Interactive tactile representation
of street intersections
(ANR ActivMAP project)

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(PhD, year 2)

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Navigating street intersections for the visually impaired (1)

Vital skill to independent journeys with great challenges

Fazzi, D. L. ., & Barlow, J. M. (2017).

Which direction / street am I facing?

Where is the curb / street / crossing?

How many lanes? Which direction?

Traffic lights control?

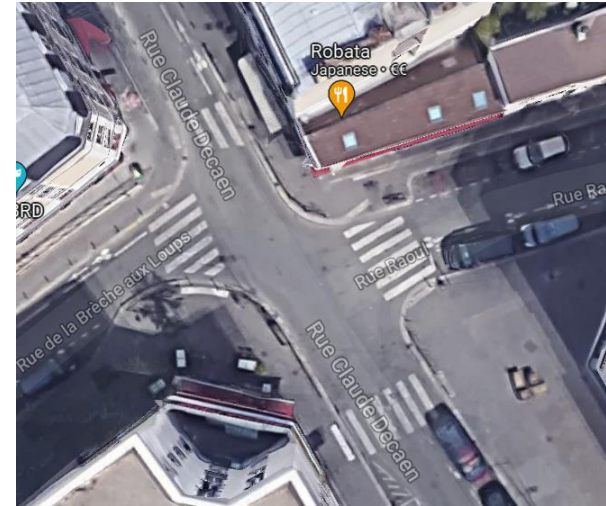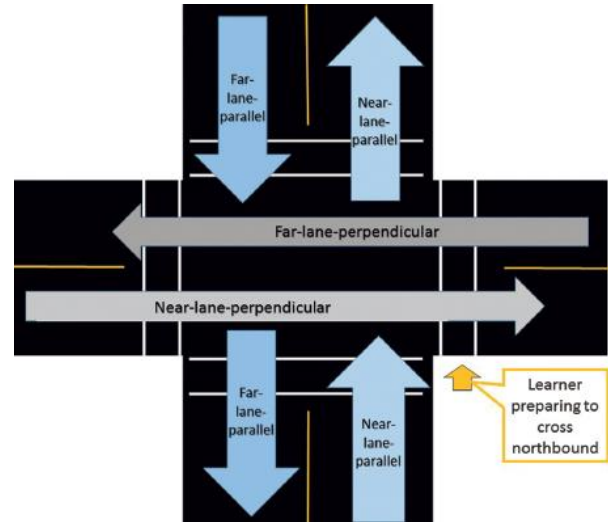When do I know I reach the other side?

…

Navigating street intersections for the visually impaired (1)

Vital skill to independent journeys with great challenges

Basic scenario as in instructions

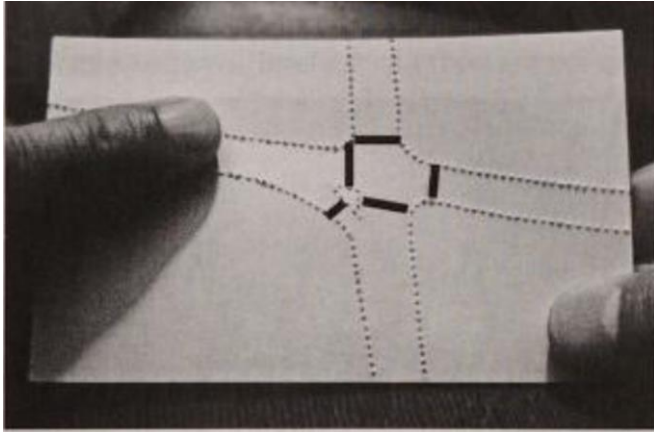Fazzi, D. L. ., & Barlow, J. M. (2017).

Which direction / street am I facing?
Where is the curb / street / crossing?
How many lanes? Which direction?
Traffic lights control?
When do I know I reach the other side?
…
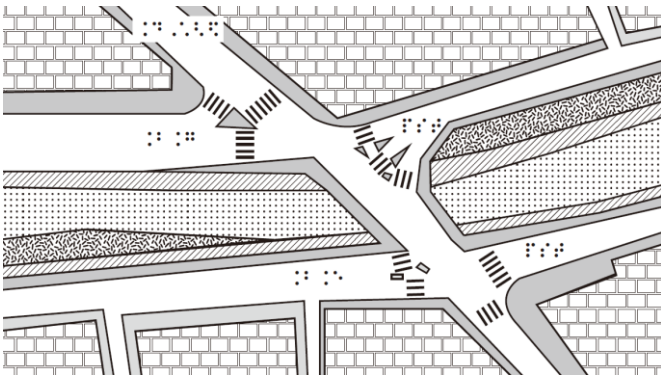

while the city can be very
complicated …

Navigating street intersections for the visually impaired (2)

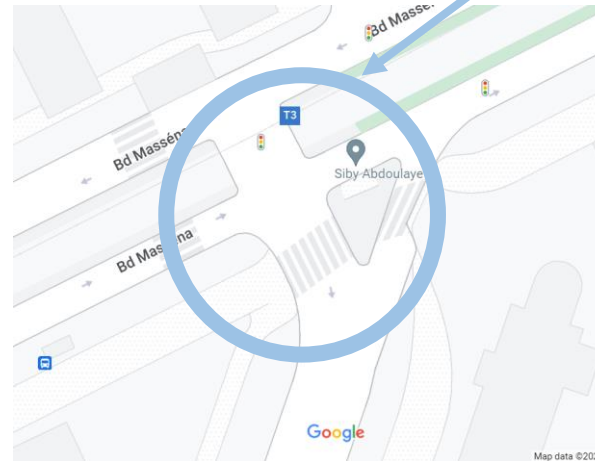## Maps as support for teaching and real journeys

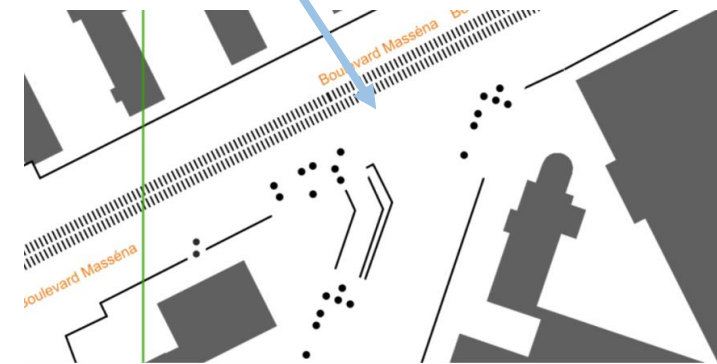simple handmade map for simple crossing (5min)

(Wiener et al., 2010)

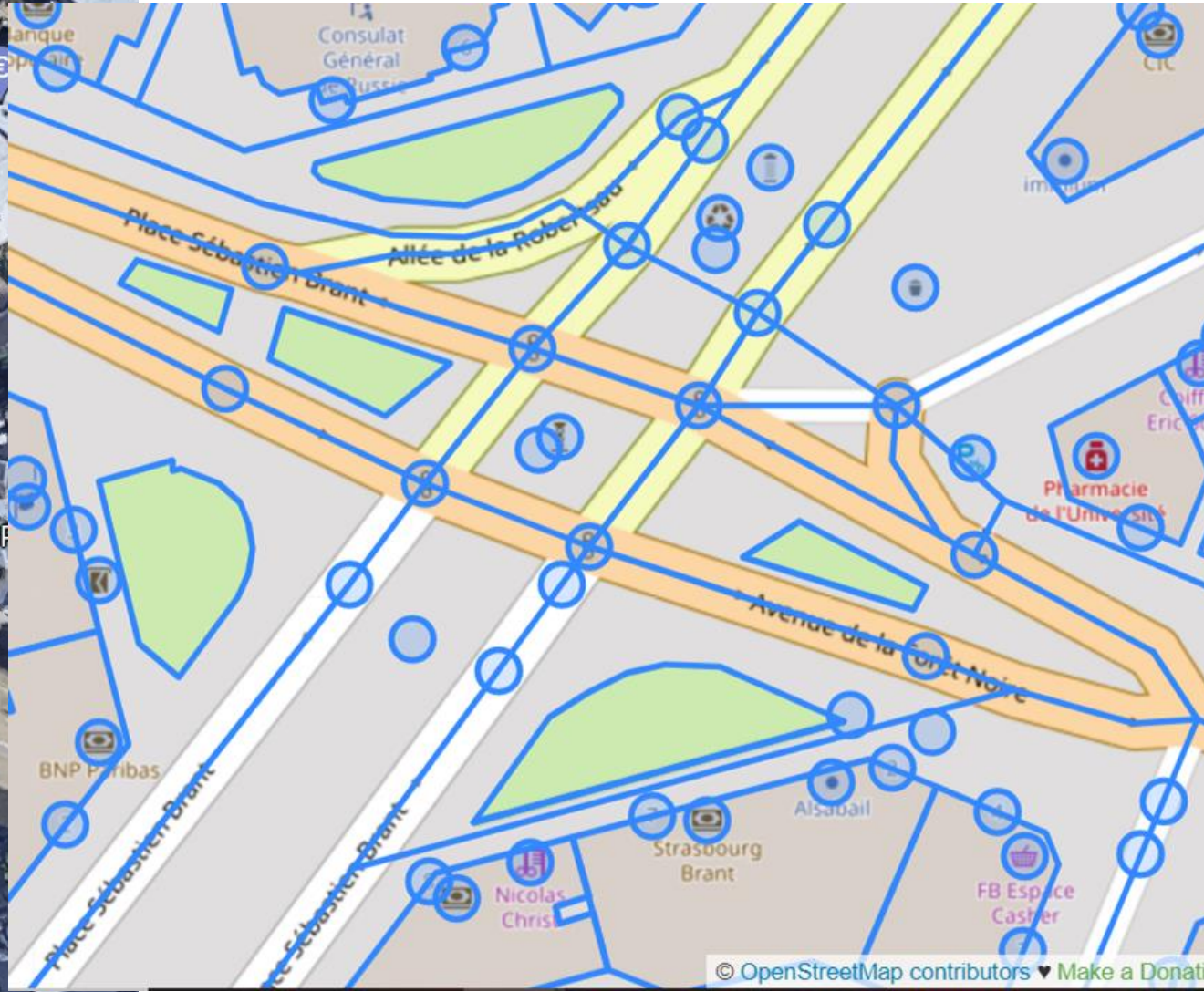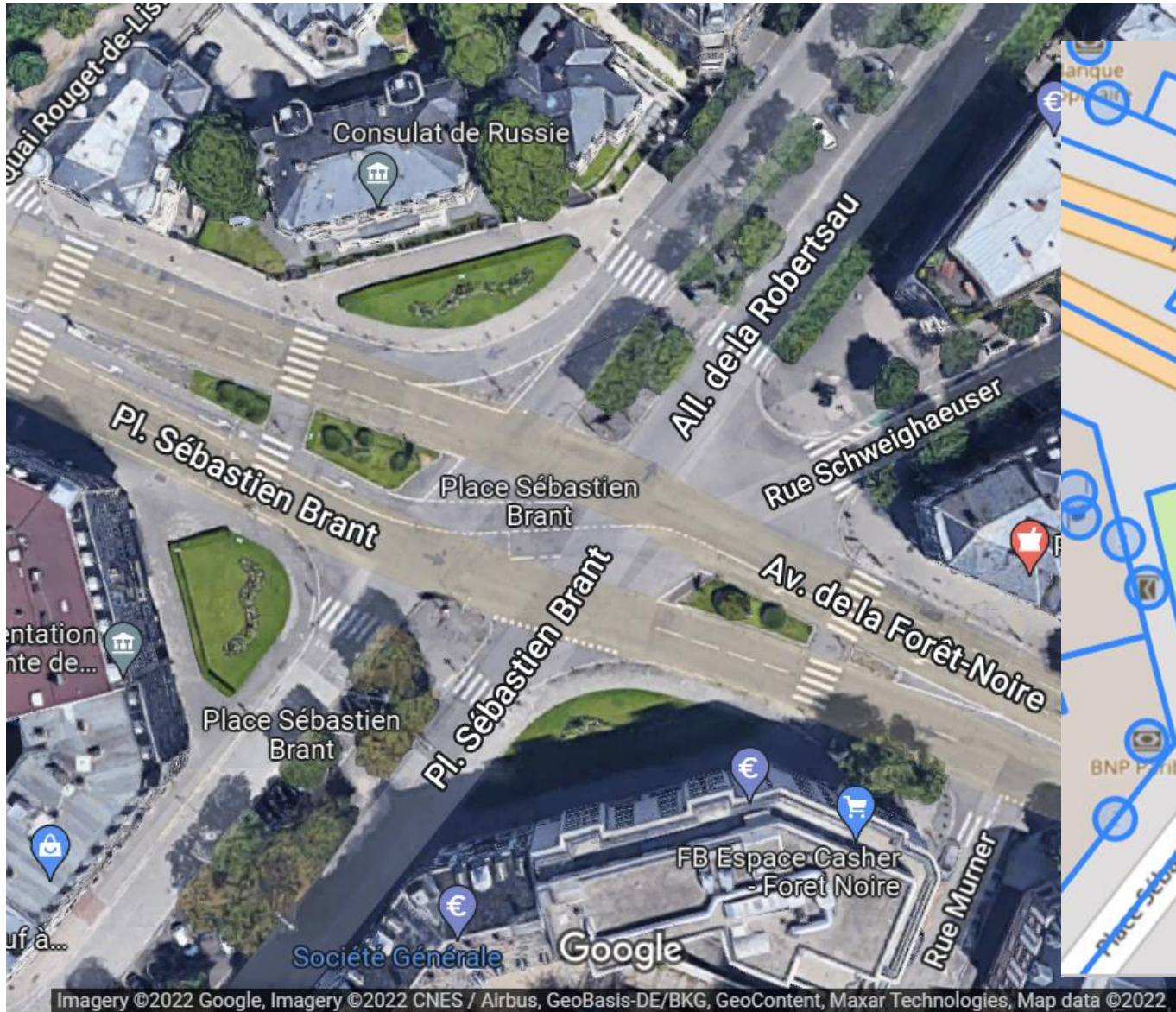detailed handmade map for complex crossing (1h+)

Latest (2022!) for some cities on Google: only visual so far, and not open.

automatically generated (paper) maps aiming at neighborhood level: missing important information mapy.cz (Červenka et al. 2016)
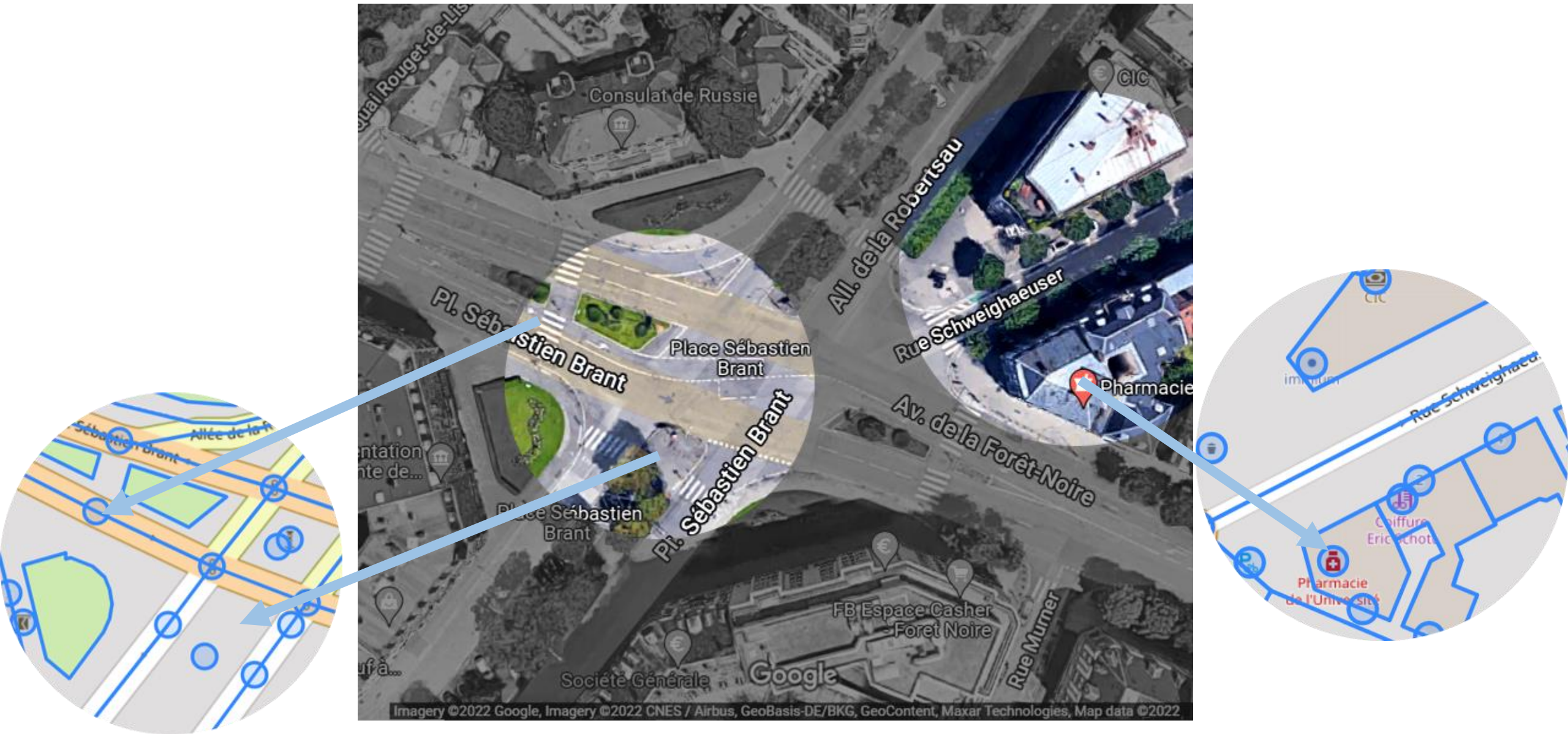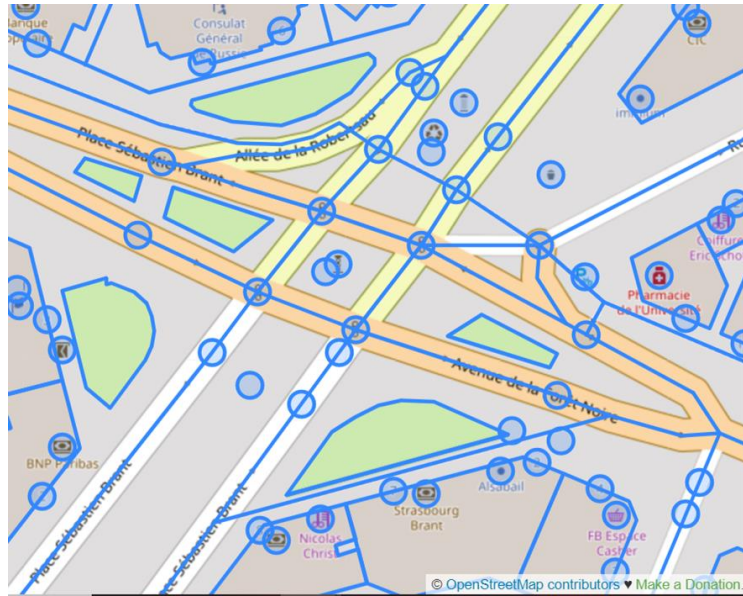
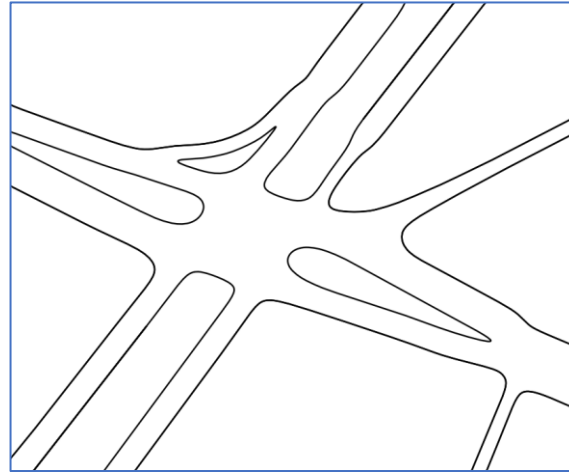# From OpenStreetMap to semi-automated tactile mapping (1)

Objects on the street vs object in the data vs objects needed for intersection familiarization and crossing

From OpenStreetMap to semi-automated tactile mapping (1)

Objects on the street vs object in the data vs objects needed for intersection familiarization and crossing
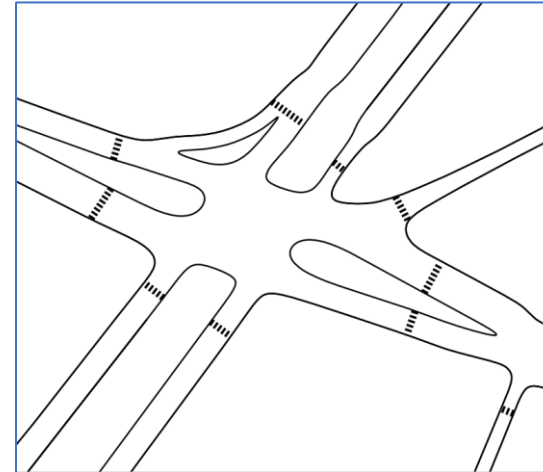
From OpenStreetMap to semi-automated tactile mapping (2)
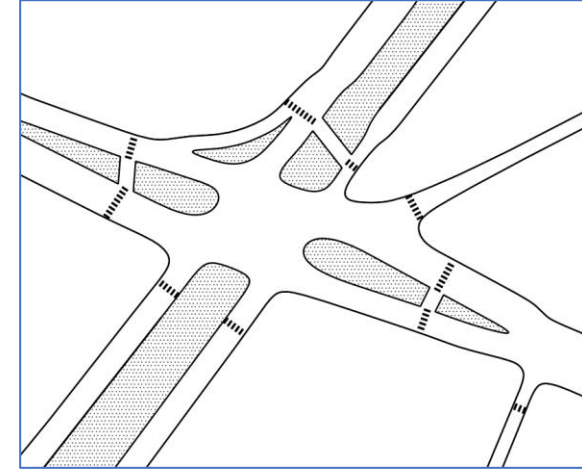
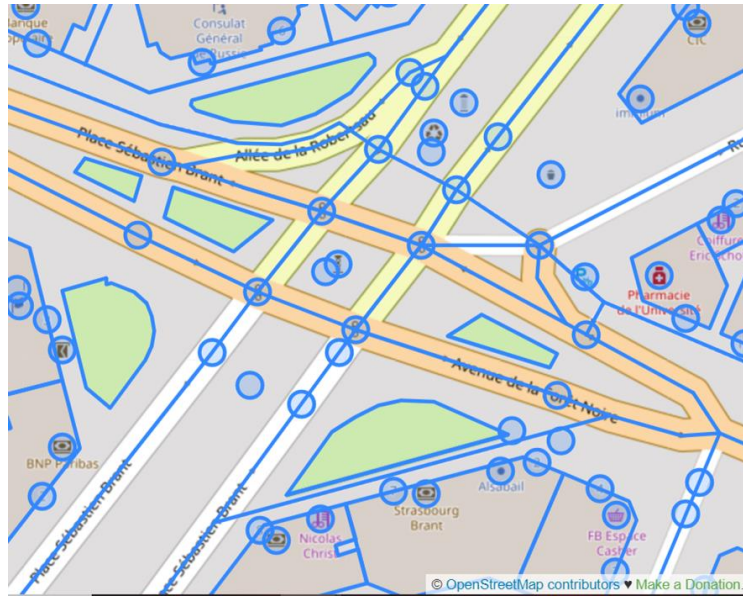Basic intersection geometries

street transformation
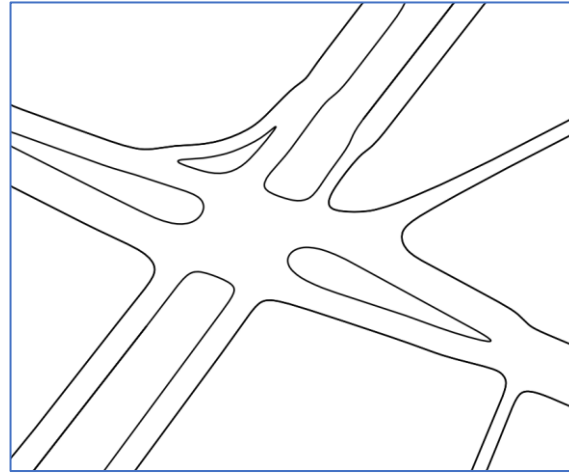

crossing line generation

island estimation

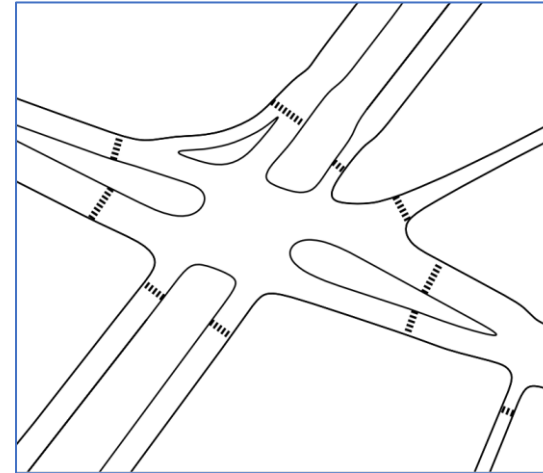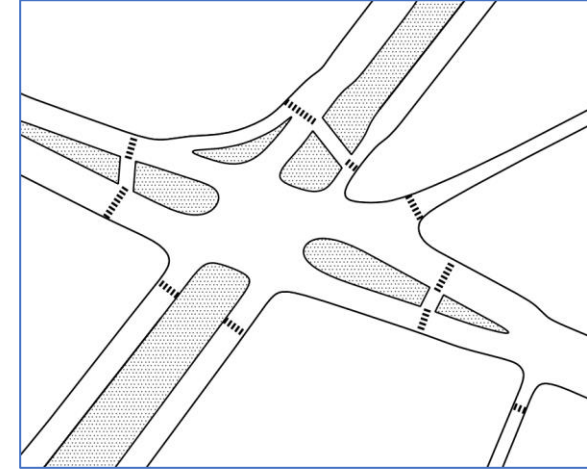# From OpenStreetMap to semi-automated tactile mapping (2)

Basic intersection geometries
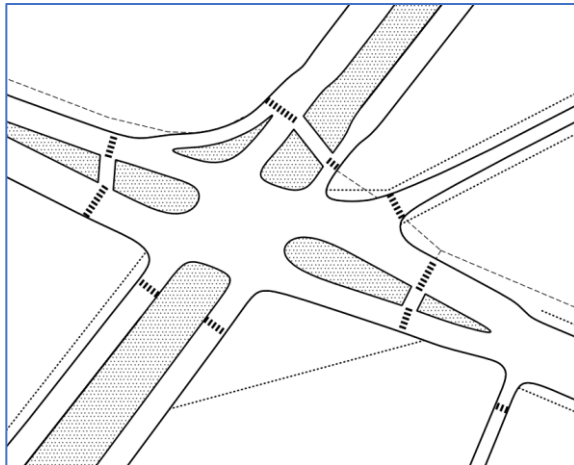

street transformation
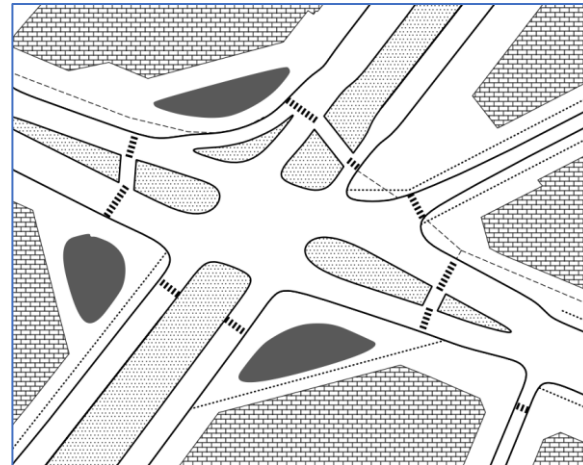

crossing line generation
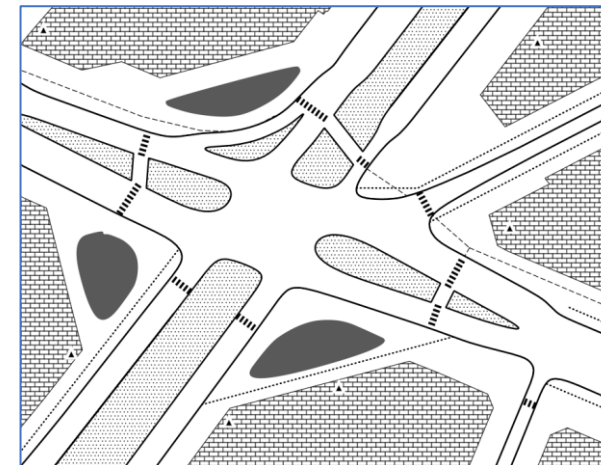

island estimation

Additional information (depending on availability and usage)

cycleway and footway

road-side patches generalization

POI overlay

+ more object classes *if data supports…*

Styling: exploration with rules and preferences

Tactile graphic guidelines as theory

The N.S.W. Tactile and Bold Print Mapping Committee. (2006).
Braille Authority of North America (2010)

(Individual) User perception and preference

Tactile professionals at work

Pipeline that technically supports various styling

?

Making (physical) prints: size probably matters
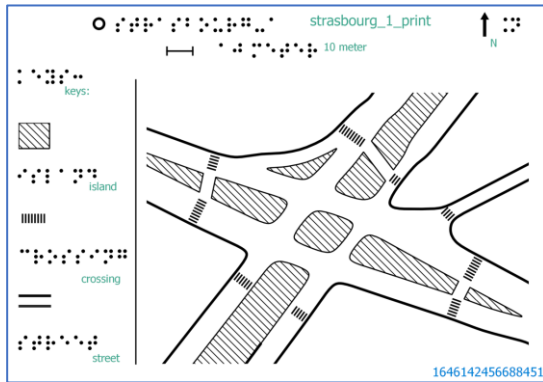
A5, 1:1000 -> tablet

A larger size can bring,
Changes in graphics
- Larger scale
- More space -> more objects, more details, less clutter?

Changes in usage
- Different use case (e.g. portable vs fixed)
- Different reading / exploration strategy?

A3, 1:500 (image shrunk)

Interactions: so little space with so much to say
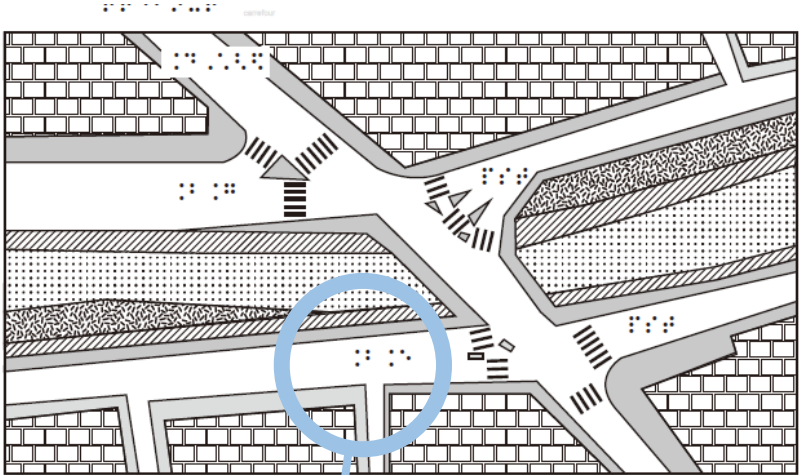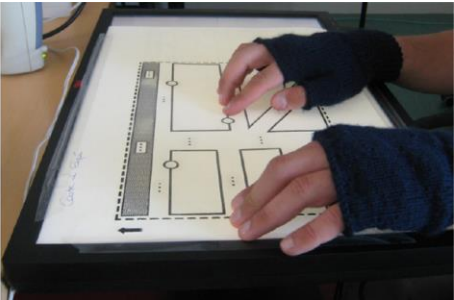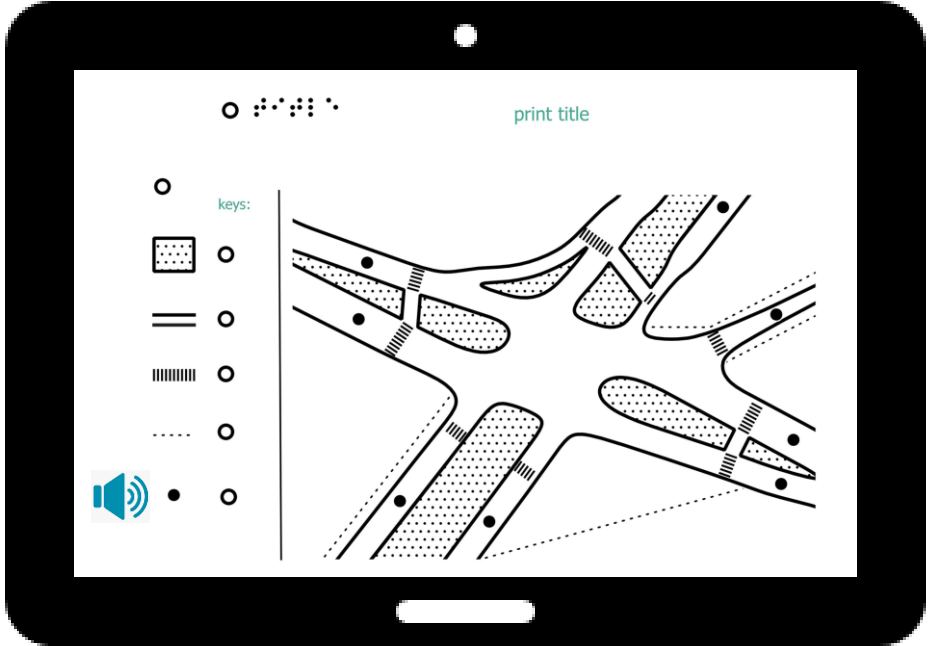
(Brock et al., 2015)   feelobject.fr

On-going: ActivMAP proof-of-concepts 2021-2022

Regular tablet with interactive
reader DERi (IRIT)

Specialized tablet Virtuoz (FeelObject) (w/ 3D prints)

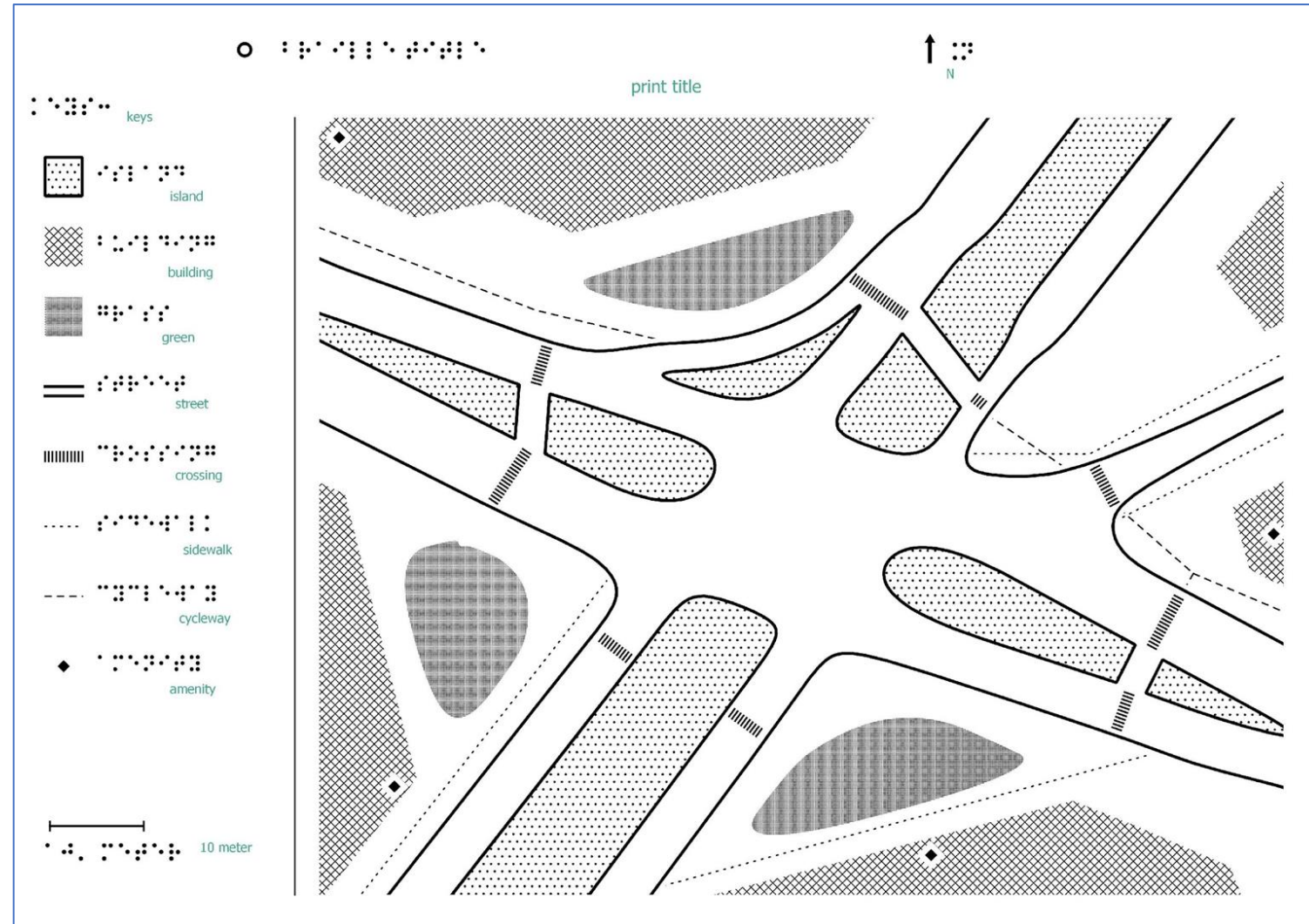**+ (swell paper) tactile prints**

+ textual descriptions
of street intersections elements
(Jérémy Kalsron, PhD)

Clickable map elements
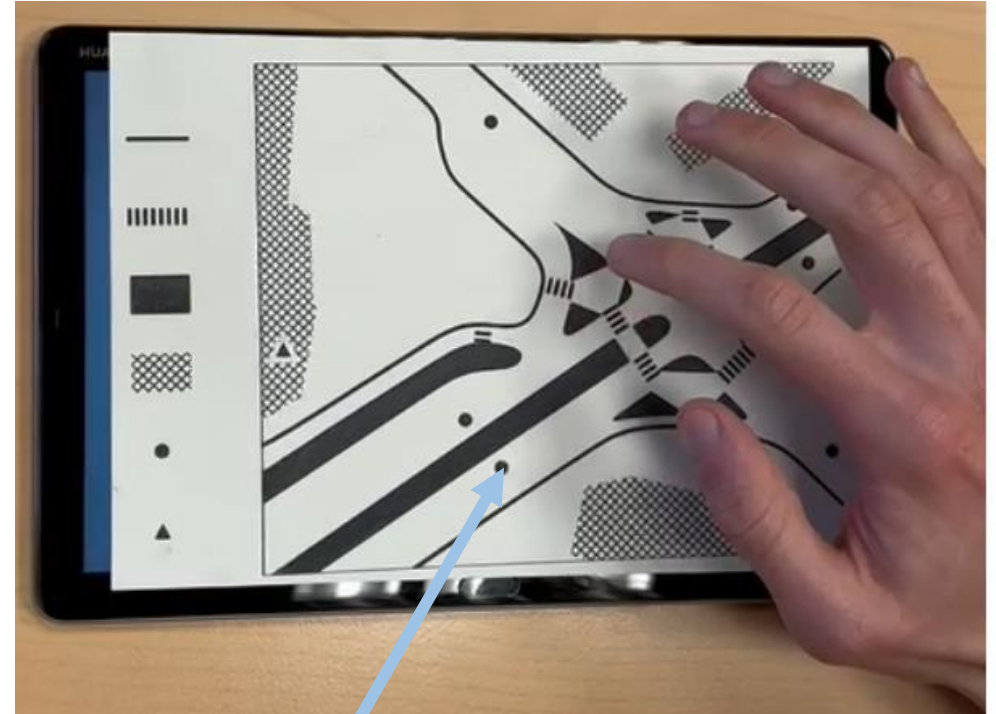
"La branche N°3 est composée de 3 voies de
circulation entrantes…."
"Le passage piéton est protégé par un feu…"
"Il y a des bandes d'éveil de vigilance.."

On-going: initial evaluations for the mapping pipeline

With tactile document makers & mobility instructors

- are the maps "ok"?
(size, geometry, style options, supplementary elements...)

- *(when)* are the provided additional objects useful?
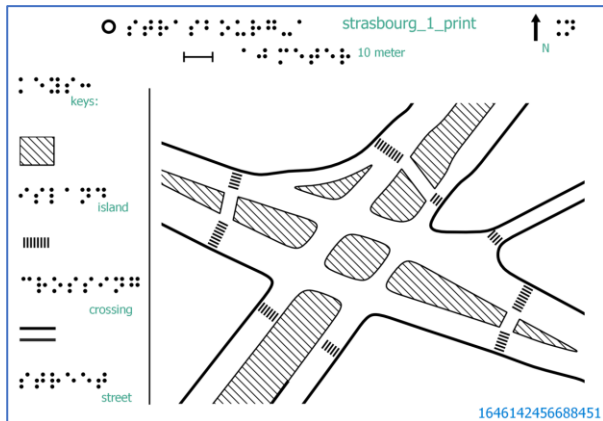
-> A5 size that *only* hosts 3 basic objects: enough for a basic task?
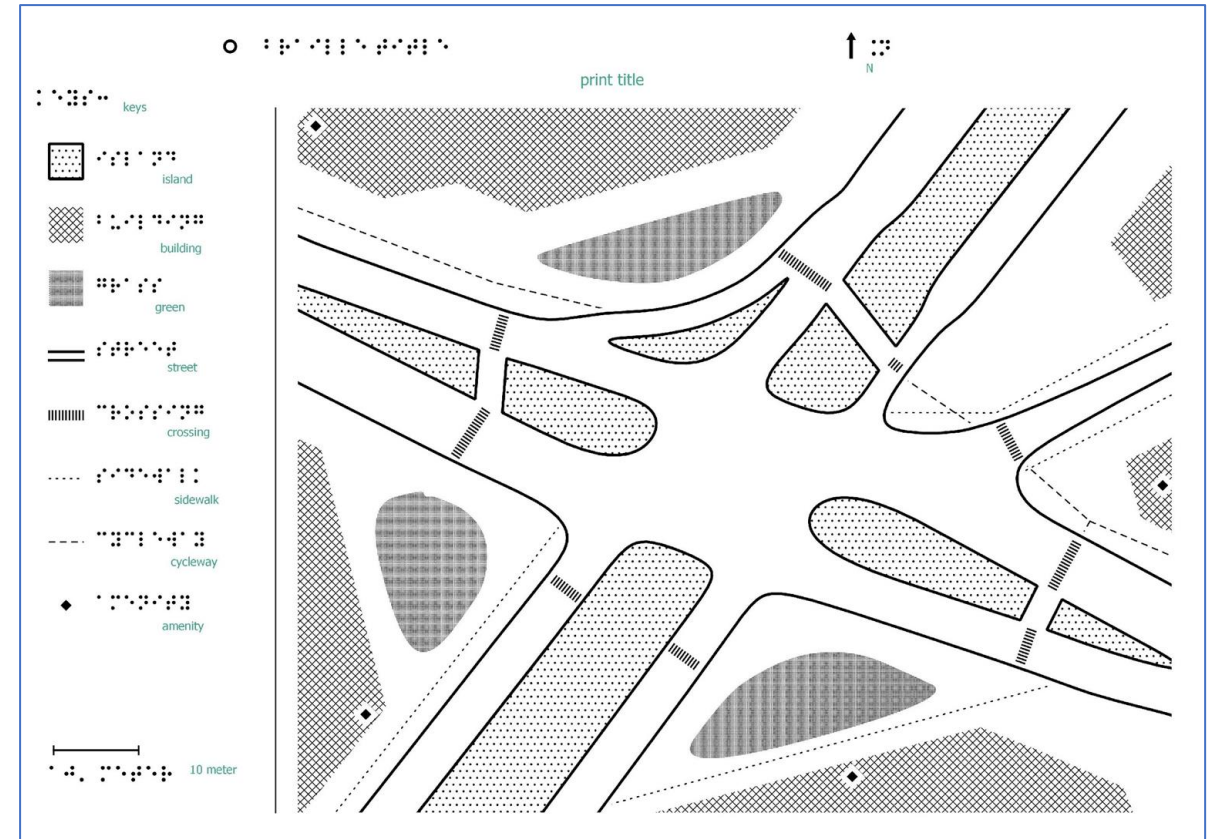
-> A3 size with everything the data can provide: when and what is (not) useful?

- what (object, style, element etc.) is missing?
(then how can I accommodate that?)

Thanks for your attention!

For more information: https://activmap.limos.fr/

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References

Brock, A. M., Truillet, P., Oriola, B., Picard, D., & Jouffrais, C. (2015). Interactivity Improves Usability of Geographic Maps for Visually Impaired People. *Human-Computer Interaction*, *30*(2), 156–194. https://doi.org/10.1080/07370024.2014.924412

Fazzi, D. L. ., & Barlow, J. M. (2017). Orientation and mobility techniques : a guide for the practitioner. In *Assistive Technology for Blindness and Low Vision* (Second edi). ABS Press. https://doi.org/10.4324/9781003003175-4

The Braille Authority of North America (2010). *Guidelines and Standards for Tactile Graphics*

The N.S.W. Tactile and Bold Print Mapping Committee. (2006). *A guide for the production of tactile and bold print maps* (3rd ed.). Vision Australia.

Wiener, W. R., Welsh, R. L., & Blasch, B. B. (2010). Foundations of Orientation and Mobility, Volume II, Instructional Strategies and Practical Applications (Third Edit). American Foundation for the Blind.