

On The Prospects and Opportunities Of The Establishment Of Khartoum Continuous Operating Reference Stations

Abdalla, K. A.

University of Khartoum, SUDAN

The proposed Khartoum Continuous Operating Reference Stations (CORS) system consists of seven stations and one central processing center for the processing and distribution of GNSS data. These stations are designed to form a precise geodetic network of permanent stations continuously track the visible GNSS satellites and where satellite receivers are to be installed. The GNSS receivers will telemetry the data to the Central Processing Center via a GSM media at a measurement interval of 1 second. The initial core product of the CORS data will be collected from the permanent stations using dual frequency GPS receivers to collect carrier phase and code observations, as well as precise GPS satellite ephemeris, earth rotation parameters, ionospheric and atmospheric information, coordinates and velocities of the permanent network stations. The objectives of establishing Khartoum CORS network are to increase and to improve the real time and post processing capabilities of GNSS and their geomatics and engineering applications, monitoring of recent crustal movements and atmospheric and geodynamic studies.

The raw GPS data from all the stations is to be processed, modeled, and adjusted applying various methods including Area Calculations Parameters, for Ionospheric, tropospheric effects and distance dependant errors. The processed data is then available for the whole Coverage area in RTCM Format either through GSM or Radio Network. The concept of having the GNSS reference stations is to have homogeneous network all over Khartoum state area. Users can log into the main control room through GSM/radio link and send their navigated position to the system, and the system in turn will send the user RTCM corrections for that navigated position, enabling the user to have 1-2cm RTK position accuracy anywhere within the coverage area of the whole Network. Data is fully controlled and archived and only authorized users can be linked to access the data.

The paper presents the technical details of the Khartoum CORS system network design, site selection, hardware configuration, modeling, monitoring and handling of satellite and receiver biases and atmospheric propagation delays.