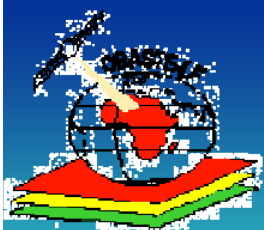
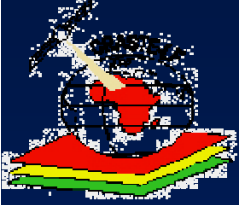


# **15th United Nations/International Astronautical Federation Workshop on**

## **“Space Education and Capacity Building or Sustainable Development”**

**14 – 15 October 2005, Kita-Kyushu, Japon**





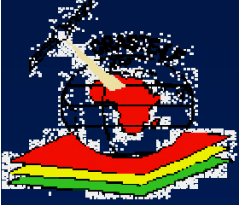
**15th United Nations/International  
Astronautical Federation Workshop on  
“Space Education and Capacity Building or  
Sustainable Development”**

*The contribution of training on Space Sciences and  
Technologies for sustainable development*

*in*

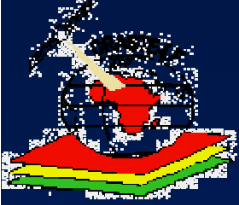
***CRASTE-LF***

*Prof. A. TOUZANI*



# The contribution of training on Space Sciences and Technologies for sustainable development

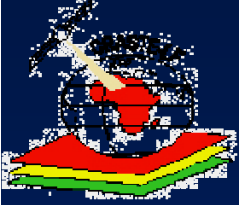
- We develop in this communication, the activities of the Centre in **Training** and **How** to contribute to the process of the **Reinforcement** of the **Building Capacities**, at the local level, in the use the Space Technologies in **Sustainable Development**.



## The contribution of training on Space Sciences and Technologies for sustainable development

The Centre has been established, on the initiative of the OOSA program on applied of the UN/G.A. Resolution, in Rabat on October 23, 1998..

**Thirteen Member States** : Algeria, Cameroon, Cap Verde, Central Africa, Cote d'Ivoire, D. R. of Congo (Zaire), Gabon, Morocco, Mauritania, Niger, Senegal, Togo and Tunisia.



# Governing Board

## CRASTE-LF

## Scientific Council

**Financial Resources**  
Members States, OOSA, Regional and International Institutions, Projects

**Human Resources**  
Experts and Institutions  
Network Teachers, supervisor for projects projects, ...

*Fields* *Competences*

- R & GIS
- S.T.
- S. M. & G.C.
- S. & A. Space



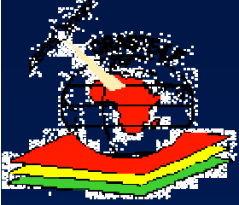
**Post-Graduate Courses**  
Training Courses, Scientific animation



**Consulting to Member State and Regional Institutions**

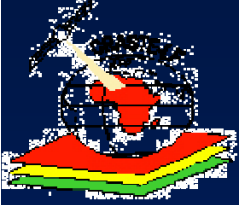


**Collect and Dissemination Information Space**



# The Objectives of the Centre

- To **increase knowledge** in Space Sciences and Technologies by organizing courses, seminars, workshops, conferences on the Regional level,
- To improve the technical **competence** of the **experts, teachers, decision-makers** and to hold them informed about technical progress .
- To **assist** the countries of the region on the development of endogenous capacities in space sciences and technologies.
- To **strengthen** the Local and Regional **Capacities**.
- To promote **cooperation** between the developed countries and States members as well as between these States.
- To develop **expertise** in Space Sciences and Technology.



# The Main Courses Programs

- Remote Sensing And Geographic Information Systems,
- Satellite Communications,
- Satellite Meteorology and Global Climate,
- Space and Atmospheric Sciences

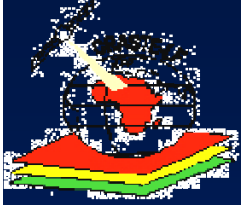
## **Target Public**

Academics, Researchers,  
Engineers, Administrators  
and Managers

## **Recovering Sectors**

Universities, Research  
Institutes, Professional and  
Private Institutes and  
Administrations





## Realized Scientific Activities



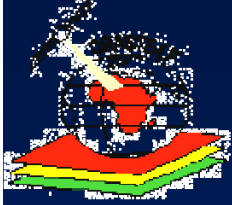
✦ **FIRST Workshop of Orientation** of the scientific activities of the Centre, with the cooperation of the experts from member countries, national centre for space research (CNES - France) and the Canadian Space Agency - **on November, 1999**

✦ **THREE Workshops on Remote Sensing and GIS** on **April 2000 , November 2001 and November 2003**

✦ **TWO Workshops Satellite Communications** on **November, 2000 and November, 2002**

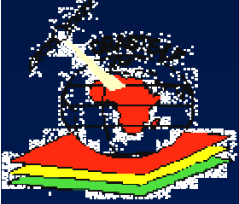
✦ **TWO Workshops Satellite Meteorology and Global Climate** on **January 2002 and November 2004**





## Realized Scientific Activities

- ✦ **International Workshop** on “The Rule and the Management of the Spectrum of Frequencies” **from 9 to 13 July 2001**
- ✦ **International Conference** on “ Space Technologies and Telemedicine ” on **June 26 and 27, 2003**
- ✦ **International Workshop** on “ RANET Internet Presence Initiative (RIPI)” **from 07 to 11 June 2004**
- ✦ **International Workshop** on “ Landsat data sets for supporting sustainable development in Africa” **from 07 to 09 July 2005**



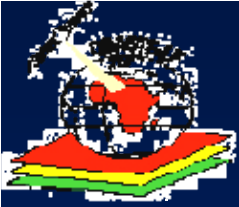
# Realized Training Courses

✦ **THREE training** courses in Remote Sensing and GIS, the First started in April, 2000 , the Second in November, 2001 the third in November 2003

✦ **TWO training** courses in Satellite Meteorology and Global Climate in January, 2002 and November 2004

✦ **TWO training** courses in Satellite Communications, the First in December, 2000 and the Second in November, 2002

✦ Until Now, **85 Trainees** followed courses in the **Centre**



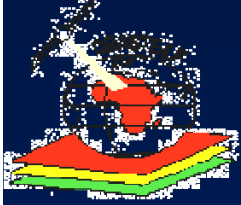
# Future Activities

✦ **Next November 2005, launch** the 4-th training course in Remote Sensing and GIS,

✦ **Organization** of an International Conference on the Contribution of “Spatial Information on Sustainable Development” the **November 2005** (received around **180 papers from 36 different countries**)

✦ **Organization** of a Workshop on Remote Sensing: Data Radar ( RadarSat and ERS) and Natural Resources , **July 2005.**

✦ **Launch** of a third training course in Satellite Communications **November, 2006.**

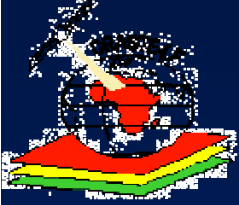


# Postgraduate Courses In Remote Sensing and Geographic Information System

**41 trainees from :  
15 Countries member and  
no member  
20 different institutes .**

## • **Trainees Profile**

- Engineer in Geodesic Sciences
- Diploma of Studies of Photogrammetry
- Engineer of Geographic Works,
- Engineer Agro - Meteorologist
- Engineer Cartographer
- Maitrise in Applied mathematics
- Master in Geography
- Doctorate in Geography
- Doctorate in Physics



# Postgraduate Courses In Remote Sensing and Geographic Information System



Activity Hours

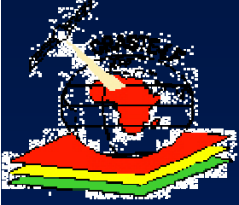
Teachers Staff

**30 Experts** from various university and professional institutions or international Organisms.

Experts Origins

Lectures and  
Practical Exercises : **684 h**  
Conferences : **64 h**  
Supervising : **240 h**  
Scientific Visits : **24 h**  
  
Total : **1 012 h**

- ✓ *Mohammadia Engineers School (Morocco)*
- ✓ *Mohamed V University of Rabat (Morocco),*
- ✓ *Hassan II University of Casablanca (Morocco)*
- ✓ *Centre Royal de Télédétection Spatiale (Morocco),*
- ✓ *Hassan II Agronomic et Vétérinaire Institute (Morocco)*
- ✓ *National Forest Engineers School ( Maroc)*
- ✓ *Centre National d'Études Spatiales (France).*
- ✓ *Others Public and Private Institutes.*



# Postgraduate Courses In Remote Sensing and Geographic Information System



## Pedagogical Support Environment

- *Important effort to provide teaching aids and material from experts and teachers.*
- *Support of institutions partners*

*. Acquisition and Constitution of basic documents.*



## Equipment Environment

- *Personal Computer (1 per trainee)*
- *Digitizers Table A0 et A3*
- *Scanner A3*
- *Plotter A0*
- *Laser and Color Printer*



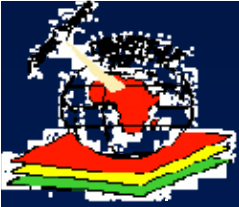
## Digital Data

- *Support of partner institutions*
- ✘ *Necessity of Images and Cartography Data*
- ✘ *Conditions of execution of the research projects in their origin Country*



## Software Environment

✘ *Temporary Installation of Software by the teachers and experts (licenses) : Urgency of durable solutions (acquisition of licenses) for the constitution of a software library.*



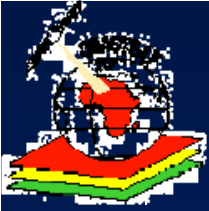
## Postgraduate Courses In Remote Sensing and Geographic Information System



### Research Projects

- 1) **Contribution of the IKONOS Images to cartography and topography . Application and use on high level these images to elaborate town plans on 1/10 000 scale.**
- 2) **Ground Digital Model ( MNT) support of the thematic cartography.**
- 3) **Referential Remote Sensing and geologic cartography by visual and semiautomatic approach to the Moroccan High Atlas.**
- 4) **Contribution of the Remote Sensing and the GIS in the management of the coast between rivers Volta and Mono and update of maps from satellite images.**
- 5) **GIS for the management and the development of the irrigation**
- 6) **Temporal study of vegetations by Satellite Images in Tunisia**



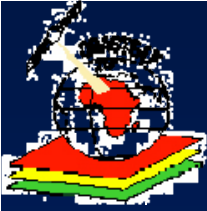


## Postgraduate Courses In Remote Sensing and Geographic Information System



### Research Projects

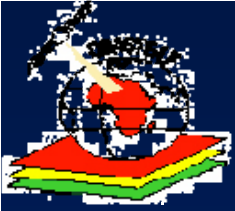
- **Classification of a Radar ERS-1 image covering the geological structure of a Region in the High Atlas Mountains in Morocco**
- **Contribution of the Remote Sensing and GIS to cartography of the dynamics of the occupation of the ground in Tunisian dry environment**
- **Conception and modeling of a data base from meta-data for the indicators of the desertification stemming from spatial data of Remote Sensing.**
- **Degradation of the environment and problem of organization of a Sahelian region. Contribution of the Remote Sensing in the inventory of the natural resources and in the follow-up of the desertification**



## Postgraduate Courses In Remote Sensing and Geographic Information System

### Research Projects

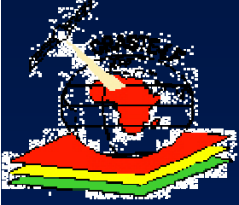
- ▣ Contribution of the GIS in the choice of sites of garbage dumps.
- ▣ Implementation and contribution of the GIS in the management of forests for a durable development.
- ▣ Study of the desert sprayers by remote sensing.
- ▣ Application of the multi-sources remote sensing in the geologic interpretation.
- ▣ Study of the dynamics of the spatial evolution of the natural resources in zone Soudano - Sahelian zone by Remote Sensing and GIS.
- ▣ Contribution of the remote sensing and the GIS to cartography and the organization of the Moresque coast ( methodological approach).



## Postgraduate Courses In Remote Sensing and Geographic Information System

### Research Projects

- Use of the GIS and the Remote Sensing for the organization of the space urban area (Case of Yaoundé).
- Conception and Modeling of a Geographic Data Base for the management of the RTC (line phone of communications) network .
- Geological photo-interpretation and images processing of the mountain Middle Atlas in Morocco.
- Contribution of the Remote sensing and GIS to the geological cartography and the mining research - Case of the mine of AOUAM Mountain.

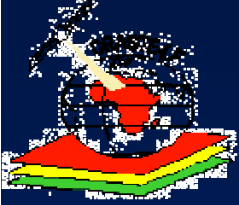


# Postgraduate Courses In Remote Sensing and Geographic Information System



## Research Project

*During of research projects last minimum 12 months and must be realized in the origin Institution of the trainees*



## Postgraduate Courses In Remote Sensing and Geographic Information System

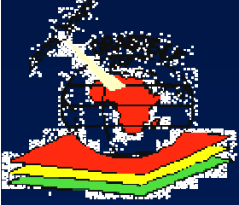


The closing ceremony of the theoretical phase of the training postgraduate in Remote sensing and G.I.S. On February 22, 2001, chaired by Mr. Minister of Higher education, President of Governing Board of the CRASTE-LF

**Promotion 2000-2001 completely, around the President of Governing Board**







# International Workshop



## **Global Sets Data Landsat For Supporting Sustainable Development In Africa**

Organized on July 07 and 09, 2004

This workshop was organized  
with the collaboration of the :

- ❖ UN / OOSA
- ❖ Landsat / USAID (USA)
- ❖ **This workshop gathered 41  
participants coming from 11  
African countries**

jeudi 10 novembre 2005

15th UN/IAF Workshop

Centre Régional Africain des Sciences et Technologies de l'Espace  
en Langue Française



Workshop Régional

Rabat, du 7 au 9 juillet 2005



Données Globales Landsat \*  
pour Soutenir  
le Développement Durable  
en Afrique



\* Donation du Gouvernement des Etats-Unis d'Amérique



Avec l'appui du Bureau des Affaires Spatiales de l'ONU à Vienne et de  
l'Organisation Islamique pour l'Education, les Sciences et la Culture ISESCO



Centre Régional Africain des Sciences et Technologies de l'Espace  
en Langue Française



## Workshop Régional

Rabat, du 7 au 9 juillet 2005

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en Afrique



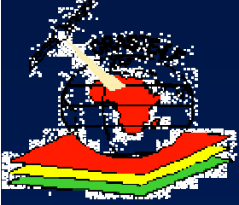
\* Donation du Gouvernement des Etats-Unis d'Amérique



Avec l'appui du Bureau des Affaires Spatiales de l'ONU à Vienne et de  
l'Organisation Islamique pour l'Education, les Sciences et la Culture ISESCO





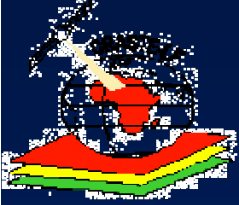


## Postgraduate Courses on Satellite Communications

**26** trainees from:  
**9** countries  
and  
**13** different institutes

### Trainees Profil

- ❖ Engineer on Communications,
- ❖ Engineer on Mechanical engineering,
- ❖ DEA. on Signal Processing,
- ❖ Engineer on Electromechanically,
- ❖ DEA on Electronics and
- ❖ DEA on Communications
- ❖ Bachelor on theoretical Physics
- ❖ Engineer Multimedia Designer
- ❖ Doctorate on Communications
- ❖ Doctorate on Physics (electro-optics)



# Postgraduate Courses on Satellite Communications



Various Hours

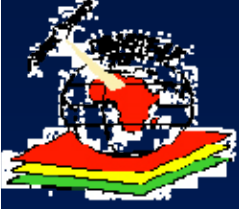
Teachers Staff

**27 Experts** from various university and professional institutions or international Organisms.

Lectures and Practically Exercises : **583 h**  
Conferences : **211 h**  
Supervising : **210 h**  
Scientific visits : **40 h**  
  
**Total : 1 044 h**

Experts Origins

- ✓ *École Mohammadia d'Ingénieurs (Maroc)*
- ✓ *Faculté des Sciences de Rabat (Maroc),*
- ✓ *Institut National des Postes et Télécommunications (Maroc),*
- ✓ *Centre Royal de Télédétection Spatiale (Maroc),*
- ✓ *Institut Agronomique et Vétérinaire Hassan II (Maroc)*
- ✓ *Centre National d'Études Spatiales (France).*

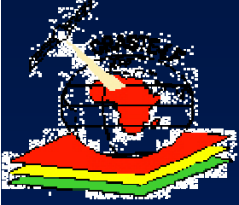


# Postgraduate Courses on Satellite Communications



## Research Projects

- ✚ Preliminary study on the functioning of antennae Radar
- ✚ Study of Global Star System
- ✚ Interconnection of the Cameroon Cities by VSAT network.
- ✚ Contribution of the Satellite Radar images to the littoral cartography and the prevention of the pollution by hydrocarbons
- ✚ Given Numbers and extending of the Centrafrique Communications network by Satellite TELCASAT.
- ✚ Study of the transmission systems of data by satellites.
- ✚ Study of the Eutelsat system
- ✚ Interest of VSAT systems for Niger and Senegal.
- ✚ Architecture of a VSAT system in the particular case of the rural telephony, the teleeducation and the telemedicine.

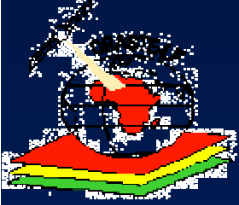


# Postgraduate Courses on Satellite Communications



## Research Projects

- ✚ Use of the VSAT network for the improvement of the System of the meteorological data transmission in Senegal,
- ✚ Economic planning of a Segment Ground for the transmission of Images by way of Satellites
- ✚ Realization of a software of balance of satellite connection " Numerical Transmissions ",
- ✚ Location: Follow-up of vehicles by GPS AND GSM,
- ✚ Conception of a Micro Satellite: CVSAT,
- ✚ Conception of a System of Educational Television by Satellite,
- ✚ Feasibility study of a Moroccan geostationary satellite of Communications.



## Postgraduate Courses on Satellite Communications



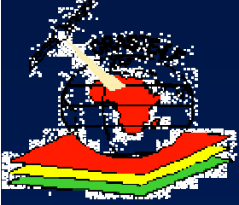
**Promotion 2000-2001 completely**

jeudi 10 novembre 2005

15th UN/IAF Workshop 14 -15, 2005

27





## Postgraduate courses on Satellite Communications

# International Workshop/Rule and Management of Spectrum of Frequencies

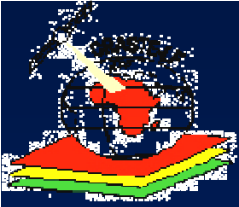
### **19 participants**

- **Trainees from CRASTE-LF** (13 persons from 6 States)
- **MOROCCO** (6 persons from the Moroccan Radio Television, the Institute National Communications and National Meteorology Department),
- **TCHAD** (2 persons from Tchadian Office of Communications Regulation)
- **SENEGAL** (Multinational High School of Communications).

### Program :

- Objectives of the Management of the spectrum
- International and National Rules of the spectrum
- Process of Planning the Spectrum
- International announcement ( earth services, BR IFIC, spaces services)
- International coordination
- Control of the spectrum and computerization of the management of the spectrum
- Delivery of licenses: case of Morocco
- Assignment of frequencies: practical exercise.
- Demonstration on the WinBASMS software





# International Conference



## Space Technologies and Telemedicine June 26 and 27, 2003

This Conference was organized with the collaboration of the Faculty of Medicine and Pharmacy Mohamed V University of Rabat

With active support of:

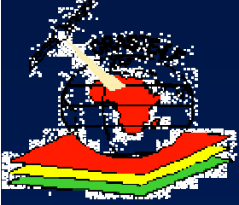
- UN/OOSA,
- ESA
- ASC – CSA ( Canada),
- CNES - MEDES (France),
- OMS ,
- ISESCO,
- EUTELSAT,
- CNRST (Morocco).

The poster features a collage of images including a satellite, medical professionals, and a satellite dish. Text on the poster includes:
 

- Le Centre Régional Africain des Sciences et Technologies de l'Espace en Langue Française, affilié à l'ONU
- Organise en collaboration avec
- Faculté de Médecine et de Pharmacie de Rabat
- Un Atelier International
- Technologies Spatiales et Télémedecine
- les 26-27 Juin 2003 à Rabat
- avec le soutien de:

 Logos of supporting organizations are listed at the bottom, including UN/OOSA, ESA, ASC, CNES, OMS, ISESCO, EUTELSAT, and CNRST.





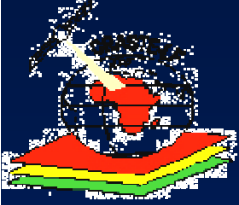
## International Conference

### *Space Technologies and Telemedicine*

**Attendance : 130 participants from member and no member countries of the CROSTE- LF and 6 experts from the International Space Agencies**

**Program : Elaborated collectively with the implied experts and with the support of participating organizations**

- Objectives of Telemedicine,
- The Contribution of Space Technologies to Telemedicine,
- European, Canadian and French Projects and their Experiences,
- African Experiences,
- Presentation of Projects Models in Telemedicine,
- Connection a live between the Conference and the Canadian and Italian hospitals
- Role of the African Bank of Development (BAD) in financing of projects on Health



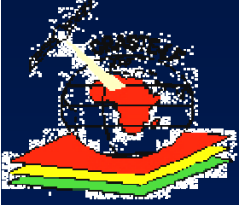
# Postgraduate Courses on Satellite Meteorology and Global Climate



**18** Trainees from:  
**8 member Countries** and  
**10** Differences Institutes

## Trainees Profiles

- *Meteorological Engineer,*
- *Mechanical Engineer,*
- *Forest Engineer,*
- *DEA on Signal Processing*
- *Computers Engineer,*
- *D.E.A. on Environment,*
- *DEA en Communication*
- *Doctorate d'Etat on Es Sciences Physiques*



# Postgraduate Courses on Satellite Meteorology and Global Climate



Teachers Staff

**26 Experts** from different institutes  
(universities, professionals or  
international Organizations).

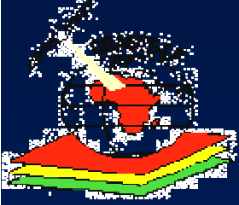
Various Hours

Experts Origins

Lectures and  
Practical Exercises : **589 h**  
Conferences : **39 h**  
Supervising : **300 h**  
Scientific Visits : **24 h**

**Total : 957 h**

- ✓ Engineers School (EMI, ENFI, IAV Hassan II of **MOROCCO**)
- ✓ Universities (FSR, IS, FSC) of **MOROCCO**,
- ✓ Centre Royal de Télédétection Spatiale (**MOROCCO**),
- ✓ Meteorological National Department (**MOROCCO**)
- ✓ National Meteorological of Algeria (**ALGERIE**)
- ✓ National Meteorological of Tunisia (**TUNISIA**)
- ✓ EUMETSAT\_EAMAC  
(**NIGER**)



# International Workshop



## **RANET Internet Presence Initiative**

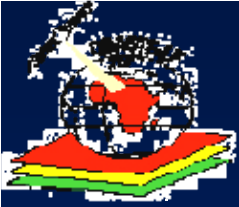
Organized on June 07 and 11, 2004

This workshop was organized with the collaboration of the :

- ❖ National Meteorology of Morocco,
- ❖ National Oceanographic Atmosphere Administration (NOAA - USA)

This workshop gathered about **Sixty** participants from **15** different countries





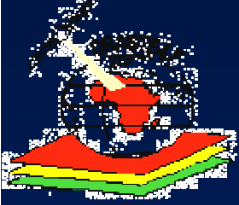
# Postgraduate Courses on Satellite Meteorology and Global Climate



## Researches Projects

- Seasonal and monthly forecast of the hunting - sand in the Algerian South.
- Problem of the forests fires in Morocco: influence of meteorological parameters
- The desertification in Morocco: contribution of satellite NOAA - AVHRR Images
- Study of the distribution of electromagnetic waves in the various atmospheric layers
- Contribution of the NOAA / AVHRR Images and the GIS in the follow-up and the cartography of the forested zones in Morocco.
- Impact of the changing climate and adaptation of the statistical approach to seasonal forecasts to Niger
- Recognition of convective systems of Meso-level by satellite images



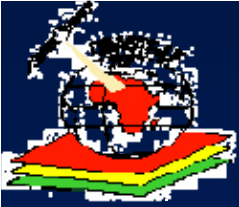


# Postgraduate Courses on Satellite Meteorology and Global Climate



## Conferences

**Besides courses, the Trainees participated in workshops  
and conferences organized by the specialized institutes in  
Space Sciences and technologies**



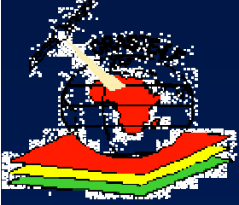
# Reports and Recommendations

jeudi 10 novembre 2005

15th UN/IAF Workshop 14 -15, 2005

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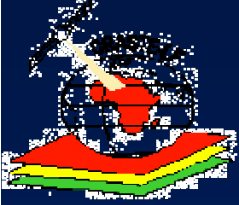


# Reports and Recommendations



## Organization and in progress of the activities of training

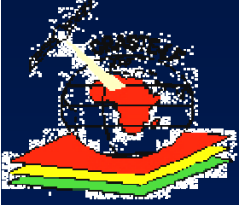
- ✿ trainings graduation **highly appreciated** and the **9 months** is an optimal duration
- ✿ Required means for the follow-up of the progress of the research project, **up to now 23 Thesis have been realized and presented, and many others couldn't be presented now because of lack of financial means.**
- ✿ the Presentation in CRASTE-LF needs to foresee practical and financial means.
- ✿ **To diversify the modes of development the knowledge by organizing the workshops, meeting, and conferences on targeted questions, because necessities in knowledge are common to all countries of the region. These modes have to be of limited duration, so as not to overload the trainees.**



# Reports and Recommendations

## Program of Training

- ❁ Necessity to update the programs in the context of use of space technologies in Africa ( to emphasize cartographic problems and of availability or update of data, specific environmental problems, Stations of satellite mobile reception typical VSAT, ...)
- ❁ To approach the techniques of **Tele-Education, Telemedicine, Teleconference...**
- ❁ Common-Module must be adapted to the initial profiles of the candidates for the training because of the disparity of candidatures.
- ❁ The introduction of the elements of legal training is strongly wished (Legal Database, Space Law, Rule, ...).

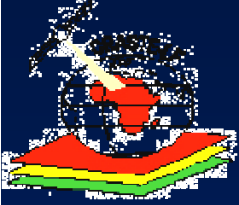


# Reports and Recommendations



## Documents and software environment

- ✿ Acquisition of the **Software packages** and the **Data** are expansive (not favoring training).
- ✿ the **specialized equipments** cost (image processing Workstation, GPS, radio station, Meteorological station, analyzer of frequencies , ...)
- ✿ **Basic documentation** (minimal library to be assured) little available, which means that the Centre needs to strengthen of educational resources.

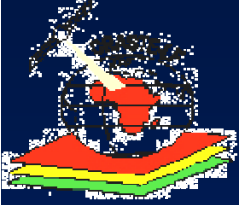


# Reports and Recommendations



## Documents and software environment

- ❖ Absence of links and access to **suited data bases** (documentaries, data images, cartographic maps, statistical data, meteorological data, ...), in particular from Organizations in relation with the United Nations (UNESCO, FAO, OMM, ...).
- ❖ Required to help in the **intensification of the potential of training and research** for the Centre and to encourage the appeal to Teleconference by the use of the New Information Technologies.



# Reports and Recommendations

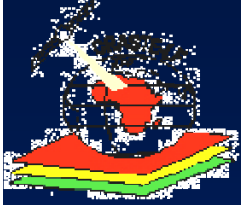


## Training Concerns

**To create a context favorable to the realization of the research projects in 2-nd phase of training.**

**Support for the actions of help in the mobility of the trainees of the CRASTE-LF (additional practical trainings) or the experts engaged in the actions of training or research piloted by the CRASTE-LF.**



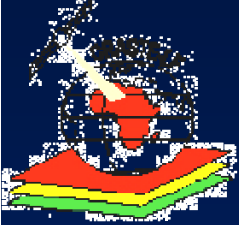


# Reports and Recommendations



## Training Supervising

- ✿ Widely assured by the staffs of institutions Centre partners in Morocco
- ✿ Financial obstacles for the mobilization and the valorization of regional competence (travel expenses and charge of the experts), major working orientation of the CRASTE-LF, in the perspective of creation of a network of competence, to limit the migration of the experts and develop regional cooperation, ...
- ✿ The **Contribution** of the **international Cooperation** remains **very limited**



# Reports and Recommendation

## Finances

- ✿ The covering of the **contributions** of member countries remains **unpredictable!**
- ✿ The donations from international or national Agency have been **limited.**
- ✿ The trainees benefit from scholarships of the **Moroccan Agency of International Cooperation**
- ✿ Travel ticket are financed on endowment of the **UN/OOSA** (Ticket plane are very Expensive in Africa, Specially since two years)
- ✿ The trainees benefit from conditions of University facilities.

*Regional African Centre of Space Sciences  
and Technologies*

*In French Language*

*C.R.A.S.T.E. – L.F.*

*Rabat (Morocco)*

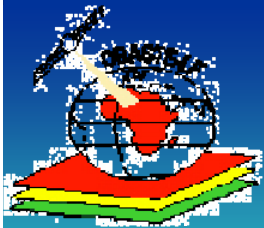


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Thank you  
for  
your attention





## CRASTE-LF : des Activités Variées

- **Juillet 2001** : Workshop International sur le thème "Régulation et Gestion du spectre de fréquences"



- **Juin 2003**  
Workshop International sur "Technologies Spatiales et Télémédecine" avec le soutien de OOSA, ESA, Agence Spatiale Canadienne, CNES (France), ISESCO, Eutelsat, OMS, ...



- **Juillet 2004** : Atelier de Formation sur RIPI (Ranet Internet Presence Initiative) à la demande de NOAA – USA.