



Promoting Cooperative Solutions for Space Sustainability



Local & Regional Authorities Going Green...Sustainable...and “Spacy”

Making cities and towns sustainable – What is the role of space applications?

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Lecture Environmental Protection Bureau of the
City of Nanjing, P.R. China





Promoting Cooperative Solutions for Space Sustainability

**The Secure World Foundation (SWF)
is a private operating foundation
dedicated to the secure
and sustainable
use of space
for the benefit of Earth
and all its peoples**



Promoting Cooperative Solutions for Space Sustainability

Basic Facts

- Non-profit operating foundation founded in 2004
- Funding comes from a private endowment
- Offices in Colorado, Washington DC and Brussels
- 4 focus areas: Space Sustainability, Space Policy, Human and Environmental Security and Planetary Defence



Promoting Cooperative Solutions for Space Sustainability

What Does the Foundation do?

Engages with academics, policy makers, scientists and advocates in the space and international affairs communities to support steps that strengthen global space security.

Promotes the development of cooperative and effective uses of space for the protection of the Earth's environment and human security.

Acts as a research body, convener and facilitator to advocate for key space security and other space related topics and to examine their influence on governance and international development.

What is the first thing that comes to your mind when you hear space?

Are you using space applications in your daily life?

Do you think that space; spatial information and data can support policies on different levels?

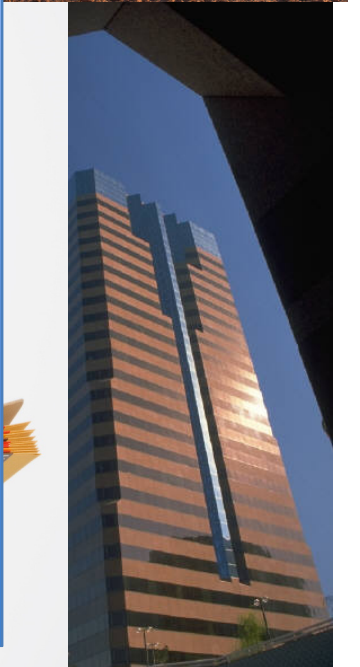
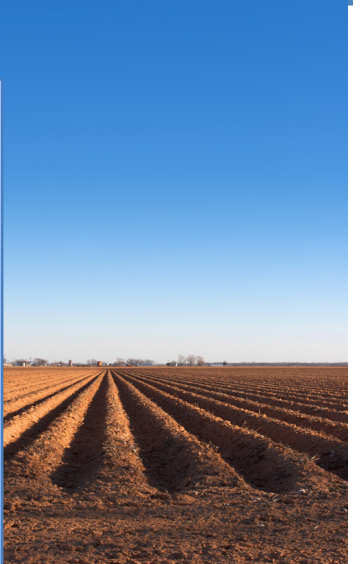


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Where space based information can be used?



Agriculture
Urban areas
Energy
Environment
Forestry
Health
Natural and Cultural Heritage
Risk Management
Transport
Tourism



Are you using navigation system?



How important do you think space derived services and space technologies are?

1. Development of innovative terrestrial application (remote medical assistance) (81%)
2. Industrial competitiveness, growth and creating of jobs (76%)
3. Policy (transportation, environment...)

Which navigation based services accessible via handled services do you find most useful?

1. Search and rescue operations
2. Help people with disabilities (blind people)
3. Real time information about dangerous situation on the road (traffic)
4. Weather forecast
5. Public transportation
6. Social networking
7. Real time information about available park
8. Nearby restaurants, hotels

Day without a satellite?



NO
Timing



NO
Navigation



NOPE...S
NO SIG

No weather
forecast



No
telecommunication

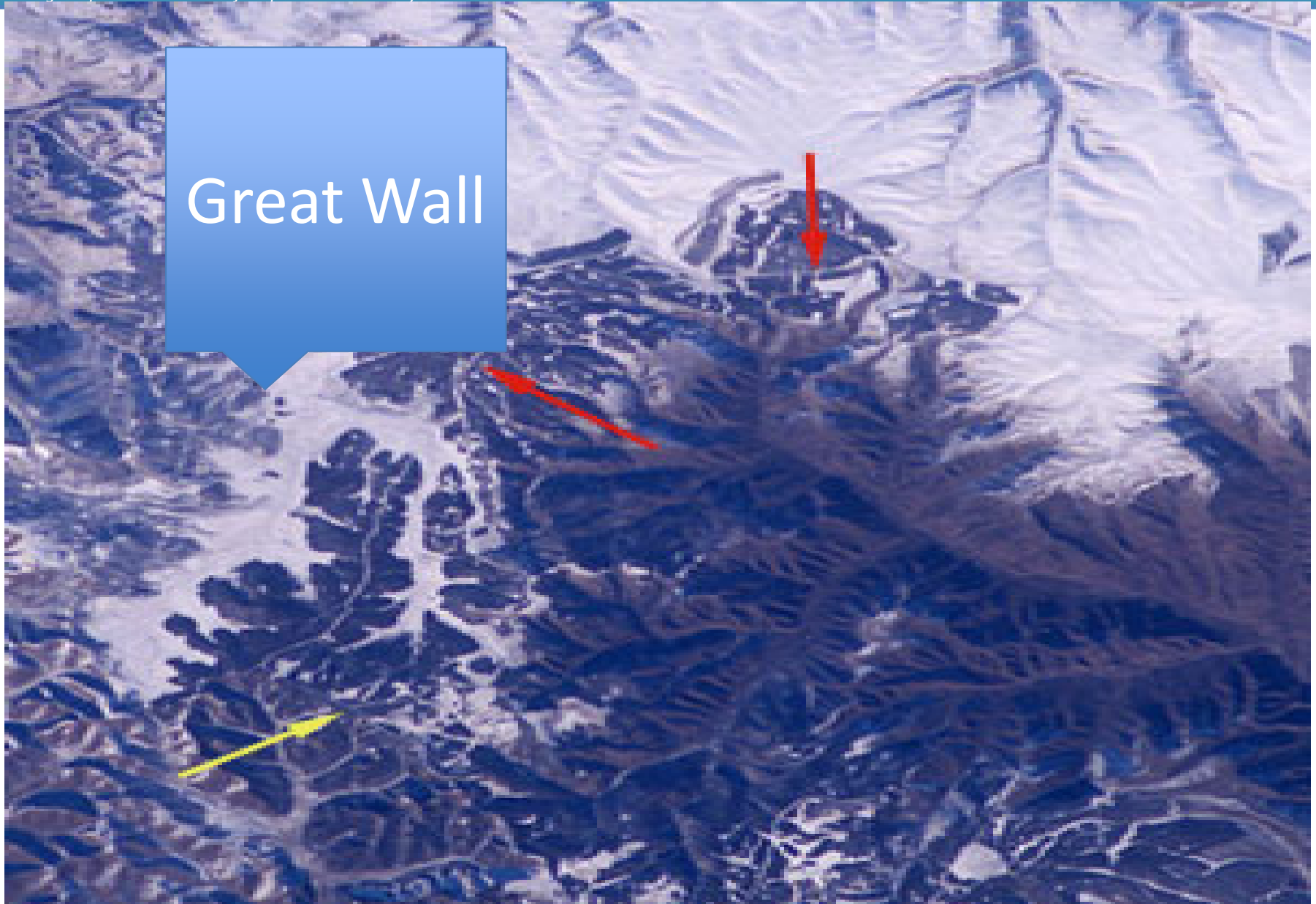
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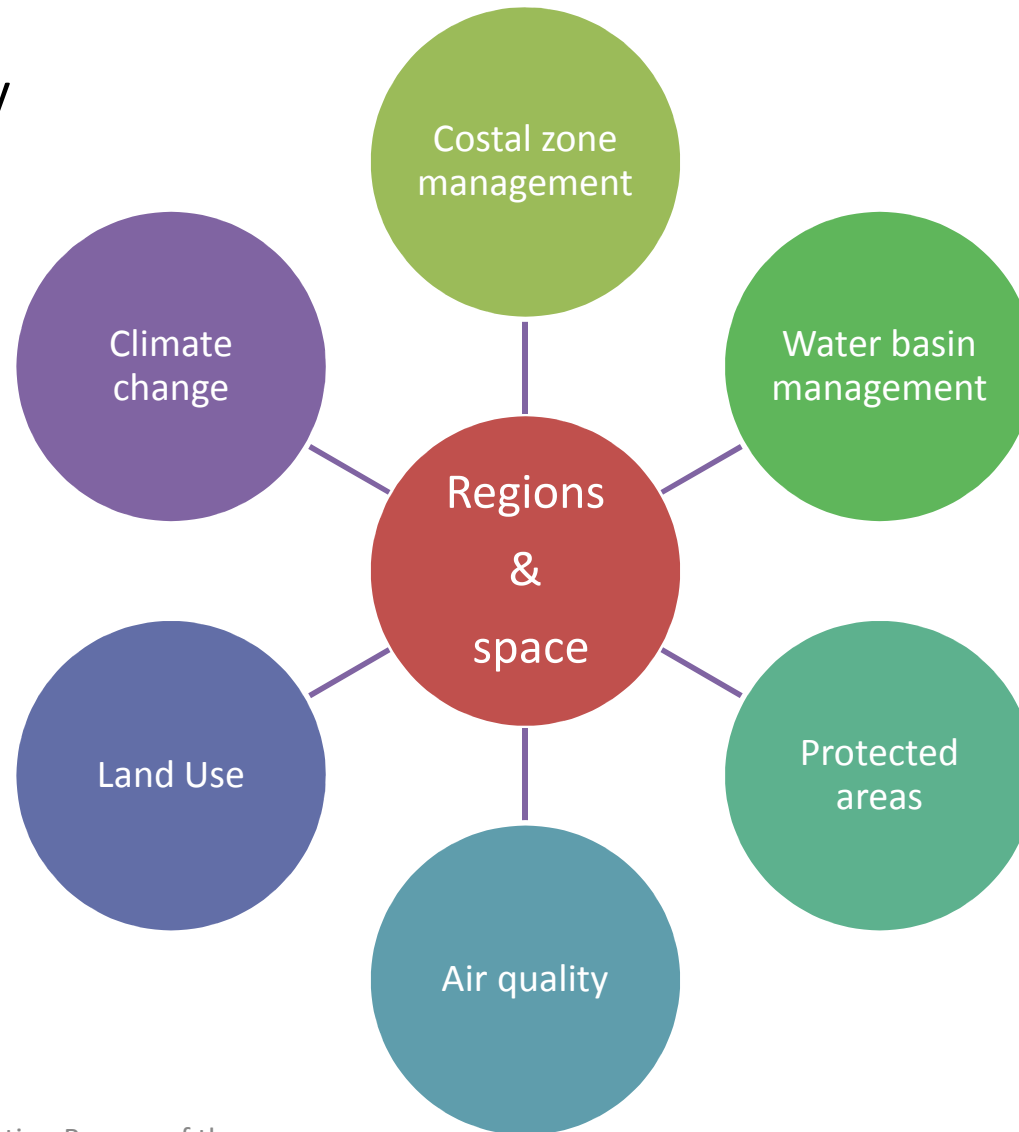
**EO
Satellites**

- Earth Observation satellites vary according to the orbit they are in, the payload they carry, and, from the point of view of imaging instruments, the spatial resolution, spectral characteristics and swath width of the sensors. All these parameters are designed at the beginning of the mission definition depending on the application the satellite mission is targeting

Examples of Satellite Images



Regions....reality





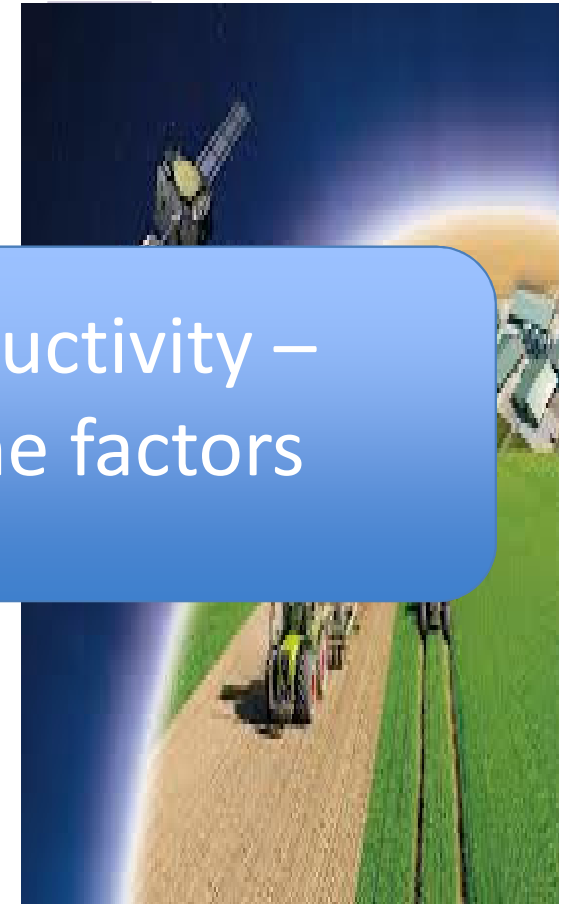
- Monitor crop acreage and livestock tracking
- Monitor crop health and yield
- Monitor soil moisture and nutrient levels
- Monitor weather and climate data
- Improve crop yields from customised treatment
- Support more efficient property management
- Track food enhancement

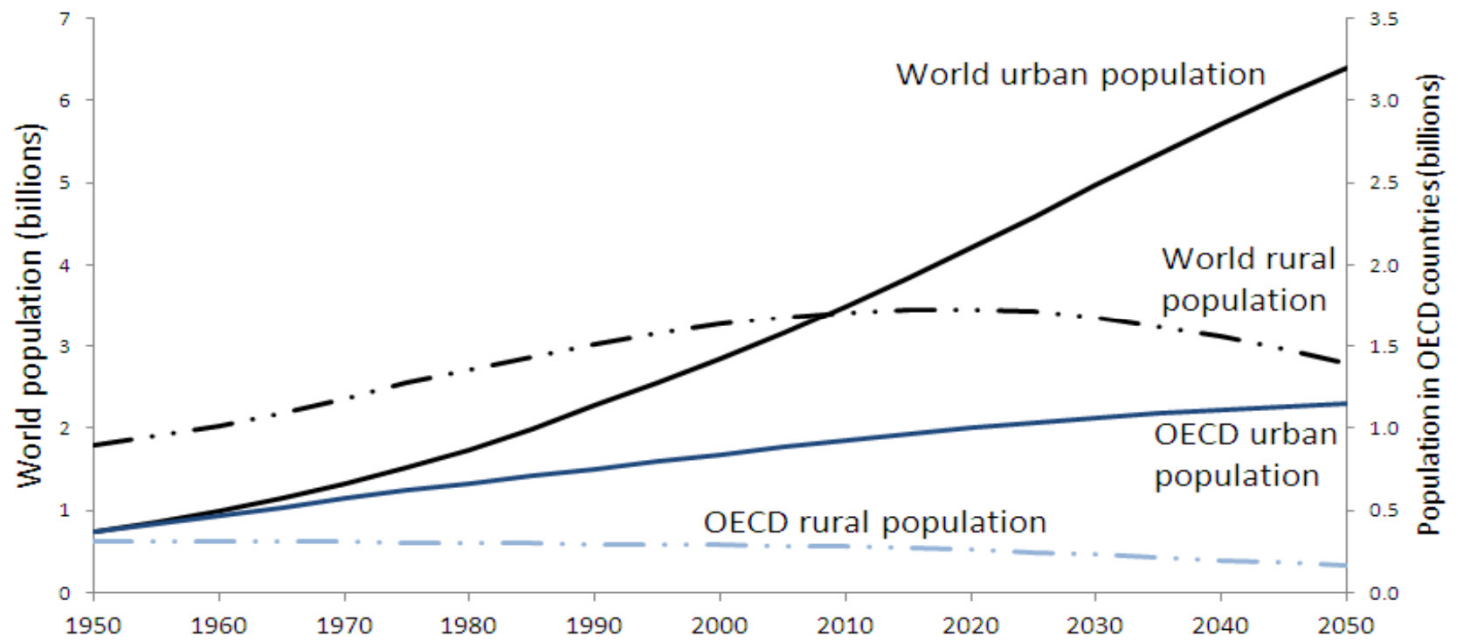


- Support rational use of fertile lands

Increase agriculture productivity – optimum utilization of the factors

- Monitor weather and soil moisture for agriculture to improve irrigation system





Langfang

Tianjin



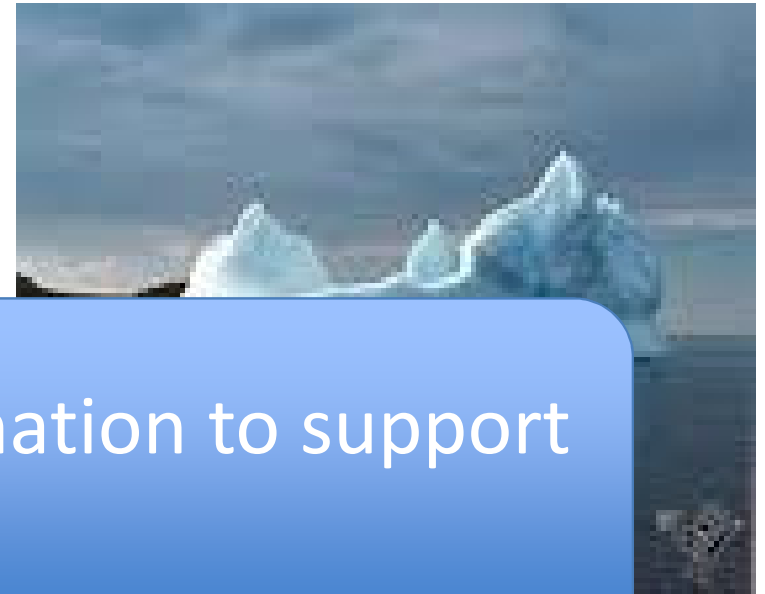
Navigation/Positioning

- Monitor ionosphere for earthquake
- Monitor atmosphere, water vapour for weather forecasting and climate studies
- T
- T

Produce data and information to support policies

Earth O

- Monitor/forecast radiation
- Monitor/forecast ozone
- Address shortages and desertification – monitor water storage

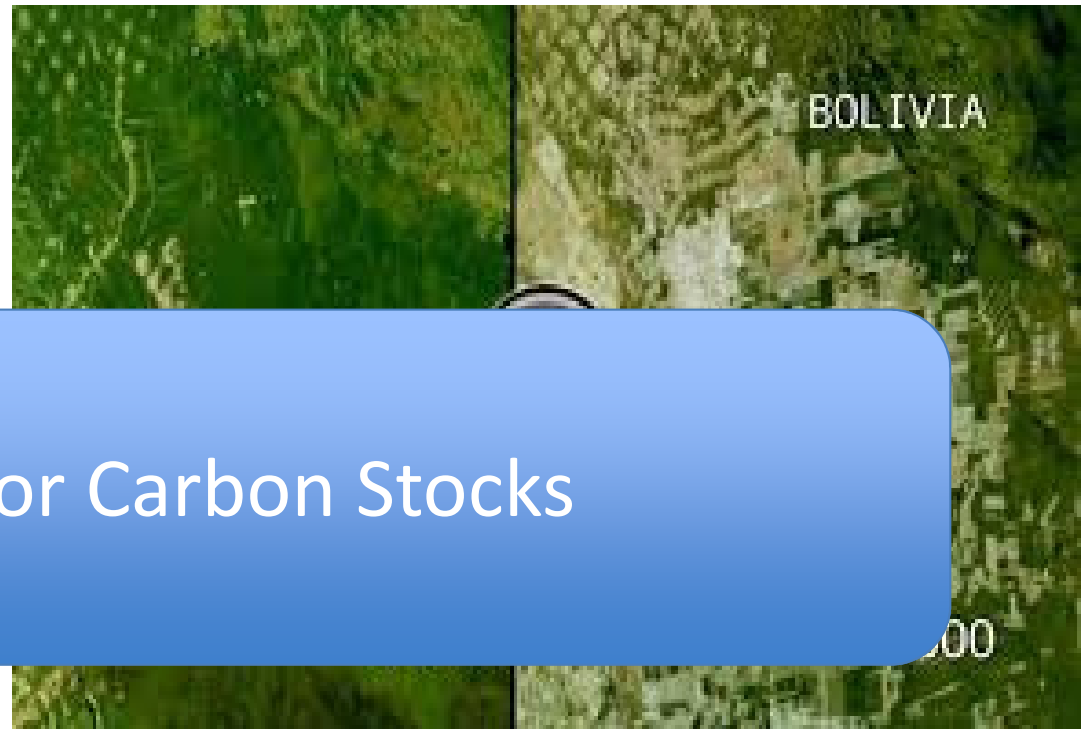


Current Situation

- Influence the carbon, water and energy cycles
- Protect land from erosion, flood, drought, yield food, medicines and biodiversity
- But economic resource
→ deforestation



- Satellite data and ground-based measurements estimate the amount of carbon stored in forests, which is related to anthropogenic greenhouse gas emissions and climate change
- The geographical maps updated with satellite images can cover the whole country



Current Situation

- Providing adequate medical care in remote areas poses a number of difficulties. Rural clinics are often not well staffed
- Lack professionals trained in specialty fields
- Malaria and other diseases are still a serious concern in developing countries and all around the world
- Air Pollution



What space applications can provide?

- Telemedicine provides assistance and expertise to personnel working in remote areas. It has been used in the United States for more than 40 years, providing improved access to rural communities at lower costs
 - Remote sensing, geographic information systems, and mapping
 - Information
- Telemedicine
 - Prediction and avoidance of diseases



Transportation

Ensure mobility of
persons and goods



Ship detection for maritime

Accurate and real time data

Smart traffic signals

Environmental
sustainable transport



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Drinking/fresh water



Lakes/ivers



DANGER
Polluted water



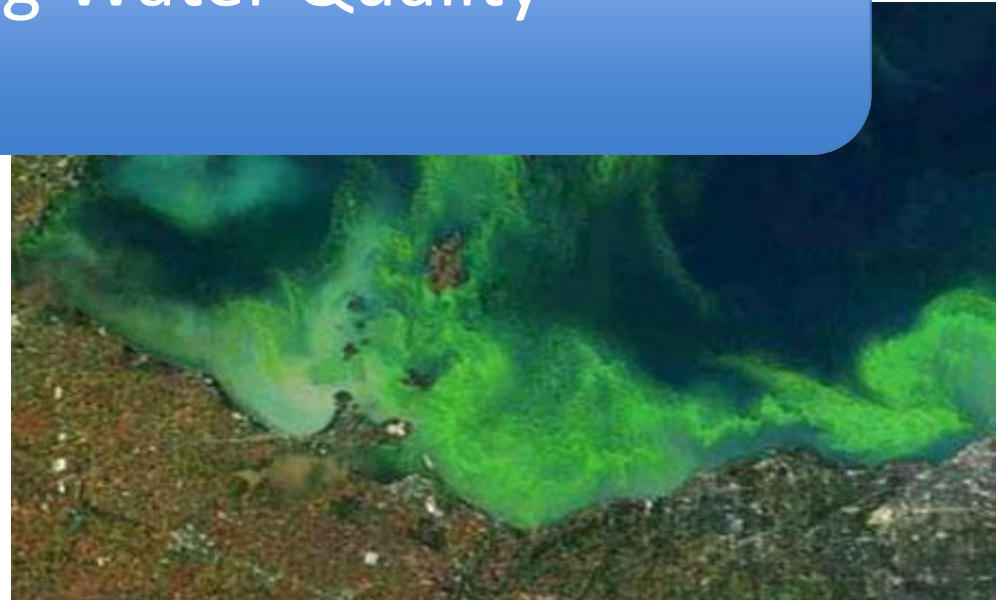
Bathing
prohibited in
this area

Satellite information

- Monitor the effect of climate change on lake/river's ecosystem
- Assess the level of pollutants and potential risk for the

Monitoring Water Quality

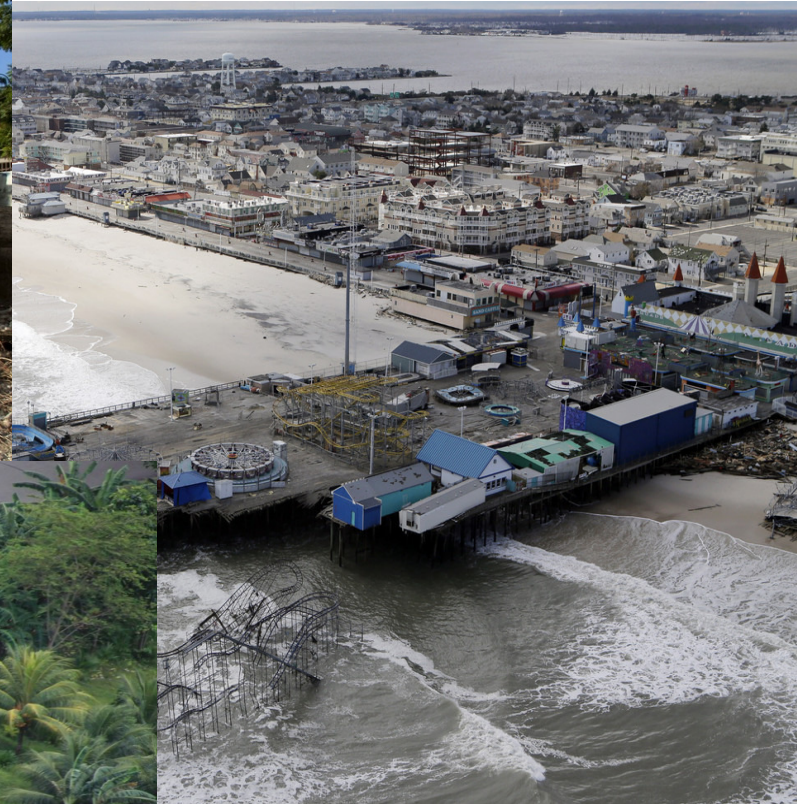
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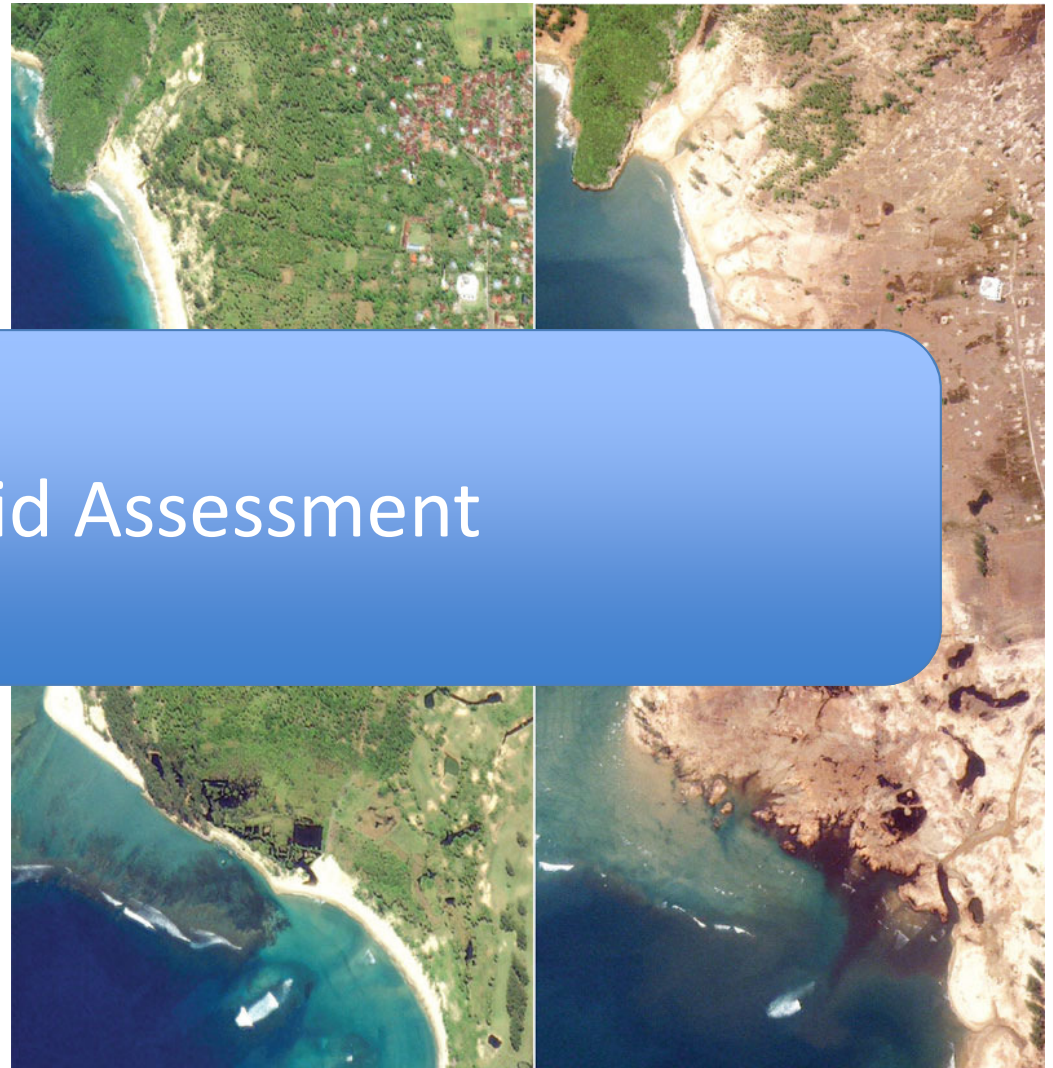
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Disasters



Space-based technologies

- Contributes to all part of the crisis cycle, Disaster Prediction, Disaster Relief
- Reliable communication systems which can be used for disaster relief and assessment
- RS can allow a rapid assessment of areas most affected





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International Response to Natural Disasters

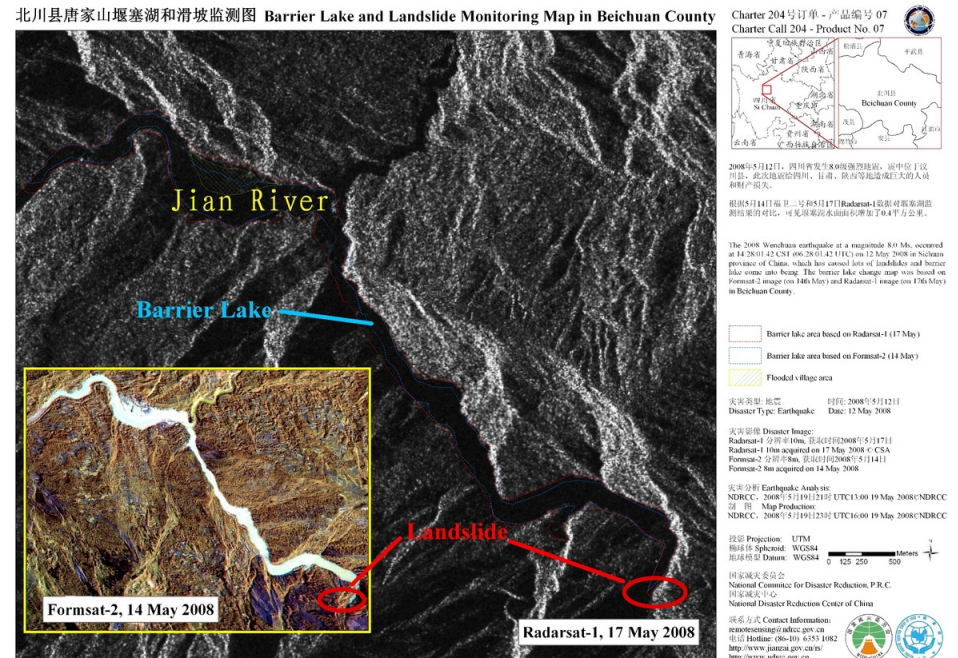
INTERNATIONAL CHARTER: SPACE & NATURAL DISASTERS

- Started: 2000
- Scope: To coordinate satellite data providers' response to major disasters
- 14 Members: ESA, Argentina, Britain, Canada, China, France, India, Japan, USA, Japan, Brazil, Germany, Korea

Activation:

China (2008) earthquake in Sichuan, giving response teams access to 18 satellites run by other charter members. Satellite imagery was used to assess damage and more efficiently distribute resources

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International Response to Natural Disasters

UNSPIDER

UNITED NATIONS PLATFORM FOR SPACE-BASED INFORMATION FOR DISASTER MANAGEMENT AND EMERGENCY RESPONSE

- Established by Resolution 61/110 of the General Assembly in 2006 within the U. N. Office of Outer Space Affairs (UNOOSA)
- Provides access to all countries and all relevant international and regional organizations to all types of space-based information and services relevant to disaster management to support the full disaster management cycle, including capacity building



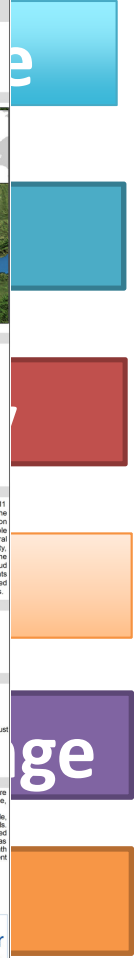
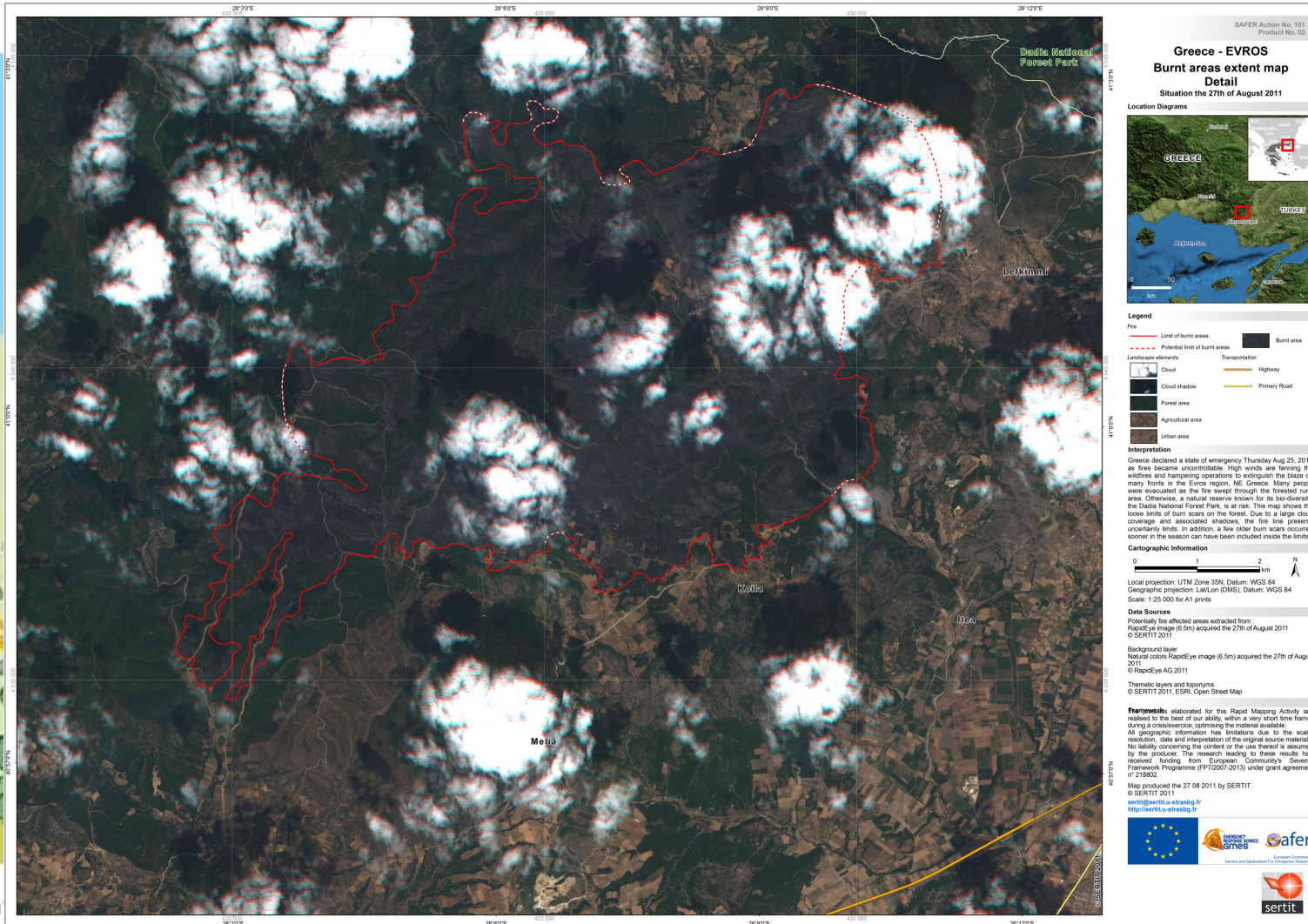
UNITED NATIONS
Office for Outer Space Affairs



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International Response to Natural Disasters

COPERNICUS



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Source: <http://gmes.gov.cz/en/gmes/history-gmes-eu>

Global Earth Observation System of Systems (GEOSS)

- GEOSS is being built by the Group on Earth Observations (GEO) on the basis of a 10-Year Implementation Plan (2005 – 2015)
- GEOSS seeks to connect the producers of environmental data and decision-support tools with the end users of these products, with the aim of enhancing the relevance of Earth observations to global issues.
- The result is to be a global public infrastructure that generates comprehensive, near-real-time environmental data, information and analyses for a wide range of users.
- Addressing nine areas of critical importance to people and society



Current Situation

- Lack of education in remote areas
- Lack of information
- Lack of personnel





Space

- Access to internet
- Distance learning courses allow teachers to continue their education and access curricula updates while students obtain information available
- Online education

Accessibility to Information





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Should local authorities become “spacy”?

- Promotion education and innovation
- Connect people in remote areas
- Enhance enterprise....ideas
- Support SMES
- Universities....
- International cooperation
- Space...so far...so close

SPACE APPLICATIONS

New tools available to decision makers to compare impacts & lessons learned

Support for policies in different levels
(Global, National, Local)

Support for environmental governance
actions

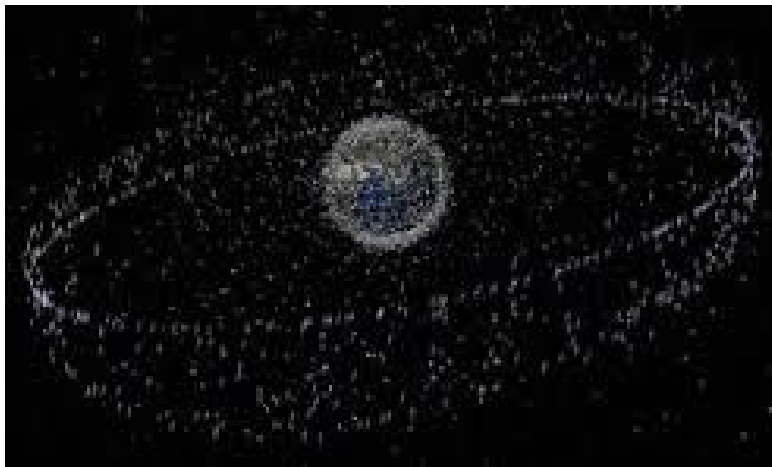
Recommendations

- Increase awareness of the benefits of space assets to local authorities
- Development of space technologies tailored to the needs of each municipality/region
- Develop/support applications for small scale entrepreneurial uses
- Research should address simpler applications for tele-education, telemedicine, and tele-business
- The local governments should invest in local science and technology capacity through increased cooperation in the space



The benefits of space applications can be utilized
by regions

Have you heard of risks related to collision between satellites or between satellites and space debris (pieces of rockets & satellites)?





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谢谢



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