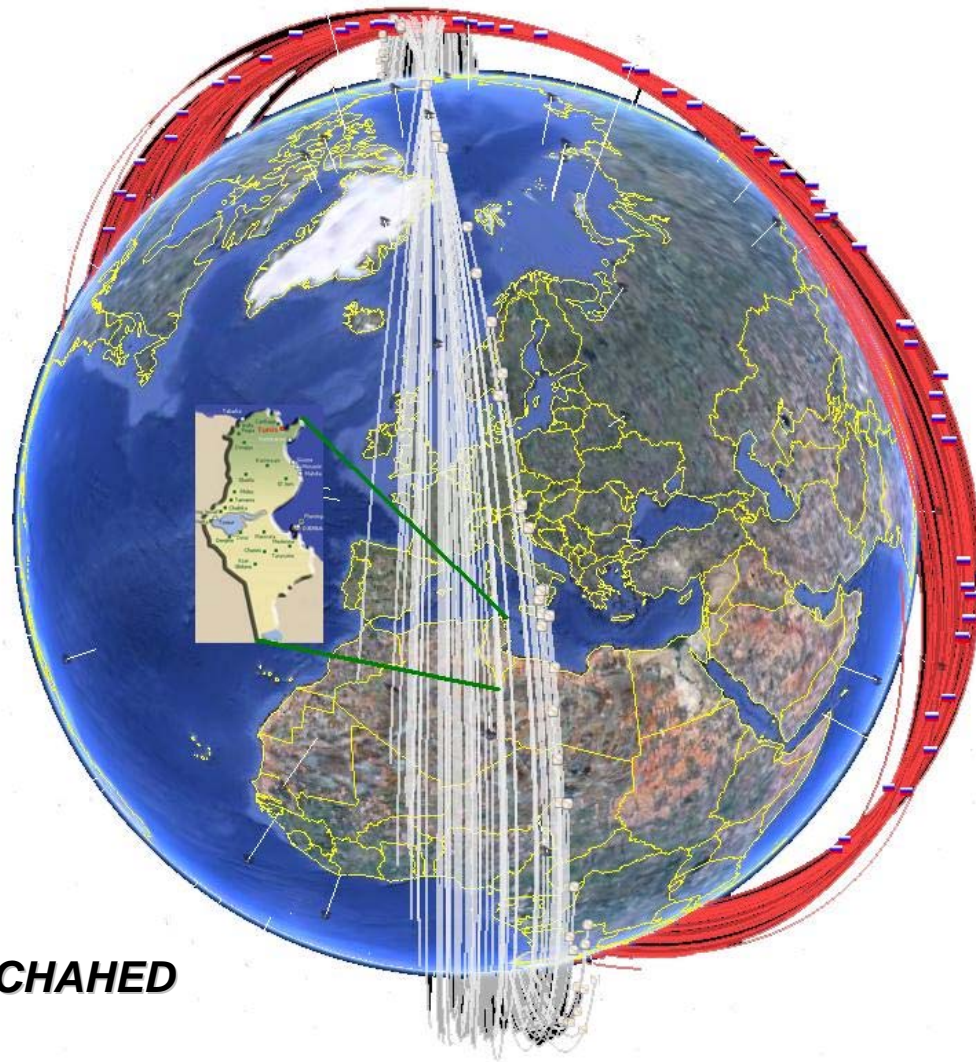


# SPACE ACTIVITIES



## IN TUNISIA



**Thouraya SAHLI CHAHED**

VIENNE 08 Fevrier 2010



# PLAN

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- INTRODUCTION
- SPACE
- EARTH OBSERVATION
- GEODESY
- METEOROLOGY OBSERVATION
- EDUCATION AND RESEARCH
- MANIFESTATION AND VULGARIZATION
- ORIENTATION

# INTRODUCTION

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## THE DEVELOPMENT MODEL

Promotion of human resources in all fields;

To provide its citizens access to knowledge and communication technologies and information;

allocation by the State of a large budget to promote scientific research;

### **In this approach**

Encouraging knowledge and understanding of space extension of knowledge for all scientific research and its integration into international programs.

# SPACE

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Tunisia is interested in the peaceful use of space since the launch of first satellite in 1957

The Tunisian interest at all levels actually resulted in the creation of :

- the National Commission of Outer Space in 1984
- the "National Center of Cartography and Remote Sensing " in 1988

Participation

Significant role in launching the Arabsat satellite, while enjoying the lattice space telecommunications.

# SPACE

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## PARTRICIPATION

Attendees at the heart of debates on other applications of space technology for economic development :

- tele-education (education for TV) ;
- telemedicine ;
- applications for economic development.

Global presence in the international congresses and global United Nations conferences ;

Contribution to activities of the International Astronautical Federation (IAF), International Academy of Astronautics (IAA) and the International Institute of Space Law (IISL) by Tunisian scientific associations.

# SPACE

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## PARTRICIPATION

Positive contribution of specific networks ;

A proposition of project about a communication satellite for the Maghreb ;

Participation in major regional and international programs / project space communication through the satellite system GMPCS-I (North Africa and Southern Europe) ;

# EARTH OBSERVATION

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Mapping and digital data needs (key sectors of the economy: agriculture, land use and urban planning, environmental protection, private sector).

Effective management and data exploitation

That's why a national institute dealing with geomatics had to be created (CNCT) in July 1988 to meet the needs of data through its contribution to projects related to the national priority issues through studies and projects.

# EARTH OBSERVATION

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Natural resources  
management

Climate  
changes

Environment  
monitoring

Definition and planning of development projects,  
study of their impacts on the environment  
project implementation monitoring  
compilation of long series of observations coherent  
and comparable

- In real time (warning and forecast)
- Time delayed (methodologies)



# ENVIRONMENT

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Several projects and studies using satellite imagery as a source of information is conducted within the National Center for Cartography and Remote Sensing with national partners in the main themes :

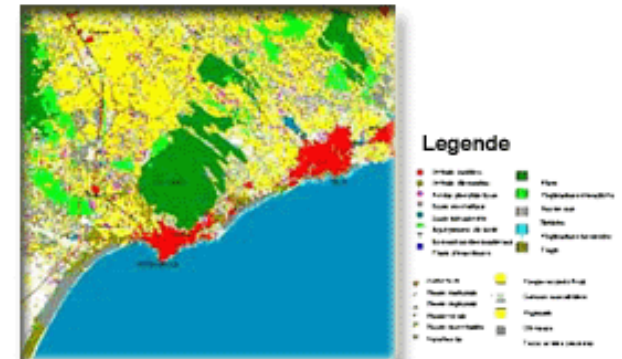
- coastal and marine environment ;
- Development ;
- Desertification ;
- Natural Hazards ;
- Agriculture.

# LITTORAL

- Study of marine pollution ;
- Assessment, monitoring and surveillance of marine and coastal ecosystems in South Mediterranean ;
- Coastal Protection ;
- Mapping i.e phyto-ecological.



Cartographie du panache du rejet



Utilisation du milieu

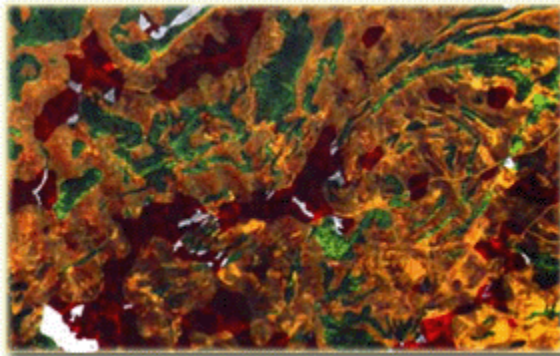
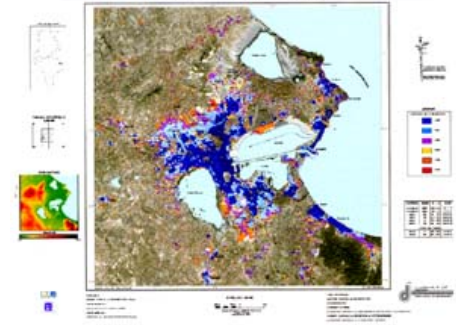
# AMENAGEMENT

## Urban planning

urban pressure on agricultural lands in the main cities;

Master plans for major Governorates.

CARTE DE L'EVOLUTION DE L'AGGLOMETRIE DE TUINS (1975-1991)



Sensibilité à l'érosion

## rural planning

Mapping of water conservation structures and soil ;

dispersed rural housing (solar electrification)

Master Plan of the Southwest

## Infrastructure and equipments

- Airport site selection;
- *Remote sensing survey of motorway section integration*

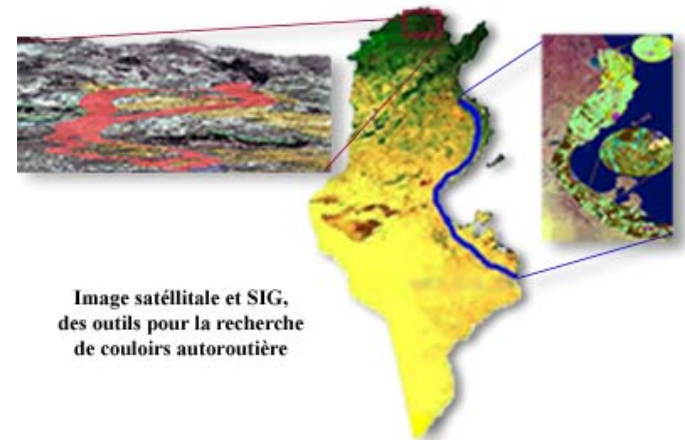
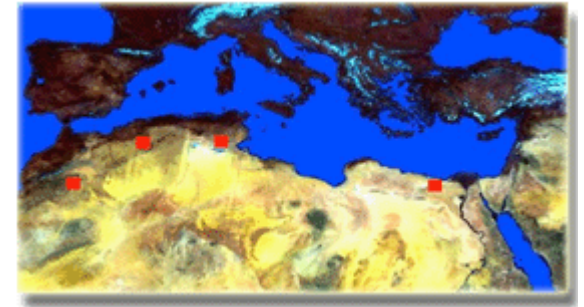


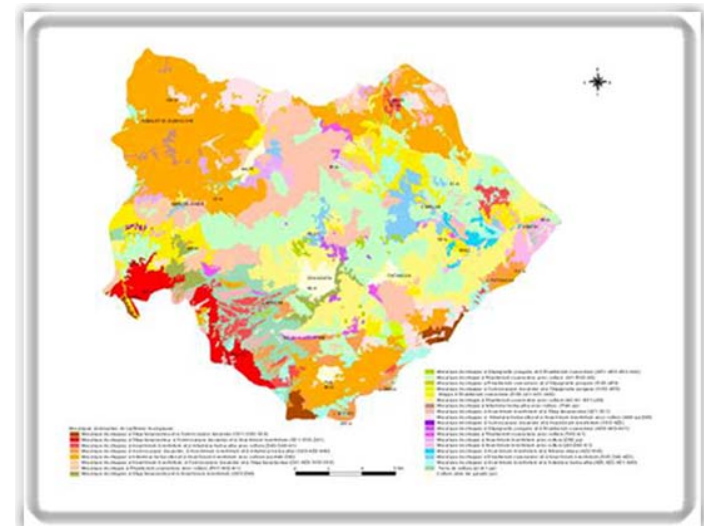
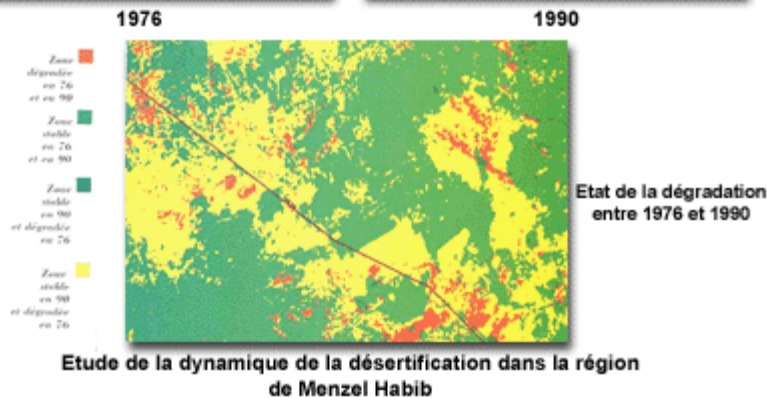
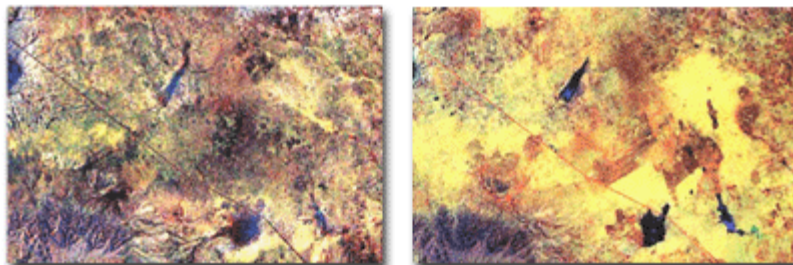
Image satellitale et SIG, des outils pour la recherche de couloirs autoroutière

# DESERTIFICATION

- Study of desertification dynamics
- Satellite Monitoring of Desertification
- establishment of a monitoring system (indicators) and control

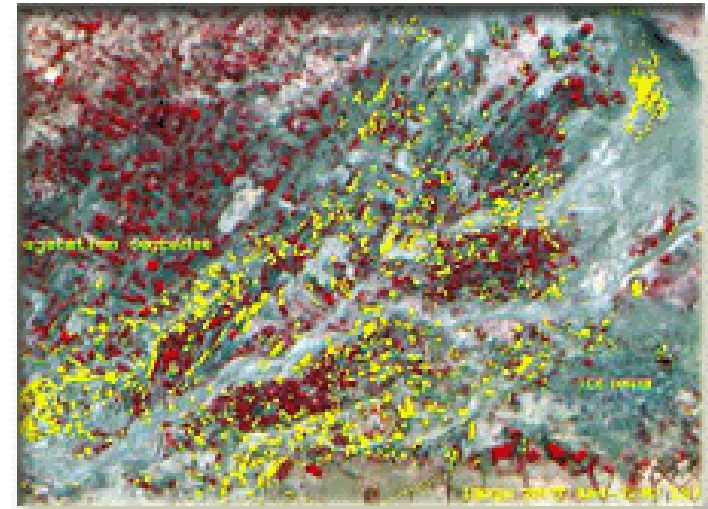


Many projects dealing with desertification



# NATURAL RISK

- The assessment of damage caused by floods in January 1990 in the region of Sidi Bouzid ;



■ Cartographie de la Végétation dégradée  
Inondations de Sidi Bouzid (1990)

- The design and implementation of a Tunisian system of prevention and fight against the risk of forest fires.
- North African System for drought early alert SMAS.

# AGRICULTURE

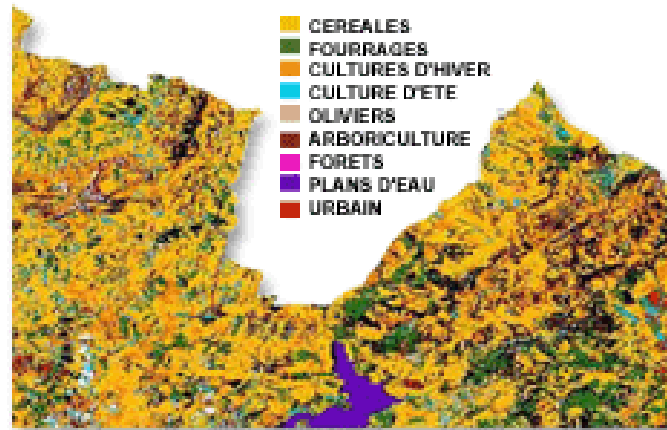
## Ressources naturelles

Forest inventory using remote sensing (INFOTEL) ;

Inventory of forest clearings ;

Oasis Inventory in Kebili governorate;

Geological cartography of north de la Tunisia ;



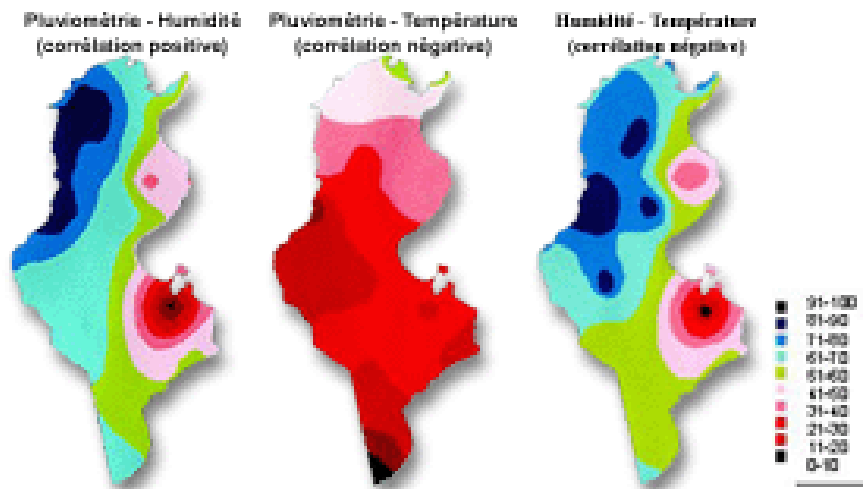
Gouvernorat de Béja



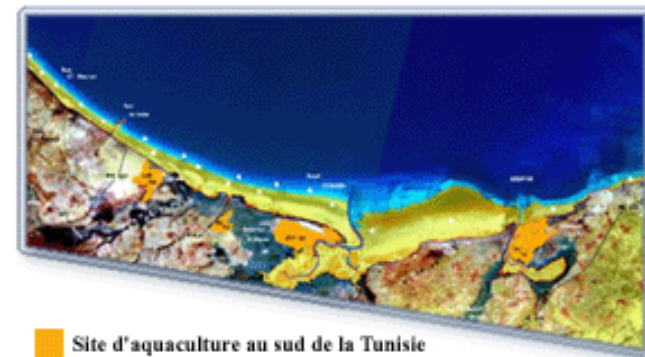
Carte des ressources forestières et pastorales  
(Béja, Jendouba, Bizerte)

# AGRICULTURE

- Selection of suitable sites for the location of dams in the region of Beja
- Selection of suitable sites for aquaculture
- Using NOAA images for surface water monitoring and control
- Sustainable Management of Scarce Resources in the Coastal Zone (SMART);
- Optimisation for sustainable Water Management (OPTIMA)



Recherche des Sites Potentiels pour l'Aquaculture



# GEODESIE

- Since 1997, geodesic networks in space technology (GPS) have been established:

- Spatial Reference Network: 28 points
- base Network : 600 points
- Secondary network: about 10,000 points

***These networks are used mainly for geo-referencing cadastral***

In topography, survey techniques using GPS in real time have been introduced for the preparation of cadastral maps

In addition, a network of 30 permanent GPS stations is established, geographically well distributed on the territory of countries with continuous data.



# METEOROLOGY OBSERVATION

Program of the World Weather Watch (WWW) of the World Meteorological (WMO),

National Institute of Meteorology (INM),  
relies on the use of outer space to ensure

The function of the observation of systematic observations on weather, water, climate, chemical constituents of the atmosphere and other environmental parameters.

Telecommunication Service : Data collection for national monitoring network, exchange of meteorological information of various types (pressure, temperature, humidity, seismic activity, etc.. ...) And different kinds (text, images ...) from every country in the world.

# METEOROLOGY OBSERVATION

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## Geostationary meteorological satellites

- Autonomous station: acquisition and use of data from the European system Meteosat (Eumetsat) ;

Meteosat : cloud of the surface underlying the temperature, humidity and ozone in the atmosphere ;

- The real-time monitoring of cloud masses and weather
- The automatic extraction of geophysical parameters
- The treatment of climatological series on clouds and rain, the surface temperature of the earth or the sea ...

# METEOROLOGY OBSERVATION

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## **POLAR meteorological satellite :**

A Station HRPT (High Resolution Picture Transmission) acquired by the MNI in 1995 from American Global Imaging.

Receive Data High resolution images (1.1 km) transmitted by the satellite NOAA

Strengthening technical Meteorological Remote Sensing to better and immediate forecasting of meteorological phenomenon (heavy rainfall).

Research and development of applied meteorology.

# METEOROLOGY OBSERVATION

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- The MetOp satellites used for precise observations of atmospheric conditions (temperature, moisture profiles, information on the chemical composition and aerosol content of the atmosphere).
- For weather forecasting, numerical weather prediction models and climate monitoring and the environment.
- MetOp (global EUMETSAT + NOAA = IJPS) weather service division to ensure that from polar orbit.

# METEOROLOGY OBSERVATION

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## Telecommunication facilities

- Use of radio communications for the reception of satellite data and radiosonde data.
- VSAT connections under the project Seismic Warning Network in Tunisia (RAST)
- Assistance in international shipping: Information Systems NAVTEX and SOLAS .
- Microwave Communications for control and data acquisition Meteorological Radar

# ENSEIGNEMENT & RECHERCHE

- The Ministry of Higher Education, Scientific Research (MESRS) through its research institutions and / or educational work in the use of spatial information for the development of related sectors,
  - The earth sciences,
  - In planning
  - Telecommunications,
- Research for development of certain spatial components,
  - Research building micro satellite the National Engineering School of Sfax (ENIS), ISSAT
  - Construction of some satellite components, Faculty of Sciences Monastir (FSM) de Monastir (FSM)

# EDUCATION & RESEARCH

## Contributions Institutions E&R

institutes are Teaching techniques for processing satellite images for earth observation arising on diploma and master by field of expertise: Geographic (FLM), the earth sciences, geology (FST), environment (ENIS), rural (INAT), Planning (ISTEUB) ...), the laboratory of remote sensing and spatial information system (ENIT)

Occupational hazards related to space users FMS

# MANIFESTATION & VULGARIZATION

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- Cité des Sciences de Tunis (CST) . Palais des Sciences de Monastir (PSM) Ecole d'Ingénieurs de Sfax (ENIS)
- Centre National de la Cartographie et de la Télédétection (CNCT)
- Association Tunisienne de Communication et des Sciences Spatiales (ATUCOM) association Jeunes Sciences de Tunisie (AJST) .
- Association Tunisienne de l'Information Géographique Numérique (ATIGN)



# MANIFESTATION & VULGARIZATION

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## COOPERATION AND PARTNERSHIP

### Nationally

Agencies, educational institutions and research (Partnership in Action and the project operator and enhancing the spatial data in various application areas.

### Regional level

The Regional Center for Remote Sensing of the States of North Africa CRTEAN headquarters in Tunisia (Algeria, Egypt, Morocco, Mauritania, Sudan, Libya and Tunisia) and Tunisia chairs its board of directors from 1990 to 2006.

Tunisia also chairs the board of directors of the African Organization of Cartography and Remote Sensing (OACT).

# INTERNATIONAL COOPERATION

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- States Euro-Mediterranean joint projects of scientific research through programs of scientific and technical cooperation.
- International organizations involved in Earth observation
- Membership in 2009 the IAF
- Focal Point Regional Activity Center for Remote Sensing in the Plan of Action for the Mediterranean (ERS / RAC MAP).
- INAT is Member in GEO
- focal point for UN-SPIDER.

# FUTURE ORIENTATION

Tunisian policy to date, the ratification and implementation of international treaties it has acceded, namely the space treaties, OST, LIAB and REG.

## ***Futur***

Training skills in the space field.

Studying a more ambitious national program and strategy for its implementation;

Take a more active part in events and activities,

Strengthen the partnership and cooperation with agencies and regional and international institutions;

Work towards the establishment of a spatial structure of high level.

**application to join the COPUOS in 2010**



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THANK YOU  
FOR  
YOUR ATTENTION

شكروا على الأمانة