

3rd International Workshop on 3D Cadastres: Developments and Practices

Modern representation technologies for the implementation of 3D Cadastres in Latin America

Diego Alfonso Erba & Mario Andrés Piumetto

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Conclusion

If the reality of Latin American cadastres is complex and, in many cases, precarious in 2D, just the thought of trying to develop 3D cadastre alternatives seems a utopia...



http://es.wikipedia.org/wiki/Am%C3%A9rica_latina

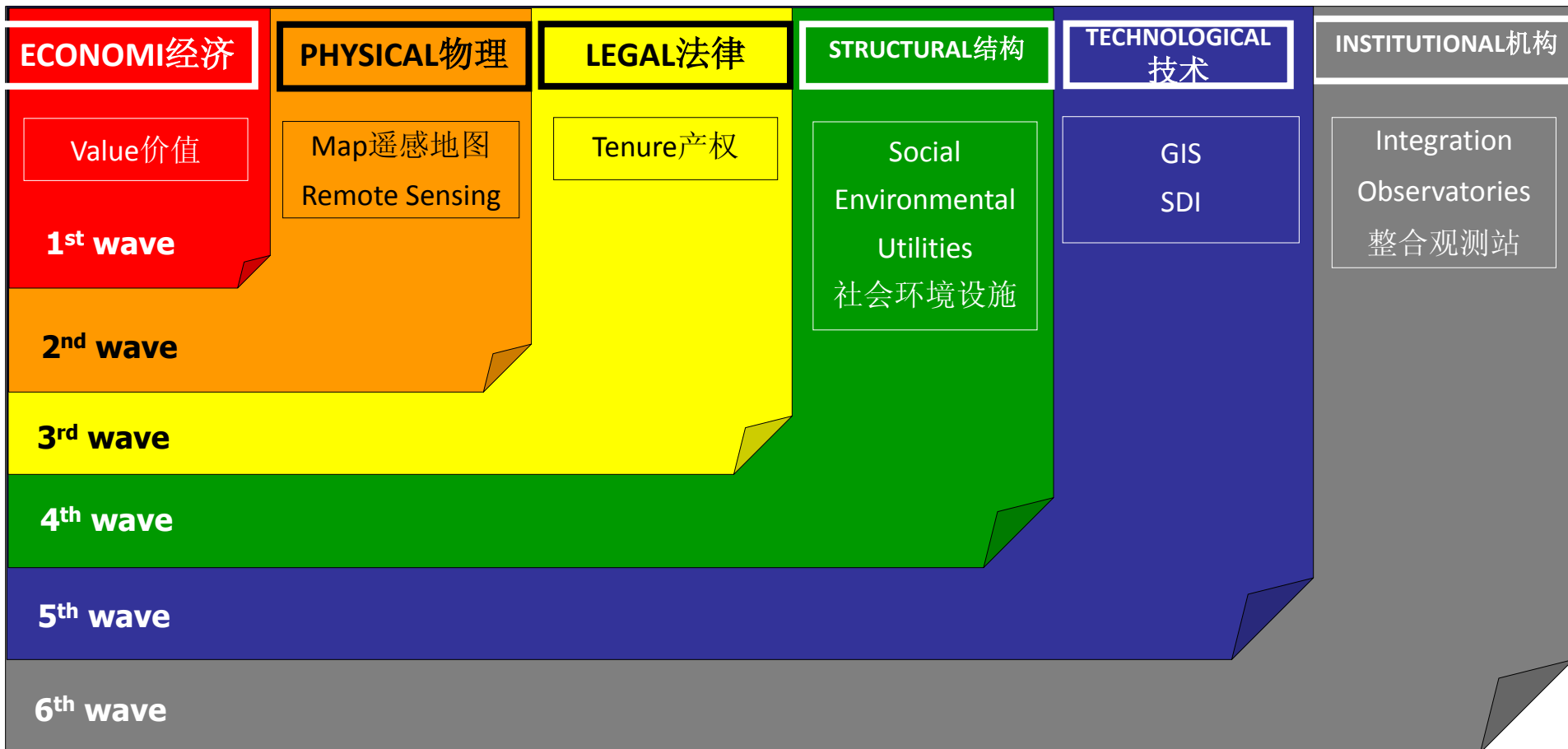
“3D, or not 3D, that is the question...”

- Latin America is a diverse region. World's most unequal region.
- The concentration of property and resources, as well as the high value of the urban land, leads to illegal and informal uses of the territory.
- This situation is a product of exclusionary land policies, the existence of incomplete and inappropriate 2D cadastres and weak land registries.

Can a 3D cadastre implementation reduce land property concentration, improve the use of natural resources and reduce informality along the region?

The waves of a multipurpose cadastre

多用途地籍的组成



“3D, or not 3D, that is the question...”

The construction of the answer must start by analyzing the traditional aspects involved in the cadastral area: the **legislation**, the **technologies**, and the land **valuation** methods in use.

Constructing the answer

The legislation

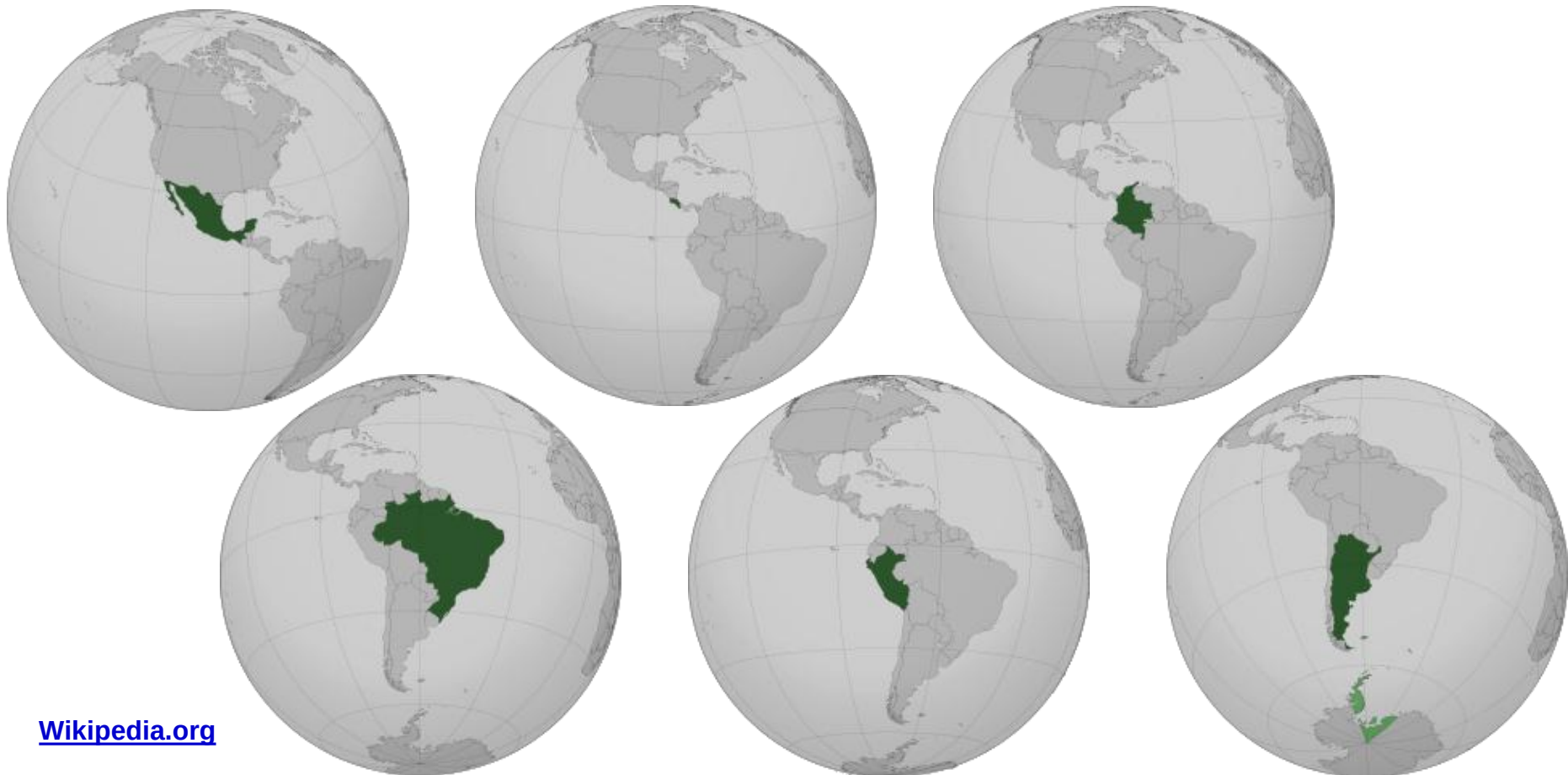
A common concept of “3D parcel” and “3D property” for the entire region is still impossible, detailed studies, by country, are necessities.



Wikipedia.org

Constructing the answer

The legislation



Wikipedia.org

Constructing the answer

The technology



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Constructing the answer

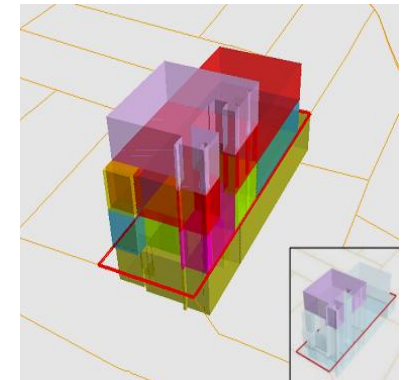
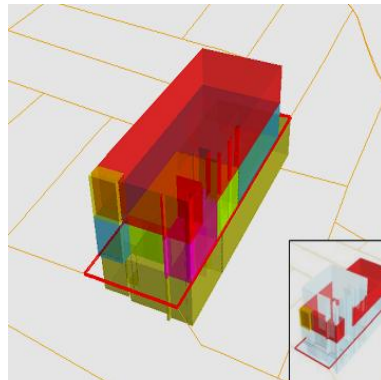
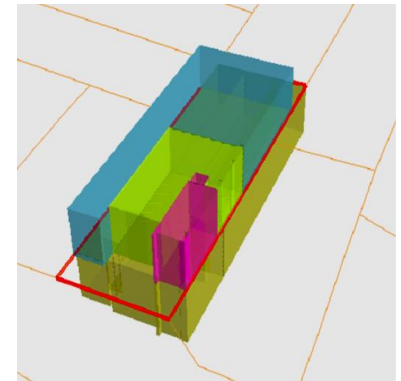
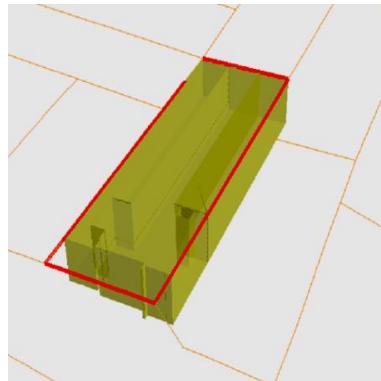
The technology

What did we find?

- Formal cities build virtual 3D models by using GIS tools, photographs (vertical, oblique and 360⁰) and LiDAR.
- Informal cities are represented by models for participatory planning.
- Underground surfaces are represented to delimit natural territorial objects.

Constructing the answer

The technology GIS-based virtual 3D cities



Sub-Department of Cadastre of the Municipality of Medellin, Colombia

Constructing the answer

The technology

GIS-based virtual 3D cities

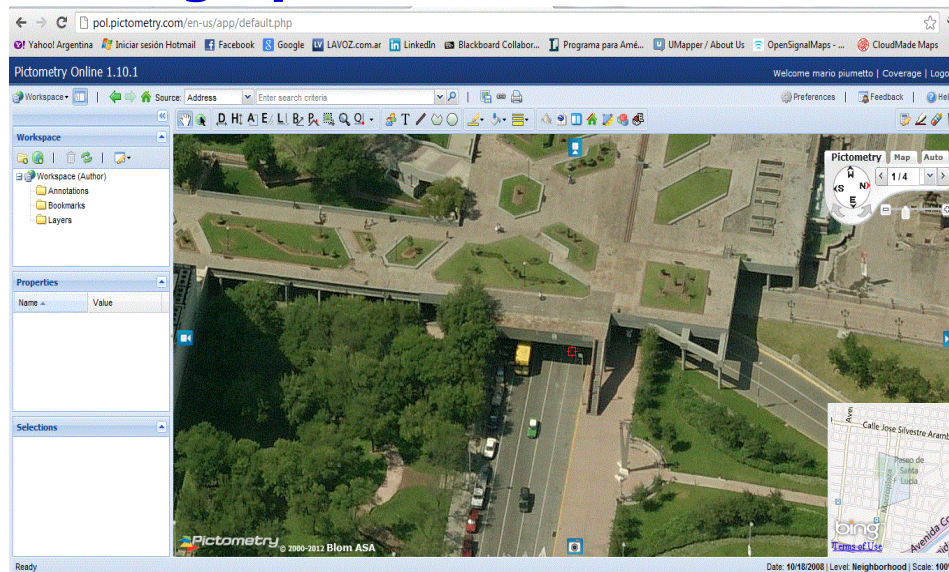
The generation of 3D objects by means of the extrusion of the existing 2D, is the most frequently used technique in the region.

Constructing the answer

The technology

Photograph-based virtual 3D cities

Based on 5
photographs



Pictometry Online

Constructing the answer

The technology

Photograph-based virtual 3D cities

Integration of aerial and oblique photographs, Monterrey, Mexico



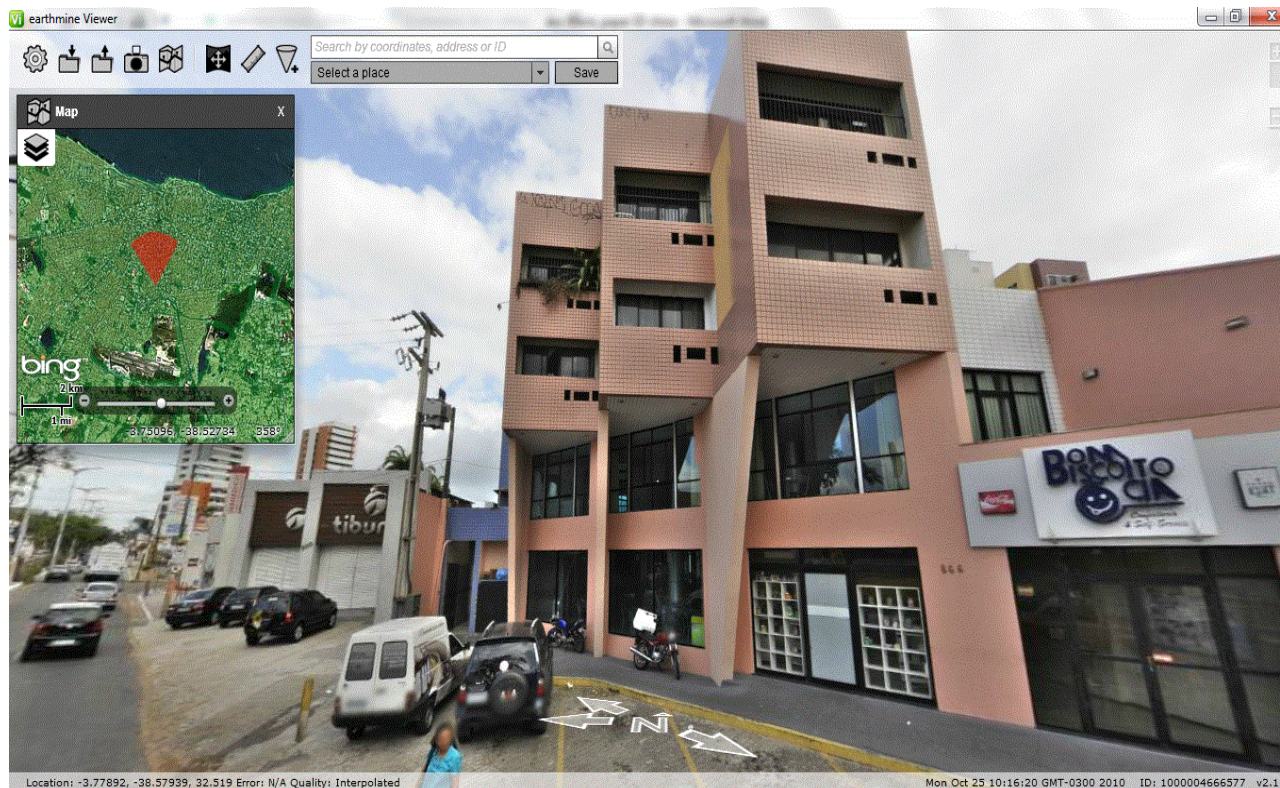
PLW Modelworks LLC & CIVIS, 2009

Constructing the answer

The technology

Photograph-based virtual 3D cities

360° space
images



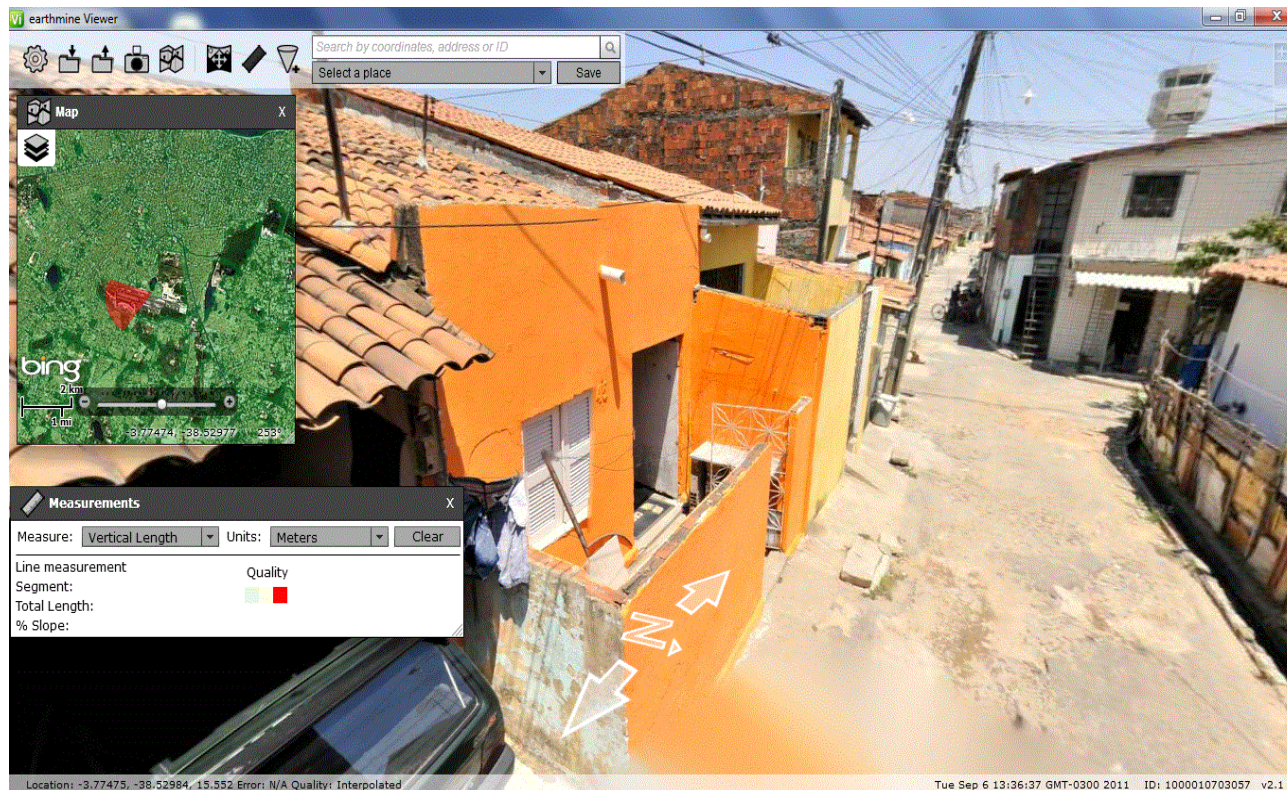
Earthmine website, 2012

Constructing the answer

The technology

Photograph-based virtual 3D cities

360° space
images



Earthmine website, 2012

Constructing the answer

The technology

Photograph-based virtual 3D cities

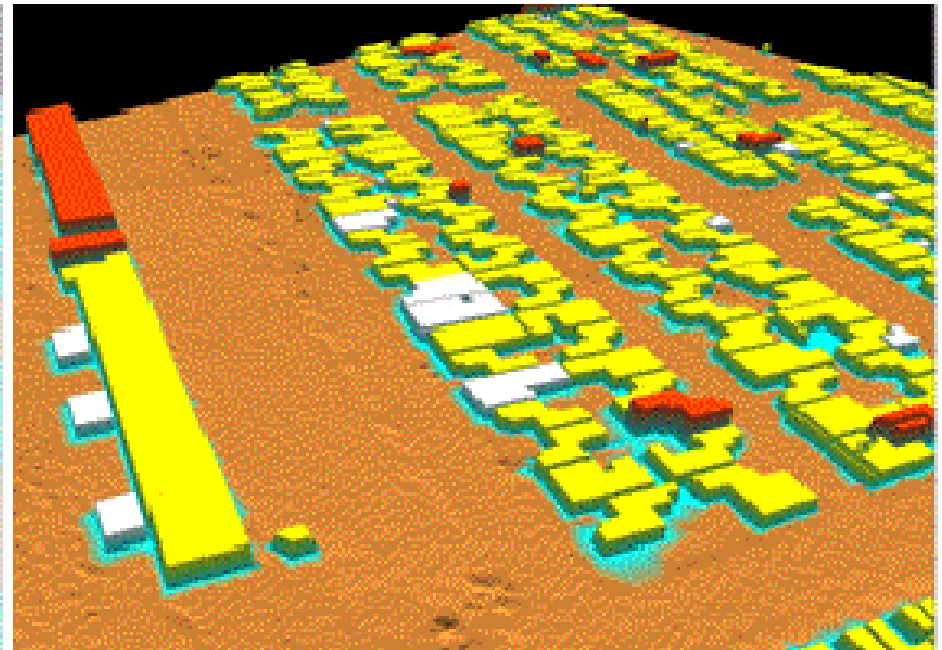
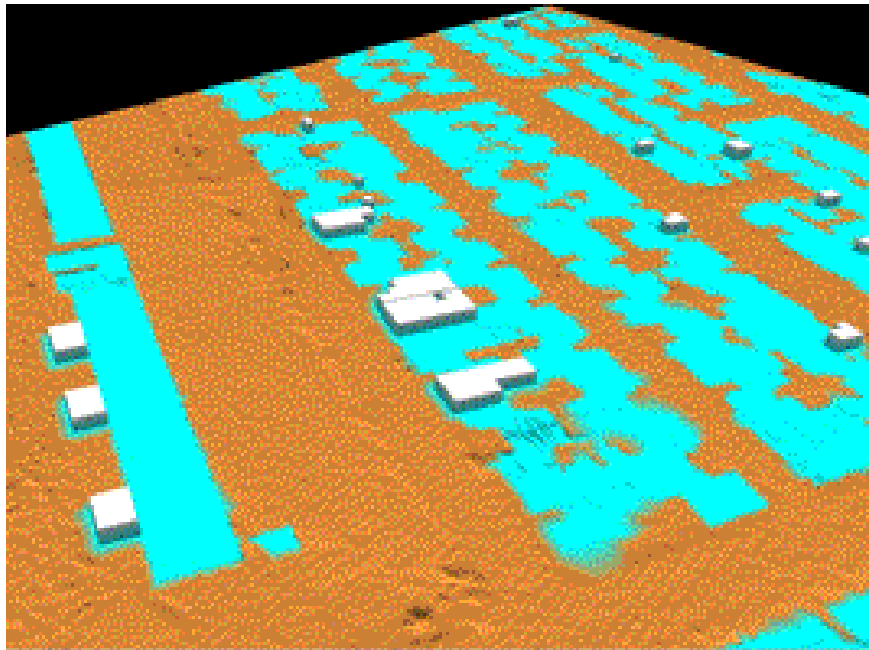
The use of vertical and oblique aerial photographs, supplemented with 360⁰ photographic land surveys, is producing very good results at competitive costs, when compared with other techniques that generate similar graphic results.

Constructing the answer

The technology

Virtual 3D cities based on LiDAR surveys

Integration 2D cadastral map and 3D LiDAR data, Gomez Palacio, Durango, Mexico



MAPA Merrick Advanced Photogrammetry of the Americas

Constructing the answer

The technology

Virtual 3D cities based on LiDAR surveys

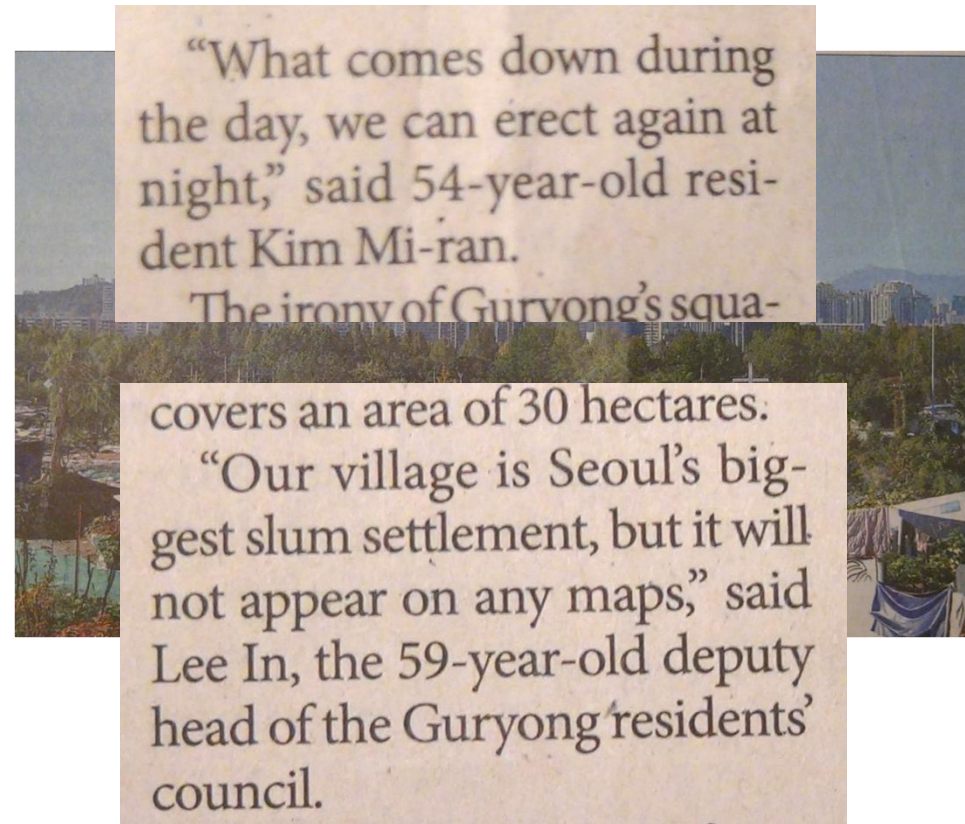
Even when data processing allows, for automatically obtaining, a first version of objects on the ground with processing and generation times significantly reduced, LiDAR surveys for the construction of virtual cities are still a few in LA.

Constructing the answer

The technology Informality



China Daily, October 23, 2012



Constructing the answer

The technology

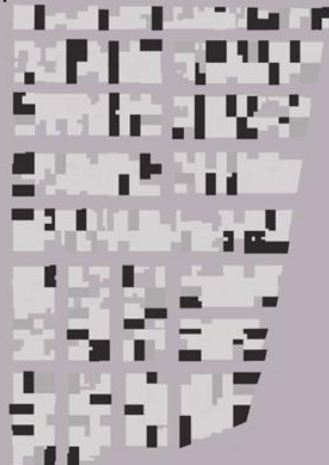
3D Informality

Neighborhood of *Potreros*, Bogotá, Colombia

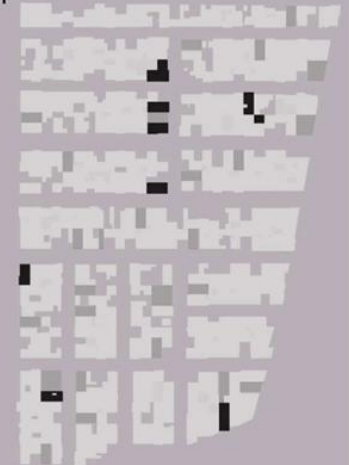
TIPOLOGIA 1 PIANO



TIPOLOGIA 2 PIANI



TIPOLOGIA 3 PIANI



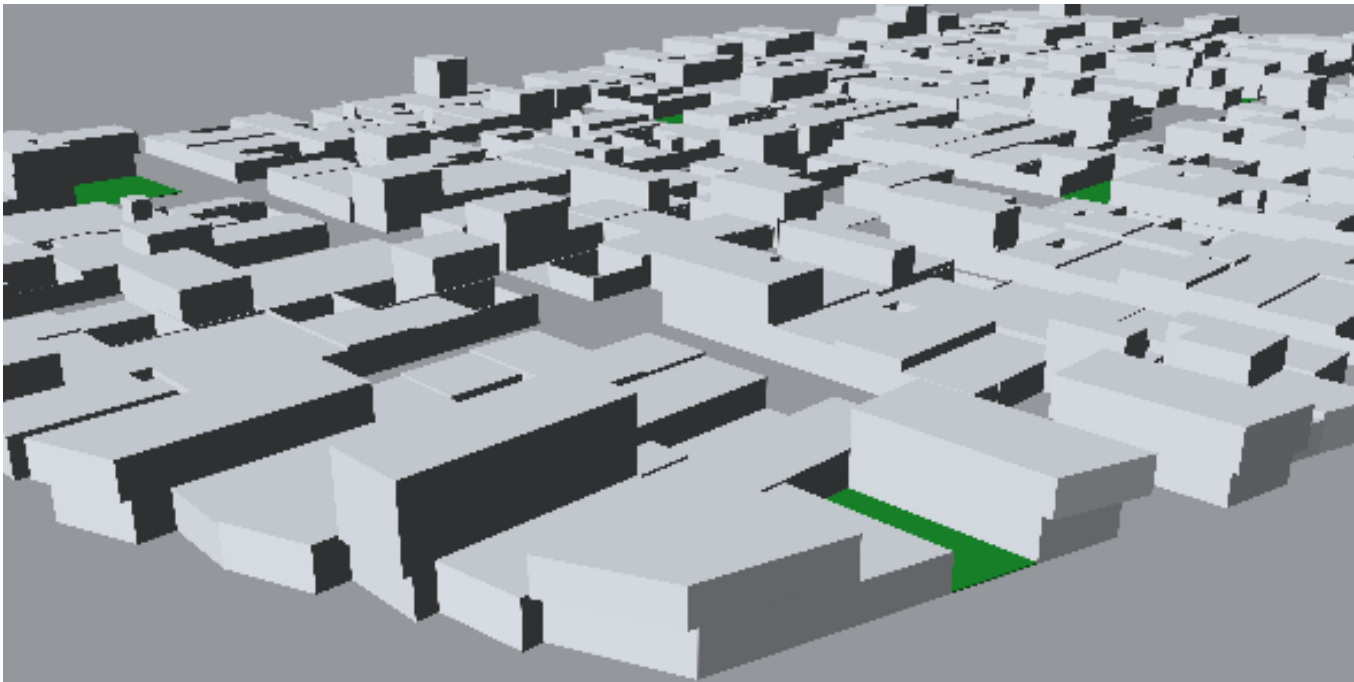
Maceratini, Elisa. 2009

Constructing the answer

The technology

3D Informality

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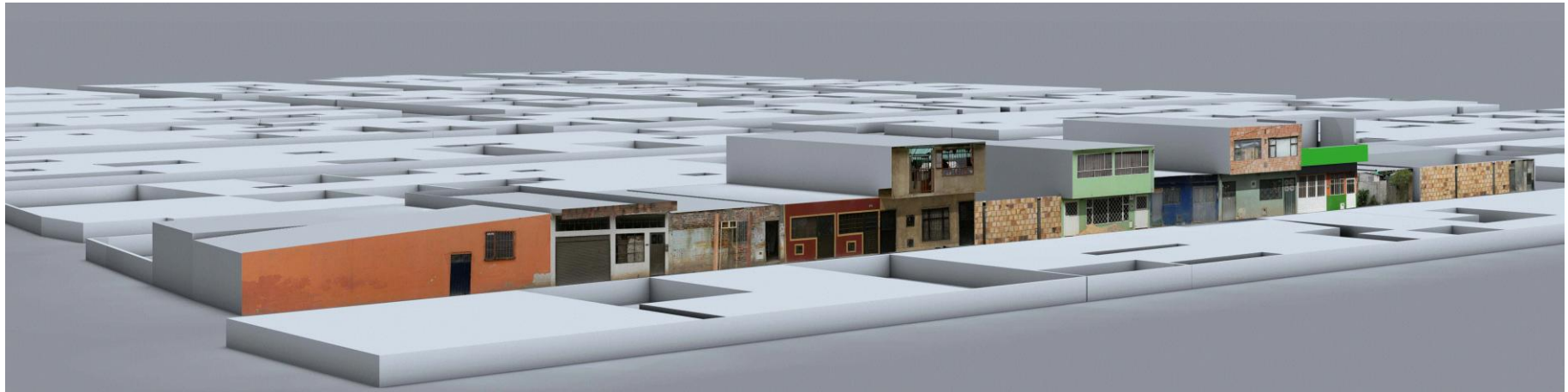
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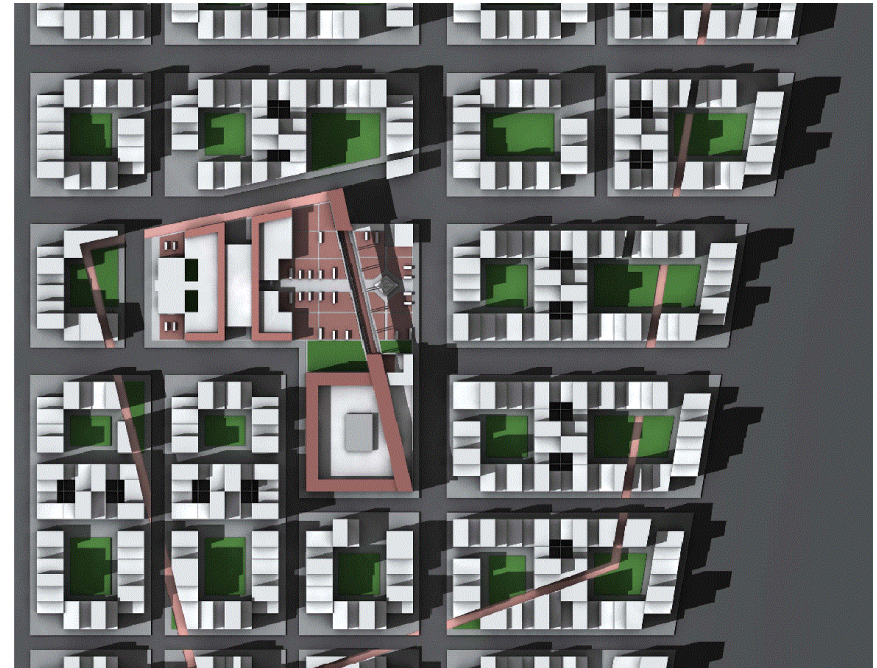
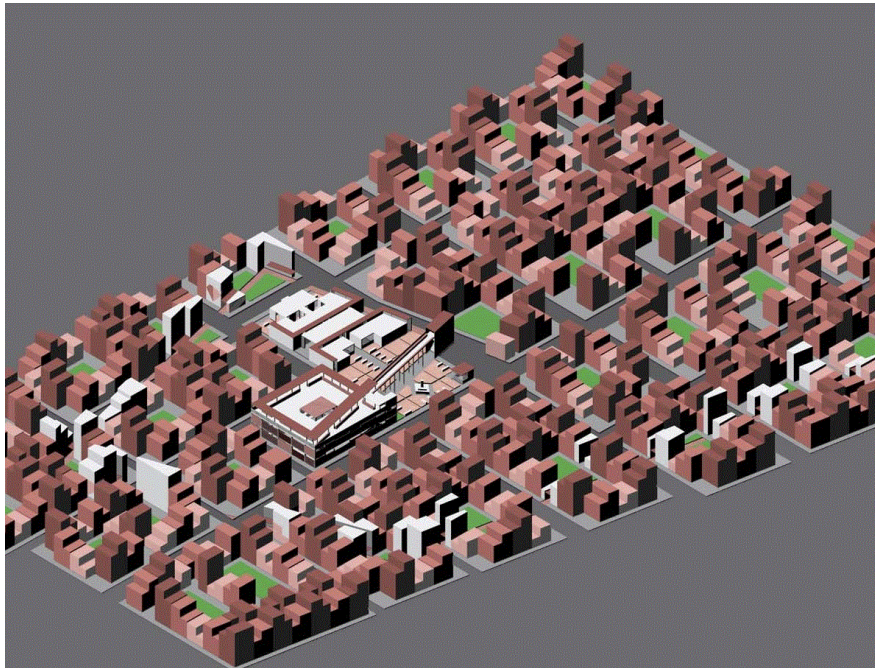


Maceratini, Elisa. 2009

Constructing the answer

The technology 3D Informality

Neighborhood of *Potreros*, Bogotá, Colombia



Maceratini, Elisa. 2009

Constructing the answer

The technology

3D Informality

Neighborhood of *Martin Pilger*, Novo Hamburgo, Brazil



Neri Martin, Luciana et al. 2011

Constructing the answer

The technology 3D Informality

Neighborhood of *Martin Pilger*, Novo Hamburgo, Brazil



Neri Martin, Luciana et al. 2011

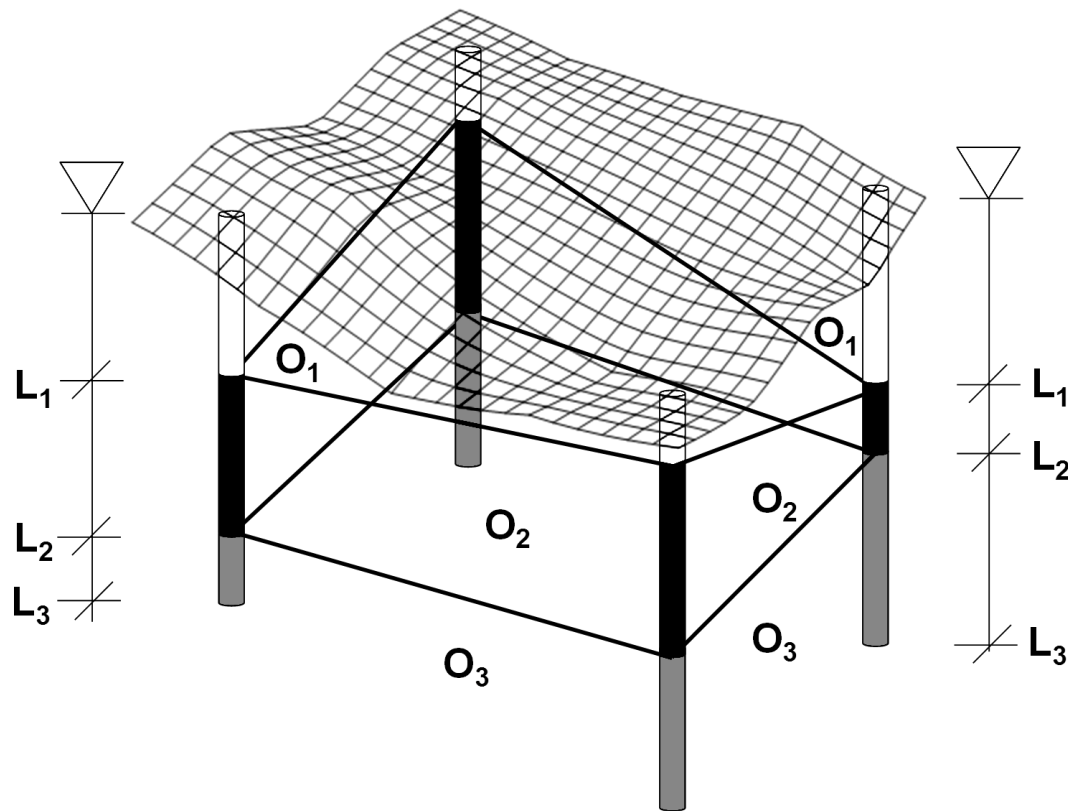
Constructing the answer

The technology 3D Informality

Representations and urban development plans based on virtual 3D city models are changing the perspective of the analysis, integrating formal and informal spaces more efficiently.

Constructing the answer

The technology 3D underground surfaces

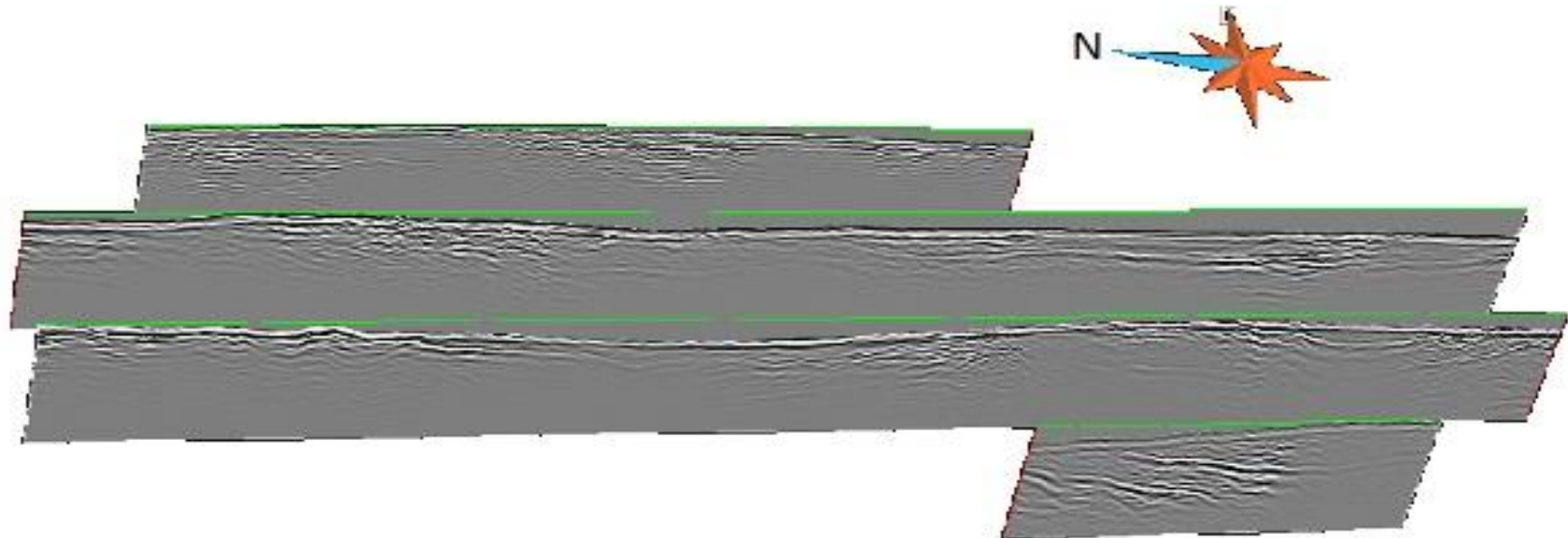


Constructing the answer

The technology

3D underground surfaces

Radargram spatial geo-referencing



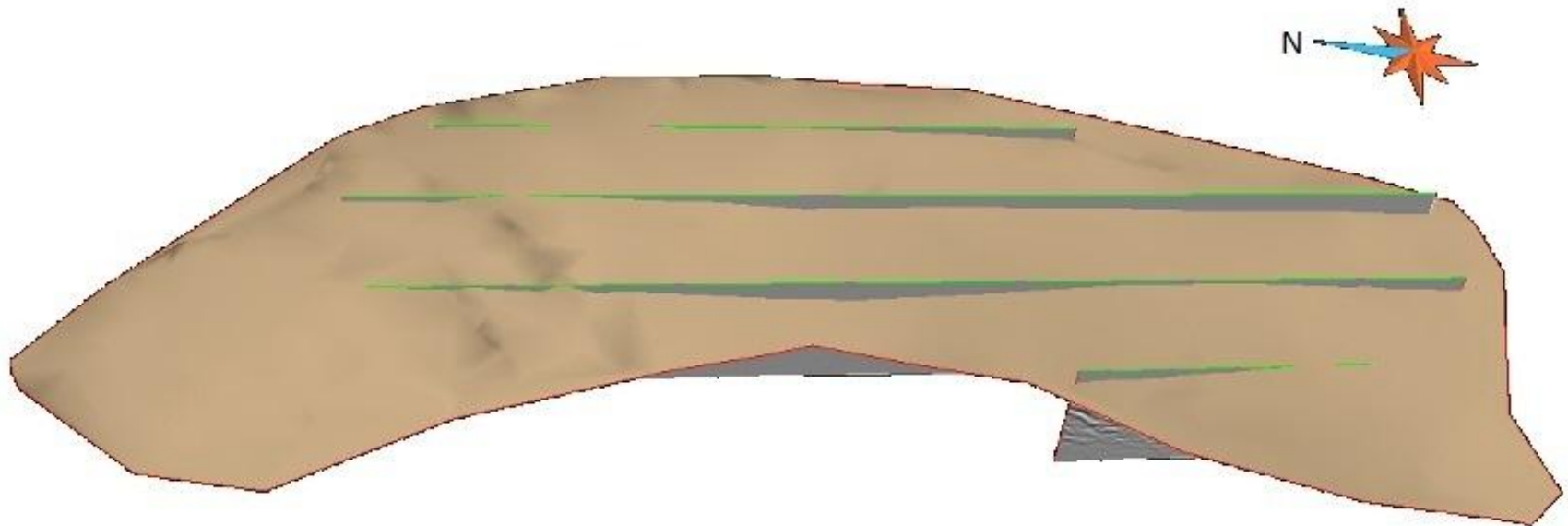
Silva, Reginaldo Macedônio. 2012

Constructing the answer

The technology

3D underground surfaces

Configuration of underground surfaces from radargrams



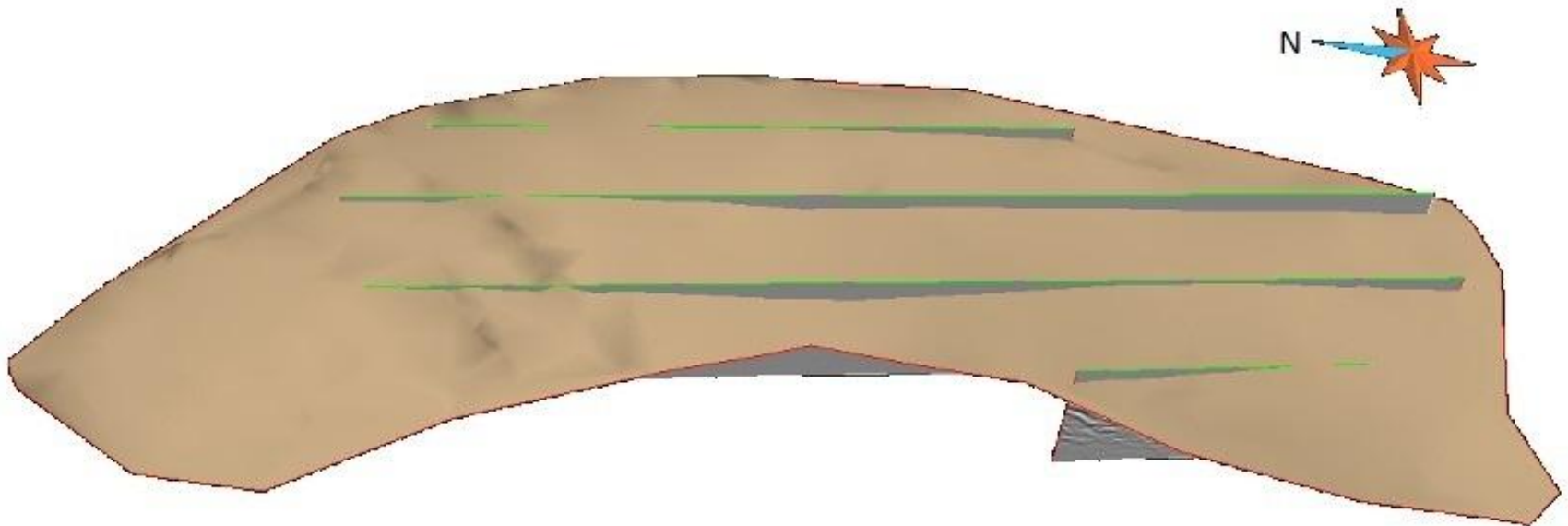
Silva, Reginaldo Macedônio. 2012

Constructing the answer

The technology

3D underground surfaces

Configuration of underground surfaces from radargrams



Silva, Reginaldo Macedônio. 2012

Constructing the answer

The technology 3D underground surfaces

Identification of territorial and legal objects on the ground surface is generally simpler, but not necessarily easier, than underground identification. That is because the 3D surface boundaries are as relevant on the ground as under it.

Constructing the answer

The economy

The costs involved in the application of geo-technologies for 3D survey and representation can be covered indeed, since the city will have more elements to redefine its financing and planning policy, making them fairer and more equitable.

“3D, or not 3D, that is the question...”

The cadastre could be 3D,
representing the whole space,
up and down the Earth's surface,
every country at its pace.

The cadastre could be 3D,
If new data can improve
urban planning and land use,
and if informality is reduced.

The cadastre could be 3D,
If the revenues grow indeed,
and the city with this money,
provides utilities for everybody.

Remember: in 2D or in 3D,
Technologies are not enough,
complex laws can be too much,
keep it simple all the time.

Thank you!

