Potential and limitations of remote sensing for cadastre and land management

*Potentiel et limites de la télédétection pour les applications foncières*

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Traditional use of remote sensing for land management
*Usages traditionnels de la télédétection pour les applications foncières*

Technological improvements and benefits for land management
*Améliorations technologiques et retombées pour la gestion foncière*

New possibilities
*Nouvelles applications possibles de la télédétection dans le domaine foncier*

Conclusion
1 Traditional use of remote sensing for land management

Usages traditionnels de la télédétection pour les applications foncières

Aerial photography for land management: a long history

First aerial photograph by Nadar (Paris, 1860)
## Applications of remote sensing

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## Advantages of using remote sensing

- Survey is often faster and cheaper
- Traditional cadastral mapping is limited to boundaries
- Remote sensing provides a visual support

## Information provided by remote sensing

- 2D / 3D geometry
- Description of land cover
- Evidence of land use

### Human settlements generate patterns under two influences

A. Spatial expression of a land policy
B. Presence of natural constraints

![SPOT-4, Macapa, Brazil](image)
**Requirement 1**
Definition of a 2D « geometry » on the Earth surface
- Measurement possibilities
- Topological rules

**Requirement 2**
Existence of suitable sensors to describe the Earth surface:
- Suitable scale
- Suitable spectral domain

2 **Technological improvements and benefits for land management**

*Améliorations technologiques et retombées pour la gestion foncière*
Ground resolution
Opens new possibilities for urban planning
Drawback: heterogeneous data bases
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Location accuracy
Reduces need for ground control points

Stereo capabilities
DTM available for image rectification
3D location
**Ground resolution**
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**Digital information**
Automated aerotriangulation
Automated image rectification
GIS has become a standard environment
GIS = standard environment

- A geodata base
- A query language
- A toolbox (computation, display etc.)

**Ground resolution**
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**Internet**
Public data bases
New possibilities

Nouvelles applications possibles
de la télédétection dans le domaine foncier
1. Virtual boundary delineation
Délimitation virtuelle

The boundary is defined in a rectified image

![Image of a real boundary contrasted with a virtual delineation]

**Technical constraints**
Location accuracy
Image quality

**Virtual delineation will never replace a surveyor**
Limitation of the legal value of an image
Legal boundaries do not always fit the visible boundaries

**It can provide a valuable help**
To save and share the information more securely
To replace traditional delineation in specific situations:
- when the boundary position is not accessible
- when the boundary is curvilinear or « fractal »
2. Public communication

Communication grand public

An ortho-image is much more friendly than a map
The information is not « filtered »
The cost per km2 is lower
Conclusion

Beijing declaration (2008) :
We, members of the International Society for Photogrammetry and Remote Sensing (ISPRS) and participants of the XXIst ISPRS Congress in Beijing, recognise the importance of imagery to measure and monitor the natural and man-made features on planet Earth and to explore other planets of the solar system, especially after witnessing the important role of photogrammetry, remote sensing and spatial information systems in the rescue operation and damage assessment of the recent devastating natural disasters.

Sydney declaration (2010) :
We, members of FIG and participants of the FIG XXIV International Congress in Sydney, 11-16 April 2010, recognise the importance of good land information and good land governance in support of the global agenda such as the Millennium Development Goals, and as a basis for meeting the key challenges of the 21st century such as climate change, natural disasters, environmental degradations, rapid urban growth, and poverty eradication.