


AFREF
ESTABLISHMENT OF A COMMON
AND
MODERN AFRICAN REFERENCE FRAME



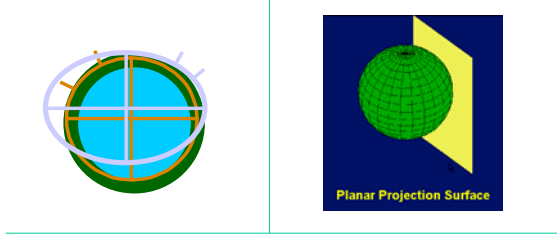

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Regional Centre for Mapping of Resources for Development(RCMRD)
 FIG/GSDI International Conference held at Cairo, Egypt, April 16th-21st 2005



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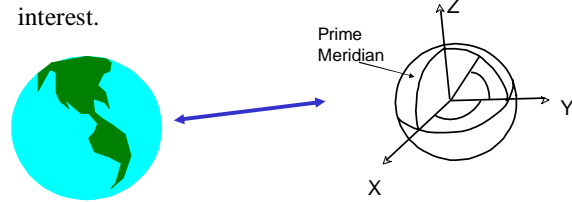
Reference Frames and AFREF



Planar Projection Surface

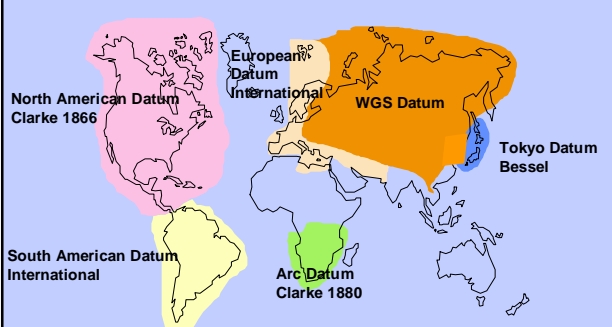
Reference Frames defined

A base reference for a coordinate system. It includes the latitude and longitude and orientation of an initial point of origin of an ellipsoid that models the surface of the earth in the region of interest.



Reference Frames

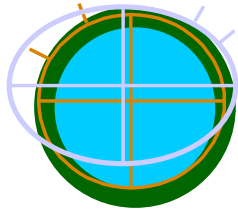
Most widely used local Datum/Ellipsoid



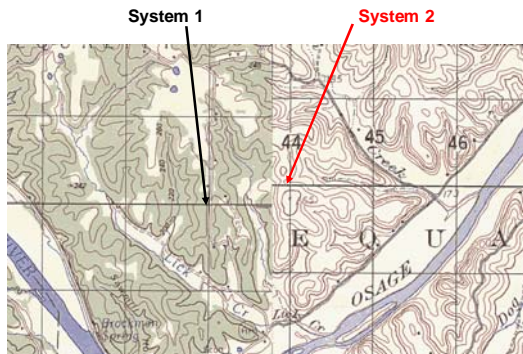
Reference Frames

Limitations to the Traditional Approach

- Many nations established their own datum
 - Standards and procedures vary widely
- Coordinates from different datums are completely incompatible
 - Relative to Initial Point of Datum
 - Will vary as a function of Ellipsoid parameters



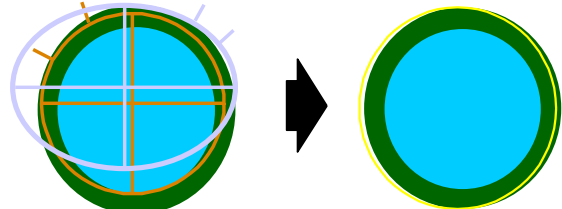
Impact of Datum Mismatch



Reference Frames

Regional/local vs. Global Approach

- Global replaces regional datums with a common, accurate standard
- One system for maps of the *entire planet*

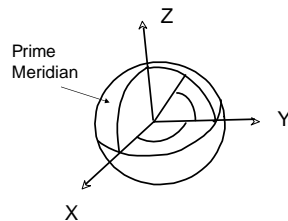


Reference Frames

WGS 1984 and AFREF

WGS -84, the GPS reference frame is an Earth Centered Earth Fixed coordinate system.

AFREF, African Reference Frame on its realization is expected to be of the same standard as WGS84 and ITRF frames



Implementation of AFREF

Implement National, Coordinate Continental

- **National implementation (individual country effort)**
 - Establish continuous/semi operating reference stations
 - Source the requires hardware and software
 - Provide suitable site with necessary communication facilities
 - Man and maintain the network
 - Disseminate GPS data to others
- **Continental and regional coordination**
 - Steering committees and regional working groups
 - Co-ordination & processing centres
 - Common standards-IGS standards

Implementation of AFREF-sub regions

• For effectiveness, the following implementation blocks have been proposed including

- North African Reference Frame (NAREF), including Algeria, Egypt, Libya, Morocco Tunisia among others
- South African Reference frame (SAFREF) including including Botswana, Lesotho, Malawi, South Africa, Swaziland, Tanzania, Namibia, Zambia amongst others
- East African Reference frame (EAREF), including countries including Burundi, Djibouti, Ethiopia, Eritrea, Kenya, Rwanda and Uganda
- Central African Reference frame (CAREF) including Chad, Congo, Zaire Cameroon, Central Africa Republic among others
- West African Reference frame (WAREF), including Nigeria, Niger, Cape Verde, Gambia, Mali, Liberia among others



Implementation of AFREF ACTION PLAN

- Permanent network of GNSS stations linked to IGS
- National GNSS networks
 - Tracking stations
 - Data holding centres
 - Data analysis centres
 - Coordinating centres



Required Resources



- Personnel and institutional resources.
- Positioning equipment and software.
- ICT hardware and software

Applications Of AFREF



- Common national/regional/continental surveying & mapping products
- Meet GNSS users post processing requirements
- Crustal movement studies
- Aviation industry
- Disaster management, climate change studies, weather focusing etc

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