

A SIMPLIFIED TOTAL STATION SYSTEM CHECK TO DETERMINE PERFORMANCE CHARACTERISTICS

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BIOGRAPHICAL SKETCH

George G. Kampmann is a founding member of the faculty of geomatic engineering of Anhalt University of Applied Sciences, at the Bauhaus in Dessau, Germany. He serves as full professor for adjustment and optimization. His various scientific publications and contributions are focusing on enhanced adjustment technologies to improve practical data analysis and validation. He has been involved in data analysis design for geomatic instrumentation with Sokkia, Leica and others. Dr. Kampmann contributes as scientific consultant to professional societies and engineering companies.

Joseph V.R. Paiva is a consultant in the fields of geomatics product development, marketing and business development, a presenter of seminars and author of many papers on surveying and mapping subjects, including columns in *POB Magazine* and *Civil Engineering News*. He has been previously employed at Trimble, Sokkia and also taught surveying at the University of Missouri-Columbia. His research interests in academia and industry have focused on instrumentation. Dr. Paiva is a professional engineer and surveyor, a member of various professional societies, and currently working on a handbook for users of total stations.

ABSTRACT

Electronic total stations enjoy widespread use in surveying practice. From time to time these instruments need to be calibrated (testing against true values and evaluate “true values”). These calibrations usually require a large amount of effort and investigations into various influences such as temperature, air-pressure, and so on. Such a process while required, involves high cost. An alternate method of checking the total station’s performance (not calibrate) in an easy to operate measurement scenario is described in this paper. By executing some 5 to ten shots (measurement of horizontal and vertical circle readings and slope distances) to arbitrary target points a number of significant computations is executed that provide necessary and sufficient information on total stations measurement accuracy. Results from both, a three-dimensional free station position and the point accuracies from a three dimensional co-ordinate transformation using minimax technologies, reveal practical information on the total station for the surveyor. In this age of “black box” technologies, when monitoring the state of operation of one’s instruments is difficult, the authors propose this method to help surveyors track the performance and reliability of their instruments.