OCENA DELOVANJA ENO IN DVOFREKVENČNIH NIZKOCENOVNIH SPREJEMNIKOV GNSS V STATIČNEM RELATIVNEM NAČINU

PERFORMANCE EVALUATION OF SINGLE AND DOUBLE-FREQUENCY LOW-COST GNSS RECEIVERS IN STATIC RELATIVE MODE

Naccieli Bojorquez-Pacheco, Rosendo Romero-Andrade, Manuel Edwiges Trejo-Soto, Daniel Hernández -Andrade, Karan Nayak, Ana Isela Vidal-Vega, Aníbal Israel Arana-Medina, Gopal Sharma, Luis Enrique Acosta-Gonzalez, Richard Serrano-Agila

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IZVLEČEK

Z napredkom nizkocenovnih sprejemnikov GNSS z vgrajenimi sodobnimi zmogljivostmi se je odprlo še eno okno za raziskovanje učinkovitosti različnih nizkocenovnih sprejemnikov s pregledi njihove zmogljivosti in primernosti za različne geodetske namene. Glavni cilj te študije je oceniti učinkovitost določanja položaja eno- in dvofrekvenčnih sprejemnikov GNSS v kombinaciji z geodetskimi antenami v statičnem relativnem načinu glede na mehiške predpise. Zabeležena opazovanja so bila obdelana s statično relativno metodo z navezavo na permanentno postajo mehiškega nacionalnega inštituta za statistiko in geografijo INEGI. Rezultati raziskave, izvedene na razdalji 4 in 33 kilometrov od permanentne postaje, kažejo podobno natančnost za vse nizkocenovne sprejemnike. Za nizkocenovne sprejemnike GNSS NEO-M8T, NEO-6T in ZED-F9P so dobljene rešitve dosegle milimetrske horizontalne natančnosti z uporabo geodetske antene. Z modelom ZED-F9P je mogoče doseči visoko natančnost na večjih oddaljenostih od permanentne postaje. Pri vertikalni komponenti pa se pokaže, da je v vseh primerih slabša kot pri uporabi geodetskih sprejemnikov. Če se ne zahteva višja natančnost od petih centimetrov, lahko uporabimo tudi nizkocenovne sprejemnike GNSS.

KLJUČNE BESEDE

statična relativna metoda, GNSS, nizkocenovni sprejemniki

ABSTRACT

The advancement of low-cost GNSS receivers with modern built-up characteristics has opened a new window to investigate the performance of various low-cost receivers with an outlook on their performance and suitability for varied geodetic purposes. The main objective of this study is to evaluate the positioning performance of single and double-frequency GNSS receivers in combination with geodetic antennas in static relative mode regarding Mexican regulations. The recorded observations were processed by a static relative method including the CORS station from the National Institute of Statistics and Geography in Mexico (INEGI). The results of the survey conducted at a distance of 4 and 33 km from CORS station show similar accuracy for all low-cost receivers. For low-cost GNSS receivers NEO-M8T, NEO-6T, and ZED-F9P the solutions that were obtained reached mm in horizontal precision using a geodetic grade antenna. Similarly, the ZED-F9P model was proved at a long distance from the CORS station and presents high precision. Regarding the vertical component, in all cases where the GGM10 model was included, the vertical component is not allowed to use for topography or geodetic works, however, the horizontal component where mm precision was achieved is allowed for different highly precision survey works.

KEY WORDS

static relative method; GNSS; low-cost receivers