

# Comparative Error Analysis Workshop

## Workshop Overview

When a surveyor signs his certificate, and it includes a statement that his work meets some set of standards, he also affirms that that work meets the accuracy requirements defined therein. If called to task to defend his accuracies, can he do it?

This workshop will lay out a roadmap for approaching that challenge. We will design a test course. We will lay out a set of monuments, both known and unknown. We will collect various field data sets. We will tabulate and correlate these data sets into relevant groups. We will lay the groundwork for how one goes about analyzing that data by applying a comparative error analysis.

We will discuss some of the pertinent topics involved in the process, such as standard deviations, degrees of freedom, root sum square errors and levels of certainty. We will compare the results to see if it meets both the Missouri and ALTA accuracy standards.

The primary purpose of this workshop is to analyze coordinates collected by two different survey techniques (both utilizing survey quality GPS equipment). As there seems to be some debate regarding the quality and/or reliability of data collected by a single unit system versus a dual unit system. Our goal will be to see if there is any appreciable difference between the two systems.

Since the advent of electronic instruments, a fundamental constant for doing accurate surveying work has been the necessity to be plumb over a point. With the addition of inertial measurement units (IMU) to GPS receivers, that constant may no longer be a requirement.

According to manufacturers, IMU units can determine the tilt and direction of the head unit, and combined with the length of the pole, can apply corrections to position and elevation (XYZ coordinates) for the subject point. As this novel concept represents a significant shift in tradition, its relevancy to producing precise surveying measurements needs to be tested. A secondary goal of the workshop will be to test these units, to see if data collected by them approaches boundary survey quality.

This workshop will attempt to address the above-described topics by setting up a test course around the Plaza, collecting data on real-world targets and analyzing that data for its accuracy. For more information on the test course, please see the Course Data Collection Procedures...