to the evolution of Leopold's Land Ethic



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ners of the surveyed premises are dependent, and their application related to the survey shall be indicated.

(f) The character of any and all evidence of possession shall be stated and the location of such evidence carefully given in relation to both the measured boundary lines and those established by the record. An absence of notation on the survey shall be presumptive of no observable evidence of possession.

(g) The location of all buildings upon the plot or parcel shall be shown and their locations defined by measurements perpendicular to the nearest perimeter boundaries. The precision of these measurements shall be commensurate with the Relative Positional Accuracy of the survey as specified in the current Accuracy Standards for ALTA/ACSM Land Title Surveys. If there are no buildings erected on the property being surveyed, the plat or map shall bear the statement, "No buildings." Proper street numbers shall be shown where available.

(h) All easements evidenced by Record Documents which have been delivered to the surveyor shall be shown, both those burdening and those benefiting the property surveyed, indicating recording information. If such an easement cannot be located, a note to this effect shall be included. Observable evidence of easements and/or servitudes of all kinds, such as those created by roads; rights-of-way; water courses; drains; telephone, telegraph, or electric lines; water, sewer, oil or gas pipelines on or across the surveyed property and on adjoining properties if they appear to affect the surveyed property, shall be located and noted. If the surveyor has knowledge of any such easements and/or servitudes, not observable at the time the present survey is made, such lack of observable evidence shall be noted. Surface indications, if any, of underground easements and/or servitudes shall also be shown.

(i) The character and location of all walls, buildings, fences, and other visible improvements within five feet of each side of the boundary lines shall be noted. Without expressing a legal opinion, physical evidence of all encroaching structural appurtenances and projections, such as fire escapes, bay windows, windows and doors that open out, flue pipes, stoops, eaves, cornices, areaways, steps, trim, etc., by or on adjoining property or on abutting streets, on any easement or over setback lines shown by Record Documents shall be indicated with the extent of such encroachment or projection. If the client wishes to have additional information with regard to appurtenances such as whether or not such appurtenances are independent, division, or party walls and are plumb, the client will assume the responsibility of obtaining such permissions as are necessary for the surveyor to enter upon the properties to make such determinations.

(j) Driveways, alleys and other ways of access on or crossing the property must be shown. Where there is evidence of use by other than the occupants of the property, the surveyor must so indicate on the plat or map. Where driveways or alleys on adjoining properties encroach, in whole or in part, on the property being surveyed, the surveyor must so indicate on the plat or map with appropriate measurements.

(k) As accurately as the evidence permits, the location of cemeteries and burial grounds (i) disclosed in the Record Documents provided by client or (ii) observed in the process of performing the field work for the survey, shall be shown.

(l) Ponds, lakes, springs, or rivers bordering on or running through the premises being surveyed shall be shown.

6. As a minimum requirement, the surveyor shall furnish two sets of prints of the plat or map of survey to the title insurance company or the client. If the plat or map of survey consists of more than one sheet, the sheets shall be numbered, the total number of sheets indicated and match lines be shown on each sheet. The prints shall be on durable and dimensionally stable material of a quality standard acceptable to the title insurance company. The record title description of the surveyed tract, or the description provided by the client, and any new description prepared by the surveyor must appear on the face of the plat or map or otherwise accompany the survey. When, in the opinion of the surveyor, the results of the survey differ significantly from the record, or if a fundamental decision related to the boundary resolution is not clearly reflected on the plat or map, the surveyor may explain this information with notes on the face of the plat or map or in accompanying attachments. If the relative positional accuracy of the survey exceeds that allowable, the surveyor shall explain the site conditions that resulted in that outcome with a note on the face of the map or plat.

Water boundaries necessarily are subject to change due to erosion or accretion by tidal action or the flow of rivers and streams. A realignment of water bodies may also occur due to many reasons such as deliberate cutting and filling of bordering lands or by avulsion. Recorded surveys of natural water boundaries are not relied upon by title insurers for location of title.

When a property to be surveyed for title insurance purposes contains a natural water boundary, the surveyor shall measure the location of the boundary according to appropriate surveying methods and note on the plat or map the date of the measurement and the caveat that the boundary is subject to change due to natural causes and that it may or may not represent the actual location of the limit of title. When the surveyor is aware of changes in such boundaries, the extent of those changes shall be identified.

8. When the surveyor has met all of the minimum standard detail requirements for an ALTA/ACSM Land Title Survey, the following certification shall be made on the plat:

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California Law of Water Rights

By: Wells Hutchins

Reprinted by Foothill Engineering with new section of definitions & legal phrases

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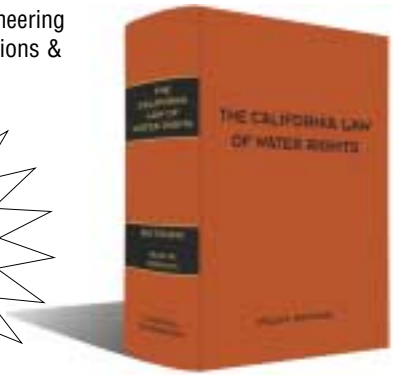

This book, first published in 1956, has been out of print for many years. This is a history of California from the standpoint of water rights--a clearly written explanation of California water law with a good index and a list of all the cited court cases. Hutchins was an excellent writer who made water law almost entertaining. This book is invaluable to anyone dealing with California land issues; riparian property owners, area planners, realtors, ditch companies, land surveyors, civil engineers, architects, etc.

For order information, visit the CLSA Website at http://www.californiasurveyors.org/files/publications.html

By: James K. Crossfield, L.S., Ph.D.
Chair, Department of CGEC & ME, CSU, Fresno

How Geomatics Professional Employment Characteristics Impact Four-Year Educational Programs

ABSTRACT

Geomatics/Surveying 4-year academic programs have now been active for 35 years. Now twenty-five such programs generate about 250 graduates each year. Owners, managers and party chiefs (in a 1-2-6 ratio) comprise the approximately 50,000 currently active professionals in the nation. New technology continues to reduce field crew size, eliminating technician slots, reducing up from the ranks professional opportunities and decreasing the pool of potential students.. Geomatics 4-year programs tend to be small and higher education is scrutinizing small programs for cutbacks. Program enrollments need to increase five-fold. The profession (one professional at a time) must mobilize significant recruitment efforts into 4-year programs across the nation. This effort will save the programs and preserve the profession.

INTRODUCTION

The first persons to complete a 4-year surveying program in the nation were Robert Parsons and Steven Thumlert who completed their studies in June of 1971 at California State University, Fresno. Nationally, since then, a continuous stream of new programs have been implemented and approximately five thousand graduates have moved into professional geomatics careers. This influx of trained measuring and mapping professionals has indeed changed the face of a profession. Yet, was 5000 enough? Each year about 250 students graduate from approximately 25 total 4-year degree programs. Are 250 graduates each year enough to keep pace with the employee needs of the greater geomatics profession that contains 50,000 individuals?

If each geomatics professional has a 40 year career and they were evenly distributed by age, then on average at least 1250 new professionals are needed each year to replace them. We have a serious shortfall. Where do the extra professionals come from?

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Many are trained on the job. Starting out as low paid technicians some of these people move up to professional positions. Others get educated in a related subject area like Forestry, Computer Science, Civil Engineering, Math, Physics, Geography or Geology. They may find jobs in their area of interest unsuitable or unavailable. Then they may get geomatics jobs and eventually move into the professional ranks as well. But what is the most effective way to generate a licensed professional? Licensure is composed of education and or experience and passing the appropriate licensing exam.

Careful analysis of the educational backgrounds of LS exam takers several years ago in one Western state revealed the following information. Examinees with a 4-year B.S. degree in surveying (or similarly named programs) were three times more likely to pass than those with a B.S. in Civil Engineering, nine times more likely to pass than someone holding an associate degree in surveying, and 20-100 times more likely to pass than any other educational category of examinee which included those with no formal education. This suggests that obtaining a 4-year degree greatly facilitates passing a state licensing exam.

CURRENT EMPLOYMENT CHARACTERISTICS

Various estimates suggest that approximately 50,000 professionals are actively engaged in the greater geomatics profession in the United States. Thousands of small, medium and large scale agencies, utilities and private companies employ the geomatics professionals who measure and map the earth. The major subgroups under the greater geomatics umbrella include (but are not limited to): land surveying, geodetic surveying, geodesy, photogrammetry, mapping, GIS, remote sensing and construction surveying.

Current approaches to geomatics personnel utilization vary across a wide spectrum. An effort to simplify this for purposes of this discussion might be justified. The typical organization might be staffed with an owner who manages the office staff and two field managers, each of whom monitors three field parties. Each field party has a party chief and an average of one additional crewman. While it is realized that many private firms already have one-person field parties (due to the use of RTK-GPS and robotic total stations) many situations still require two or more persons as a minimum for safety and/or to comply with various work rule requirements that may apply. The typical office staff then is comprised of approximately three additional CAD drafters or report writers or data processor technicians. This organizational scheme has any number of variations. Yet the ratios of geomatics professionals identified here are representative of those found across the nation. The makeup then is one owner, two managers, six party chiefs, six crewpersons and three office technicians or 1-2-6-3. It is assumed that on average the owner, managers and party chiefs are licensed and the office technicians are not. The number of licensed office workers probably very nearly is balanced by the number of party chiefs who are not.

The current 50,000 licensed geomatics professionals are broken into job types as defined by the 1-2-6 owner - manager - party chief ratio, or approximately 5500 owners, 11,000 managers and 33,500 party chiefs.

Continued on next page

Continued from previous page

How Geomatics Professional Employment Characteristics Impact Four-Year Educational Programs

EMPLOYMENT TRENDS

The Owner - Manager - Party Chief employment ratio is likely to remain virtually the same for the foreseeable future. Technology continues to drive this profession however. Whereas thirty years ago a three person crew was typical, now the goal seems to be to get a crew size of one person if possible, using RTK-GPS or a robotic total station. That one person typically is the party chief. The noticeable decline recently has been the number of crew members. These persons have historically been the huge pool of raw talent from which future professionals have generated, coming up through the ranks and eventually developing themselves into a licensed professional. These crew persons have also often been the typical 4-year student, often unhappy with their immediate career prospects, and thereby deciding to use an education to catapult them into the career faster than would have normally been the case.

The number of (not yet professional) crew persons is declining. This has serious implications for the supply of future geomatics professionals regardless of the methodology chosen for obtaining the necessary credentials for licensure.

DISTURBING EDUCATIONAL TRENDS

Colleges and Universities are under great pressure across the nation to economize. State support for higher education continues to dwindle almost everywhere. Since geomatics degree programs typically have chronic low enrollment (compared to other disciplines) they are often singled out for cuts or elimination. These geomatics/surveying program difficulties have manifested themselves in numerous ways over the last few years. A few examples include:

1) A forced department merger into another department
2) A publicly announced plan to close one program
3) A publicly announced plan to merge one programs department into another College
4) The fragmentation of an entire department and drastic change in accreditation status
5) One programs department forcing the program to absorb the entire budget cut assigned to the department

These situations are bad enough, but there may be more trouble ahead. Several programs are almost totally dependent upon one individual faculty person. When that person retires or collapses from fatigue, the campus administration (especially when enrollment is low) sees a great opportunity to close the program.

Unfortunately, community colleges are less likely now to produce potential geomatics transfer students, since many have dropped surveying coursework. Only three community colleges out of 107 in California currently offer more than two surveying courses on a regular basis. It could be argued then, that a larger share of new prospective professionals will have to be recruited directly from high schools into 4-year geomatics type programs.

MAKING UP THE SHORTFALL

We need 1250 new professionals every year. Colleges are producing about 250. The number of technicians on survey crews is dwindling, thereby decreasing the number of professionals who come up through the ranks. Community colleges are cutting back on geomatics related coursework, thereby reducing the number of potential transfer students. Clearly, there is a need for up to 1000 more Geomatics (and related named degrees) graduates each year from the nations institutions of higher learning. That will require a five fold increase in students. Simply stated, 1000-2000 new geomatics students must enroll each year. This correlates to approximately 40-100 for each of the 25 or so 4-year degree programs in the nation. These programs need help recruiting students.

Continued on next page 26

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How Geomatics Professional Employment Characteristics Impact Four-Year Educational Programs

FUTURE PROFESSIONAL COMMITMENT

Many professionals have historically gone all out to promote 4-year education. NSPS and ACSM routinely endorse the concept. A few reluctant holdouts might still not agree with this idea. A few select quotes from William Brown, a Minnesota licensed surveyor are appropriate here.

> ***"If land surveyors ignore the need for college education we are going to find ourselves waking up in a new world and wondering what happened to our profession."***

> ***"Will a high school education and on-the-job training really prepare us to fill the expanding role of the land surveyor?"***

The 4-year programs are doing everything they can to encourage enrollment. But professionals must help. Every current geomatics professional (on average) must recruit at least two geomatics students (during their lifetime) to enroll in a 4-year program. Some professionals probably won t do anything, so to make up for their inaction try to refer five or ten. An average of two are required per professional because the typical dropout rate is 50%. Two new students should equal one graduate. One graduate will replace you.

Some professionals have already done their part. Recent success stories at Fresno State include fathers sending three sons and one daughter; one woman sent her younger sister and a Junior College surveying instructor who sent four transfer students. The referring professional in each of these instances has done his or her part to preserve the profession. Similar success stories abound across the nation.

But what about everyone else? Who have you sent? Remember, there are no excuses now. Complete 4-year degree programs are available on the Internet. Current Fresno State distance learners for example reside in the states of New Jersey, North Carolina, Illinois, Washington, Ohio, Utah, Michigan and throughout distant parts of California (San Diego, Pasadena, San Francisco and Bishop).

So what can you do to help? Simply send students. Send your son or daughter, nephew, niece, step-child, friend of the family or someone who works for you. Maybe someone wants to work for you but is unqualified. Tell them to go to a 4-year program and get a degree first. Send yourself. Go to local high schools or community colleges to promote the program that best serves your area, state or region. Try not to mention the S word (surveying) however, as this turns off most high school students. It s OK to

Continued from previous page

talk to prospective students one-on-one about surveying if they bring it up first. Call your favorite 4-year program and they will be glad to send you suitable recruitment materials. If schedules allows it, a faculty member or student may be able to come to the recruitment event with you.

Helping to motivate a student already enrolled will reduce dropout rates, thereby increasing the number of graduates. Provide a good summer job. Sponsor a scholarship. Participate on Advisory Committees if asked, go to annual banquets or conferences that the 4-year program organizes. Contribute to endowments and other forms of program support. Send unused equipment for possible use in labs. It may take a little extra effort, but in the end you will be able to say, I did my part. Send students to 4-year geomatics and surveying programs. The faculty at those programs will educate them, the profession will nurture the graduates and thus we will all have managed to keep a profession alive.

CONCLUSION

Geomatics 4-year programs tend to be small and higher education is scrutinizing small programs for cutbacks. Not enough prospective geomatics professionals are entering the pipeline. Ultimately, 4-year geomatics and surveying degree program enrollments need to increase five-fold just to keep our professional ranks stable. The profession must help the academic institutions mobilize significant recruitment efforts to increase 4-year program enrollment across the nation. This effort will simultaneously save the programs and preserve the profession.

REFERENCES

Brown, William, "Wake Up", Minnesota Surveyor, Vol. 11, Fall 2004, pp 15-16.
Crossfield, James K., "Where Have All The Flowers Gone", ForeSight!, Vol. 22, No.1, Fall 2004, p 7.

About the Author

Dr. James K. Crossfield

received his Ph.D. from the University of Wisconsin, Madison in 1984. Since then he has taught at CSU, Fresno. He has been an ACSM member for over thirty years, serving on several committees and presenting numerous papers at national meetings. He was AAGS President in 1996. He served as the ACSM member of the Engineering Accreditation Commission of ABET from 1995-2001. Dr. Crossfield currently serves as chair of the Department of Civil and Geomatics Engineering and Construction and Mechanical Engineering at CSU, Fresno.

James K. Crossfield, L.S., Ph.D.
Chair, Department of CGEC & ME
CSU, Fresno
Fresno, CA 93740-8030
(559) 278-4827

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To (name of client), (name of lender, if known), (name of title insurance company, if known), (name of others as instructed by client):

This is to certify that this map or plat and the survey on which it is based were made in accordance with the "Minimum Standard Detail Requirements for ALTA/ACSM Land Title Surveys," jointly established and adopted by ALTA and NSPS in 2005, and includes Items _of Table A thereof. Pursuant to the Accuracy Standards as adopted by ALTA and NSPS and in effect on the date of this certification, undersigned further certifies that in my professional opinion, as a land surveyor registered in the State of _____, the Relative Positional Accuracy of this survey does not exceed that which is specified therein.

Date: (signed) (seal)
Registration No.

NOTE: If, as otherwise allowed in the Accuracy Standards, the Relative Positional Accuracy exceeds that which is specified therein, the following certification shall be made on the plat:

To (name of client), (name of lender, if known), (name of title insurance company, if known), (name of others as instructed by client):

This is to certify that this map or plat and the survey on which it is based were made in accordance with the "Minimum Standard Detail Requirements for ALTA/ACSM Land Title Surveys," jointly established and adopted by ALTA and NSPS in 2005, and includes Items _ of Table A thereof. Pursuant to the Accuracy Standards as adopted by ALTA and NSPS and in effect on the date of this certification, undersigned further certifies that in my professional opinion, as a land surveyor registered in the State of _____, the maximum Relative Positional Accuracy is _____feet.

Date: (signed) (seal)
Registration No.

The 2005 Minimum Standard Detail Requirements for ALTA/ACSM Land Title Surveys are effective January 31, 2006. As of that date, all previous versions of the Minimum Standard Detail Requirements for ALTA/ACSM Land Title Surveys are superseded by these 2005 standards.

Adopted by the American Land Title Association on _____.
Adopted by the Board of Directors, National Society of Professional Surveyors on _____.
American Land Title Association, 1828 L St., N.W., Suite 705, Washington, D.C. 20036.
National Society of Professional Surveyors, Inc., 6 Montgomery Village Avenue, Suite 403, Gaithersburg, MD 20879

TABLE A – OPTIONAL SURVEY RESPONSIBILITIES AND SPECIFICATIONS

NOTE: The items of Table A must be negotiated between the surveyor and client. It may be necessary for the surveyor to qualify or expand upon the description of these items, e.g., in reference to Item 6, there may be a need for an interpretation of a restriction. The surveyor cannot make a certification on the basis of an interpretation or opinion of another party. Items 16, 17 and 18 are only for use on projects for the U.S. Department of Housing and Urban Development (HUD).

If checked, the following optional items are to be included in the ALTA/ACSM LAND TITLE SURVEY, except as otherwise negotiated:

1. _____ *Monuments placed (or a reference monument or witness to the corner) at all major corners of the boundary of the property, unless already marked or referenced by an existing monument or witness to the corner.*

2. _____ *Vicinity map showing the property surveyed in reference to nearby highway(s) or major street intersection(s).*

3. _____ *Flood zone designation (with proper annotation based on federal Flood Insurance Rate Maps or the state or local equivalent, by scaled map location and graphic plotting only.)*

4. _____ *Gross land area (and other areas if specified by the client).*

Continued on next page

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5. _____ *Contours and the datum of the elevations.*

6. _____ *List setback, height, and floor space area restrictions disclosed by applicable zoning or building codes (beyond those required under paragraph 5d of these standards). If none, so state. The source of such information must be disclosed. See "Note" above.*

7. _____ *(a) Exterior dimensions of all buildings at ground level*

(b) Square footage of:

_____ *(1) exterior footprint of all buildings at ground level*

_____ *(2) gross floor area of all buildings; or*

_____ *(3) other areas to be defined by the client*

_____ *(c) Measured height of all buildings above grade at a defined location. If no defined location is provided, the point of measurement shall be shown.*

8. _____ *Substantial, visible improvements (in addition to buildings) such as billboards, signs, parking structures, swimming pools, etc.*

9. _____ *Parking areas and, if striped, the striping and the type (e.g. handicapped, motorcycle, regular, etc.) and number of parking spaces.*

10. _____ *Indication of access to a public way on land such as curb cuts and driveways, and to and from waters adjoining the surveyed tract, such as boat slips, launches, piers and docks..*

11. *Location of utilities (representative examples of which are shown below) existing on or serving the surveyed property as determined by:*

_____ *(a) Observed evidence*

_____ *(b) Observed evidence together with evidence from plans obtained from utility companies or provided by client, and markings by utility companies and other appropriate sources (with reference as to the source of information)*

- *railroad tracks and sidings;*
- *manholes, catch basins, valve vaults or other surface indications of subterranean uses;*
- *wires and cables (including their function, if readily identifiable) crossing the surveyed premises, all poles on or within ten feet of the surveyed premises, and the dimensions of all crossmembers or overhangs affecting the surveyed premises; and*
- *utility company installations on the surveyed premises.*

12. _____ *Governmental Agency survey-related requirements as specified by the client.*

13. _____ *Names of adjoining owners of platted lands.*

14. _____ *The distance to the nearest intersecting street as designated by the client*

15. _____ *Rectified orthophotography, photogrammetric mapping, laser scanning and other similar products, tools or technologies may be utilized as the basis for the location of certain features (excluding boundaries) where ground measurements are not otherwise necessary to locate those features to an appropriate and acceptable accuracy relative to a nearby boundary. The surveyor shall (a) discuss the ramifications of such methodologies (e.g. the potential accuracy and completeness of the data gathered thereby) with the title company, lender and client prior to the performance of the survey and, (b) place a note on the face of the survey explaining the source, date, relative accuracy and other relevant qualifications of any such data.*

16. _____ *Observable evidence of earth moving work, building construction or building additions within recent months.*

Continued on next page

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17. _____ *Any changes in street right of way lines either completed or proposed, and available from the controlling jurisdiction. Observable evidence of recent street or sidewalk construction or repairs.*

18. _____ *Observable evidence of site use as a solid waste dump, sump or sanitary landfill.*

19. _____

Accuracy Standards for ALTA/ACSM Land Title Surveys

Introduction

These Accuracy Standards address Relative Positional Accuracies for measurements that control land boundaries on ALTA/ACSM Land Title Surveys.

In order to meet these standards, the surveyor must assure and certify that the Relative Positional Accuracies resulting from the measurements made on the survey do not exceed that which is allowable.

If the size or configuration of the property to be surveyed, or the relief, vegetation or improvements on the property will result in survey measurements for which the allowable Relative Positional Accuracies will be exceeded, the surveyor must alternatively certify as to the Relative Positional Accuracy that was otherwise achieved on the survey.

Definition:

"Relative Positional Accuracy" means the value expressed in feet or meters that represents the uncertainty due to random errors in measurements in the location of any point on a survey relative to any other point on the same survey at the 95 percent confidence level.

Background

The lines and corners on any property survey have uncertainty in location which is the result of (1) availability and condition of reference monuments, (2) occupation or possession lines as they may differ from record lines, (3) clarity or ambiguity of the record descriptions or plats of the surveyed tracts and its adjoiners and (4) Relative Positional Accuracy.

The first three sources of uncertainty must be weighed as evidence in the determination of where, in the professional surveyor's opinion, the boundary lines and corners should be placed. Relative Positional Accuracy is related to how accurately the surveyor is able to monument or report those positions.

Of these four sources of uncertainty, only Relative Positional Accuracy is controllable, although due to the inherent error in any measurement, it cannot be eliminated. The first three can be estimated based on evidence; Relative Positional Accuracy can be estimated using statistical means.

The surveyor shall, to the extent necessary to achieve the standard contained herein, (1) compensate or correct for systematic errors, including those associated with instrument calibration, (2) select the appropriate equipment and methods, and use trained personnel and (3) use appropriate error propagation and other measurement design theory to select the proper instruments, field procedures, geometric layouts and computational procedures to control random errors.

If radial survey methods, GPS or other acceptable technologies or procedures are used to locate or establish points on the survey, the surveyor shall apply appropriate procedures in order to assure that the allowable Relative Positional Accuracy of such points is not exceeded.

Computation of Relative Positional Accuracy

Relative Positional Accuracy may be tested by:

(1) comparing the relative location of points in a survey as measured by an independent survey of higher accuracy or

(2) the results of a minimally constrained, correctly weighted least square adjustment of the survey.

Allowable Relative Positional Accuracy for Measurements Controlling Land Boundaries on ALTA/ACSM Land Title Surveys

0.07 feet (or 20 mm) + 50 ppm

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LS Review Course (PostConference 12 hrs. - March 15th & 16th)	$ 95	$115	$_____

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LS Review Course (PostConference 12 hrs. - March 15th & 16th)	$155	$185	$_____

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By: Santiago Canyon College

Mapping the Course for Future Surveyors

As land development throughout California continues at a rapid rate, so does the need for experienced and licensed surveyors. According to the State of California s Employment Development Department, the occupational outlook for surveyors includes an 11 percent increase through the year 2010. The need for surveying and mapping technicians is even greater, with estimated growth of 28 percent by the end of the decade. This raises the question, what is being done to ensure that qualified, experienced professionals are ready to meet the demand just as many current surveyors near retirement age?

Step 1: Increasing Awareness of the Profession

Santiago Canyon College (SCC) in Orange offers both an associate degree and a certificate in survey/mapping sciences. With the **only** comprehensive program among Southern California s community colleges, student enrollment has grown by 214 percent over the last three years.

We re already widely known as a great place to prepare for the Land Surveyor-in-Training (LSIT) and Land Surveyor (LS) examinations, says Jeremy Evans, Santiago Canyon College s Survey/Mapping Sciences program facilitator, who is also the vice president and technical director of surveying at Psomas in Costa Mesa. Now we re concentrating on training people for entry-level positions in the field to meet the huge numbers who will be needed over the next decade.

Many of these future surveyors are today s high school juniors and seniors. To let them know about the many career opportunities with good salaries that exist in the surveying field, Santiago Canyon College is hosting Southern California s first Trig Star event on Saturday, March 4, 2006 (see sidebar for more information).

Step 2: Provide High Quality, Affordable Training

Our program provides an excellent foundation for those looking to enter the challenging, rewarding field of surveying and mapping sciences, Evans said. Students who successfully com-

plete the five classes (17 units) in the certificate program are qualified for entry-level surveying and mapping jobs in both the public and private sectors. Classes are available during evening hours and on Saturdays to accommodate busy schedules.

Taught by professionals working in the field, students receive a combination of classroom instruction and hands-on-training using the latest software technology, including ArcView 9.0, ArcGIS 9.0, Bentley InRoads/MicroStation, AutoCad and Microsoft Project. Field equipment used includes total stations, digital levels and GPS.

For those already employed in the field who meet the work experience requirements, Santiago Canyon College offers Land Surveyor-in-Training (LSIT) and Land Surveyor (LS) exam preparation coursework. Obtaining professional licensure makes sense in terms of career opportunities and earning potential. California s Employment Development Department s Occupational Guide lists the average surveyors salary in the state (in 2002) as $58,707 per year, with survey/mapping technicians averaging $45,407 per year. And as demand increases for both entry-level and experienced professionals, so do salaries.

Compared with four-year universities, Santiago Canyon College s comprehensive survey and mapping sciences program is a bargain at just $26 per unit. **Registration is now underway for spring semester classes that begin February 6, 2006.** For more information call (714) 628-4883 or check out the website at www.sccollege.edu/survey. ❖

TRIG•STAR

CALIFORNIA LAND SURVEYORS ASSOCIATION 1966

Vital Link
Connecting Students to Their Future

Who will be the 2006 Trig Stars?

Santiago Canyon College's Career Education division is proud to host Southern California's first Trig Star event on Saturday, March 4, 2006. Open to local high school and community college students 16 years and older, the fun, free event serves as an introduction to careers in surveying. Local engineering firms and others who employ surveyors are invited to exhibit and talk to students about careers in the industry.

"We are pleased to offer the first Trig Star competition in Orange County as a major kick-off event to promote surveying careers to high school students and their parents," said Tricia Evans, dean of career education at Santiago Canyon College. "Local community college students are also invited to participate."

Students will compete for cash and prizes in the Trig Star trigonometry test and Survey Challenge. The event also will feature continental breakfast and a barbeque lunch, informational exhibits and an overview of surveying career information and equipment.

Trig Star is sponsored by the Orange County Chapter of California Land Surveyors Association and is part of a nationwide competition of the National Society of Professional Surveyors. The event is facilitated by Vital Link Orange County.

For exhibitor and sponsorship opportunities, please contact Vital Link Orange County at (949) 646-2520 or e-mail Bonnie@vitallinkoc.org.

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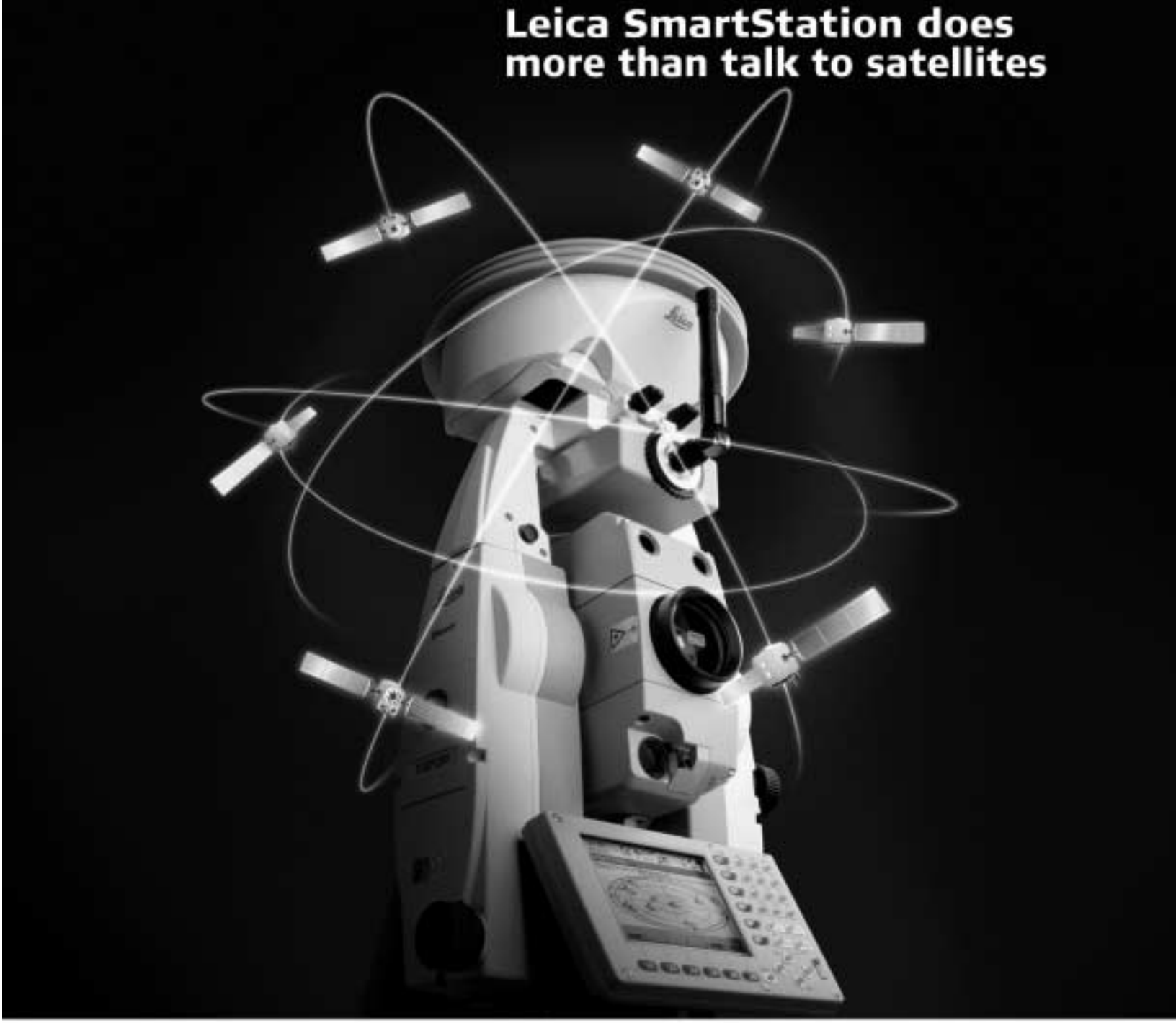

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Lewis & Clark Update

August 12, 1805
Jefferson receives the shipment from Fort Mandan; Lewis finds the headwaters of the Missouri River, then crosses the Continental Divide and Lemhi Pass to discover that there is no Northwest Passage.

August 17, 1805
The main party arrives at the Shoshone camp, where Sacagawea recognizes the chief as her long-lost brother, Cameahwait.

August 18, 1805
Lewis' celebrates his 31st birthday and vows "in future, to live for mankind as I have heretofore lived only for myself."

August 31, 1805
The expedition sets out for the Bitterroot Mountains with many horses and a mule acquired from the Shoshone.

September 9, 1805
The men camp near today's Missoula, Montana at a spot they name Traveler's Rest while they prepare for the mountain crossing to come.

September 11, 1805
The Corps begins the steep ascent into the Bitterroot Range of the Rocky Mountains; the crossing will cover more than 160 miles (260 kilometers).

September 23, 1805
Starving, the men emerge from the mountains near present-day Weippe, Idaho, at the villages of the Nez Perce Indians.

October 7, 1805
After learning a new method to make dugout canoes from the Nez Perce, the men push off down the Clearwater River near Orofino, Idaho; it is the first time they've traveled with the current at their back in almost two years.

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Here's Some Important Information About CLSA

The goal of the California Land Surveyors Association is to promote and enhance the profession of surveying, to promote the common good and welfare of its members, to promote and maintain the highest possible standards of professional ethics and practice, and to elevate the public's understanding of our profession. CLSA represents all Land Surveyors, whether they are employees or proprietors, whether in the public or private sector.

Representation

LOCAL: Your local chapter represents you in local issues. Through your chapter representative to the State Board of Directors, the individual member can direct the course CLSA will take. STATE: The Surveyor is represented at the state level through an active legislative program, legislative advocate, and liaison with the State Board of Registration. REGIONAL: CLSA is an active member of the Western Federation of Professional Surveyors. This Federation is composed of associations throughout the western United States and addresses regional issues. NATIONAL: Through institutional affiliation with the National Society of Professional Surveyors and the American Congress on Surveying and Mapping, CLSA is represented at the national level.

Educational Opportunities

CLSA presents annual conferences which provide technical and business programs, as well as exhibits of the latest in surveying and computing technology. Seminars and workshops are presented to assist in continuing education. CLSA publishes the California Surveyor magazine and the CLSA NEWS to keep the membership abreast of changing legislation, legal opinions, and other items which affect our profession.

Business and Professional Services

CLSA provides a fully staffed central office which is available to answer questions or to provide up-to-date referrals concerning legislation, educational opportunities, job opportunities, or other issues concerning our membership. Professional liability insurance programs are available to members.

JOIN CLSA TODAY!

■ **CORPORATE MEMBER** *$159.00 + Entrance Fee. Shall have a valid CA Professional Land Surveyor or Photogrammetric license.

■ **CE CORPORATE MEMBER** *$159.00 + Entrance Fee. Any California registered Civil Engineer who is authorized to practice land surveying pursuant to Article 3, Section 8731 of the PLS Act and must be actively practicing land surveying and show sufficient proof thereof. CE Corporate membership must be approved by the Board of Directors.

■ **AFFILIATE MEMBER** *$79.50 + Entrance Fee. Any person who, in their profession or vocation, relies upon the fundamentals of land surveying.

■ **ASSOCIATE MEMBER GRADE** *$79.50 + Entrance Fee. Any person who holds a valid certificate as a Land Surveyor-in-Training.

■ **OUT-OF-STATE CORPORATE MEMBER GRADE** *$79.50 + Entrance Fee. Any person who resides in a state other than CA, who is a member of the other state's Association, and meets the requirements of Corporate Member.

■ **STUDENT MEMBER GRADE** *$15.90. A student in a college or university actively pursuing a surveying education.

■ **SUSTAINING MEMBER GRADE** *Annual Dues $318.00 + Entrance Fee. Any individual, company or corporation who, by their interest in the land surveying profession, is desirous of supporting the purposes and objectives of this corporation.

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6. Res. Phone_____ 7. Fax _____ 8. E-mail _____
9. Name of Firm, Agency or College _____
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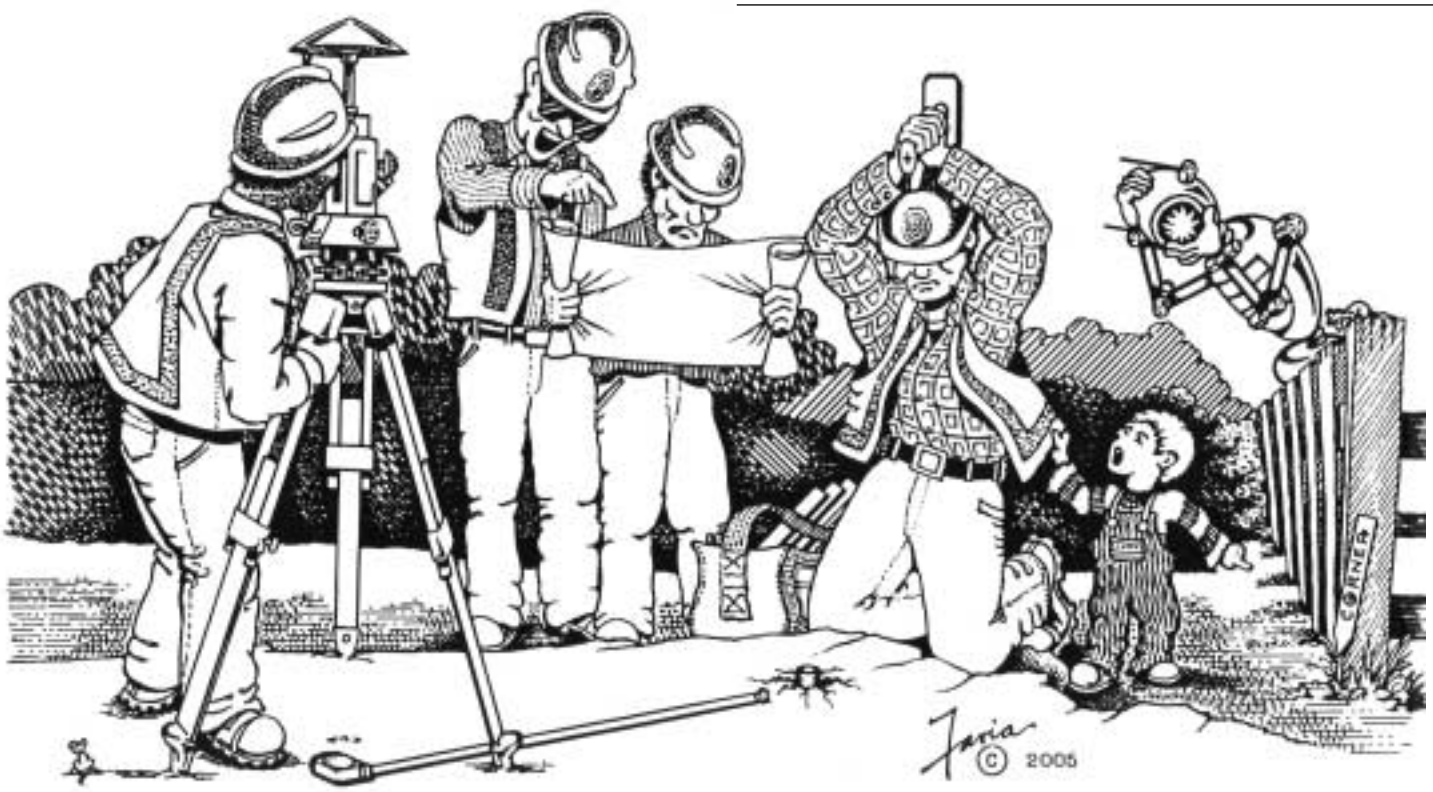

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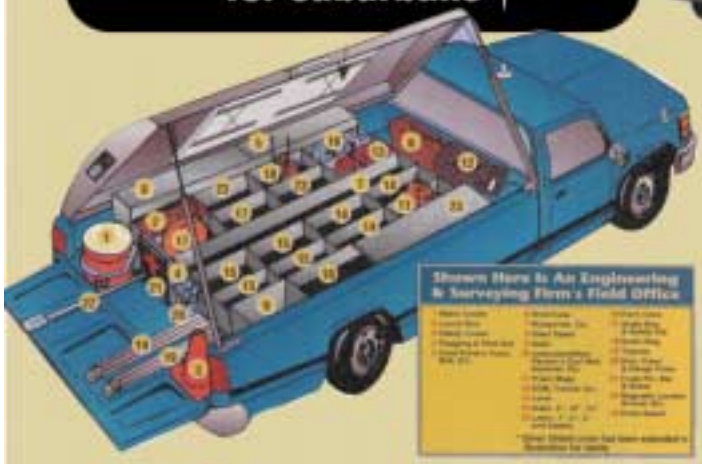

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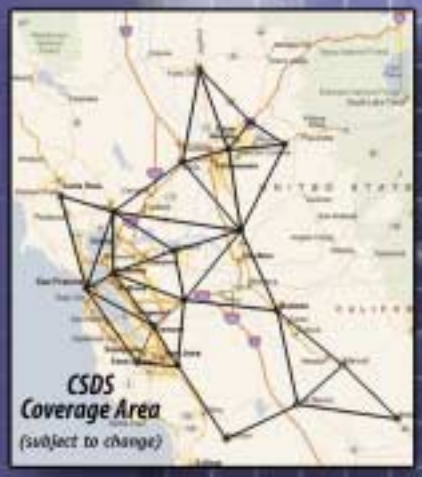
California Surveying and Drafting Supply (CSDS) is pleased to offer GPS users in the Surveying, Engineering, Construction and GIS communities a new service to produce survey-quality GPS work with increased accuracy, productivity and profitability. The **California Surveying Virtual Survey Network (CSVSN™)** is northern California's first wide area, high accuracy, real time GPS reference station network, allowing users to collect data with centimeter accuracy from any jobsite in our coverage area.

Using Trimble VRS™ technology, CSDS has created a network of 14 permanent base stations, 6 in greater Sacramento and 8 in the San Francisco Bay Area, *(see map for specific locations)*. Within this coverage area, users can survey quickly and reliably, 24 hours a day, 7 days a week, without distance limitations from the base stations.

Surveying in the **CSVSN** is easy. Using only a rover, one person can perform construction stakeout, surveying, and precision GIS data collection, without setting up a GPS base station.* Not only does this allow you to be more productive, but it also reduces operation costs tremendously, as the ability to eliminate the purchase of a base station to implement RTK into your company is cut in half.

The **CSVSN** can be used with all manufacturer brands of GPS/GIS equipment. However, using the **CSVSN** in conjunction with wireless bluetooth options, like the Trimble R8 rover, provides a superior alternative to other "cabled" instruments.



Virtual Survey Network™ Benefits:

Increases Productivity

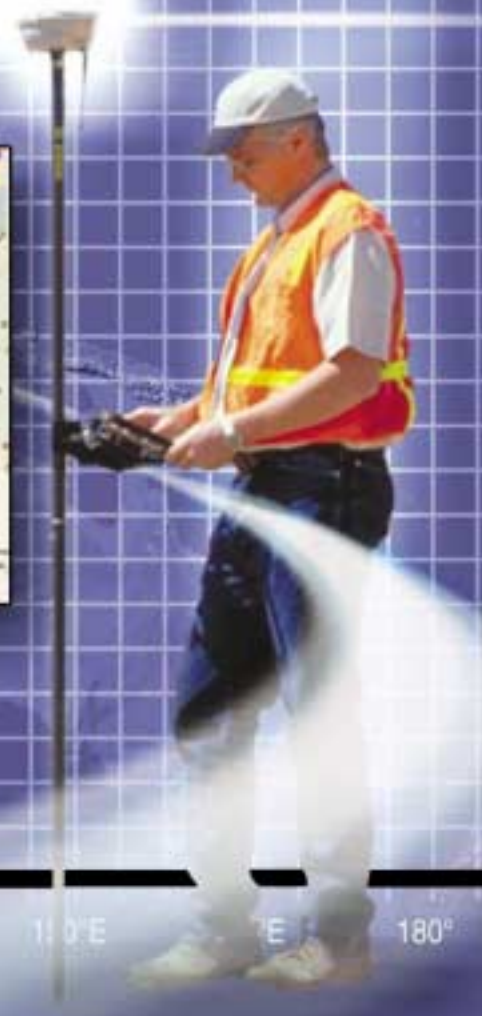
- A single user, with one rover, can perform RTK surveys with centimeter accuracy
- Eliminates the need to set-up a base station each day
- Exceeds the range of conventional RTK systems
- Allows users to utilize their existing base station as an additional rover

Increases Accuracy

- Centimeter accuracy is achieved within the **CSDS** coverage area

Reduces Costs

- A variety of subscription plans are available to meet the needs of GPS users
- Increases in productivity and reductions in set-up time saves thousands of dollars each month
- Use of the network can eliminate the need to purchase a base station



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