Establishment of National GNSS Network in Nigeria: The Present Status

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Abstract

The Office of the Surveyor General of the Federation (OSGOF) holds more than a century-old proud record of serving the needs of the Government, the military, the industry and the general public. It is promoting itself to be a Centre of excellence for all survey and mapping activities in Nigeria. It also aims to provide an efficient and high quality surveying and mapping services that include the dissemination of geodetic information in line with the national requirements and the federal government transformation agenda. The current national mapping in Nigeria relates to the old systems of the Nigerian Primary Triangulation Network of 1960s. These traditional survey control systems were referenced to a nongeocentric datum, based on Clarke 1880 ellipsoids. Both fit well regionally but not globally. In order to fully support the Global Navigation Satellite Systems (GNSS) activities, modern positioning infrastructures and provide support for Global mapping, a more accurate control system in the form a geocentric datum is needed. The establishment of the Nigerian Permanent GNSS Network (NIGNET) which began in 2008 has provided the impetus for the adoption of the geocentric datum in all geodetic activities. With the data products obtained from the International GNSS Service (IGS) stations, the coordinates of the NIGNET stations have been derived using 2-year continuous GPS data. Following this, GPS observations were carried out on the passive primary control stations; these were strengthened and now superseded the old networks. The final outcome from this exercise is an accurate set of coordinates for NIGNET and 60 GPS stations in Nigeria referred to the International Terrestrial Reference Frame 2008 at epoch 1 January 2012. There are plans to add another set of 24 stations. Collectively these coordinates represent the basis for the Nigerian Geocentric Datum (NGD2012). This paper is intended to provide the results of the definition and realization of a geocentric datum for Nigeria and the establishment of the new Nigerian Primary Geodetic Network (NPGN). This is expected to take off in $4\frac{1}{2}$ years time.

Keywords: NIGNET, ITRF, geocentric datum, GNSS, Nigerian Primary Geodetic Network.