

Establishment of Egyptian National Gravity Standardization Network

Dr. Dalal S. ALNAGGAR, Dr. A. A. SAAD and Dr. G. M. DAWOOD, Egypt

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ABSTRACT

Local gravity field representations are required for establishing geodetic control networks in geodetic and engineering surveys. With the rapid growth of the use of the satellite-based Global Positioning System (GPS), high resolution gravity field data are needed to transform the ellipsoidal heights into orthometric heights. In geophysics, gravity data are used in a wide range of applications such as exploration of mineral and underground water resources, monitoring crustal movements, and the study of the orbits of natural and artificial celestial bodies.

Gravity control networks are essential to support several applications on a national and international scales. The Potsdam gravity system provides an example of an international gravity datum from 1909 to 1971. In Egypt, the National Gravity Standard Base Net (NGSBN-77) afforded the gravity framework in the second half of the twentieth century. In addition, the Egyptian Survey Authority (ESA) usually is carrying out gravity measurements, for some specific applications, especially for correcting precise levelling observations. However, all such gravity measurements, can not satisfy the modern precise applications in Egypt. Consequently, the establishment of a precise new national gravity base network becomes an essential and urgent task for the geodetic community in Egypt, and this is actually the main point of our interest in the current investigation. The Egyptian National Gravity Standardization Network of 1997 (ENGSN97) serves as the precise national gravity datum for Egypt. So, the ENGSN97 will be documented in details in this research.

CONTACT

Prof. Dr. Eng. Dalal S. Alnaggar
Director of Regional Training Center
EGYPT
E-mail: Dalnagar@training-center.com

Ass. Prof. Dr. Eng. A. A. Saad
Surveying Dept.
Shoubra Faculty of Engineering Institute
Zagazig university-Benha Branch
EGYPT

Dr. Eng. G. M. Dawood
Surveying Research
Ministry of Water Researches and Irrigation