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Part 11: GNSS instruments

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Partie 11: Instruments GNSS

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Foreword

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A list of all parts in the ISO 17123 series can be found on the ISO website.

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Introduction

The ISO 17123 series specifies field procedures for adoption when determining and evaluating the uncertainty of measurement results obtained by geodetic instruments and their ancillary equipment, when used in building and surveying measuring tasks. Primarily, these tests are intended to be field verifications of suitability of a particular instrument for the immediate task. They are not proposed as tests for acceptance or performance evaluations that are more comprehensive in nature.

These field procedures have been developed specifically for in situ applications without the need for special ancillary equipment and are purposely designed to minimize atmospheric influences.

ISO 17123-8[1] provides a standard which exclusively covers Global Navigation Satellite System (GNSS) test procedures for real-time kinematic applications. Since the creation of ISO 17123-8[1], GNSS-based geodetic measurement and instrumentation techniques have evolved in many ways:

— in addition to the classical real-time kinematic measurement procedures on which ISO 17123-8[1] is based, other GNSS-based geodetic measurement procedures have become established;

— complementary to classical base-rover measurement arrangements and the instrument morphology by means of separation of antenna and receiver, which was widely used at the time, versatile integrated measurement instrument types are currently available;

— correction data services play an essential role in the analysis.

This document therefore has the following objectives:

— provision of GNSS field test procedures to achieve the highest possible reliability in the use of GNSS-based geodetic measurement techniques;

— far-reaching consideration of technological advancements both in instrument technology and morphology as well as in data streams;

— extensive independence from the accuracy class of the measuring equipment;

— consideration of the measuring equipment as a complete system;

— qualitative and quantitative multistage nature of the field test procedure in order to be able to meet different requirement profiles;

— inclusion of the user's expertise.

The implementation of these objectives is limited by the following framework conditions:

— a GNSS measuring instrument is not a measuring device in the narrower sense that can be tested independently of external infrastructure on its own as well as without target specifications. Instead, GNSS measuring instruments are subcomponents of an overall system;

— GNSS measuring instruments are perceived as black box systems. A large group of these systems is designed by the manufacturer in such a way that no, or only little, influence can be exerted on important instrument parameters;

— another group of GNSS measuring instruments follows an open-box strategy and allows a large number of parameter settings in the positioning algorithm, the changes of which have a direct influence on the determined position;

— GNSS-based measurement techniques are always based on an estimation algorithm, the result of which depends on a very large number of possible influencing factors;

— the quality of satellite geodetic measurements and the positional accuracies that can be achieved with them depend directly on the measurement conditions on site;