



AFRICAN GEODETIC REFERENCE FRAME (AFREF)-NEWSLETTER

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

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Introduction

The purpose of this newsletter is to create a forum for discussions and exchange of information and experiences in the implementation of AFREF. The objective of the AFREF initiative is to unify and modernize the geodetic reference frame for Africa. 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.

In this issue we report on Status of AFREF Operational Data Centre, Pilot CORS Network project in Kenya, Institute of Navigation Technical Meetings, 14th IAIN World Congress: International Association of Institutes of Navigation and GNSS for Mali Hydro-Agricultural Mapping Project.

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Status of AFREF Operational Data Centre

The AFREF Operation Data Centre (ODC) has been in operation since 2009 and as at May 2012 has 68 stations listed for possible data download although, as can be seen from the table below, not all stations are providing data or providing it regularly. Data from some stations is downloaded manually at widely spaced intervals which gives the impression that stations are no longer operating. The following tables give a few statistics on the data archived in the ODC based on the 2010, 2011 archive and on the period Day 1 to 128 for 2012:

Year		2010		2011	
Number of stations listed		49	% of Number of Stations	67	% of Number of Stations
Average number of stations for which data is logged on a daily basis		35		35	
Number of stations archived for	0-75 days	8	16%	19	28%
	76-150 days	7	14%	11	16%
	151-225 days	3	6%	7	10%
	225-300 days	4	6%	7	10%
	300-365 days	27	46%	23	34%

Table 1 Summary of data in archive for 2010 and 2011

Number of stations listed		70	% of Number of Stations
Average number of stations for which data is logged on a daily basis		35	
Number of stations archived for	0-30 days	30	43%
	31-60 days	1	1%
	61-90 days	3	4%
	91-120 days	8	11%
	121-144 days	28	40%

Table 2 Summary of data in Archive for the period Day 1-144 for 2012

The tables have been divided into 5 groupings of days considering the different time spans of each year or portion of year.

Many of the stations in the 0-75 day (for 2010 and 2011) and 0-30 day (2012) groupings are campaign stations and do not provide continuous data. It is disappointing to see the relatively low portion of stations providing more than 76 days of data during 2010 and 2011. The outlook for 2012 does however look a bit more promising. It is known that data from stations is downloaded manually but only at 2 or 3 month intervals which makes it makes it time consuming to go back to retrieve data.

Spread sheets used to draw up the above tables are obtainable from:

ftp.afrefdata.org/RefData.Station_information/Data_Availability/

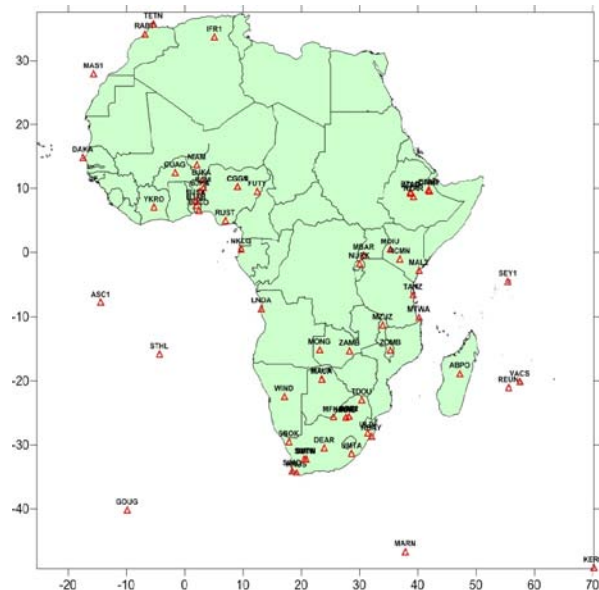


Figure 1 Stations listed in AFREF ODC May 2012. Note that not all stations are providing data on a regular daily basis.

It is clear from Fig 1 that the distribution of stations contributing to the ODC is somewhat localized to east and Southern Africa and West Africa with a few stations in North Africa. The lack of stations in the swath from Angola through Central Africa to Egypt and across North Africa will require some attention and countries in these regions should be encouraged to fill these major gaps.

Richard Wonnacott (email: rwonnacott@ruraldevelopment.gov.za)
24 May 2012.

Pilot CORS Network Project in Kenya

In a meeting held recently between RCMRD and Leica Geosystem Middle East and Southern Africa Region (MESA), Leica Geosystems proposed to provide at least 4 GNSS Receivers to be used to establish a pilot GNSS RTK network in Nairobi Kenya.

The major aim of the pilot project was to be a 'show-case' for students who will be undertaking the AFREF and GNSS Data Processing Course at RCMRD. It was noted that Survey of Kenya (SK) has plans to establish CORS Network for the whole country that will be a reference for planned establishment of the Land Information Management Systems (LIMS). SK has already designed the CORS network.

The meeting agreed that the GNSS RTK Pilot project be undertaken jointly with SK. The possibility of installing the GNSS Receivers in location designed by SK should be explored. It was deemed that the pilot project CORS will be integrated into the country network designed by SK.

Institute of Navigation Technical Meetings – October 2012.

The Institute of Navigation (ION) is the world's premier non-profit professional society dedicated to the advancement of the art and science of positioning, navigation and timing (PNT). Founded in 1945, it serves a diverse community including those interested in air, space, marine, land navigation, and position determination. Its membership is worldwide, and it is affiliated with the International Association of Institutes of Navigation.

ION members are drawn from many sources including professional navigators, astronomers, cartographers, photogrametrists, meteorologists, engineers, physicists, educators, geodesists, surveyors, general aviation and airline pilots, mariners, yachtsmen, and anyone interested in

position-determining systems. Corporate members include corporations, civil and military government agencies, private scientific and technical institutions, universities and training academies, and consulting firms.

The Institute of Navigation hosts three technical meetings each year: The International Technical Meeting in January; the Joint Navigation Conference (co-sponsored by JSDE and ION) in June; and the Satellite Division Technical Meeting (ION GNSS) in September. The ION also co-sponsors IEEE/ION PLANS every two years. The meetings provide:

- Current, relevant information presented by experts in the navigation community
- Professional networking opportunities
- Opportunities to present research/information
- Registration discounts for ION individual/corporate members
- Exhibit displays offer demonstrations of available products and services
- Proceedings of these meetings may be ordered from the Publications section.

(Source: http://www.ion.org/about_ion/)

The 14th biennial International Association of Institutes of Navigation (IAIN) World Congress will take place in Cairo, Egypt from October 1 to October 3, 2012, in conjunction with MELAHA 2012, the 6th Arab Institute of Navigation conference and exhibition. The theme is "Seamless Navigation: Challenges and Opportunities."

Just before the conference, on September 30, two workshops will be offered for graduate students and researchers with knowledge of GPS who are new to the mobile mapping field:

- Multi-constellation GNSS Precise Point Positioning with Ahmed El-Rabbany, professor of geomatics engineering at Ryerson University, Canada
- GNSS/INS Integrated Navigation Systems– State of the Art and Future Trends in Mapping and Navigation Applications with Naser El-Sheimy, professor and Canada Research Chair, Department of Geomatics Engineering, University of Calgary.

For information about the scientific program, email [Ahmed El-Rabbany: ain@aast.edu](mailto:ain@aast.edu). The conference chair is Dr. Refaat Rashad, president of IAIN and the [Arab Institute of Navigation](#). More information may be accessed at <http://www.iaincongress2012.org/pages.php>

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GNSS for Mali Hydro-Agricultural Mapping Project.

In the heart of landlocked Mali, with the Atlantic Ocean 800 miles to the south and the Sahara desert to the north, lies the extraordinary Inner Niger River Delta, also known as the Macina, a 1.8 million hectare oasis of lakes and floodplains with a vast potential for hydro agriculture. Working on behalf of the Office du Niger, a quasi-governmental Mali company charged with managing more than 100,000 hectares of irrigated delta land, West African consulting engineering firm CIRA has completed surveying an additional 25,000 hectares for hydro-agricultural development.



In the course of two months during the dry season, two CIRA survey teams, each equipped with three ProMark 500s, a base station and two rovers connected via UHF, completed the entire 25,000 hectare survey collecting four points in x,y and z per hectare to produce the digital model. The model enabled the production of rough pre-study with all plans and a detailed pre-project CAD drawing for drainage, irrigation canals and related infrastructures.

An eight-month contractual time set to complete the different studies meant that the land survey study would have to be completed as quickly as possible. Using aerial photography combined with LIDAR would have taken too long, according to a CIRA spokesperson. Instead, CIRCA chose to employ

differential GNSS, using base and rovers working in RTK. CIRA's experience suggested they would achieve reliable results and quicker than using only optical total stations. CIRA elected to use Ashtech ProMark 500 GNSS receivers for the project. From experience, they knew the models were easy to set up and use, light in weight, offered long battery life in the field, and field to office data transfer would be easy. Their expectations were met, and the job was completed within two months and on time.

(Source: <http://www.gim-international.com/news/>)