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

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

Natassa Antoniou
Project Manager
nantoniou@swfound.org

©2013 Secure World Foundation. Used with Permission

Lecture Environmental Protection Bureau of the City of Nanjing, P.R. China
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.
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
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?
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
- No weather forecast
- No telecommunication
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

Great Wall
Regions & Space Technologies

Regions...reality

- Costal zone management
- Water basin management
- Protected areas
- Air quality
- Land Use
- Climate change
• Monitor crop acreage and livestock tracking
• Monitor chemical spraying
• Monitor crop yield
• Monitor the distribution and dilution of chemicals
• Improve parcel yield from customised treatment
• Support more efficient property management
• Track food enhancement

• Support rational use of fertile lands
• Monitor weather and soil moisture for agriculture to improve irrigation system

Increase agriculture productivity – optimum utilization of the factors
Current Situation

• Urban areas play a key role in fostering economic development and 'green growth' policies
• More than a quarter of the European Union territory is directly covered by urban land use
• Cities and towns face major challenges (managing urbanisation, environment, mitigating climate change impacts)
Benefits of Space Applications

• Improve the traffic management and system transportation
• Monitor air pollution
• Monitor the evolution of soil sealing and help cities to adapt their spatial planning policies
• Monitor the evolution of urban green areas or improving waste management

Information on urban growth, urban green areas, land use and its evolution
Environment
Navigation/Positioning
- Monitor ionosphere for earthquake
- Monitor atmosphere, water vapour for weather forecasting and climate studies
- Tides, sea level
- Track pollutants, icebergs, dangerous goods

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

Produce data and information to support policies
**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 country's anthropogenic forest-related greenhouse gas emissions and carbon stock 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 satellites can identify meteorological conditions and geographical areas combined with other information to generate risk maps—predict and avoid diseases, including cholera, dengue fever, dysentery.
- Information for air quality.

- **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
Water

Drinking/fresh water

Lakes/rivers

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 environment
- Sample large areas simultaneously and cost-efficiently, more frequently

Monitoring Water Quality
Disasters

Current Situation

• Many natural disasters strike across the globe, killing thousands and inflicting billions of dollars in property and infrastructural damage.

• Disasters such as hurricanes and earthquakes to droughts, heat waves and wildfires, events were both widespread and severe.

• Hurricane Sandy, one of the most prominent disasters of the year in the U.S., killing at least 125 people and inflicting at least $62 billion in damage.
Space-based technologies

- Contributes to all part of the crisis cycle, Disaster Prediction, Disaster Relief
- Reliable access to communication technology which is essential before and after natural disasters
- RS can allow rapid assessment of areas most affected
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.

Lecture Environmental Protection Bureau of the City of Nanjing, P.R. China
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
International Response to Natural Disasters

COPERNICUS

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 and educational materials that would not otherwise be available.
- Online education programs are of great benefit for adult education and job training.
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
Conclusions

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)?