The AFREF Project

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A uniform co-ordinate reference system is fundamental to any project, application, service or product that requires some form of geo-referencing. Most countries in the world have established such reference systems that are used for national surveying, mapping, photogrammetry, remote sensing, Geographical Information Systems (GIS) and the planning and execution of development projects. Many of these national co-ordinate systems are based on reference figures of the Earth which are somewhat outdated and, when based on a local origin or datum, are restricted to a particular country making cross-border or regional mapping and development projects very difficult indeed. When using modern positioning technology such as GNSS, technical understanding and careful mathematical manipulation is required to relate GNSS derived co-ordinates to classical national co-ordinate systems. Many countries are therefore updating these national reference systems to be compatible with the GNSS reference systems.

The African Reference Frame project, AFREF, has the primary objective of defining a continental reference system for Africa to be fully consistent and homogeneous with the global reference frame of the ITRF. One of the core objectives of the project is the establishment of a network of permanent GNSS base stations throughout Africa to be used as a set of fiducial points for the definition of the a unified African reference frame. These stations will serve not only the fundamental geodetic objectives of AFREF but also the global densification of the IGS stations and the associated benefits to be derived from such a global densification. The network of AFREF base stations will also serve the diverse disciplines for which GNSS data is currently being used and promote an interest in geodesy, geophysics, space physics and atmospheric science among others within African countries.

This paper describes the background, rationale and progress made with AFREF since 2000 and the benefits that the infrastructure of permanent GNSS base stations will have for the diverse range of applications of GNSS data.