



*Centre Royal de Télédétection  
Spatiale*



المركز الملكي للاستشعار البعدي  
الفضائي

**Space activities and space policy in Africa**  
***Social, economic and legal aspects***  
**Case of Morocco**

**United Nations/United Arab Emirates High Level Forum**  
**“Space as a driver for socio-economic sustainable development”**

***6 – 9 November 2017 Dubai, United Arab  
Emirates***



## *The economic situation in Africa*

- ✓ Africa faces several challenges in its development:
  - Enormous disparities between countries,
  - Accentuated poverty,
  - Lack of mechanisms for resource mobilization
  - Lack of a significant industrial sector on the African continent
  - etc.

- ✓ The MDGs have been partially achieved

- ✓ Africa is experiencing strong population growth with young and dynamic youth population.

**And yet**

- ✓ Africa is experiencing economic growth of more than 5%

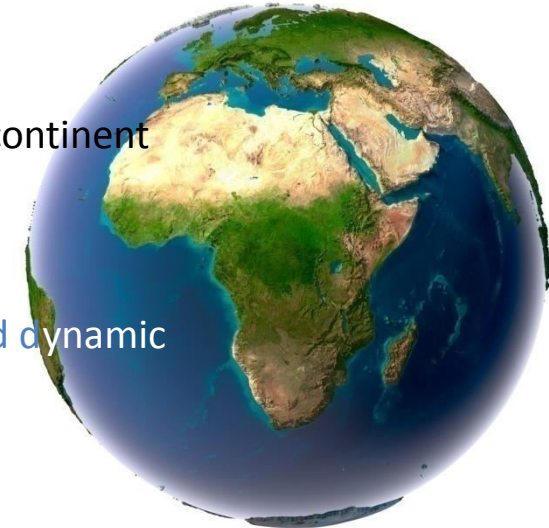
- ✓ This growth is facilitated by better governance, investment in infrastructure, regional economic exchange, etc.

**But**

- ✓ This is insufficient for sustainable development without the use of space science and technology !!!

**Because**

- ✓ The high cost of space activities for many countries,





## The space policy situation in Africa (Continental)

According to a recent report of the African Union on the African space policy, there are several obstacles to social development and economic growth (HRST/STC-EST/Exp./15(II)).

### → Needs

- ✓ African countries recognize the need for Africa to:
  - Benefit from space science and technology for socio-economic development
  - Harmonize space programs in Africa
- ✓ Africa still not well represented in the outer space.

### → To be done

- ✓ Africa has to establish mechanism to coordinate Pan-African space initiatives
- ✓ Africa has to support a common space security position for the benefit of the entire community.
- ✓ Africa has to strengthen space technology role in the socio-economic development as a whole.





## *The space policy situation in Africa (Countries level)*

- ✓ African countries started to build national space policies late 1980s :  
South Africa and then  
Egypt, Morocco, Algeria and Nigeria.
- ✓ Today others countries are joining space activities, particularly Remote Sensing.
- ✓ During these last few years, some space agencies (3 to 4) have been created in Africa,.
- ✓ some satellites of earth observations (<10) have been launched
- ✓ This shows that progress in space science and technology is very slow, which limited impact on socioeconomic development.



### *the space policy goals \**

- ✓ Substantive work to improve human and technical capabilities in space technology should be carried out by the African community.
- ✓ Use space science and technology to ensure optimal socio-economic benefits that improves the human well-being

\* 2017 African Union Report on African space policy





## *Space activities in Africa (I)*

✓ By using remote sensing and GIS, Africa continues to discover new applications in space and in several areas, such as:

- Natural resources management
- Climate change
- Food security
- Defense
- Fisheries.
- Land Management
- Mapping
- Etc.





## *Space activities in Africa (II)*

### ✓ Remote sensing

- Several national institutions in Africa have established structures and capacities for satellite data processing.....
- Most of these institutions were set up with the support of International partners in the framework of cooperation projects
- Depending on countries needs and priorities, various applications in different domains were implemented such as in agriculture, hydrology, and natural resource management, in general to support development policies of each country.
- To strengthen endogenous capacities of these institutions major efforts were undertaken in terms of training and capacity building programs.
- Ambitious R&D programs on space techniques and remote sensing were implemented in African universities within the international cooperation framework.



### *Space activities in Africa (III)*

#### ✓ Remote sensing applications in Africa

- The use of Space techniques by several African countries helped to solve many socio-economic situations such as:

- *Monitoring territorial dynamic (Land cover, change detection, etc.)*

- *Monitoring costal Dynamics (urbanization, pollution, etc)*

- *Natural resources monitoring (agricultural, water, mines, etc.)*

- *Hazards / insurance (Floods, drought, forest fire, etc)*

- *Early warning systems for food security*

- In some African countries, satellite data is a major element in decision-making.



## *Africa and UN/COPUOS*

### ❖ Africa and International meetings dedicated to space activities

#### ✓ COPUOS and African participation

- The COPUOS is the committee of the General Assembly dealing exclusively with international cooperation in the peaceful uses of outer space
- its role is to discuss developments related to the exploration and use of outer space and the evolving use of space science and technology for sustainable development.
- The UN/COPUOS has a current membership of 84 states of which 19/54 are African
- 4 to 6 of those African membership are regularly present in the legal and Scientific & Technical subcommittees of the COPUOS

#### **This is due to**

- Less interest; no space technology existing in the major of African countries
- Lack of awareness to the space law governing the outer space activities



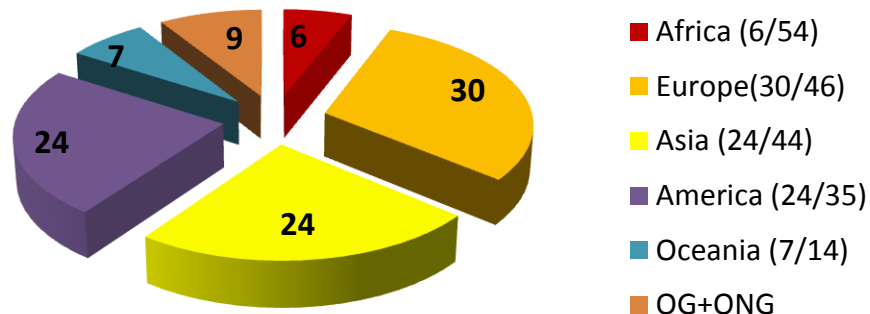




## Africa and UN/COPUOS

### ❖ COPUOS African participation rate

Participation rate in the last session (June 2017)



- ✓ As we can see from this graph, the participation of African countries in international events related to the management of space activities in the world is very low!
- ✓ This result is identical for other entities specialized in space activities.
- ✓ This lack of interest can also be explained by the lack of financial resources experienced by most African countries.....



## Space Law in Africa

### ○ Institutions and Space Law in Africa

✓ To illustrate the situation of space law and its evolution in Africa, we have chosen to present the case of the five major countries using space technology in Africa

States of Members	Space institutions	Copuos Member	Outer Space Treaties	National space law
<b>Morocco</b>	<b>CRTS-CRERS</b>	Since 1961	5 ratified	Decrees covering several aspects of space activity
	Royal Center for Remote Sensing			
	/Royal Center for Sapce Research and Study			
<b>Algeria</b>	<b>ASAL</b>	Since 2002	3 ratified	Decrees covering several aspects of space activity
	Agence Spatiale Algérienne			
<b>Nigeria</b>	<b>NASRDA</b>	Since 1973	4 ratified	Acts covering several aspects of space activity
	National Space Research and Dev. Agency			
<b>South Africa</b>	<b>SANSA</b>	Since 1994	4 ratified	<b>Yes</b>
	South Africa National Agency			The Space Affairs Act (No,84 of 1993)
<b>Egypt</b>	<b>NARSS</b>	Since 1958	2 ratified	Decrees covering several aspects of space activity
	National Authority for Remote Sensing and Space science		1 signed	

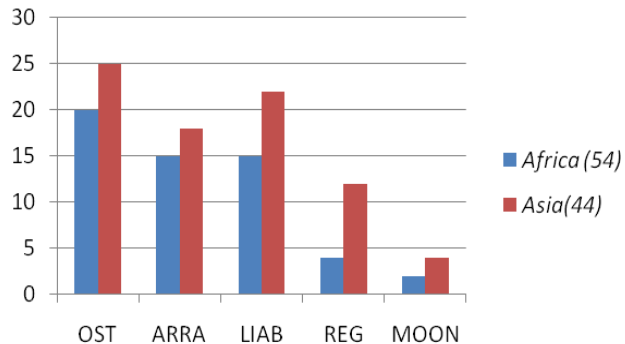
✓ The table above shows that emerging African countries have not yet established their own space legislation, but have all the necessary elements to make one. 10



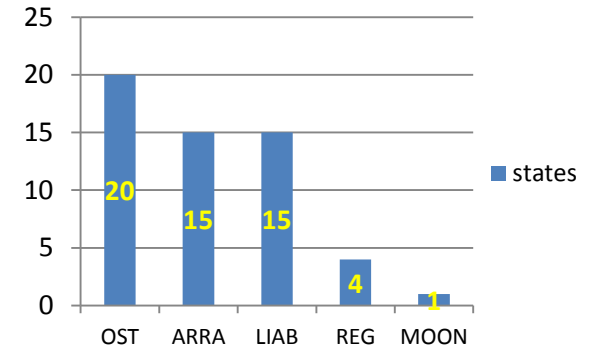
## Space Law in Africa

### ❖ The five treaties and the African ratification

✓ only a few African countries have been able to ratify the five treaties, as shown in the following graph



*Comparison with Asian States*



*The five treaties ratification states in Africa*

- ✓ A comparison of ratification rate has been made between Asian countries and African countries
- ✓ the rate of ratification of five treaties governing the Outer Space in Asia greatly exceeds the ratification rate of African countries

✓ In Asia, during the last decade several national institutions and specialized agencies have been set up to promote science and technology in space



## Capacity building on space activities in Africa (I)

### ❖ Regional Centers for Space Science and Technology Education

Affiliated to the UN

- ✓ The regional centers were recommended by the COPUOS and approved by the G.A in its resolution 45/72 of 11 December 1990,
- ✓ The role of these regional centers, is to promote space science and technology education in developing countries,
- ✓ The African countries hosting the two regional centers are:
  - 1) Nigeria (English speaking countries ) and,
  - 2) Morocco (French speaking countries)
- *The Moroccan Center offers 3 graduate Master (RS&SIG, Satellite Meteorology and Satellite Navigation)*
- *More than 300 participants from member States and others were trained at the Center.*
- *The Centre also organized workshops and symposiums, which have been attended by over 600 participants and experts.*
- ✓ Since 2007, Morocco through the CRTS has supported the introductory teaching of space law at the Masters of the Regional Center of Rabat and continues to be available until today





## Capacity building on space activities in Africa (II)

### ❖ National initiatives for Space Science and Technology Education

- ✓ Few are the African Universities which offer courses specializing in the space science and technology,
- ✓ Most of these initiatives are in the form of training modules offered by national institutions created for this purpose.

✓ Among the countries offering a university degree in space technology in collaboration with specialized national institutions are:

1) South Africa

2) Nigeria

3) Egypt

4) Morocco

5) Kenya

6) Soudan

✓ Other South-South cooperation projects in the field of space technology training are being carried out, Morocco is taking an interesting part in this aspect.



## International Cooperation on space activities in Africa

- ✓ Overall, international cooperation in space technology is highly inadequate in Africa.
- ✓ international cooperation initiatives exist in some African regions to help States develop effective tools to necessary needs
- ✓ These initiatives mainly concern remote sensing.
- ✓ Among these cooperation initiatives are:
  - Tiger
    - GMES-Africa
    - Afri-GEOSS
    - GEOGLAM
    - GEO-CRADLE
    - SERVIR-AFRICA



- ✓ Most of these initiatives do not lead to sustainable international cooperation.
- ✓ In order to ensure sustainable development in Africa, space science and technology capacities must be strengthened.



## How to promote space activities in Africa

- ✓ The promotion of outer space technology in Africa should be done through an African strategy and South-South cooperation.
- ✓ An African space program must be established to define such a strategy.
- ✓ International and regional organizations (AU, UN, etc.) must play a key role in promoting the use of outer space science and technology in Africa.
- ✓ Build a stronger partnerships and international cooperation and coordination in peaceful uses of outer space at all levels.
- ✓ The Office for Outer Space Affairs should assist African States in the use of space for sustainable development
- ✓ The role of OOSA should also be strengthened in disaster management and awareness-raising and capacity-building, including legal and technical assistance
- ✓ Wide access to space data, to achieve sustainable development goals, should be facilitated
- ✓ Intensify coordination efforts among non-governmental organizations the private sector and the user community in Africa.
- ✓ UNISPACE + 50 should play an important role in promoting space activities in their different aspects, scientific, technical and legal



## Space Activities in Morocco

- ❑ National institutions to promote space activities

### ❖ *Two national institutions*

- ✓ There are two Moroccan institutions working in the space field, the Royal Center for Space Research and Study (CRERS) and the Royal Center for Remote Sensing (CRTS)
- ✓ The two Centers are departments under the Ministry of Defense.
- ✓ The Royal Center for Remote Sensing was established as an R&D centre in remote sensing and related technologies in August 1988 and was fully operational in January 1990
- ✓ The Royal Centre for Space Research and Study (CRERS) was created in 2001 after the launch of the first experimental satellite, to develop Moroccan space technology.





## Space Activities in Morocco

### ❑ Principal objectives of CRTS

✓ To develop applications of remote sensing and related technologies for use in operational agencies and ministerial departments for more effective management of :

*Agriculture production*

*Natural resources,*

*security.*

*land development*

*Environment,*

*Capacity Building*

*Disaster,*

### ❑ CRTS Vision

✓ CRTS aims to :

- become a leading institution in the field of Geo-Information production,
- develop R&D and capacity building in the field of earth observation,
- encourage the use of remote sensing tools to contribute to the development and prosperity of the country.



## Space Activities in Morocco

### ❑ CRTS Mission

✓ There are four main missions that justify the existence of the center:

- *Promote and integrate the Earth Observation technologies to enable Morocco to effectively use and exploit satellites data and applications **to meet needs of users and decision makers** involved in Socio-economic and development projects at the national level,*
- *Centralize and coordinate the acquisition and management of satellite data to facilitate easy and fast access for all users to satellites adapted to their needs and requirements,*
- *Promote capacity Building and Human Capital development to maximize the use of Remote Sensing in the country,*
- *Promote Space Law and Space Technologies to raise awareness among decision-makers, students and the general public of understanding space activities by organizing seminars, workshops and international conferences.*



## Space Activities in Morocco

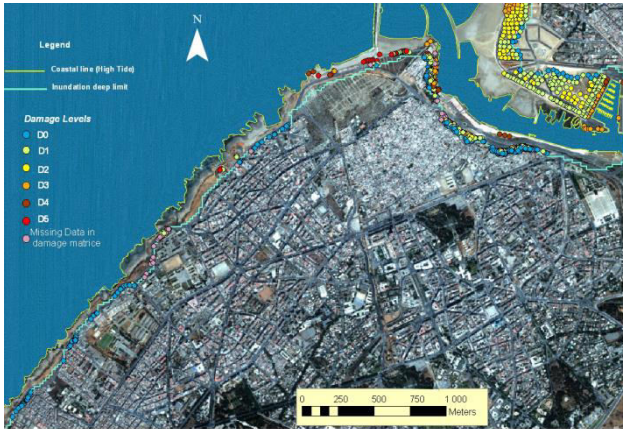
### ❑ Strategic objectives

- ✓ Providing support to decision-makers in all sectors
- ✓ Working with various government departments of different joint projects
- ✓ Participating in several national commissions and working groups, to enhance the national capacities in space affairs.
- ✓ Empowering Moroccans in Earth Observation scientific technology and applications and enhance their skills.
- ✓ Raising community awareness of, and culture in space technology and its applications.
- ✓ Creating a productive environment conducive of researches and initiatives and act as a effective scientific Center.
- ✓ Acting as a cooperative regional and international network of Earth Observation technology and its applications.
- ✓ Establishing appropriate infrastructure for Geo-Information data and services in the country.

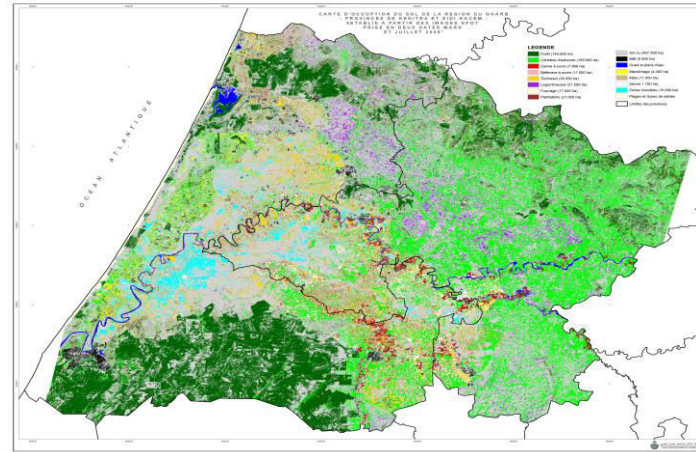




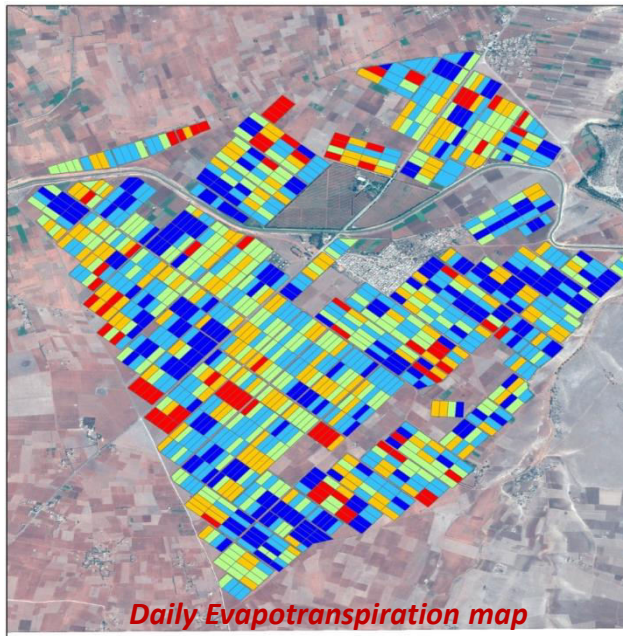
## Examples of Some Applications



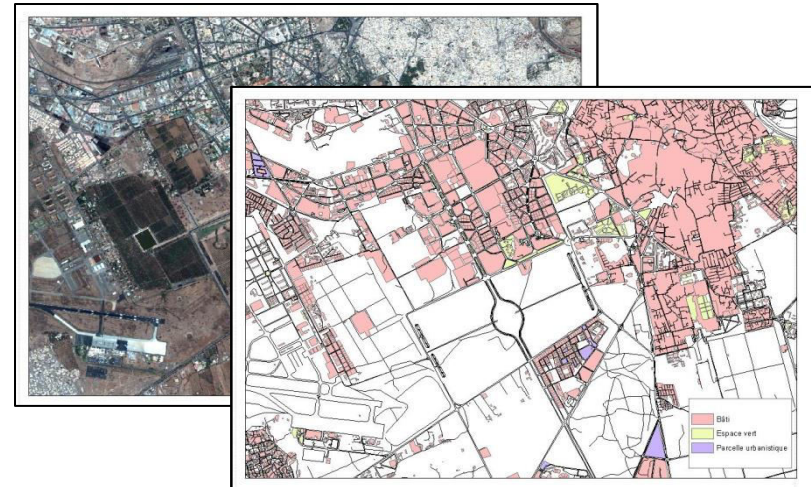
**Modeling of Tsunami Risk**



**agricultural resources management**



**Daily Evapotranspiration map**



**Urban mapping for water distribution network**





## Space law in Morocco

### ❖ The Moroccan space law situation

- ✓ Morocco is a member of COPUOS since 1961
- ✓ Actively takes part in the proceedings of the committee and its subcommittees since 1992
- ✓ United Nations Treaties

Morocco has ratified all the UN treaties :

- The outer space treaty
- The rescue agreement
- The liability convention
- The registration convention
- The Moon agreement

### ❖ Actions that allowed the promotion of Space Law in Morocco

- ✓ Information actions were organized frequently, to increase public awareness



## Space law in Morocco

- ❖ Actions that allowed the promotion of Space Law in Morocco
- ✓ Tree regional workshops on space law dedicated to French speaking African countries are organized;

*All the workshops were  
Co-organized with European partners, ESA-ECSL, CNES  
ASI, DLR, and regional organization, CRASTE-LF*

- ✓ Active involvement to regional workshops in space Law co-organized by OOSA or others international organizations;
- ✓ Participation to international space law courses organized by ECSL
- ✓ integration of space law in the University and regional centres curricula



## Training and R&D in space activities

Objectives : Enlarge users community and enhance national and regional capacities

- ✓ Dedicated infrastructures
- ✓ Annual program : Up to 10 training sessions / Year
- ✓ specific programs for International users (Africa, MENA)

*Training on Space techniques for  
the benefit of representatives of the  
UNDP-Africa*



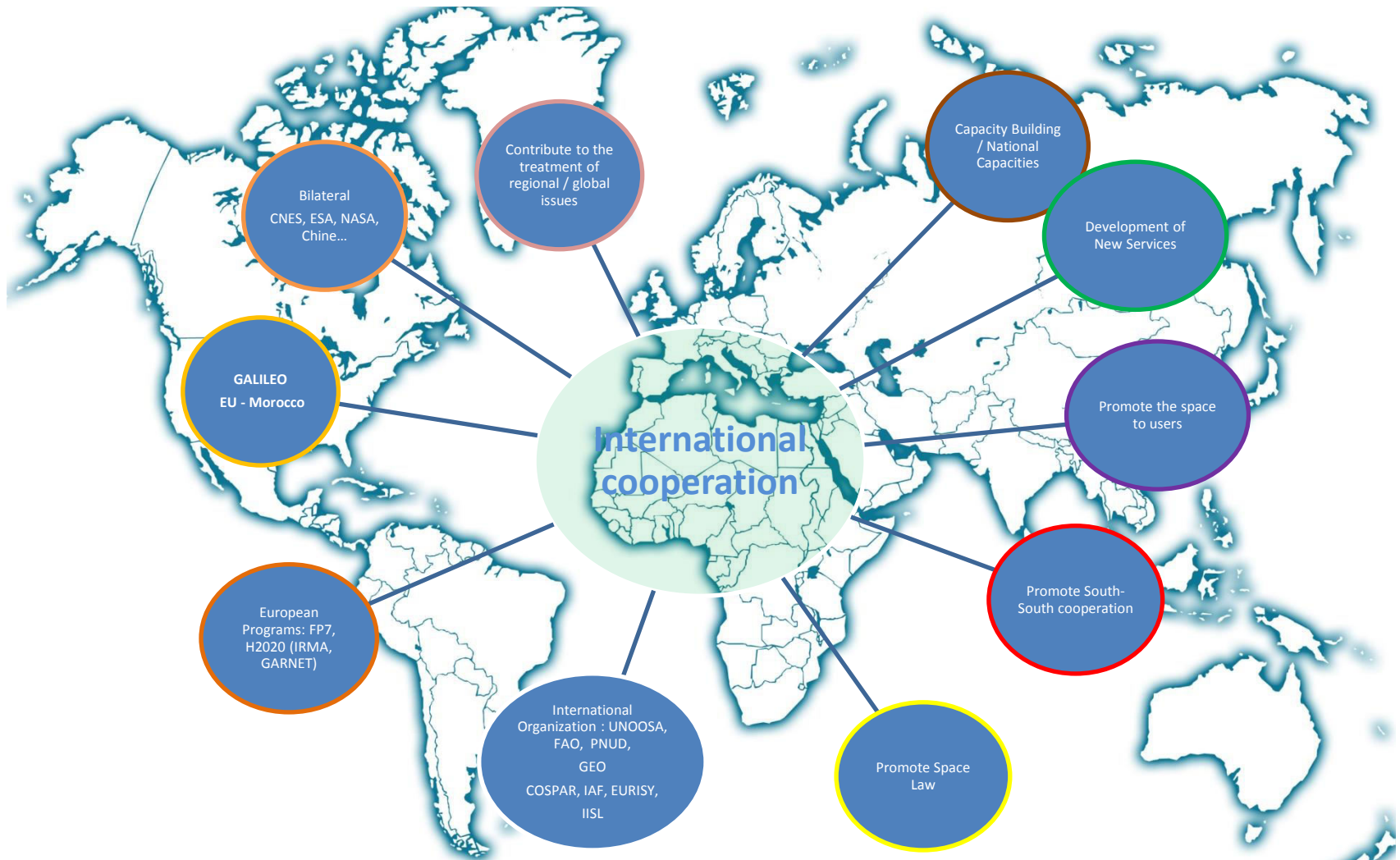
*CRTS  
16-20 October 2017*

Beneficiaries : National and from the region

- ✓ Cooperation with international organizations (ESA, FAO, COSPAR, ECSL, UNDP, UNESCO, FMI, OADA)
- ✓ More than 2,000 people benefited from this training programs



## International cooperation in space activities



*lot of cooperation throughout the world*



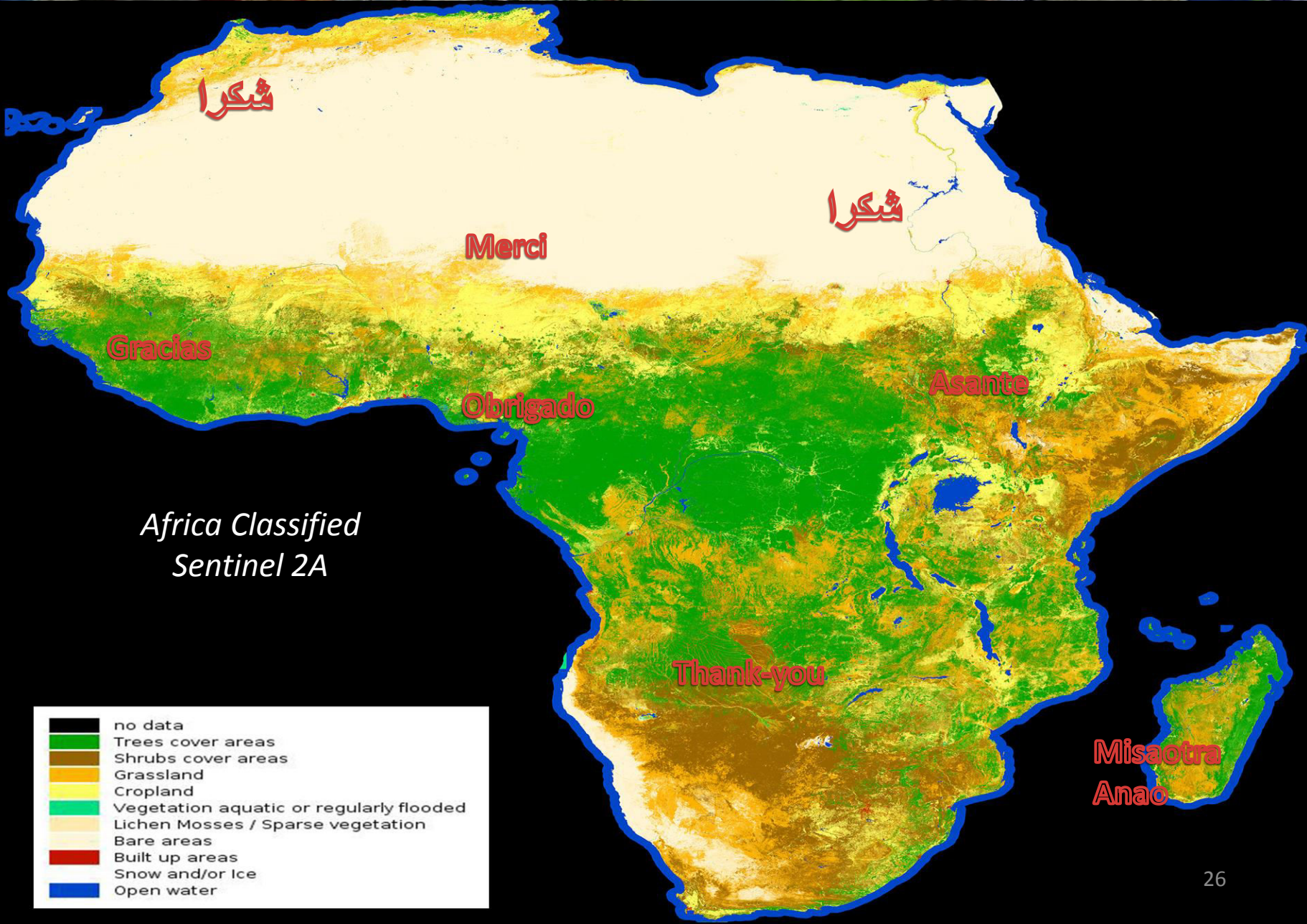


## Space Activities in Morocco

### ❑ Moroccan space program

**A 30-year program that starts in 1989 with**

- ✓ the creation of CRTS then CRERS
- ✓ promoting the use of satellite data for decision-making
- ✓ value-Added Services proposal to support the user community
- ✓ launch of the first experimental Moroccan satellite 2001
- ✓ generalization of the use of satellite data and information systems for the socio-economic development of the country.
- ✓ capacity-building in the field of space techniques
- ✓ use of high resolution satellite data by installing a SPOT receiving station
- ✓ wide and fruitful international cooperation with many international institutions and organizations.
- ✓ Earth observation Satellite launch project in 2017 and 2018



Africa Classified  
Sentinel 2A

	no data
	Trees cover areas
	Shrubs cover areas
	Grassland
	Cropland
	Vegetation aquatic or regularly flooded
	Lichen Mosses / Sparse vegetation
	Bare areas
	Built up areas
	Snow and/or Ice
	Open water