REPORT

1st AFREF TECHNICAL WORKSHOP

CAPE TOWN, SOUTH AFRICA

9-13 July 2006

Introduction and Background

AFREF is designed to unify the co-ordinate reference systems of Africa to create an environment in which all activities requiring sound geo-spatial information such as surveying, mapping, geographical information systems, navigation, engineering projects, atmospheric and geophysics research and applications and disaster monitoring and mitigation are based on a uniform modern international co-ordinate system. The project has been initiated from within Africa and is being implemented, managed and executed by African geodesists, surveyors and scientists with assistance from the international community.

Although the ideals and concepts of AFREF have been debated for a number of years, the scientific and technical aspects of the project had never been highlighted in a dedicated workshop. The possibility of South Africa hosting such a technical workshop was raised at a United Nations Office for Outer Space Affairs (UNOOSA) meeting in Vienna in December 2004. A small Local Organising Committee was constituted and the University of Cape Town was selected as the most appropriate venue. The workshop was initially planned for January / February 2006 but, because of insufficient funding at the time, was postponed to July 2006.

Aims and Objectives

The primary objective of the workshop was to introduce representatives of National Mapping Organisations (NMO's) and academic institutions of African countries to the scientific and technical aspects of the AFREF project. To achieve this, a number of internationally recognised geodesists and Global Navigation Satellite Systems (GNSS) specialists were invited to give presentations on scientific, technical and practical topics of importance to the project. Invitations sent to NMO's stated that the NMO representatives should be directly involved with the geodetic component of the NMO organisation, and preferably have had some practical experience with GPS and reference frames. It was also recommended that the nominee should have a first degree or 4 year diploma in geomatics/surveying with geodesy as a major subject.

An equally important objective was to facilitate the interaction between the representatives of NMO's and presenters in an informal atmosphere.

Sponsorship

Direct and indirect sponsorship for the workshop was provided by a number of organisations. Airfares and/or accommodation for delegates from Africa, the general running costs of the workshop and social events were paid through direct sponsorship. Indirect sponsorship for the workshop was provided by the home organisations of presenters who paid for the airfares and accommodation of presenters. The following government or non-government organisations provided sponsorship for airfares, accommodation or logistic costs (in alphabetical order):

- Chief Directorate: Surveys and Mapping of the Department of Land Affairs of South Africa (CDSM);
- International Association of Geodesy (IAG);
- National Research Foundation of South Africa (NRF);
- University of Cape Town (UCT);
- University NAVSTAR Consortium Inc. (UNAVCO); and
- United Nations Office for Outer Space Affairs (UNOOSA).

The following suppliers of GNSS equipment provided sponsorship for the two social events (in alphabetical order):

- Leica Geosystems Africa (Pty) Ltd;
- OmniSTAR Pty Ltd (South Africa);
- Optron (Pty) Ltd;
- Sokkia-RSA (Pty) Ltd; and
- VI Instruments Division of Hudaco Trading Ltd.

The willingness of the above organisations to support the workshop is indicative of their support for the AFREF project and is to be commended.

Country Representation

There was a good geographical distribution of African countries represented at the workshop with 38 representatives from the following 17 countries:

Benin	Botswana	Burkina Faso
Cameroon	Egypt	Ethiopia
Ghana	Guinea	Lesotho
Malawi	Morocco	Mozambique
Namibia	Nigeria	South Africa
Swaziland	Tanzania	

4 representatives from 2 of the 3 regional centres for mapping in Africa also participated in the workshop viz. the Regional Centre for Mapping of Resources for Development (RCMRD) based

in Kenya and the Nigerian based Regional Centre for Training in Aerospace Surveys (RECTAS).

In addition to the above representatives from Africa, 15 speakers from the following countries gave presentations:

Brazil	Egypt	France
Germany	Portugal	South Africa
United States of America		

Programme

Apart from an introductory session of formal welcomes and preamble speeches, the programme was divided into 10 sessions covering 4 broad themes viz.:

Background and reports	(6 presentations)
Reference systems and frames	(7 presentations)
Geodetic stations and permanent GNSS stations	(9 presentations)
Data processing and analysis	(2 presentations)

The presentations were all of a very high quality and were extremely informative and useful in content. Of great interest to participants was a presentation on the SIRGAS project and the lessons that could be learnt from it in the AFREF project. SIRGAS is a project to unite the geodetic reference systems and frames in South America and is very similar to AFREF in its objectives.

A visit was arranged to the offices of the Chief Directorate: Surveys and Mapping in which the control centre for the South African network of permanent GNNS stations (TrigNet) is situated. Another visit was arranged to the Hermanus Magnetic Observatory where, besides being the location of one of the TrigNet remote sites, research is being carried out on ionospheric mapping using TrigNet GNSS data.

A copy of the full programme is enclosed as Appendix A. A CD of all presentations and other resource material was prepared and given to each participant at the close of the workshop.

A number of topics were highlighted during open discussion and debate. The following is a brief synopsis of some of the points raised:

- Much was presented and said regarding the budget requirements for both capital purchases and running costs required for the installation of permanent GNSS base stations. Capital costs can be considerably reduced by bulk purchasing of equipment for

the project as whole rather than each country making small quantity purchases. If AFREF is to succeed and remain sustainable, a dedicated budget for the running of the network of permanent GNSS base stations must be set aside by countries hosting such stations. Much of the running cost is required for communication, power supply and general maintenance.

- The infrastructure of a network of permanent GNSS base stations required to realize the geodetic objectives of AFREF can be utilized for other disciplines and applications such as atmospheric and geophysical research and applications, air and road navigation, disaster mitigation and monitoring and so on. Organizations and individuals active in these non-traditional fields of GNSS application should be encouraged by the AFREF Steering Committee to play an active role in AFREF to leverage funds, equipment and technical support in an effort to spread the responsibility and interest in the project.
- All countries represented at the workshop agreed by a show of hands to continue supporting the project and also agreed to review the "Call for Participation" and submit "Letters of Intent" in support of AFREF.

Problems encountered

No serious problems were encountered with the organization of the Workshop. One of the shortfalls, however, was the difficulty that French speaking delegates had in following presentations and discussions. Unfortunately the cost of providing an English / French translation service would have been prohibitive as both translators and translating equipment would have had to be hired. The available budget did not extend to this expense.

Objectives achieved

It is believed that the primary objective of the AFREF Technical Workshop was achieved. The CODI-Geo AFREF Steering Committee confirmed this at their meeting held on Friday 14 July. It is believed that the delegates who attended the workshop sessions responded well and learned a great deal of the aims and objectives of AFREF as well as the theoretical, technical and practical implications of the project. It is also believed that delegates will continue to strongly support the project. A critical factor in succeeding in these aims and objectives, however, will rest with the AFREF Steering Committee who will have to maintain the high level of interest in the project through continuing communication, seminars and workshops.

Recommendations

It is recommended that:

- A broad project plan must be prepared as soon as possible. Such a plan must include the identification and endorsement of potential sites for permanent GNSS stations by the

AFREF Scientific Advisory Group, who must take note of the primary objective of AFREF. Such a set of sites will be used by NMO's to identify further stations for densification within their own countries;

- Countries must commit to the project and submit "Letters of Intent" as soon as possible;
- Regional and national conferences, workshops and seminars must continue to be held regularly to maintain a high level of interest and to ensure ongoing participation in the project. In an effort to address the high cost of providing translation services, it is suggested that a similar technical workshop be held in a French speaking country in either West or North Africa.

Conclusion

As a general statement it is felt that this, the first AFREF Technical Workshop, was successful and met the set aims and objectives. It is trusted that this will be the first of many similar workshops in the future. The representatives from the National Mapping Organizations and academic organizations of attending countries are supportive of the AFREF project and appreciate its aims and objectives.

The workshop would not have been possible without the support of all sponsors. Their generosity and commitment to AFREF is appreciated very much indeed.

R Wonnacott
Convenor Local Organising Committee
for UNECA CODI-Geo AFREF Steering Committee
31 July 2006