TRANSPARENCY PERFORMANCE IN THE 3D VISUALIZATION OF BOUNDING LEGAL AND PHYSICAL OBJECTS:
Preliminary results of a survey

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3D Cadastre Workshop 2014, Dubai, November 9-11

Rationales

- 3rd experiment to assess the performance of visual variables for visualization of 3D cadastre
- Targeted end-user:
  - Notaries
- Targeted object:
  - Apartment building with co-ownership units
- Targeted tasks:
  - Distinguish the limits between two categories of objects (administrative and physical boundaries)
  - Distinguish common and private parts

The overall idea

- It is possible to determine a transparency chart that will perform to distinguish two categories of object (physical and administrative), and will give a sensation of ownership.
- as it exists for 2D for maps (color ramps)

Legend
Elevation
750
0
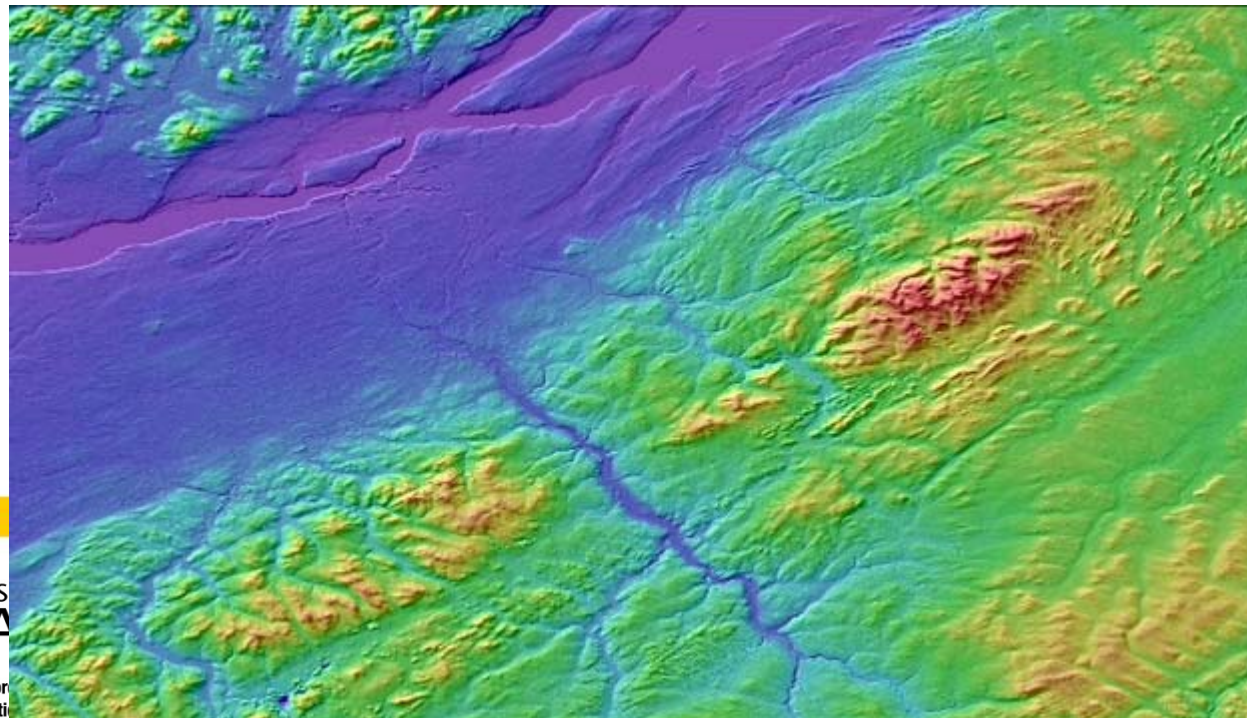
3D apartment unit visualisation

Two hypothesis tested:

- **Hypothesis 1**
  - Transparency is performing to give the impression (the notion) of ownership

- **Hypothesis 2**
  - Transparency is performing to distinguish two groups of bounding objects such as physical (e.g., walls) and legal (administrative units)

- **How:**
  - Online questionnaire
    - **3dcadastre.com**

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Setup of the experiment

- ■ **12 Prebuilt 3D models**
  - • Simple cases; One building level
  - • To be answered in less than 15 minutes
  - • Only one spatial relationship (TOUCH) (two cases)
 - • 6 combinations of transparency tested

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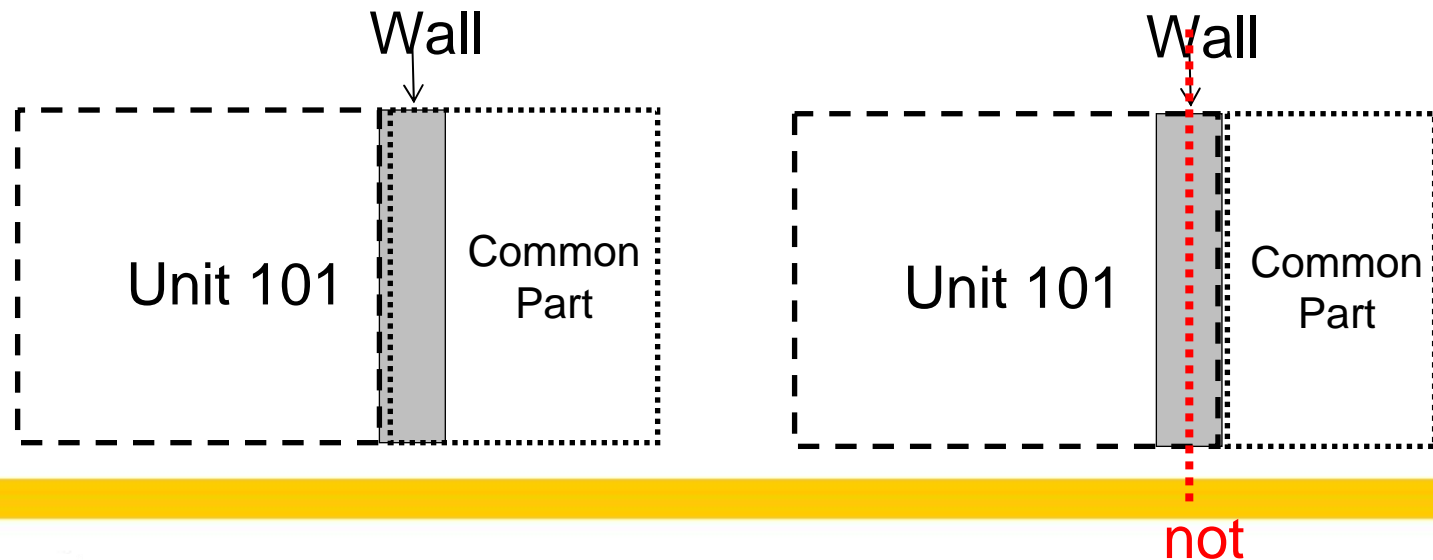
12 Tested 3D models with their related Alpha values

Test #	Wall belong to Private unit	Alpha Values		
		Face of the Private unit	Face of the wall next to the private unit	Face of the wall next to the common part
1	Y	100	100	100
2	N	100	100	100
3	N	13	100	100
4	Y	13	36	100
5	Y	36	13	100
6	N	36	100	100
7	N	13	85	85
8	Y	13	33	85
9	N	60	100	100
10	Y	60	20	100
11	Y	20	60	100
12	N	20	100	100

Alpha Transparency : High (13%), Low (100%)

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Test #	Wall belong to Private unit	Alpha Values		
		Face of the Private unit	Face of the wall next to private unit	Face of the wall next to common part
4	Y	13	36	100
12	N	20	100	100
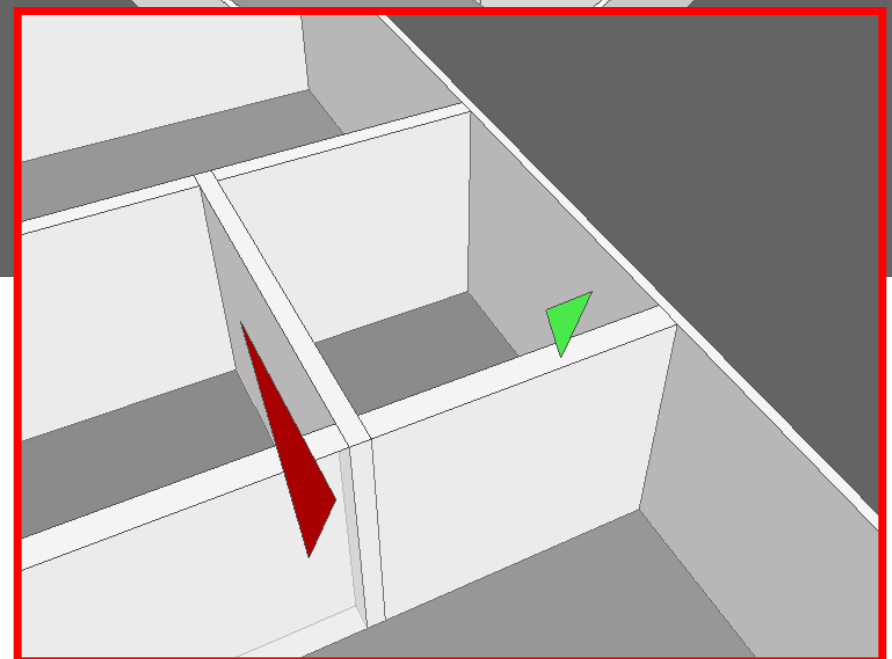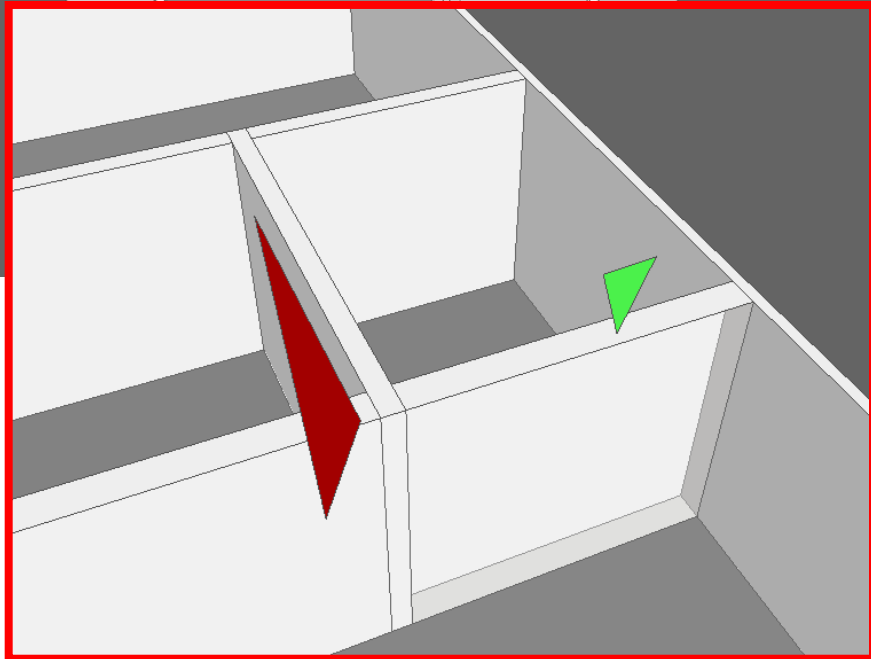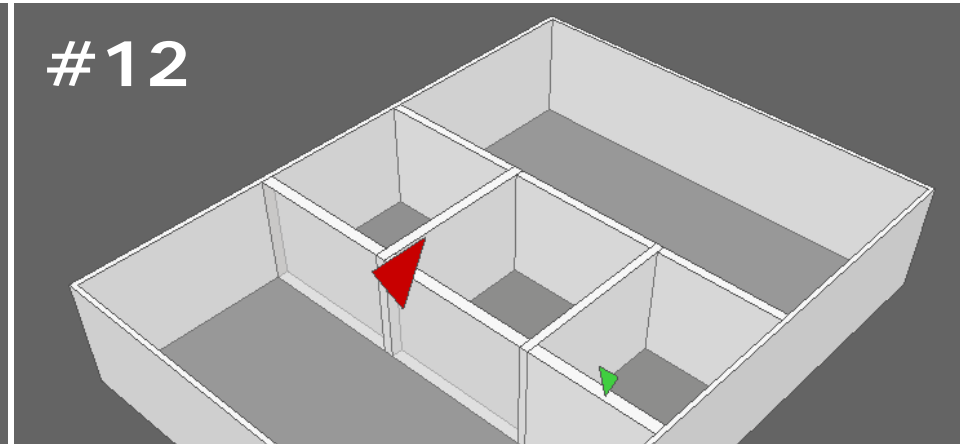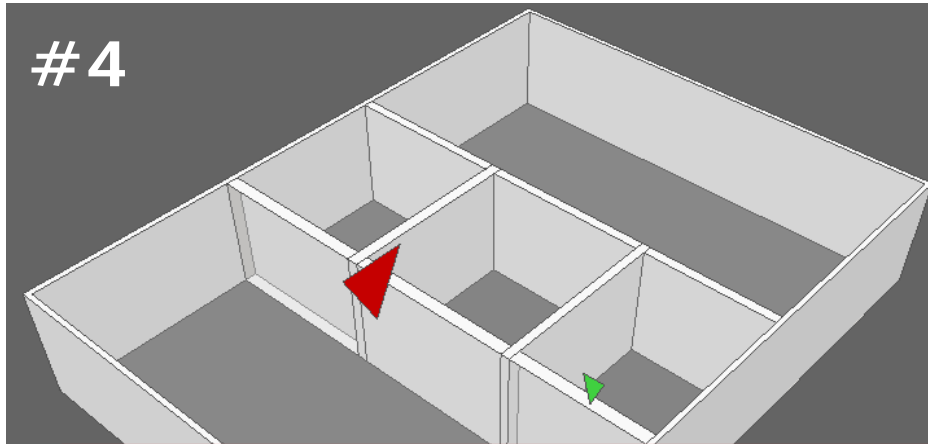
Online questionnaire

1. Participant's profile
   - Training background?
   - Frequency of manipulating cadastre data?
   - Frequency of manipulating 3D visualisation engine?
   - Color identification deficiency?
2. Demonstration
3. Questions
   - Is the wall belongs to you (or your apartment) ?
   - The level of certainty of their response ?
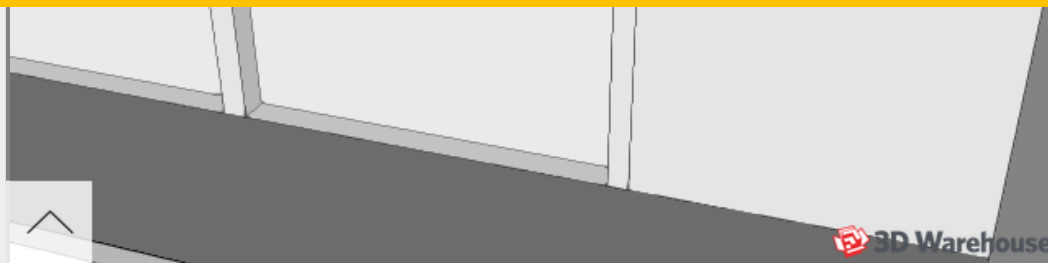   - fully confident, half confident, not confident

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41 participants (till now, still running)
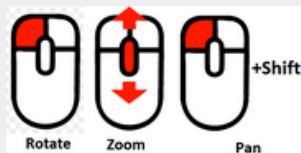
Test #	% of Correctness	Weighted % of Correctness	% of Certitude
4	71%	71%	100%
12	63%	50%	78%
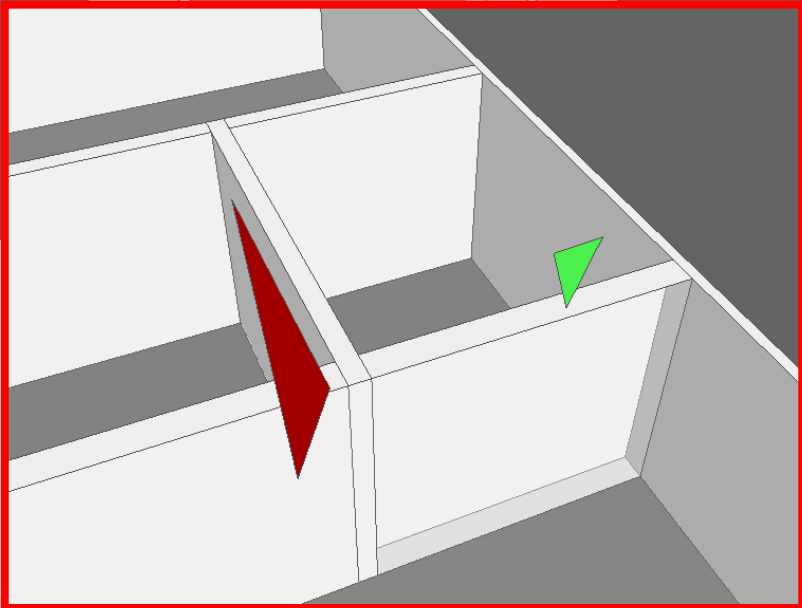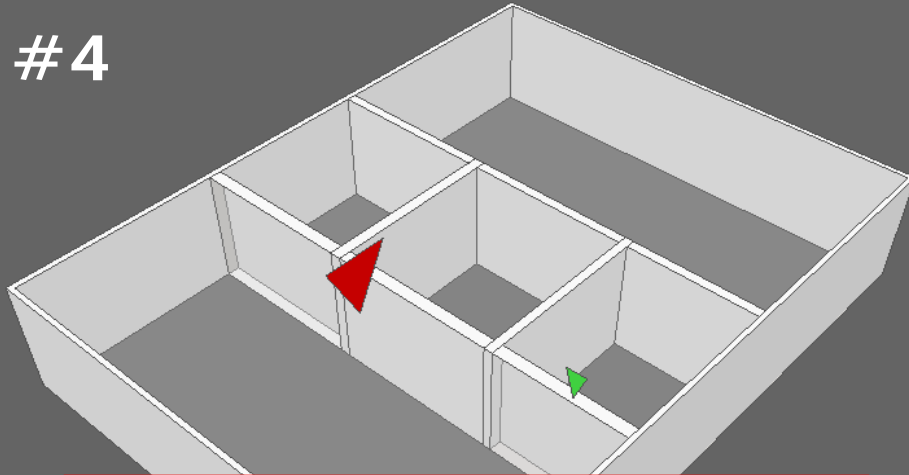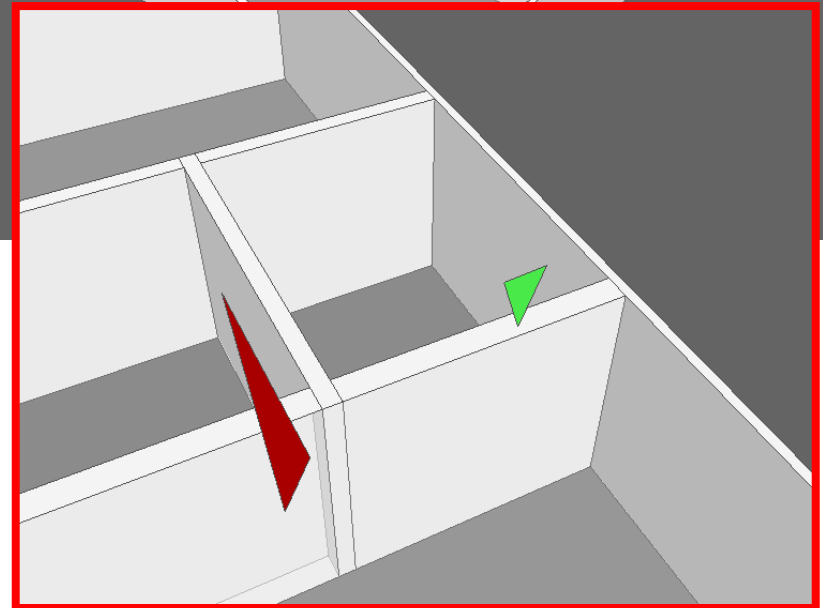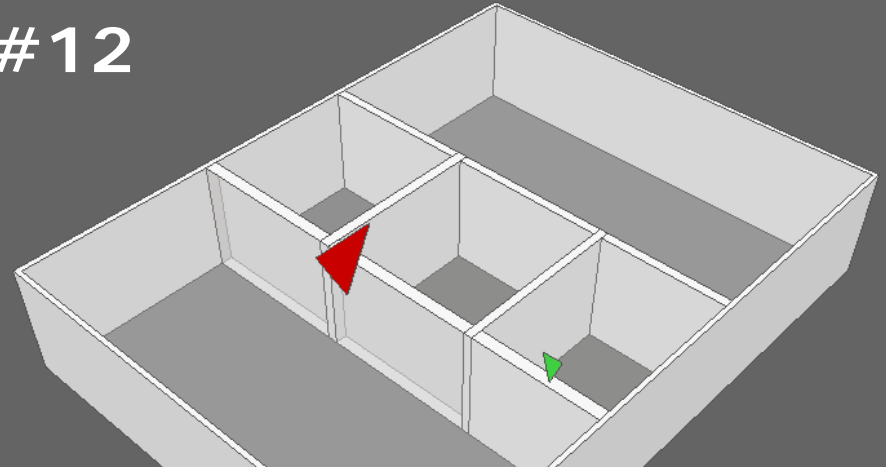
Results - Hypothesis 1

Transparency is performing to give the impression of ownership?

- Clear impact of the transparency on the correctness and the certitude

  B&W models (0% transp.)

  Average of 50% correctness; 47% certitude

  With transparency

  Average of 65% correctness; 78% certitude

  100% of the participants were more than 70% certain

  Moderate correlation between correctness and certitude (r=0.60)

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Results - Hypothesis 1

Transparency is performing to give the impression of ownership?

Regarding the difference in transparency

- Between private and common
  - Moderate correlation
    correctness (r=0.31) ; certitude (r=0.62)

    ↑ Difference in transparency   ↑ Certitude

- But no evidence of preference between low to high or high to low

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Results - Hypothesis 2

Transparency is performing to distinguish 2 categories of objects (wall and administrative units)?

- When the transparency of the overall model is medium, the % of certitude is lower
  - Having low transparency for the overall background looks more performing

Regarding the difference in transparency

- Between wall and units
  - No correlation

    Correctness (r=0.04) ; Certainty (r=0.003)

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Skills in cadastral data manipulation

- No real correlation
  - Correctness r=0.10
  - Certitude r=0.08
- Analysis by group
  - Often (20), Rarely <10 times/year (18), Never (3)
  - Participants having skills (often) tend to have lower % of correctness ($\downarrow$26%)
    - no influence on the certainty
  - May confirm that people having experience in cadastral data used to work in 2D (not 3D)

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Skills in 3D visualisation

- Low correlation
  - Correctness r=0.15
  - Certitude r=0.11
- Analysis by group
  - Often (9), Rarely <10 times/year (19), Never (13)
  - Participants having skills (often) tend to have better % of correctness and certitude (↑ 10%)
    - Participant without skills (never) (↓14%)
 - May confirm that training actions would be helpfully

Time elapse

- Ranging from 16 to 28 seconds/model
  - About 5 min for the complete test
- No real correlation between time elapse and certitude and correctness

- A low correlation between the order of presentation and time elapse (r=-0.40)
  - No clear learning curve
    - Random presentation of the 3D models
  - People starts slow and finish faster
    - Loosing interest ? or the learning curve ?

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Results 2013

- Focused on 6 notarial tasks
- Complex Apartment of 70 lots, 10 floors
- Transparency was part of it (low, high)
- 4 interviews (face-to-face)
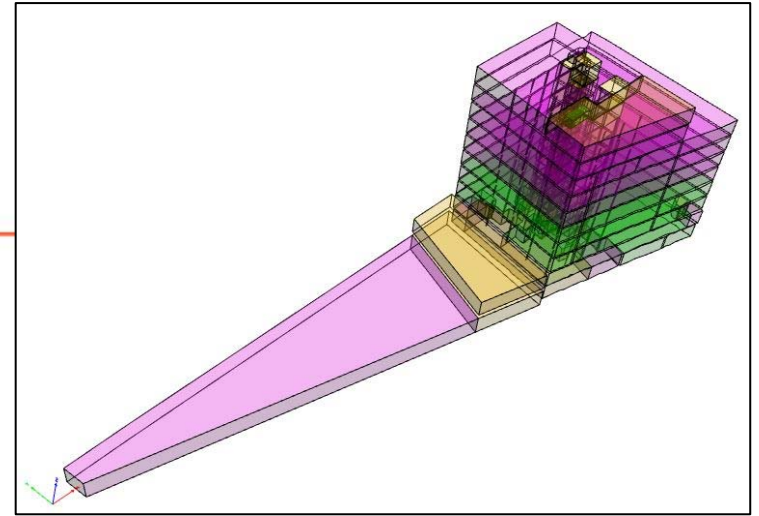
	Performing or not	Preferred or not
Transparency	–	👎

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👍 Yes

👎 No

– No conclusion

Conclusion (1/2)

- The use of transparency clearly impacts the decision making of both tasks:

  - Distinguish two groups of bounding objects
    - physical (e.g., walls) and legal (administrative units)
  - Distinguish between private and common

- B&W models are not a good visualization chart
- Not yet able to identify a transparency chart
  - The tendency is not clear enough

Conclusion (2/2)

- Need model refinement to assess the impression of ownership
- Additional data analysis required
  - the cognitive aspects
    - The relative position of the wall inside the model
- More participants (target > 100)
- A excellent opportunity to make people interested in 3D cadastre
- Online questionnaire
  - Difficult to control and get their "feelings"
  - Loose interaction with the participants

Acknowledgement

- The participants
- Francois Brochu (notary)

Online questionnaire (French)

3dcadastre.com

- Extra

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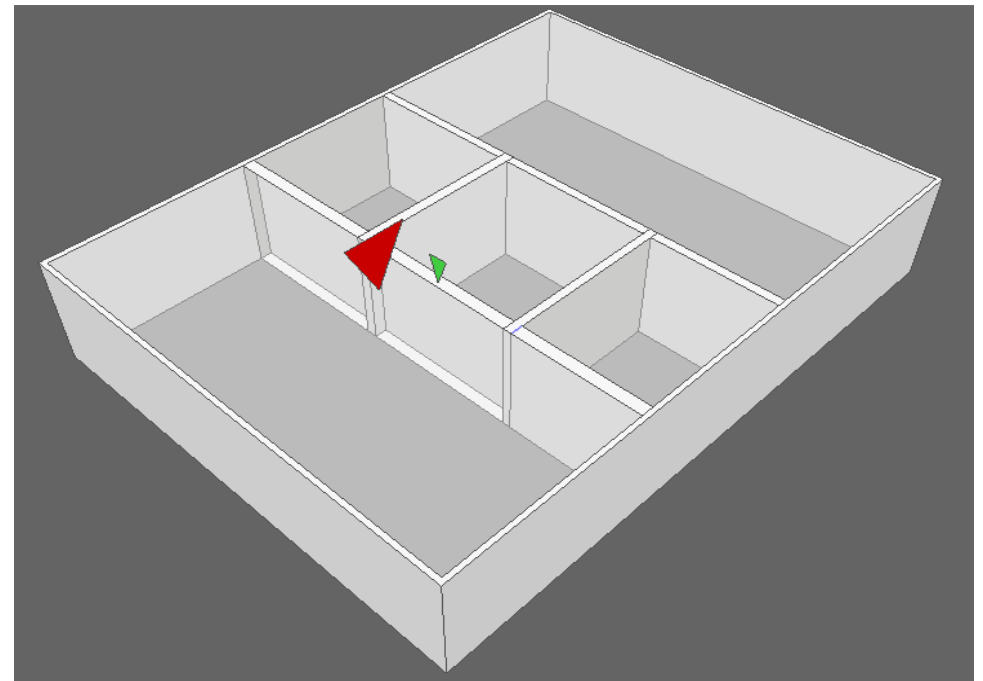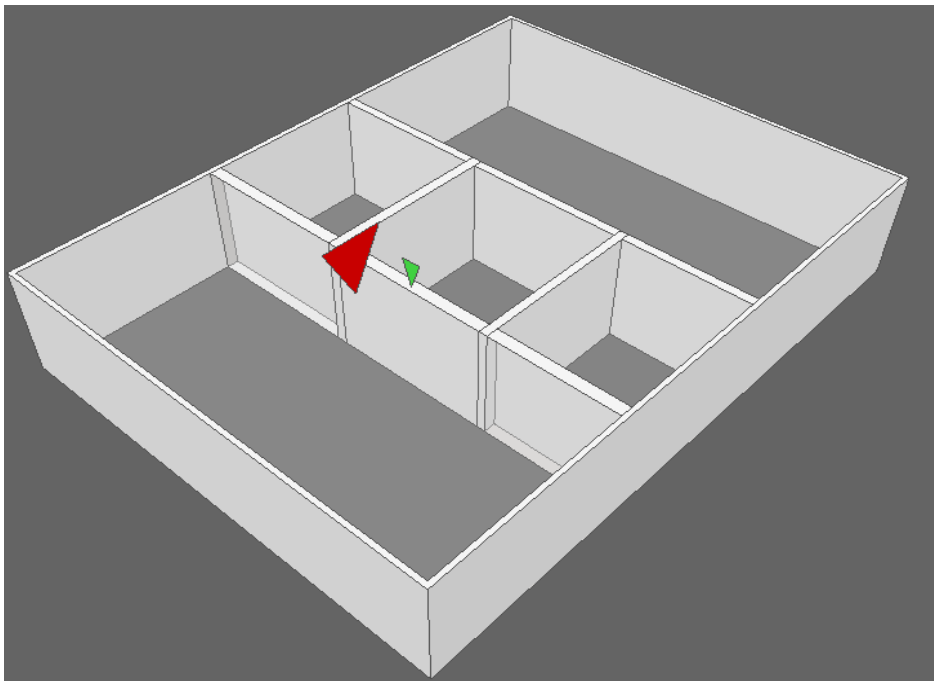Faculté de foresterie, de géographie
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Examples of 3D models tested

Test #	Wall belong to Private unit	Alpha Values		
		Face of the Private unit	Face of the wall next to private unit	Face of the wall next to common part
3	N	13	100	100
5	Y	36	13	100

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Voici un modèle 3D représentant deux unités de condominium (l'un avec le plancher en rouge et l'autre plancher en gris foncé), et deux blocs (plancher gris pâle) montrant des parties communes comme les limites de l'ascenseur ou l'escalier. On peut aussi observer des murs délimités par des lignes.

Vous êtes propriétaire de l'unité de condo en rouge, tandis que l'unité de condo en gris foncé appartient à un autre propriétaire.

Prenez la souris, agrandissez et tournez autour du modèle 3D. Remarquez, deux situations (marquées par les lettres A et B)

A: Le mur est situé à l'extérieur de la limite de votre propriété, ainsi le mur ne vous appartient pas

B: Le mur est situé sur la limite de votre propriété et ainsi le mur vous appartient

3D Warehouse

Rotate   Zoom   Pan   +Shift