AFREF

AFRICAN GEODETIC REFERENCE FRAME

A Modern and Unified Reference Frame for Africa

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Development approaches in Africa are geared towards continental and regional economic and political integration:

- AU
- NEPAD
- COMESA
- SADC
- EAC
- ECOWAS

This requires uniform geo-spatial information.
• Traditionally each country has its own geodetic reference system

• Maps in neighbouring countries do not match at the national boundaries
Impact of Reference Mismatch

Map dated 1989
WGS-84

Map dated 1957
NAD-27
Consequences of using reference systems that are not consistent!
PROBLEM - CONSEQUENCES:

- A multitude of different datums, different ellipsoids and different projections

- Confusion within countries as to appropriate datums, projections and transformations to use

- Confusion and delays in cross-border projects: transport corridors, mapping projects, conservation and environment, exploitation of mineral resources

- Confusion and conflict regarding international borders
Solution

• Move from National Reference Systems to Regional or Global Reference Systems
Solution

Non-uniform systems

Uniform system

GNSS + ITRF
Objectives of AFREF

– To establish a continental reference system as a basis for national reference networks.

– To establish permanent GNSS base stations such that users will be within 500km of a base station and that data is freely available to all users.

– To realize a unified vertical datum and to support efforts to establish a precise African geoid.
The structure reflects the broad concepts of AFREF that:

– It is to be designed, managed and executed from within Africa;

– It is to be organized on a regional basis;

– It is to be executed at the national level
• The establishment of a framework of active GNSS stations
• Computation of AFREF solution
IMPLEMENTATION STRATEGY

- The densification of the network at national level
- Computation of Transformation Parameters

Frame Relay continuous stream
ISDN Daily download
Int GPS Service Stations

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IMPLEMENTATION STRATEGY

• The development of a refined geoid model for Africa
AFREF STRUCTURE ON REALIZATION

Field CORS

Network Control Centre

Telecom Sat

DGPS

DGPS -RTK

GSM / GPRS

Real Time Users

Post Processing Users

FTP/ Web Server

GSM GPRS internet etc
Applications in crustal dynamics

GPS data from AFREF base stations will be used to continuously monitor:

• Earth crustal movements
• Atmospheric physics
• Meteorological studies.
Required resources

• Trained technical staff – 2 per station.

• Positioning equipment – GNSS receivers – USD 20,000 per station.

• Reliable power supply.

• Computing facilities.

• Communication facilities – Internet, VSAT, telephone.
CALL FOR PARTICIPATION
in the
UNIFICATION OF AFRICAN REFERENCE FRAMES
The AFREF Project
2005-2010
Committee on Development Information, Geo-
Information Subcommittee
(CODI-GEO)
United Nations Economic Commission for Africa (UNECA)
http://geoinfo.uneca.org/afref/
Endorsed by:
International Association of Geodesy (IAG) International
Global Navigation Satellite System Service (IGS)
United Nations Office of Outer Space Affairs (UNOOSA)
Federation of International Surveyors (FIG)
August 2005

• Call for Participation sent out
  (28 responses received)

Present status

First technical Workshops
Present status

- Two training courses held.
- Two Expert Group Meeting held
- AFREF Station Guidelines published.
Present status

• AFREF Web site established

http://geoinfo.uneca.org/afref

• AFREF quarterly Newsletter launched

AFRICAN GEODE蒂C REFERENCE FRAME (AFREF)-NEWSLETTER

AFREF News Letter No.8 e-mail: afref@rcmrd.org January 2009
Present status

• 22 Countries have established GNSS permanent stations

• 50 permanent station are sending data to AFREF ODC
• One Operational Data Centre established
• Data Holding and Analysis Centers to be established (Cfp to be sent out)
Present status

- ECA and AUC proposed implementation Plan approved in 2009

- New Management Structures to be put in place

- Coordination between partners and stakeholders to be formalized

- Capacity building programmes to be undertaken
Requirements to Move Forward

• More Publicity of AFREF initiative.

• commitment from Countries thro’ National Mapping Organizations.

• Capacity building – manpower and equipment at national level.

• Support from international partners.

• Build capacity in AFREF data holding & analysis centres.

• Compute first official AFREF Coordinates
Thank you

http://geoinfo.uneca.org/afref