AFRICAN GEODETIC REFERENCE FRAME (AFREF)-NEWSLETTER

Secretariat: Regional Centre for Mapping of Resources for Development (RCMRD)

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AFREF News Letter No.1 **e-mail: afref@rcmrd.org** **August 2006**

Message from the Chairman, AFREF steering committee

I am pleased to welcome you to the first edition of the AFREF newsletter. The idea to have a quarterly newsletter was conceived at the AFREF Steering Committee meeting held on 14th July 2006 in Cape Town. The objective of this newsletter is to create a forum for discussions and exchange of information and experiences in the implementation of AFREF project. I appeal to all those involved in AFREF project or wish to participate to contribute articles to this newsletter. The next edition is expected to be released in December 2006.

As we move towards regional integration and sustainable development, we have to adopt regional approaches to peace and security, environmental management, infrastructural development, poverty alleviation, trade and industry. This requires maps and other geographic information products that are continuous across national boundaries. Such maps can only be prepared through a common and modern reference frame and coordinate system, such as AFREF. This provides a basis for effective planning and efficient implementation of development projects.

AFREF was conceived as a unified and modern geodetic reference frame for Africa to be the fundamental basis for the national and regional 3D reference networks fully consistent and homogeneous with the International Terrestrial Reference Frame (ITRF) Standards. When fully implemented, it will consist of a network of continuous, permanent GPS stations such that a user anywhere in Africa would have free access to the generated data and would be, at most, 1000km from such stations.

AFREF has vast potential for the promotion of geodesy and surveying, geo-information, earth and atmospheric science, disaster mitigation, the monitoring of crop and vegetation distribution and animal migration patterns. The implementation of AFREF and its applications will provide a major platform for the enhancement of skills and skills transfer in these sciences and further some of the objectives and actions of the NEPAD science and technology platform.

The demonstration phase of AFREF has already started with commitment of 10 countries to set up Continuous Operating Reference Stations (CORS) by the end of 2006. The collection of first AFREF data is expected by early 2007.

I would like to take this opportunity to thank all the resource persons and participants of the 1st AFREF Technical Workshop held in Cape Town in July 2006. Special thanks go to the local organizing committee and the following organizations who provided financial support : The Chief Directorate: Surveys and Mapping of S. Africa, The International Association of Geodesy (IAG), The National Research Foundation of S. Africa, The United Nations Office of the Outer Space (UNOOSA), The University of Cape Town , The University NAVSTAR Consortium Inc (UNAVCO) and GNSS instrument vendors Leica geosytems, Ominstar, Optron, Sokkia RSA, VI instruments.

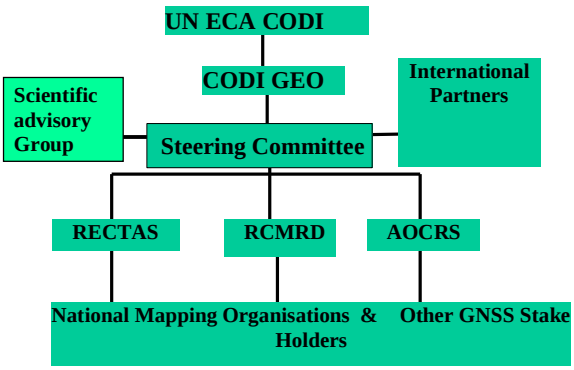
Thank you.

Dr. W.K. Ottichilo

Chairman, AFREF Steering Committee

Management & coordination of AFREF

The figure below shows the management structure. AFREF is an initiative of United Nations Economic Commission for Africa (UNECA) Committee on Development Information (CODI). The secretariat of the committee is hosted at Regional Centre for Mapping of Resources for Development (RCMRD). The Steering Committee is responsible for the over all management and coordination on the implementation of AFREF.



Management Structure

NB: RECTAS- Regional Centre For Training in Aerospace Surveys
AOCRS- African Organisation of Cartography and Remote Sensing

The AFREF project is being coordinated at sub-regional level by sub-regional representatives and at continental level by the AFREF Steering Committee. This is to ensure that same standards of geodetic data collection and processing are maintained. This will also assist institutions with the necessary resources willing to support the project to get the right contact in African states

Implementation Strategy

The implementation is however expected to be carried out at national level preferably in collaboration with National Mapping Organizations. It is expected that AFREF shall be implemented at two levels. The first level will be composed of a network of CORS, spread over the African continent. Every African state is expected to establish at least one CORS station which will act as national connection to AFREF network. Data from such station will be forwarded to AFREF processing centers for the computation of AFREF.

The second level will be the establishment of GNSS based National geodetic networks. Networks of both active and passive stations are expected to be established.

Call for participation (CFP)

The AFREF Steering Committee is inviting organizations to participate by providing the resources to implement AFREF. The participation is open to a broad range of organizations such as National Mapping Organizations, Universities and research organizations dealing with earth and environmental sciences including geo informatics, seismology, geophysics, meteorology, GNSS hardware and software vendors and donor community.

Call for participation documents are available at AFREF web site http://geoinfo.uneca.org/afref

AFREF Scientific Advisory Group appointed

The AFREF Steering Committee has appointed the following to the Scientific Advisory Group: Prof. Salah Mahmoud (salahm@nriag.sci.eg), Dr. Ludwig Combrinck (combrinck@hartrao.ac.za) and Prof. Charles Merry (cmerry@eng.uct.ac.za). The TOR of the group are as follows :

- Preparation of training material for data processing.
- Prepare White Paper on the rationale of AFREF,
- Propose core network of AFREF stations,
- Prepare AFREF Cook Book,
- Analysis of data from the existing and new AFREF stations.

TOR for AFREF Sub-Regional Coordinators published

There are four sub-regional AFREF coordinators namely;

Southern Africa- Dr Karim Owolabi (kowolabi@namibia.com.na)
Western Africa –Mr. I.Adewola (iaaadewola@yahoo.com)
Eastern Africa- Mr. L. Molel (smd@raha.com)
Northern Africa - Prof. Salah Mahmoud (salahm@nriag.sci.eg)
Central Africa-Dr.J.Kufoniyi (jidekufoniyi@yahoo.com)

The following are the terms of reference for sub-regional representatives:

- Communication of AFREF issues to countries,
- Keep in touch with what countries are doing and report to Steering Committee meetings,
- Organize or coordinate joint campaigns in GPS observation in their respective sub-regions,
- Liaise with Regional Centres in capacity building.

Responses to AFREF Call for Participation

Below is a summary of organizations that responded to the call for participation. Participation is still open to all.

Algeria-National Mapping Organization
Installation of five CORS and creation of a data centre.

Nigeria- National Mapping Organization
Establishment of One CORS at Abuja, Nigeria by end of 2006 and fifty other stations in future.

Namibia- National Mapping Organization
One CORS already installed at Windhoek. Another planned in Raucana. Both shall contribute data for AFREF.

Cameroon- National Institute of Cartography
Establish tracking stations, data centre and analysis centre

Moroco-Abdelmalek Essadi university
Provide GPS data from existing CORS to AFREF database, capacity building and creation of data centre

Cote d'Ivoire-National Mapping Organozation
Install tracking stations and establish data holding and analysis centres

South Africa-National mapping organization
Provide data from existing CORS and training of African geodesists.

Cote D'Ivoire
Establish tracking stations, data centre and analysis centre

National Aeronautics and Space Agency, USA
Provide an archive and distribution service for AFREF CORS.

Addis Ababa university in collaboration with Darmstadt University of technology
Establish One CORS at Addis, Ethiopia. Provide capacity building and GNSS infrastructure.

Purdue University, USA
To set up CORS and undertake campaign GPS measurements in Ethiopia and Tanzania. Also provide capacity building and develop analysis centre.

University of Lisbon, Portugal
Proposed installation of tracking stations in yet to be named countries , establishment of data holding and analysis centre and capacity building at the University of Lisbon

Leica Geosystems
Provide GNSS Hardware and software, training on CORS installation at RCMRD, RECTAS, and Ghana.

Padova University
Installation of CORS, training and establishment of data holding and analysis centre in Libya

Ten Countries commit themselves to Start AFREF project

During the 1st AFREF Technical Workshop held in July 2006, 10 countries committed themselves to establish one CORS each by the end of 2006. The countries are Nigeria, Tanzania, Namibia, Cameroon, Ghana, Morocco, Mozambique, Benin, Ethiopia and Egypt

First AFREF Technical workshop held at Cape Town in South Africa

A technical workshop was held at the University of Cape Town, South Africa 9-13 July 2006. It drew participation from 30 African states, mostly from national mapping organisation. World-renowned scientist on GNSS technologies from NASA, NGIS, HARTRAO, IGN, EUREF, SIRGAS attended and shared their knowledge and experiences.

AFREF and GNSS data processing Training at RCMRD, Kenya

A two-week AFREF and GNSS data processing training will be held at Regional Centre for Mapping of Resources for Development(RCMRD), Kenya from 11th to 27th October 2006. The topics to be discussed will include AFREF, IGS products & data, establishment of CORS, Geodetic networks, and GNSS data processing. Ten countries from RCMRD member states are scheduled to take part. Participants from other African countriies may apply to take part in the course.

Partial implementation of AFREF in Southern Sudan

A new geodetic network was established in southern Sudan by RCMRD. Base stations were erected using standard pillars in the major cities of southern Sudan including Juba, Malakal, Wau, Bor, Bentiu and Torit. GPS observations using dual frequency receivers were carried out. The base station coordinates were processed using IGS data from Mali (malindi), BAHR (Barhlin) and NKLG (Libreville in Gabon) and LEICA SKI Pro. The solutions were also computed using GIPSY Point Positioning Software. Geodetic networks for each town were also established . A combination of both ground marks (Iron Pin in Concrete) and pillars were used. GPS processing was carried out with data from the base stations.

JICA sponsored Global Satellite Navigation satellite systems (GNSS) training at KISM

Kenya Institute of Surveying & Mapping (KISM) has been running GPS/GNSS course since 1997, drawing participation from National Mapping Organisations in eastern and southern African states. This year, the course was held between 1st –25th August 2006. It attracted participants from 11 countries. RCMRD collaborates with KISM in the implementation of this course.

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