Calibration procedure for portable coordinate measuring systems

Mariusz WIŚNIEWSKI*

** Corresponding author: Laboratory of Length, Central Office of Measures, Elektoralna 2, 00-139 Warsaw, Poland, e-mail m.wisniewski@gum.gov.pl*

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We presents calibration of porttable spherical measurement systems (SMSs) such us laser trackers (LT) and robotic total stations (RTS). These instruments are used extensively in large scale (volume) metrology. They are able to determine three dimensional coordinates of a point by measuring two orthogonal angles (horizontal and vertical) and a distance to a reflector (SMR).

The standard for testing of the theodolite and total station systems is the ISO 17123 series of international standards [1]. The LT test procedure is outlined in the American standard ASME B89.4.19 – 2006 [2]. The establishment of verification facility at Central Office of Measures, Poland is introduced. The set of laser wavelength calibration, environmental sensors calibration, ranging tests, length measurement system tests and two-face system tests were performed to assess the performance of instruments. For length measurement errors the Brunson Instrument Company KinAiry laser tracker evaluation system was used (Fig. 1). Example results from the tests were presented.

Fig. 1.
Brunson Instrument Company KinAiry laser tracker evaluation system

[1] ISO 17123 Optics and optical instruments - Field procedures for testing geodetic and surveying instruments Parts 1 to 8. 2001-2007, ISO: Geneva Switzerland

[2] ASME B89.4.19-2006: Performance Evaluation of Laser Based Spherical Coordinate Measurement Systems, ASME, November 2006