



By Gary Kent, LS

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Relative Positional Accuracy—Again

It was with considerable disappointment that I read Joel Leininger's recent "Point to Point" column in the July/August issue in which he derided the concept of positional accuracy in the 2005 Minimum Standard Detail Requirements for ALTA/ACSM Land Title Surveys. My response to his rhetorical comment "Perhaps I'm missing something here ..." is yes, you are. With respect to his request that NSPS "explain this or correct it," I cannot speak for NSPS, but as chairperson of the NSPS Committee responsible for the ALTA/ACSM Standards, I will try to correct his misconceptions, since I was "in the room when this was decided."

By way of background, readers might find it interesting to know that the measurement standard contained in the original 1962 ALTA/ACSM Standards was a positional uncertainty standard. It was, however, unachievable; the urban allowance was only 0.02 feet. The use of the current relative positional accuracy in the 2005 ALTA/ACSM Standards was taken directly from the Urban standard contained in the NSPS Model Standards which had been developed by the NSPS Standards Committee several years earlier.

First and foremost, the suggestion that all planimetric features on an ALTA/ACSM survey must be located to 0.07 feet and 50 ppm is simply wrong. Arriving at such a conclusion is the result of either not reading the entire standard or of taking the measurement standard out of context. This issue came up years ago, which is why it was addressed more than ten years ago starting with the 1997 Standards.

The very first sentence of the 2005 Accuracy Standards states, "These Accuracy Standards address Relative Positional Accuracies *for measurements that control land boundaries* on ALTA/ACSM Land Title Surveys." (emphasis added by author). The rest of the accuracy-related text is obviously qualified by that statement, including the definition of Relative Positional Accuracy ("...*the value expressed in feet or meters that represents the uncertainty due*

only planimetric features that have a measurement accuracy associated with their locations are buildings. Admittedly the current wording in that regard could have been better and will be improved with the next set of standards, but buildings are to be located to the same degree of accuracy as the boundary.

I find particularly interesting Joel's statement that "...*no one except surveyors... ([a]nd only few surveyors at that)*" care about positional accuracy. Perhaps

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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.")

The last item in the Accuracy Standards – the small table that specifies the actual requirement of "0.07 feet (or 20mm) + 50 ppm" – is also prefaced by similar words: "Allowable Relative Positional Accuracy *for Measurements Controlling Land Boundaries* on ALTA/ACSM Land Title Surveys." (emphasis added)

So, clearly the ALTA/ACSM standard is not concerned with the accuracy of location of a water valve (except in the unlikely event that it was to control a boundary line or corner). In fact, the

average citizen does not care about it consciously, but he certainly cares about it when he sees the neighbor's surveyor set a rebar one inch away from the one his surveyor set. He finds it confusing and ridiculous. And with that singular thought, he obviously understands positional uncertainty better than that second surveyor does.

There are many things in surveying that few people, other than surveyors, understand. That does not mean they are not important. Why not just use a \$200 Garmin to do our surveying? Why dig that hole in my street? Who cares what that deed from 1805 says; how can that be important in 2007? No, as the professionals, surveyors have an obliga-

tion to do what is right regardless of what the public thinks.

Admittedly, what defines “right” is often in the eye of the beholder – and that is something that professionals should – and are obligated to – have public and respectful dialogue about.

With regard to measurement issues, I have been involved with, testified at, or given depositions in a number of situations in which a surveyor, speaking with confidence and knowledge about measurement integrity, could have helped the parties avoid contentious and costly attorney fees or litigation. I am involved in one right now in which the measurement issues are so utterly disjointed that it boggles the mind.

The old measurement tables in the ALTA/ACSM Standards were outdated and unworkable. Yet ALTA and, in fact, most state legislatures for that matter, have never been willing to merely trust surveyors on the issue of accuracy and precision. And based on what I see and hear, they are right.

There have been dozens upon dozens of articles written and presentations made regarding what have been variously called

“pin farms,” “porcupine corners,” and so on. Why is there so much written and spoken about on this topic? Apparently because it continues to be a problem. Why is that? How can that be? There is only one explanation – some surveyors do not understand the integrity of their measurements and, as a result, they ignorantly think that they can mark a boundary corner one inch better than their brethren.

I recall one time hearing a surveyor state that he could not represent his survey as being anything other than perfect. I asked him “*Is your survey perfect?*” He responded “*Of course not, but I can’t tell the client that.*” Personally, I don’t WANT a client to think my survey is perfect! I am only contributing to a misconception, at best, and a lie, at worst, by implying otherwise.

As Joel wrote, “*Clients expect a survey to be perfectly accurate and perfectly precise. These unattainable goals have never been satisfied in any survey, anywhere.*” The first is generally true and the second, absolutely. But I disagree with his assertion that “*there are no consequences of producing these less-than-perfect surveys*” because in boundary surveying, imperfect measurements do not

exist in a vacuum, they intermingle with the rest of the boundary resolution.

It will surprise most readers, but there are surveyors in some regions of this country that say if they measured a line as 100.00 feet last year, but on a retracement this year they measure it as 100.01 feet, they must reflect the new measurement and even write a new legal description for the new survey! I have been told by some that they do this because they believe their registration board requires it.

As “measurement experts” I believe surveyors have a responsibility to understand and educate themselves and their clients on what the numbers on a plat or record of survey actually mean, and what the markers in the ground actually represent. By doing this, surveyors can actually act as consultants and help clients and property owners make rational decisions about *apparent* disagreements.

Measurements are, however, in the real world of boundaries, the least of our worries. Interestingly, most problems with boundaries, and most disagreements between surveyors on boundaries, are not the result of positional uncertainty. No, these are the result of disagreements over

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the location or use of reference monuments, ambiguities in record documents, the evidence found (or not found) in the field and/or the manner in which all of that is interpreted.

A few years ago, I was given part of a court's opinion on a boundary dispute. The court stated "*Surveyor Jones' confirmation of a corner by computer analysis to within one inch is phenomenal if not preposterous, in view of the terrain, the age of the deeds, and the numerous mistakes in the deeds conveying property in this tract.*" This judge seems to have captured the issue in spades.

The ALTA/ACSM Standard does not, as Joel suggests, sidestep the issue of boundary misplacement. In fact, it expressly addresses the elements that contribute to boundary misplacement in several places.

In particular, paragraph 5e states "*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 corners of the surveyed premises are dependent, and their application related to the survey shall be indicated.*" What better way to avoid a boundary dispute than by surveyors

openly sharing what evidence they found and how they used it to resolve the boundary? As I noted above, this is one of the primary sources of disputes.

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

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More to the point, the Accuracy Standards state:

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

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.

Thus, the standards promote using proper techniques in boundary resolution. But once the boundary is resolved, surveyors are also generally obligated to

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mark the corners (although a number of states inexplicably do not expressly require this). Properly working through the boundary resolution allows the surveyor to determine *where* to place the lines and corners of the property. Positional uncertainty addresses how well he or she can actually *mark* those positions.

Unfortunately there is a tremendous aversion across much of this country to the sharing of the types of information outlined in the Accuracy Standards and in paragraph 5e between surveyors. The Indiana Administrative Code requires that such information be denoted on or with the survey in the form of a report. A number of other states have similar requirements, although they are routinely ignored. In some states and regions, including areas that contain some of the most developed and expensive real estate in the country, the sharing of information is apparently expressly forbidden by individual surveyors and companies. This is, in my opinion, shameful, albeit it long-standing, behavior on the part of the surveying community in those areas.

Understanding measurements, openly sharing information (including evidence found in the field and decisions made in boundary resolution) and taking the time and energy to educate ourselves and the public on why boundary surveying is not a perfect science would go a long way towards addressing the misconceptions that the surveying community endures – inside and out.

Purdue University Update

There are changes in store for the Land Surveying and Geomatics program at Purdue University, but the program has not been shut down, despite rumors that may be circulating to the contrary. The University is working with the surveying community to take steps to enhance and improve the visibility and viability of the program. As of now, it appears that the program will be moved from the School of Civil Engineering to the School of Engineering Education. The land surveying/geomatics program will continue to exist, although the *degree* upon graduation from the new program may be in Interdisciplinary Engineering, rather than in Land Surveying and Geomatics Engineering. Purdue hopes to fortify and strengthen the program by enlisting the help of a broad-based committee representing the various interests of the surveying and geomatics community in Indiana to provide guidance in the transition. *A*

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