

THE AFRICAN REFERENCE FRAME (AFREF) PROJECT

ITS CURRENT STATUS

1. BACKGROUND

The African Reference Frame (AFREF), project aims at establishing a geodetic control network for Africa, which will be used in the planning and implementation of all geodetic and development projects in Africa. In this summary report, we present the activities carried out by the Regional Centre for Mapping of Resources for Development (RCMRD), Nairobi, Kenya; following the discussion and recommendations made during the UN/US Regional Workshop on the Use and Applications of Global Navigational Satellite Systems, held in Lusaka Zambia, in July 2002.

2. MANDATE OF RCMRD

The Centre is mandated to coordinate the implementation of the AFREF project. The following recommendations were made by the above workshop and the Centre made efforts to implement some of them:

- A continental reference system be established in Africa using GPS, which should be consistent with a global frame work such as the ITRF;
- All nations should modernize their datums and align them to ITRF through the AFREF framework using the GNSS;
- The reference system be organized through a continental project to be known as AFREF: with common goals and objectives and supported by all African governments and international organizations. That for practicability and success the implementation be on sub regional basis, i.e. NAFREF, SAFREF, etc.
- The AFREF project should solicit the resources to procure and support the GNSS technology and network infrastructure. The project would promote training courses to build capacity for GNSS and the AFREF project. It should develop standardized training material for use through out Africa and facilitate the acquisition of GNSS and other materials by negotiations with development partners to get special pricing. It should also arrange for the acquisition and distribution of the necessary software and address ICT costs for the project.

Finally the Workshop came up with a proposed Implementation structure, which was recommended to CODI for adoption. The structure incorporated all stakeholders, such as the IAG, IGS, ECA, partner organizations such as NIMA, the African Regional organizations such as RCMRD, RECTAS, etc and the governments.

As a following up to this meeting, a three days AFREF project Meeting was organized by the RCMRD, the Namibian Surveyor General's office and IAG/IGS through the regional representative, South Africa in Windhoek, Namibia; in December 2002.

This meeting was to coincide with the 4th Meeting of the Conference of Ministers for the RCMRD, which was hosted by Namibia and held from 11-17 December 2003.

Attendance was supposed to be from all the countries in eastern and southern Africa. The Centre financed the cost of participation for all delegates from its 15 members States.

The meeting was attended by 16 participants, which included delegates from nine member states of the Centre, South Africa, the ECA and the RCMRD. The meeting reviewed the status of the efforts for the establishment of the African Datum and then the AFREF project as presented by the IAG/IGS regional representative. The proposed implementation structure made by the 4th IGSS Workshop was accepted.

Following the presentation of a lead paper by RCMRD, the meeting then received summaries from the participating countries on their current GPS applications and their capabilities to participate in the project. Proposals were also made on the selection and spacing of IGS and national permanent GPS points. For example it was observed that the situation for each of the participating countries was as follows:

- Botswana has plans to prepare 4 points to be located at Gaborone, Maun, Francistown and Kasane;
- Ethiopia has GPS points located in Addis Ababa, Axim, Dire Dawa and Arba Minch. They need to verify if the points satisfy IGS standards;
- Kenya has two operating points, Nairobi and Malindi, which is already in the IGS network;
- Malawi, were to select and confirm their points;

- Namibia have established one point in Windhoek and will add another one at Ruacana;
- South Africa has four active IGS stations, i.e. Hartebeeshoek, Sutherland, Richards Bay and Simsonstown;
- Swaziland did not need a point due to its proximity to the SA stations;
- Tanzania had three proposed stations located at Dar es Salaam, Mwanza and Mbeya airports;
- Uganda has one established IGS station in Mbarara;
- Zambia has an active IGS station in Lusaka and proposed to construct two additional stations at Ndola and Mongu.

After completing the discussion, it was agreed that the out put of the meeting should be a document to be called the Windhoek Declaration.

In summary the Windhoek Declaration covered the following:

- Recognized that the implementation of the goals of the new partnership for Africa's Development (NEPAD) and all regional projects in Africa require a uniform geodetic reference frame and maps;
- The participants declared their support and commitment to the concepts of AFREF;
- Recognized the need to involve the UNECA and its committees in the implementation of AFREF;
- Implored the UNECA to full support the AFREF concept and present it to CODI and to the conference of Ministers for implementation;
- Requested the African Union to accept the concepts of AFREF and encourage its members to implement it and use the results;
- Recalled that because the implementation of AFREF will depend on the application of GNSS, the Workshop requested the Un Office of Outer Space Affairs (OOSA) to fully support the principles and the implementation of AFREF;
- Further recalling the involvement of IAG in the EUREF and SIRGAS projects and its support for AFREF, urged it together with IGS to continue supporting the concept and assist in its implementation.
- Finally requested Africa's bilateral and multilateral development partners to support AFREF and its implementation.

Following this, the meeting agreed that its report and the Windhoek Declaration be presented to the Committee for Development Information 3 (CODI 3) which is organized by ECA every two years. The meeting was held in May 2003 and the RCMRD presented the AFREF report and the Windhoek Declaration. The project

was discussed in detail during the pre- Meeting Workshop. The summary of the discussion was presented to the main CODI Geo information sub committee meeting. During the discussion it was emphasized that there was a need for the African governments to implement the AFREF project, as it is the backbone of the implementation of the NEPAD continental development programmes and projects. These require uniform geo spatial data and maps, which can only be generated when we have a single uniform framework for the whole continent.

The importance and need for this project was included in the Geo information resolutions, which were also incorporated into the CODI 3 recommendations and resolutions.

As part of the Centre's contribution to the implementation of the AFREF project, at the beginning of 2002 we sent questionnaires to a number of countries in the eastern and southern Africa sub region. In the forms we requested them to express their willingness to participate in the project and their capability.

Responses were received from Botswana, Kenya, Namibia, Swaziland, Uganda and Zambia. They all expressed their readiness to participate in the project and nearly all have the necessary GPS receivers, expertise and software.

During the Centre's 37th Governing Council Meeting held in Arusha Tanzania in November 2003, the Centre submitted its programme for the future activities of AFREF. The GC approved the proposed project activities and entranced them in the Centres's programme.

3.PROBLEMS AFFECTING THE IMPLEMENTATION OF AFREF PROJECT.

Nearly all the countries of Africa support and are willing to implement the AFREF project. However due to economic difficulties most find it difficult to include the project among their development priorities. For example although many of the countries have now acquired GPS receivers, they find it difficult to use them in AFREF activities. Many can not allow receivers to be used in permanent observations, as it means the resources are no longer available for daily operation, which are given higher priorities..

Through this report I urge those countries, which can spare used GPS receivers and other facilities to donate them to the African countries. These receivers will then be used for the permanent GPS observations.

Further countries with long experience in data processing and analysis should assist African countries by donating their soft ware and equipment for use in the AFREF project.

Another urgent area that will need support from the development partners is training and Workshops to prepare our geodesists to participate in this project.

Presented at the UN/US International Workshop on the Use and Applications of Global Navigational Satellite Systems,
8-12 December, 2003
Vienna, Austria.

By Martins L. Chodota
Senior Surveyor, RCMRD
P.O. Box 18118, Nairobi
Kenya.
Tel. 254 20 861671
Fax 254 20 861673.
Email: chodota@rcmrd.org.