

How Good is Good Enough?

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This item is written in response to a January 17th thread on 'Surveyor Connect' asking what tolerance one might expect in repeat occupations (by different crews/equipment) of a GPS point. I suggest, "It depends!"

First, a quick story, not original with me but the source of which I haven't a clue.

It seems a moderate size business was in the process of hiring a chief executive officer and the selection came down to three candidates – a surveyor, an accountant, and an attorney. In turn, each was called into an interview and asked the same question. "What is two + two?"

The surveyor was quick to answer, "Two plus two is four – always has been, always will be." He was cordially dismissed and the accountant brought in. When asked the same question, the accountant put his elbow on the table and rested his chin in his palm before stating, "Well two credits and two credits are four credits. Two debits and two debits equal four debits. But if you have two credits and two debits, they balance and you could say that they cancel out to zero."

The accountant was also dismissed and the attorney brought in. He was asked the same question, "What is two plus two?" The attorney leaned back in his chair and thoughtfully asked, "What do you want it to be?"

The CEO story is not a direct parallel, but with regard to the original question posted on Surveyor Connect, I'd ask, "Accuracy with respect to what?" Comments to consider include:

1. GPS is a 3-dimensional measuring system. New technology has brought impressive capability to the user community. But isn't it true that, in many cases, we are guilty of throwing away 1/3 of the data we collect. The Earth-centered Earth-fixed (ECEF) coordinate system and the global spatial data model (GSDM) provide an environment in which we can capture/salvage valuable data.
2. OPUS too is very useful and many use it beneficially. But, isn't it true that OPUS is really not yet proven reliable for high-quality geodetic control? What about those cases in which an OPUS approximation is not "good enough?"
3. In answering the question, "with respect to what?" I offer several references for your consideration:
 - a. Spatial Data Accuracy as Defined by the GSDM – SALIS, March 1999 [click here](#)
 - b. Fundamentals of Spatial Data Accuracy and the GSDM – Copyright Office [click here](#)
4. Likewise, I offer the following examples in which, using "standard" GPS equipment, proven control point positions, and off-the shelf software, those values should be duplicable within 1 cm. Another question to consider is, "What are the consequences of being different?" That risk assessment is the responsibility of the professional signing the plat and/or certifying the results. Both examples are based upon two local A-order HARN stations – CRUCESAIR and REILLY.
 - a. Least squares example of local NMSU network – [click here](#)
 - b. Cadastral survey example of Section 31, T23S-R1E, NM PM - [click here](#)