



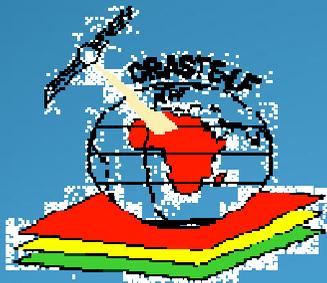
# *Regional African Centre of Space Sciences and Technologies*

*In French Language (CRASTE – LF)*

*Affiliated to the United Nations*

***Pr. Abderrahmane TOUZANI***

***Director, CRASTE-LF***

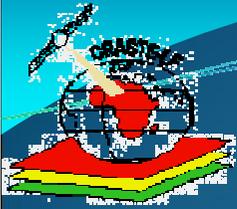


*Sis Ecole Mohammadia d'Ingénieurs (E.M.I) -*

*Avenue Ibn Sina, B.P 765, Agdal-Rabat Maroc*

Tel: 212 537 68 18 24 – Fax : 212 537 68 18 26 – Email :

[touzani@emi.ac.ma](mailto:touzani@emi.ac.ma) / [craste@emi.ac.ma](mailto:craste@emi.ac.ma)



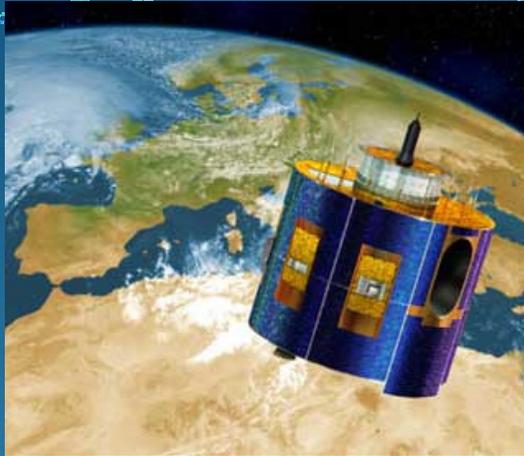
# **UN / Azerbaijan / ESA / USA Workshop**

**Experience Of CRAFT-LF in Capacity Building  
In Space Sciences and Technologies:  
Introduction of New Applications of the Use  
Space Techniques**

**Baku, Azerbaijan, 11-15 May 2009**



## Space Sciences and Technologies

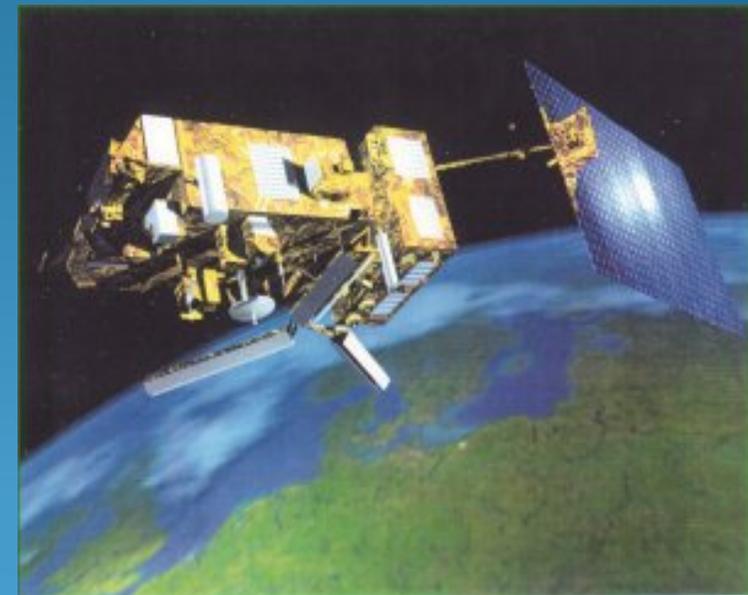


### **Meteorological Satellite, Satellite of Observation, Positioning**

The use of the data of the Earth Observation Satellite knows a strong growth in fields of intervention increasingly wider.

Communication Systems by Satellite tools essential to the economic and social development

The Space Techniques Applications constitute a major development tool, in particular for the Earth Observation and Communications....



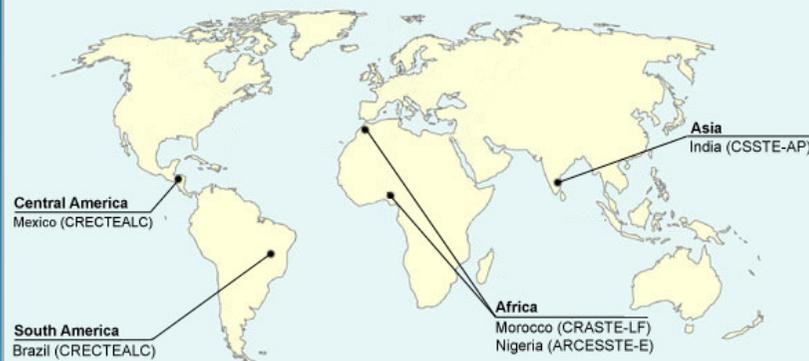
### **Satellites Communication**



## Regional Centres for Space Sciences and Technologies Education Affiliated to UN

**Solutions** for the implementation of training schemes, to share of Training, Experiments and Competences

Regional Centres for Space Science and Technology Education  
(affiliated to the United Nations)



Map CENT-03-01 Rev.1  
June 2003

Office for Outer Space Affairs (UN-OOSA)  
United Nations

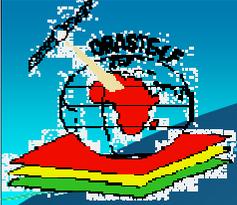
United Nation General Assembly  
Resolutions : 45/72 of 11 November 1990  
- 50/27 of 6 December 1995 (International  
effort to create of the Regional Centres  
for Space Science and Technology  
Education, affiliated to U.N.)

4 Centers in Activities affiliated to UN  
in differences regions of the World :

**India (Asia & Pacific),**

**Morocco (Africa – French Language),**

**Nigeria (Africa – English Language),**  
**Brazil – Mexico (Latino America &  
Caribbean)**



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



The **CRASTE-LF** 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.



Building of CRASTE-LF



# CRASTE-LF STRUCTURE



**Governing Board**

**Scientific Council**

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

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

**Space Sciences  
And  
Technologies**

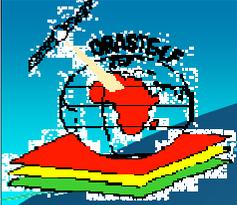
**Post-Graduate Training**

**Short Courses Training , Scientific  
animation  
Consulting to Member State and  
Regional Institutions**

**Collect and Dissemination Space  
Information**

*Competences*

*Fields*



# The Objectives of the Centre

To **increase knowledge** in Space Sciences and Technologies by organizing courses, seminars, workshops, conferences at the Regional level,

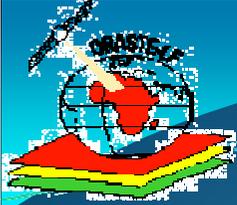
To improve the technical **competence** of the **experts, teachers, decision-makers** and to hold them informed about technical progress .

To **assist** the countries of the region on the development of endogenous capacities in space tools.

To **Strengthen** the Local and Regional **Capacities**.

To promote **Cooperation** between the **Developed Countries** and **States Members** as well as among **these States**.

To develop **expertise** in Space Sciences and Technology.



# The Main Courses Programs



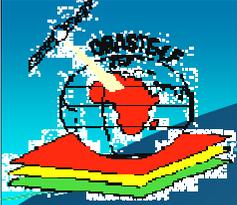
- Remote Sensing And Geographic Information Systems,
- Satellite Communications,
- Satellite Meteorology and Global Climate,
- Space and Atmospheric Sciences

## Target Public

Academics (Professors,...)  
Researchers, Engineers,  
Administrators and  
Managers

## Recovering Sectors

Universities, Research  
Institutes, Professional  
and Private Institutes and  
Administrations



# Realized Training Courses



☀ **Six training** courses in Remote Sensing and GIS, the First started in April, 2000 , the Second in November, 2001 the third in November, 2003, the fourth in November 2005, fifth in November, 2006 and November 2008.

☀ **Two training** courses in Satellite Meteorology and Global Climate in January, 2002 and November 2004

☀ **Three training** courses in Satellite Communications, the First in December, 2000 and the Second in November, 2002

☀ **Until Now, Up 155 Trainees** followed Postgraduate courses in the **CRASTE-LF from 17 countries**



# Postgraduate Courses In Remote Sensing and Geographic Information System

**113 trainees from :  
18 Countries member  
and no member  
22 different institutes .**

**From Countries:** Morocco, Algeria, Tunisia, Mauritania, Senegal, Burkina Faso, Niger, Tchad, Cote d'Ivoire, Togo, Benin, Gabon, Cameroon, Cap Verde, R.D. Congo, Madagascar, Syrie, Central Africa

## •**Trainees Profile**

- Engineer in Geodesic Sciences
- Diploma of Studies of Cartography
- 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



More than 32 Experts from various university and professional institutions or international Agency

Lectures and Practical Exercises : 700 h  
Conferences : 70 h  
Supervising : 240 h  
Scientific Visits : 36 h  
  
Total : 1 046 h



11-15 May 2009

Applications of C  
Azerbaïjan

# Postgraduate Courses In Remote Sensing and GIS



## Research Projects

The research projects covers several topics in preparation of the Memoir of the Master in Space Sciences and Technologies, relate to the applications of Remote Sensing and Geographical Information Systems on: Cartography, Topography, Urban, Agriculture, Geology, Natural resources, Water, Ecology, forest, desert progress, coastal Managing, Migration of Population, etc...

11-15 May 2009

Applications  
Azerbaïjan





le Bureau des Affaires Spatiales  
de l'ONU (OOSA / UNVIENNA)

**Organisent**  
en partenariat avec



l'Agence Spatiale  
Européenne

## Workshop International en Télédétection et SIG



# INFORMATION SPATIALE ET DÉVELOPPEMENT DURABLE

### Sponsors



du 14 au 16 novembre 2005

Lieu  
Ecole Mohammadia d'Ingénieurs  
Rabat (Maroc)



15 May 2009

Applications of GNSS; 11-15 Mai, 2009 Baku,  
Azerbaïdjan

## International Workshop on Remote Sensing and GIS « Space Information and Sustainable Development »

120 communications  
More than 150 participants  
from 30 countries

Partnership : CRASTE – LF,  
Mohamed V University, ISESCO, –  
UN-OOSA and ESA

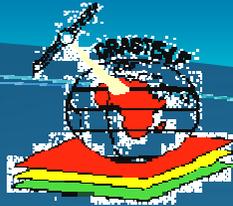
Sponsored by

French Speaking Academic Agency  
(AUF)– Mohammadia Engineering  
School (EMI).

(Rabat, 14 – 16 November  
2005)



# International Workshop



## Space Tools with the Service of the Disaster Management and the Emergencies in Africa. Technical, Organisational and Legal Aspects.

Rabat (Maroc)

November 10, 11 & 12 2008

Organize jointly with:

UN/OOSA, ISESCO, CRTS, EMI, BID

And With support: CNES, ESA,, UNOSAT, EUROPA OPA, INFOTERRA, EUMETSAT,

11-15 May 2009

Applications of GNSS; 11  
Azerbaïdjan



X<sup>ème</sup> Anniversaire du  
CRASTE-LF

Organisent

le workshop International

"L'Outil Spatial au Service de la Gestion des Catastrophes et des Situations d'Urgence en Afrique"

Aspects Techniques, Organisationnels et Juridiques



Ecole Mohammadia d'Ingénieurs (EMI)  
Rabat (Maroc) les 10, 11 et 12 Novembre 2008



CNES (France)

ITHACA (Italie)

SERTIT (France)

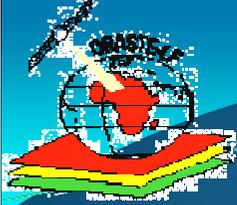
UNOSAT

ESA-ECSL

GMES (Kopernikus)

GEO

ASAL(Algérie)



# International Workshop

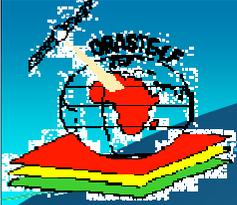


## Space Tools with the Service of the Disaster Management and the Emergencies in Africa

With :

More than **100 participants** from 22 countries;

Up 42 specialized Communications and Conferences on the use of Space Information in Disaster Management



# Postgraduate Courses on Satellite Communications



**37** trainees from:  
**9** countries  
and  
**14** different institutes

**From Countries:** Morocco, Algeria, Tunisia, Mauritania, Senegal, Niger, Tchad, Cote d'Ivoire, Togo, Cameroon, Cap Verde, R.D. Congo, Central Africa

## 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

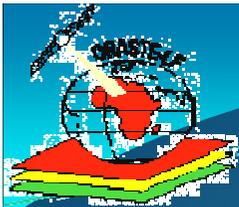
Various Hours

Teachers  
Staff

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

Lectures and  
Practically Exercises : 600 h  
Conferences : 210 h  
Supervising : 210 h  
Scientific visits : 40 h  
  
Total : 1 060 h





# International Conference



## **Space Technologies and Telemedicine**

June 26 and 27, 2003

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

**With active support of:**

UN/OOSA,

ESA

ASC – CSA ( Canada),

CNES - MEDES (France),

OMS ,

ISESCO,

EUTELSAT, CNRST (Morocco).

11-15 May 2009

Applications of GNSS  
Azerbaïjan

Le Centre Régional Africain des Sciences et Technologies de l'Espace  
en Langue Française, affilié à l'ONU



Organise

en collaboration avec

La Faculté de Médecine et de Pharmacie de Rabat



5<sup>e</sup> Atelier International  
Technologies Spatiales et Télé-médecine

les 26 - 27 Juin 2003 à Rabat

Soixante-Neufième Session de la Faculté de Médecine et de Pharmacie de Rabat



avec le soutien de :



Bureau des affaires spatiales de l'ONU



Agence spatiale européenne



Organisation internationale pour l'étude, la recherche et l'usage de l'espace



Union internationale des télécommunications



EUTELSAT



Centre national d'études spatiales - France



Agence spatiale Tchèque



Agence spatiale canadienne



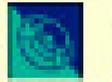
Centre national de la recherche spatiale



Centre de la recherche spatiale



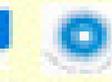
Centre national de la recherche spatiale



Centre national de la recherche spatiale

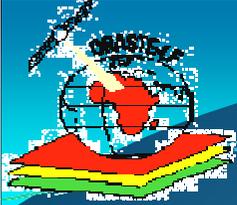


Centre national de la recherche spatiale



Centre national de la recherche spatiale

Agence spatiale Marocaine - Agence spatiale algérienne - Agence spatiale tunisienne (ASATAT)  
En 2003, l'agence de l'espace française - Rabat 06 - 13 63 23 61 80 - Fax: 203 63 23 61 80 - Email: [space@maroc.ma](mailto:space@maroc.ma)



# Postgraduate Courses on Satellite Meteorology and Global Climate

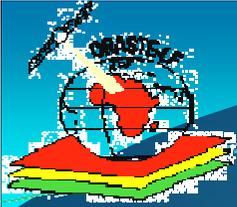


**18** Trainees from:  
**8** member Countries and  
**10** Differences Institutes

**From Countries:** Morocco, Algeria, Tunisia, Mauritania, Senegal, Niger, Cameroon, Cap Verde, R.D. Congo, Central Africa, Togo

## Trainees Profiles

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



# Postgraduate Courses on Satellite Meteorology and Global Climate



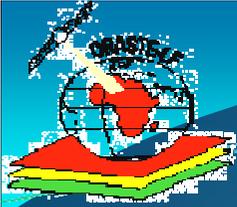
Teachers Staff

Various Hours

**More than 26 Experts** from  
different institutes  
(universities, professionals or  
international Organisations).

Lectures and  
Practical Exercises : **600h**  
Conferences : **50 h**  
Supervising : **300 h**  
Scientific Visits : **36 h**  
  
Total : **986 h**





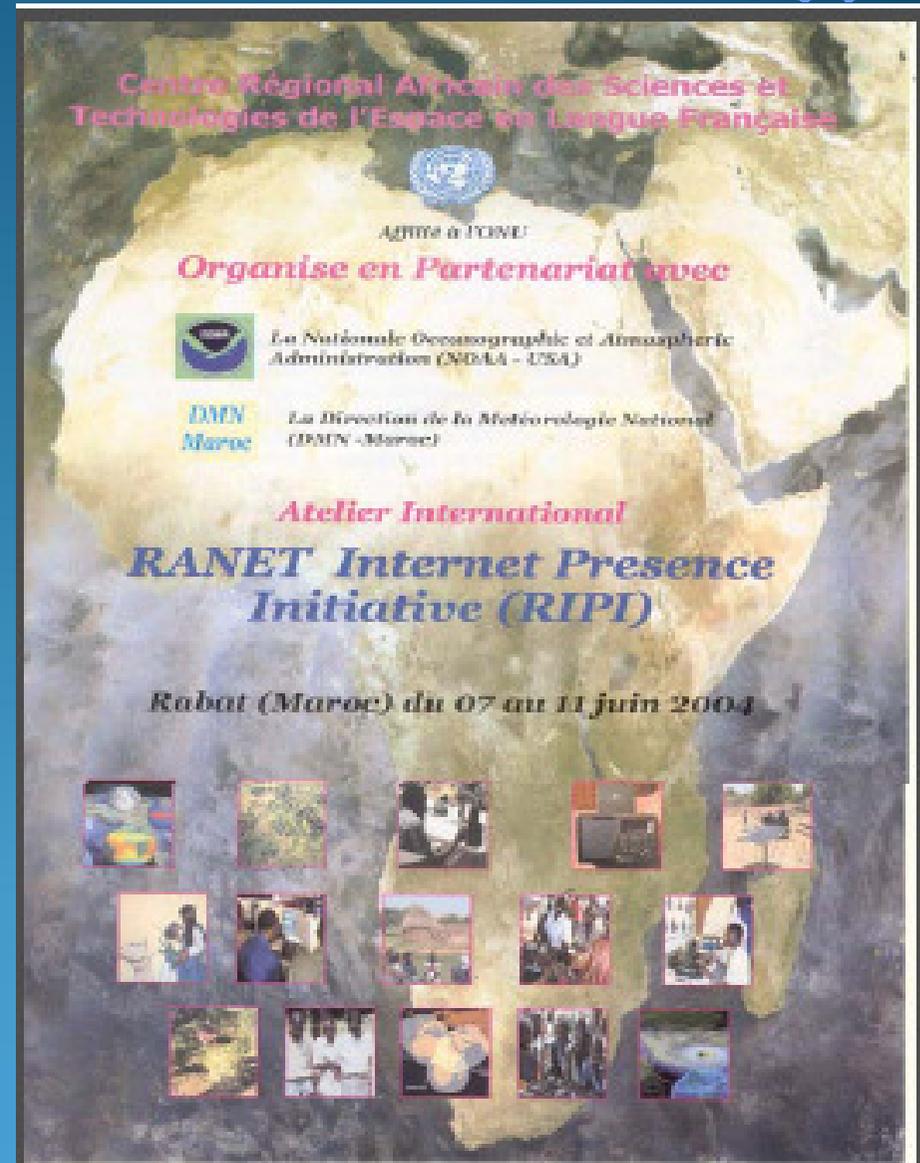
## ***RANET Internet Presence Initiative***

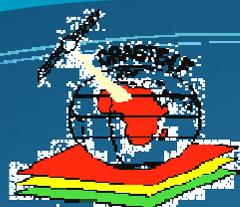
Organized on 07 – 11 June, 2004

This workshop was organized with the collaboration of the :

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

This workshop gathered about **60** participants from **15** different countries





Workshop International  
**Les Changements  
 Climatiques et  
 Adaptation en Afrique**  
 - Le Rôle des  
**Technologies Spatiales –**  
 ALGER, les 22, 23 et 24  
 octobre 2006

**organized with  
 the collaboration of the  
 ASAL,  
 CRASTE\_LF,  
 UNOOSA  
 Supporting by  
 IDRCI\_CRDI (Canada)  
 ISESCO**

11-15 May 2009

Applications of GNSS; 11-15 Mai 2009 Baku,  
 Azerbaïdjan



République Algérienne Démocratique et Populaire

Sous le haut patronage de

Monsieur le Ministre  
 de l'Aménagement  
 du Territoire, de l'Environnement  
 et du Tourisme

Monsieur le Ministre  
 de la Poste et des Technologies  
 de l'Information  
 et de la Communication

**L'AGENCE SPATIALE ALGÉRIENNE**

ORGANISE

EN COLLABORATION AVEC

**LE CENTRE REGIONAL AFRICAIN DES SCIENCES ET TECHNOLOGIES**

**DE L'ESPACE (NATIONS-UNIES)**

**L'ASSOCIATION ALGERIENNE DE RECHERCHE SUR LE CLIMAT**

**ET L'ENVIRONNEMENT**

**UN ATELIER INTERNATIONAL SUR LES**

**Changements Climatiques  
 et Adaptation en Afrique  
 le Rôle des Technologies Spatiales**

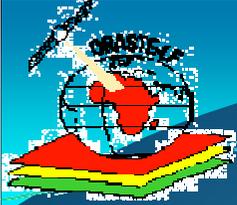


**ALGER - HOTEL EL-DJAZAIR LES 22, 23 ET 24 OCTOBRE 2007**



From the Left to Right. : le CRASTE-LF Director, ASAL D.G., The Ministre of Communication, Information Technology and Poste, UNOOSA Representing





# Introduction the New Topics in Space Sciences and Technologies Education



## *Capacity Building in Space Law*

*The Centre has including, in first one, one module initiation in space Law (16 hours) for the all space Curricula education:*

*Remote Sensing and GIS,*

*Satellite Communication,*

*Satellite Meteorology and Global Climate.*

*UNOOSA was organizing the experts meeting in December 2009, to develop the curricula education on Space Law.*



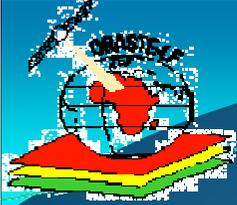
## Introduction the topics in Space Sciences and Technologies



### *Development the Courses in Disasters Management.*

as part of outreach activities Un-Spider Program, The Centre proposed a curricula for the program course to Building Capacity to Reduce Disasters Management.

It will be the subject of the Next Workshop which will be organized on June 2009 in Vienna by UNOOSA



# *International Training Courses in GNSS on Satellite Navigation and Location Based Services*

*The Centre will organize the GNSS courses for 4 weeks from September 28 to October 24, 2009, Supporting by UNOOSA, ICG and others National and International Institution.*

*Duration : Weeks*

*Location: The Course will be conducted at CRASTE\_LF*

*Objective : Capacity Building in GNSS, and to make the participants aware of the potential of Satellite Navigation Technology and its application*

*Target Public: Trainees from Institutions work and use Space Tools from Africa Region and speaking in French, they have high level education.*



# International Training Courses in GNSS on Satellite Navigation and Location Based Services

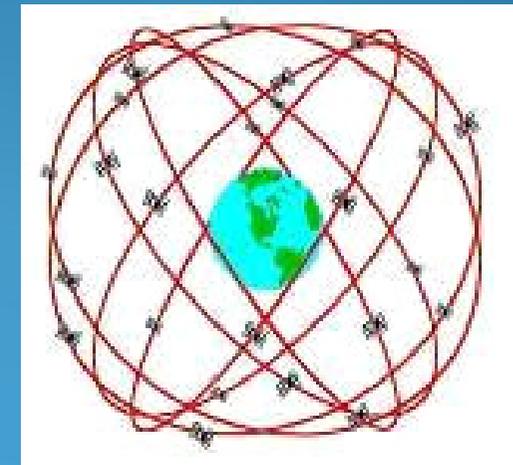
## PROGRAM

### MODULE I

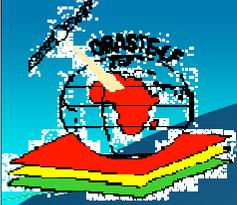
- Elements of Geodesy,
- Satellite Positioning,
- The Global Positioning System,
- GNSS Receiver Architecture
- New GNSS Generation

### MODULE II

- GNSS Augmentation System,
- GNSS Applications,
- GNSS Markets,
- GNSS Regulation



Applications of GNSS; 11-15 Mai, 2009 Baku,  
Azerbaïjan

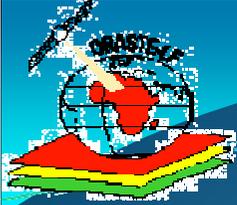


## Postgraduate Courses In R. S. and GIS, S. C. and S.M & G.C.



*The realization of the research projects is carried out between 15 et18 month. These projects must be carried out in the establishment of origin of the trainees*

*Until Now, There are 41 Master Diploma of Space Sciences and Technologies have been delivered by the Centre in each fields.*



## Scientific Animation



*Until Now, There are up **850 experts** are attending different Conferences and Workshops organized by the Centre in each fields from of Space Technologies from up **45 countries** in Africa, Europe and North America.*

# Thank you

# for

# your attention

- Web Site: [www.crastelf.org.ma](http://www.crastelf.org.ma)

