



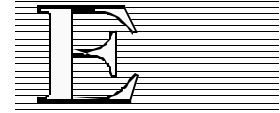
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**Subcommittee on Geo-information Synthesis Report  
of the Activities of the CODI-Geo Working Group**

## I. Introduction

1. This report is a synthesis of activities undertaken by working groups established by the Executive Working Group (EWG) of CODI-Geo. The working groups were established at the third meeting of Committee on Development Information (CODI), which recommended that the former Standing Preparatory Working Group of CODI-Geo be transformed into the EWG - along with other working groups, in order to promote and foster the development of geo-information activities in Africa. The working groups are as follows:

Working Group	Convenor
Standards	EIS-Africa
AFREF	AOCRS and RCMRD
Capacity-building	RECTAS
Fundamental Data Sets	South Africa

## II. Working Group on AFREF/International Steering Committee

2. The report has been prepared by Dr. W.K. Ottichilo, Co-Chair, AFREF Steering Committee.

### 1. Introduction

3. African Geodetic Reference Framework (AFREF) is an initiative of ECA's CODI. The secretariat of the committee is hosted at the Regional Centre for Mapping of Resources for Development (RCMRD). Because the scope of the AFREF initiative involves and affects stakeholders outside Africa, the Working Group on AFREF has been expanded to include representatives of these stakeholders to constitute the AFREF International Steering Committee, which is responsible for the overall management and coordination of the implementation of AFREF.

4. The AFREF project is being coordinated at the subregional level by subregional representatives and at the continental level by the AFREF Steering Committee. This is to ensure that consistent standards of geodetic data collection and processing are maintained. This will also assist institutions with the necessary resources willing to support the project to contact the right party or parties in each member State.

5. Implementation is expected to take place at the national level, preferably in collaboration with National Mapping Organizations. The AFREF project will be implemented at two levels. The first level will be composed of a network of one Continuous Operation GNSS Reference Stations (CORS), spread over the continent. Every African state is expected to establish at least one CORS station that will act as the national connection to the overall AFREF network. Data from each station will be forwarded to AFREF processing centres for the computation of AFREF. The second level will be the establishment of GNSS-based National geodetic networks, including both active and passive stations.

6. The Steering Committee held three meetings during the reporting period. The first meeting was held in Cairo, Egypt in April 2005. The second was held in Pretoria, South Africa in November 2005 while the third was held in July 2006 in Cape Town, South Africa. The main activities during the reporting period were creating awareness and requesting organizations to

join the AFREF project, technical workshops and preparation of technical documents for the implementation of AFREF. These activities are detailed below.

## **2. Call for Participation**

7. A draft call for participation paper (CFP) was prepared and circulated to members of the Steering Committee for discussion. The draft CFP was finalized in April 2005. The call invites 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, research organizations, GNSS hardware and software vendors and the donor community. ECA was mandated to circulate the CFP to all prospective organizations identified by the Steering Committee. So far responses has been received from twenty-four organizations.

## **3. Workshops and Training**

8. A technical workshop was held at the University of Cape Town, South Africa from 9 to 13 July 2006. It drew participation from 30 African countries, mostly from national mapping organizations. World-renowned scientists on GNSS technologies attended and shared their knowledge and experiences. Participants discussed the modalities of the implementation of AFREF, such as setting up of tracking stations, data-analysis centres and data-holding centres.

9. During the workshop 11 countries committed themselves to establish one Continuous Operating Reference Station by the end of 2006, and these include Benin, Cameroon, Egypt, Ethiopia, Ghana, Malawi, Morocco, Mozambique, Namibia, Nigeria and Tanzania.

10. A two-week AFREF and GNSS data processing training was held at Regional Centre for Mapping of Resources for Development (RCMRD), Kenya from 16 to 27 October 2006. The objective of the course was to equip geodesists with practical skills in the establishment and operation of Continuous Operating Reference Stations. The topics discussed include AFREF implementation strategy, IGS products & data, hardware and software requirements to establish Continuous Operating Reference Stations, design of geodetic networks and GNSS data processing. Participants from nine countries, namely Algeria, Botswana, Ethiopia, Kenya, Lesotho, Swaziland, Tanzania, Uganda and Zambia, took part in the course.

## **4. AFREF Website and AFREF Newsletter**

11. ECA was requested to create a website for AFREF. The website was created in May 2006 (<http://geoinfo.uneca.org/afref>). All papers and presentations relating to AFREF and the CFP are available on the site.

12. The idea to have a quarterly newsletter was conceived at the AFREF Steering Committee meeting held in July 2006 in Cape Town, South Africa. The objective of the newsletter is to create a forum for discussions and exchange of information and experiences in the implementation of the AFREF project. The first edition of the Newsletter came out in August 2006 and the second in January 2007.

## **5. AFREF Implementation Plan**

13. An implementation plan for the AFREF project is now complete. The plan will be discussed before approval by the Steering Committee during the CODI-V meeting.

## **6. Requirements and Installation Guidelines for AFREF Station Document**

14. The scientific advisory group prepared a guideline document in January 2007. This document describes the necessary requirements and procedures that should be considered by participating organizations in order to qualify their stations to be part of the AFREF network. In keeping with the voluntary nature of participation and the current phase of AFREF (where densification of the network is the major objective), the use of many and overly rigid rules is avoided. However, the AFREF stations must satisfy minimum standards in order to ensure the quality of the entire network. The document will be circulated after approval by the Steering Committee in May 2007.

## **7. Implementation Status**

15. The demonstration phase of AFREF has already begun. The objective of this phase, which is expected to last up to the end of 2007, is to demonstrate installation, operational, data dissemination, and analytical capabilities. The following countries have already established at least one Continuous Operation GNSS Reference Stations (CORS): Algeria, Benin, Egypt, Ghana, Ivory Coast, Kenya, Morocco, Mozambique, Namibia, South Africa, Uganda and Zambia. Countries that plan to establish CORS in 2007 are Angola, Cameroon, Malawi, Mauritius and Nigeria. Some data from the established CORS are already being received by HartRAO Data Centre in South Africa and the International GNSS Service (IGS). The Scientific Advisory Group of AFREF will start analyzing the data received during the demonstration phase. The next phase is to densify the network of CORS and realize the Africa Reference Frame that can be adapted by African countries.

## **III. Working Group on Fundamental Datasets**

16. This report is prepared by Derek Clarke, Convenor of the Working Group on Fundamental Datasets.

### **1. Meetings**

17. The Working Group on Fundamental Datasets (WGFD) conducted most of its business by e-mail, with one physical meeting held in November 2005 (coinciding with the Africa GIS 2005 Conference). Enthusiasm for and commitment to the WGFD by members has been encouraging. It is regrettable that ECA (ISTD) has lost the services of Daniel Berhanu, a promising young person, but we wish him well in his new job.

### **2. International collaboration**

18. WGFD has been working very closely with the WG on Mapping Africa for Africa of the International Cartographic Association, which has provided some guidance on its work programme.

19. At the end of January 2007 the Chair of WGFD attended a working session together with representatives of the European Umbrella Organization for Geographic Information (EUROGI), ECA, the Regional Centre for Mapping of Resources for Development (RCMRD), the African

Organization for Cartography and Remote Sensing (AOCRS), the Regional Centre for Training in Aerospace Surveys (RECTAS), the (South African) Human Sciences Research Council (HSRC) and other interested parties to discuss a possible proposal to be submitted to the European Union for funding in terms of the EU's Seventh Research Framework Programme (FP7). At this meeting it was decided to formulate a proposal for an African-European Spatial Information Alignment (AESI-Align). The proposed project will permit joint collaboration between various identified organizations in Africa working on Africa SDIs (e.g., ECA, RCMRD, RECTAS, HSRC, and others) and EUROGI. This project intends to share experiences between the two continents and to boost the establishment of SDI in Africa. The project will assist in the work of the WGFD. It will be some time before it is known whether or not the proposal has been successful.

### **3. Achievements in the period May 2005– April 2007**

20. The main achievements for the Working Group on Fundamental Datasets (WGFD) in this period have been:

#### **3.1. Determination of the fundamental geo-spatial datasets for Africa**

21. A comprehensive study was done to determine what is commonly understood to define the fundamental datasets for Africa. Inputs for this study were received from most countries in Africa. The findings of the study are being published and will be available from ECA. This study is regarded as a definitive work. Please note that this study specifically excluded socio-economic data, such as demographic (population census) data, which is also fundamental data for development.

#### **3.2. Inventory of available fundamental geo-spatial datasets for Africa**

22. A study was conducted (in the latter half of 2006 and early 2007) on the current availability of fundamental geo-spatial data for each country in Africa. The study included data available in-country and from sources external to that country. The inventory is only as good as the responses received. While every effort was made to obtain data on every country, this proved not to be possible. From the data collected a metadata facility has been created at ECA. It is the intention that this inventory will be kept up-to-date through updating the metadata facility at ECA.

#### **3.3 Inventory of land cover data for the SADC subregion**

23. In parallel with the inventory of fundamental data, a specific study was conducted on available land cover data covering the SADC countries. The study was done at the request of the United Nations Food and Agriculture Organization (FAO). A report on this study is available.

#### **3.4. Gap analysis for each country**

24. The next task after the inventory of available fundamental geo-spatial data was to prepare a gap report for each country indicating the gap between the available fundamental geo-spatial data and the desired fundamental geo-spatial data, as defined in the earlier task of defining the fundamental geo-spatial datasets. Each country, for which responses were received, will receive the gap report for their respective country. The purpose of this report is to inform the country of the gap in fundamental geo-spatial data (excluding socio-economic data) so that they can address any shortcomings identified.

#### 4. Recommendations

25. It is recommended that:

- CODI-Geo endorses the report on *Determination of the Fundamental Datasets* for Africa and requests the secretariat (ECA) to arrange for its translation, printing and wide dissemination;
- CODI-Geo accepts the inventory of available fundamental geo-spatial data as conducted and requests ECA to host the metadata facility. Furthermore, all member countries, regional and international organizations and other parties collecting such data, should be requested to keep the metadata facility up-to-date by providing the necessary metadata to ECA;
- Each member State notes the content of the gap report for their country and utilizes this gap report to assist in programmes to collect and maintain the fundamental geo-spatial data for their country. Furthermore, regional and international organizations should note the gap report and when working in that country they should ensure that their work does assist the country in addressing the gap; and
- CODI-Geo support the proposal of AESI-Align and request ECA to work, together with the other African partners, on this project.

#### IV. Working Group on Standards

26. The report is prepared by Anthony Cooper ISO/TC 211 Liaison to ECA

##### 1. Background

27. ISO/TC 211 is the International Organization for Standardization's Technical Committee developing standards for Geographic Information/Geomatics. During June 2006, ECA became a Class A Liaison organization to ISO/TC 211. This liaison is through ECA's Committee on Development Information (CODI), specifically its Subcommittee on Geo-information (CODI-Geo). The following is a brief report of the activities of ISO/TC 211. ISO/TC 211 was founded in 1994 and has now published 23 International Standards, three Technical Specifications and three Technical Reports (see: <http://www.isotc211.org>). Perhaps the best known of these standards is ISO 19115:2003, *Geographic information – Metadata*. Other projects completed recently that might be of interest to the CODI-Geo community include:

- ISO 19110:2005, Geographic information – Methodology for feature cataloguing;
- ISO 19116:2004, Geographic information – Positioning services;
- ISO 19117:2005, Geographic information – Portrayal;
- ISO 19119:2005, Geographic information – Services;

- ISO/TR 19122:2004, Geographic information/Geomatics – Qualification and certification of personnel;
- ISO/TS 19127:2005, Geographic information – Geodetic codes and parameters;
- ISO 19128:2005, Geographic information – Web Map Server interface; and
- ISO/TS 19138:2006, Geographic information – Data quality measures.

## 2. Activities Status

28. The revision and amendment cycle for the ISO 19100 family of standards has already begun, with three corrigenda having been published since 2005 and four projects having started to correct, amend or revise other standards. New projects that have commenced recently are:

- ISO 19101-1, Geographic information – Reference model – Part 2: Imagery;
- ISO 19132, Geographic information – Location-Based Services – Reference model;
- ISO 19141, Geographic information – Schema for moving features;
- ISO 19142, Geographic information – Web Feature Service;
- ISO 19143, Geographic information – Filter encoding;
- ISO 19144-1, Geographic information – Classification Systems – Part 1: Classification system structure;
- ISO 19144-2, Geographic information – Classification Systems – Part 2: Land-Cover Classification System (LCCS);
- ISO 19145, Geographic information – Registry of representations of geographic-point location;
- ISO 19146, Geographic information – Cross-domain vocabularies;
- ISO 19147, Geographic information – Location-Based Services – Transfer Nodes; and
- ISO 19148, Geographic information – Location-Based Services – Linear Referencing System.

29. ISO 19144 is being developed together with the United Nations Food and Agriculture Organization (FAO) and should be of particular interest to CODI-Geo as it arises out of FAO's Africover project. Part 1 provides a generic classification system structure which is implemented in Part 2 for land cover, by providing the elements and formal rules for constructing a classification 'legend' (an example of such a legend could be CORINNE). FAO has also developed open-source software to support LCCS and has translated LCCS into several languages.

30. Also of immediate interest to CODI-Geo should be ISO 19146. ISO/TC 211's Terminology Maintenance Group (TMG) has been maintaining a spreadsheet (in English) of all the normative terms used in all the ISO/TC 211 documents to ensure they are harmonized. While this spreadsheet was developed for use within ISO/TC 211, it is publicly available and will now be expanded to include the term equivalents and their definitions in other languages. This should help promote interoperability in multilingual environments.

31. ISO/TC 211 typically meets twice a year, with recent sessions held in Kuala Lumpur, Malaysia, from 27 to 28 May 2004; in Pallanza, Italy, from 7 to 8 October 2004 (co-hosted by the Joint Research Centre); in Stockholm, Sweden, from 9 to 10 June 2005; in Montréal, Canada, from 15 to 16 September 2005 (co-hosted by the International Civil Aviation Organization); in Orlando, Florida, USA, from 25 to 26 May 2006, and in Riyadh, Saudi Arabia, from 14 to 15 November 2006. Each of these meetings was preceded by a number of Working Group, Project Team and Editing Committee meetings, as well as workshops and seminars on the implementation of the ISO 19100 standards by ISO/TC 211's member and liaison countries. The 24th Plenary is scheduled for Rome, Italy, on 31 May and 1 June 2007, and will be co-hosted by FAO. It is significant that three liaison organizations have volunteered to co-host ISO/TC 211 Plenaries, reflecting the value of the ISO 19100 standards to their communities.

### **3. Perspectives**

32. Selected resolutions from these Plenaries that might be of interest to ECA include:

- (a) ISO/TC 211 established a Focus Group on Data Producers (FGDP) to raise the awareness and promote the use of international standards by data producers. FGDP collected the requirements of data producers for additional standards for geographical information;
- (b) ISO/TC 211 intends developing an application profile of the Reference Model – Open Distributed Processing (RM-ODP), ISO/IEC 10746:1995;
- (c) There is a need for registers to contain information that is not appropriate for inclusion in a standard, because of the speed at which it changes. ISO/TC 211 is in the process of establishing a register for geodetic codes and parameters, to support ISO/TS 19127. This is being done in conjunction with the International Association of Geodesy (IAG). This resource will benefit the African Geodetic Reference Frame (AFREF) project, for example;
- (d) New liaisons have been established between ISO/TC 211 and Pan American Institute of Geography and History (PAIGH), the ECA (as mentioned above), European Spatial Data Research (EuroSDR), European Space Agency (ESA), ISO/TC 69, Applications of statistical methods, and ISO/TC 154, Processes, data elements and documents in commerce, industry and administration;
- (e) ISO/TC 211 is also proposing entering into a liaison with ISO/TC 207 Environmental management, which is developing the ISO 14000 suite of standards;
- (f) To enhance collaboration, ISO/TC 211 has established cooperation agreements with ISO/TC 204, Intelligent Transport Systems, FAO and ISO/IEC JTC 1/SC 24, Computer graphics, image processing and environmental data representation;
- (g) ISO/TC 211 proposes starting a new project to investigate how ontology and semantic web approaches can benefit ISO/TC 211 objectives; and



- (h) ISO/TC 211 has established an ad hoc group for ubiquitous geographical information (UbGI) to establish what standards might be needed for UbGI. As mentioned above, the 24<sup>th</sup> Plenary of ISO/TC 211 is scheduled for Rome 31 May to 1 June 2007, preceded by Working Group, Project Team and other meetings. The 25<sup>th</sup> Plenary is scheduled for Xi'an, China, in November 2007.

## **V. Working Group on Capacity-building**

33. The report is prepared by Dr. Olajide Kufoniya, Convenor of the Working Group on Capacity-building.

### **1. Activities**

34. Apart from the regular programmes of human capacity development institutions (Universities, Regional Centres), some of the direct and related activities of the WG since CODI-IV are:

- RECTAS organized a 5-day regional workshop on SDI for Heads of National Mapping Agencies and Private Sector representatives from 15 West and Central African countries with 27 participants in November 2005, funded by the Directorate of Technical Cooperation in Africa, Nigeria;
- Two workshops on SDI/NICI for IGB and geo-organizations in Burkina Faso by ITC, ECA and RECTAS in 2005;
- Participated as invited speaker at the Global Mapping and SDI workshops in Dakar, Senegal, organized by DTGC in 2005 and 2006 with participants from Francophone West African countries and supported by ISCGM and JICA;
- Fourth Executive Seminar for Heads of National Mapping Agencies organized by ITC in December 2006;
- Special session on Capacity-building during the 6<sup>th</sup> AARSE conference in Cairo, October/November 2006;
- Capacity-building session during Africa GIS 2005 conference in South Africa;
- Commencement of a joint ITC/RECTAS Ph.D study in the area of e-governance and SDI;
- Some information on institutional GI capacities expected from the result of the fundamental dataset study in Africa by the WG on Fundamental dataset/MAFA;
- Related technical workshop of AFREF in Cape Town, South Africa in July 2006; and
- Other related capacity-building workshops and training organized by RECTAS and RCMRD and directly by ECA are listed in the reports of the two Centres and the ECA report.

## **2. Outlook**

35. The WG still has a lot of work to do but progress is slow due to limited financial resources. However, with a continued focus on building synergies amongst related initiatives and organizations, it is hoped that the WG's terms of reference will be achieved.