

**Activities of CRASTE-LF  
on  
Capacity Building  
in  
Space Sciences and Technologies  
Launch  
Postgraduate Training in GNSS**

**Prof. Abderrahmane TOUZANI**  
Director

**Beijing, 5-9 November 2012**



for the implementation of  
training schemes, to share  
Training, Experiences  
and Competences



## United Nation General Assembly Resolutions

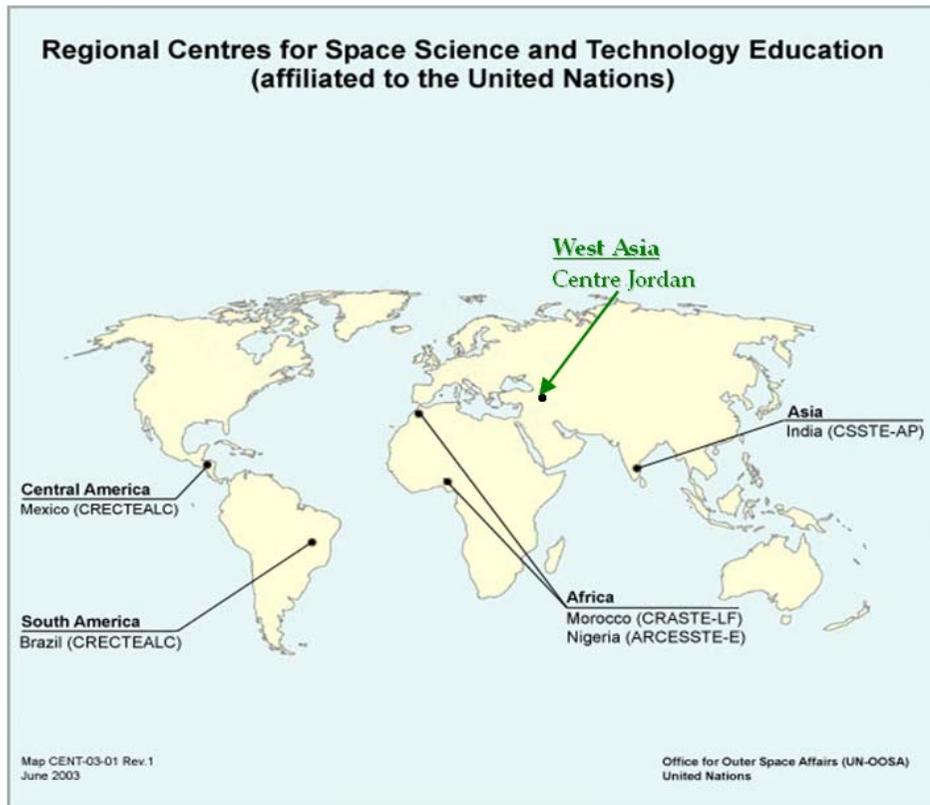
**45/72 of 11th Nov. 1990**

**50/27 of 6th Dec. 1995 ,**

**International effort to create Regional  
Centers for Space Science and  
Technology Education, affiliated to U.N.**

**5 Centres affiliated to UN in activities in  
differences regions of the World :**

- **India** (Asia & Pacific, 1995),
- **Morocco** (Africa – French Language, 1998),
- **Nigeria** (Africa – English Language, 1998),
- **Brazil – Mexico** (Latin America & Caribbean)
- **Jordan** (Western Asia, 2012, June)





# Contribution of training on Space Science and Technology for sustainable development



**CRASTE-LF** has been established, on the initiative of the UN-OOSA program on applied of the UN/G.A. Resolutions, in Rabat on October 23, 1998.

**Thirteen Member States** : Algeria, Cameroon, Cape Verde, Central African R., Ivory Coast, D. R. of Congo, Gabon, Morocco, Mauritania, Niger, Senegal, Togo and Tunisia.



**Building of CRASTE-LF**



## 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 **competences** 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.

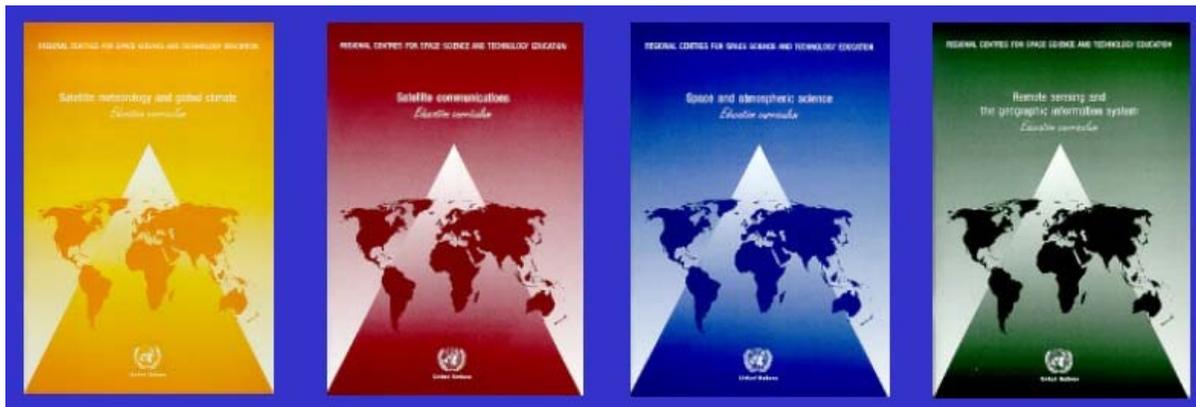


# Main Courses Programs



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

Education Curricula  
established and  
Published by  
UN-OOSA  
1995, Update in  
2001 and 2008



## Target Public

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

## Recovering Sectors

Universities, Research  
Institutes, Professional and  
Private Institutes and  
Administrations



## Each Training Session takes place in 2 phases:

**Phase I** : In Centre, theoretical & practical courses ~ 1200 h.

**Phase II**: 12 to 18 Months, achieve the Research Project in their institution .

**End of phase II** : Defense of memoire in Centre (Jury Members are Professors) .

Détail of courses located in Web Site of :

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

- [www.oosa.unvienna.org/centres](http://www.oosa.unvienna.org/centres)



# Realized Training Courses



✳ **9 training** courses in Remote Sensing and GIS,  
Apr. 2000 and Nov. 2001, 2003, 2005. 2006. 2008, 2010,2011 &  
Sept 2012.

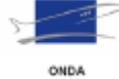
**167** trainees from **19** member and non member Countries  
**25** different institutes .

✳ **4 training** courses in Satellite Meteorology and Global Climate  
Jan. 2002, Nov. 2004, Dec. 2009 & Sept. 2012

**52** trainees from **10** member Countries  
**15** different institutes.

✳ **3 training** courses in Satellite Communications  
Dec. 2000, Nov. 2002 and 2007

**33** trainees from **11** member and non member Countries  
**10** different institutes.



**Cours International**  
**Navigation et Services basés sur**  
**le Positionnement par Satellites**

Rabat, du 28 septembre au 24 Octobre 2009



Avec le Soutien de l'Agence Spatiale Européenne et des Etats Unis d'Amérique à travers le Comité International de Navigation Globale par Satellite (ICG)



**International Short Courses on**  
**"Navigation and Services**  
**Based on Satellite**  
**Positioning"**

**28 September au 24 October 2009**

**The training program is divided into two**  
**Modules :**

**Program of short courses GNSS 2009**

**Participation of 35 trainees from 17**  
**African countries**



**The Centre has conducted the short courses on GNSS  
outside of host country of CRASTE-LF, e.g. in Togo:  
Regional Training Workshop**

**Lome, Togo, 03 - 07 October 2011**

## **« Global Navigation and Based Service on Satellite Positioning »**

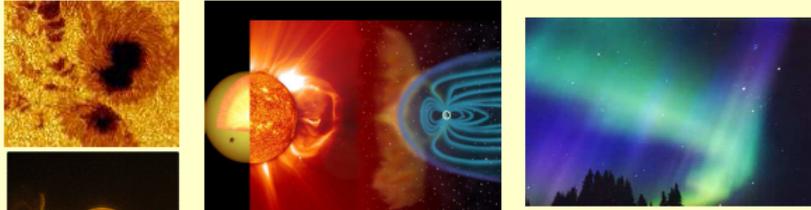
**Participation of 24 trainees from 10 African countries**

**Group Photo**



**European Program FP7**

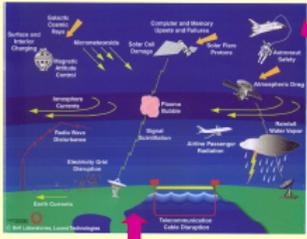
**SCHOOL ON SPACE WEATHER**  
**RABAT / MAROC [December 5-16, 2011]**  
 Organized by the French ISWI national committee  
**CRASTE – EMI – MENESFCRS**



The Sun is the source of many physical processes (radiations, winds, mass ejections, energetic particles) that may affect the terrestrial environment

Northern Lights

Sunspot and magnetic loops at the surface of the Sun



The community of users of space weather products (from Bell Laboratories Lucent Technologies)

Context of the school  
 International Space Weather Initiative (ISWI) 2010-2012

Registration before April 30, 2011 at the 2two addresses  
[craste@emi.ac.ma](mailto:craste@emi.ac.ma)  
[christine.amory@lpp.polytechnique.fr](mailto:christine.amory@lpp.polytechnique.fr)

**Objectives**  
 -To learn about the solar processes influencing the terrestrial environment  
 -To learn how to use data obtained with the network of instruments in Africa

**Program**  
**Lectures and practical work**  
**First week**  
 Solar Physics: Solar radiation and its variability  
 Solar cycle and activity  
 Solar flares, Coronal mass ejection and solar energetic particles  
 Solar wind and its perturbations  
 Magnetosphere and Ionosphere of the Earth  
 Solar-terrestrial Physics and Space Weather



Instruments deployed in Africa in the context of the International Heliophysical Year IHY (2007-2009)

**Program**  
**Lectures and practical work**  
**Second week**  
 Upper Atmosphere  
 Ionospheric electric currents  
 Earth's magnetic field  
 Atmospheric electricity  
 Precipitation Systems  
 Chemistry and Transport in the atmosphere  
 Sounding of the earth's atmosphere by microwave radio inst

**School of Space Weather**  
**Rabat, from 05 to 16 /12/2011**

**International Conference on GEOSPATIAL Information, effects and impacts of the CC in Africa**  
**Rabat from 30/11 to 02/12 2011**

Organisent une

**CONFERENCE INTERNATIONALE**

**INFORMATIONS GEOSPATIALES : EFFETS & IMPACTS DES CHANGEMENTS CLIMATIQUES EN AFRIQUE**

Les 30 Novembre, 01 et 02 Décembre 2011  
 A l'Ecole Mohammedia d'Ingénieurs, Rabat - Maroc

CRASTE-LF Affilié à l'ONU  
 UN-OOSA  
 ISESCO  
 GEONETCAB  
 Institut Scientifique UM5A  
 EMI  
 UM5A

Logos of CRASTE-LF, UN-OOSA, ISESCO, GEONETCAB, Institut Scientifique UM5A, EMI, and UM5A.

Images illustrating climate change impacts: Land Cover, Droughts, Desertification, Hydrography, Geographic Names, Transportation, Elevation, and Orthorectification.

Images illustrating climate change impacts: Drought, Desertification, and Flooding.

Images illustrating climate change impacts: A map of Africa and a satellite image of a forest.

Images illustrating climate change impacts: A globe being held and a satellite orbiting Earth.

CRASTE-LF : Sis EMI, Avenue Ibn Sina, BP 765, Agdal - Rabat (Maroc)  
 Tél. : 212 537 68 18 26 – Fax : 212 537 68 18 24 Email : [craste@emi.ac.ma](mailto:craste@emi.ac.ma)





## Additional Post-Graduate Courses



### **2) Development of a curricula on GNSS**

As part of outreach activities UN-OOSA Program, the Centre is working a Education Curriculum for a course on Global Navigation Satellite Systems and Applications.

UNOOSA with ICG secretariat has organized some experts meeting in to develop a curricula education on GNSS.

*The CRASTE-LF will be launch the courses on **GNSS** and **Communication by Satellite** next September 2013*

*This courses are basing on Education Curricula developed by UN-Experts and updated in CRASTE-LF with respect of regional context:*

**Program of courses Master GNSS-CRASTE-LF (2)**



## Actual and Futures Activities

### Launch of post-graduate training courses:

- |                              |                |
|------------------------------|----------------|
| - 9th session on : - RS&GIS, | September 2012 |
| - 4th session de MSCM,       | September 2012 |
| <br>                         |                |
| - 4th session de SC,         | September 2013 |
| -1st session de GNSS,        | September 2013 |



## Evaluation of the use of earth observation in French-speaking Africa

- launched a data collection campaign based on document developing by the Centre in frame work GEONetCaB European FP7 Project to:
  - competences
  - Official Institutions
  - Others services in space technologies uses
- Choosing, after receiving the answers, 2 or 3 representatives countries in differences cases space sciences & technologies uses (high, medium and low level) describing the situation in Earth Observation in French speaking countries.



## Success stories



- 232 trainees
- Professionals and become a part in the higher management in their institutions
- 100% go back to their home countries (original institution)
- Themes of research projects in connection with local problematic
- In many cases, the trainees generated new activities related to space technology in their country (courses in local universities : trainers, projects, ...) : *snow ball effect*
- Creation of an Expert Network through the all Africa
- Substantial contribution in rising the awareness of the utility of space technologies for development, particularly in Earth Observation and GIS.

**THANK YOU FOR YOUR  
ATTENTION**

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