# Improving Cadaster Boundary Accuracy through Crowdsourcing

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**National Land Survey of Finland**

Pyykkijahti
**Verfolgung von Grenzmarken**
Rösejakt
Boundary mark chase
Grænsepæl jagt
Markahrúgur veiða
Grensepel jakte

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# Boundary Marker Chase
## (Pyykkijahti)

**Crowdsourcing Game Overview**

**Goal**: Improve boundary markers in Finnish Cadastral Index Map (CIM)

•**Players**: Measure inaccurate markers or mark them missing

•**Duration**: June 2021 – September 2022

•**Users**: 5,000 participants

•**Contributions**: Over 30,000 entries

•**Feedback**: 82% rated Pyykkijahti as pleasant (n=402

03/09/2021
Mikko Rönneberg, FGI, NLS
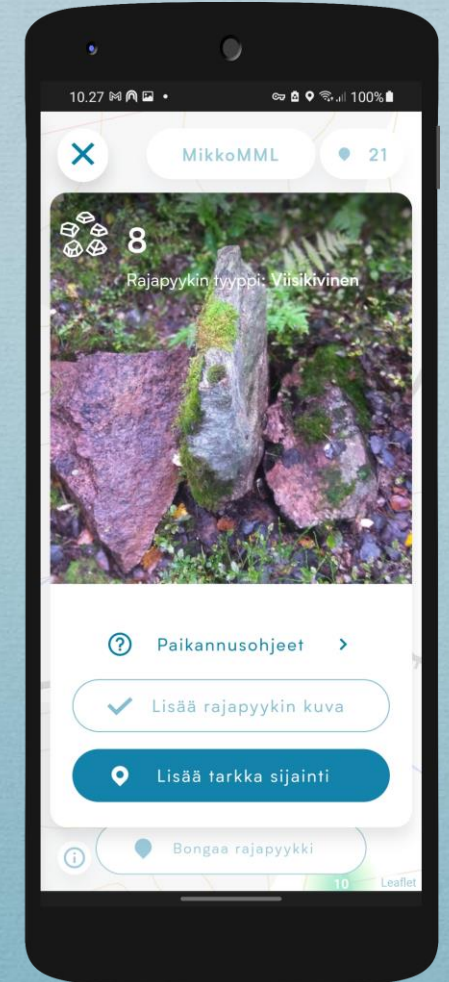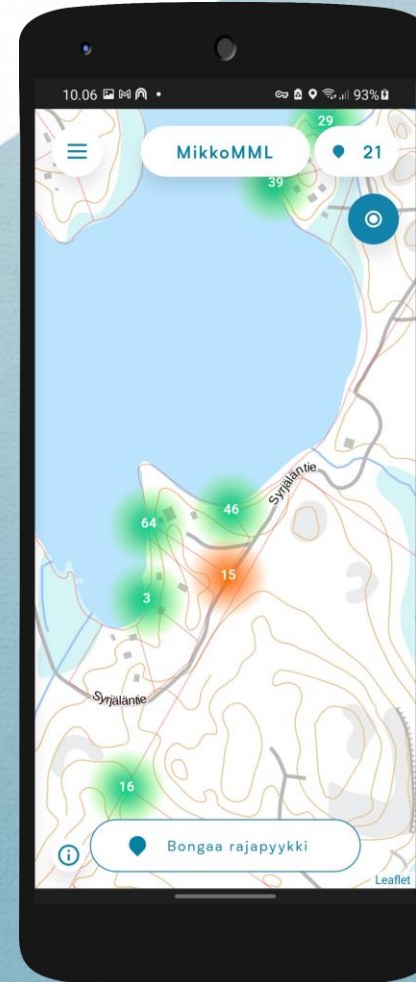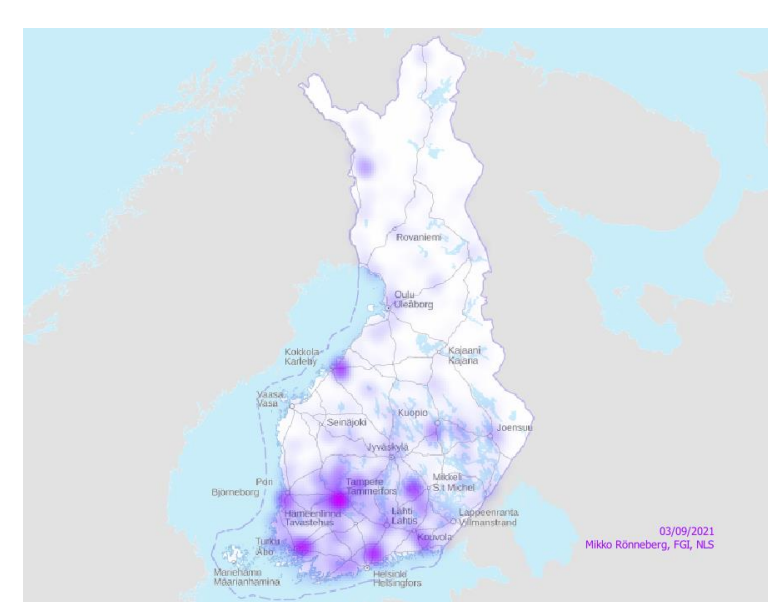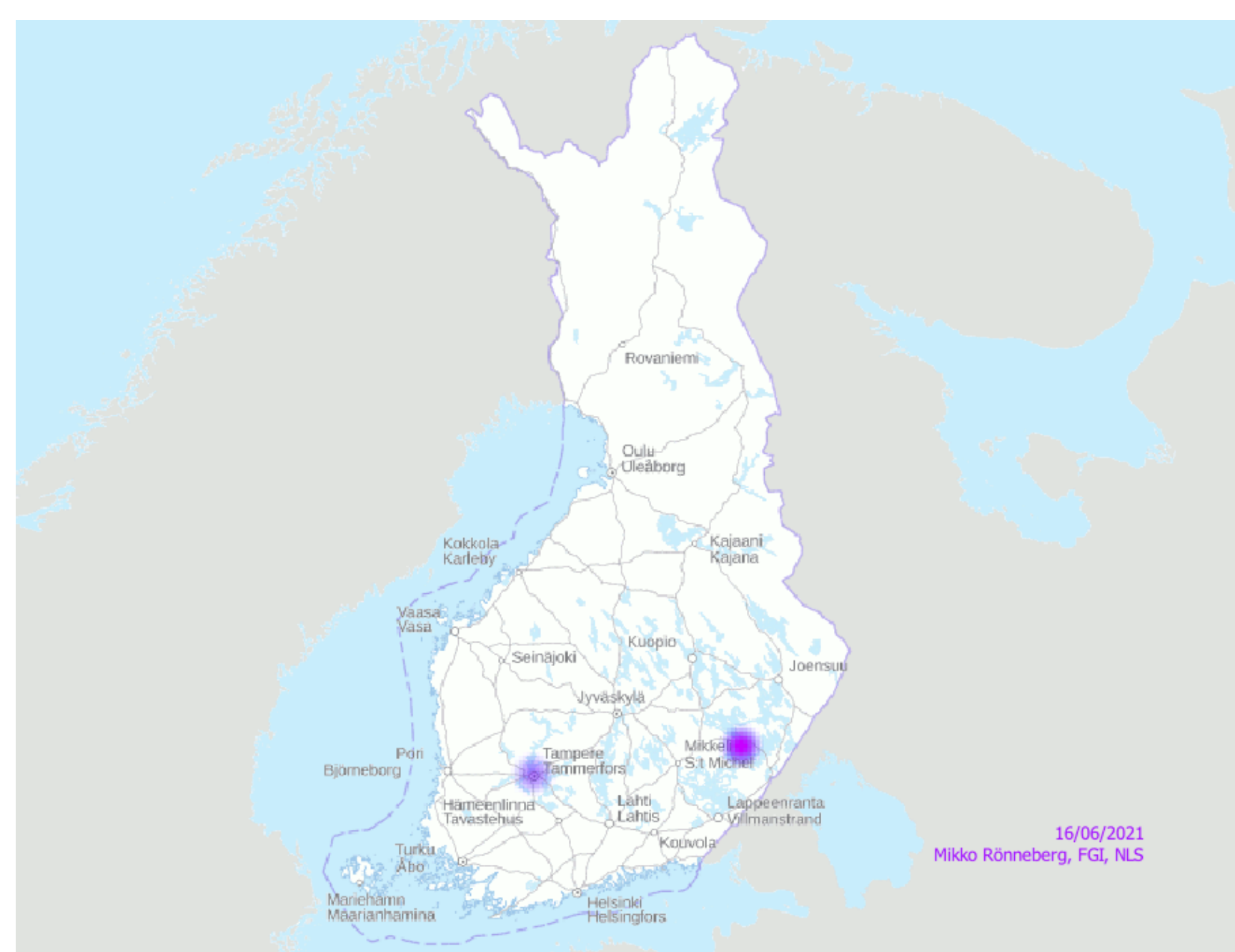
# Data Gathered During the Pilot

- 17.6.-1.9.2021

- Media Campaign in Pirkanmaa

16/06/2021
Mikko Rönneberg, FGI, NLS

# Reliability of Marker Chase Measurements

Visual inspection of photos by professional surveyors:

- 400-marker random samples

1. Certain border marker
2. Probable border marker
   - 60 % possibility
3. Not a border marker





15 %
14 %
Not
Probable
Certain
71%
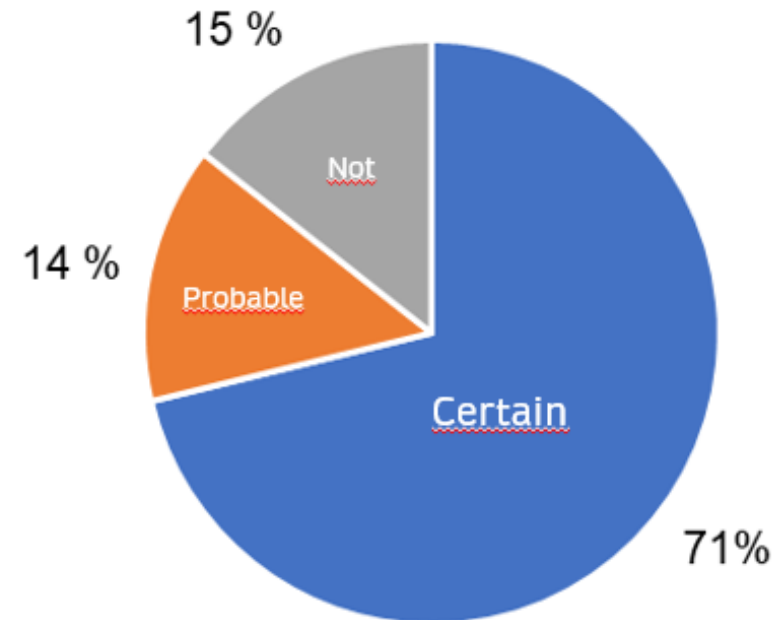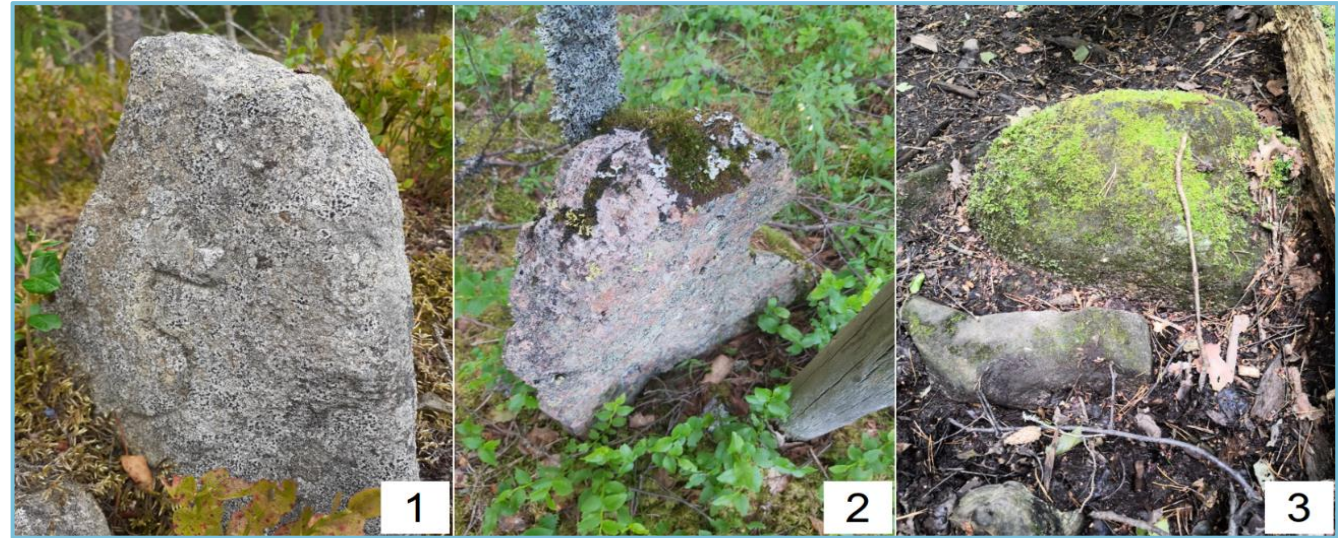
# Project results 1/2

- Crowdsourcing successfully mobilized participants for charitable activities

- The chosen Crowdsourcing method was effective in practice useful

# Project results 2/2

- Positioning accuracy was not the main focus
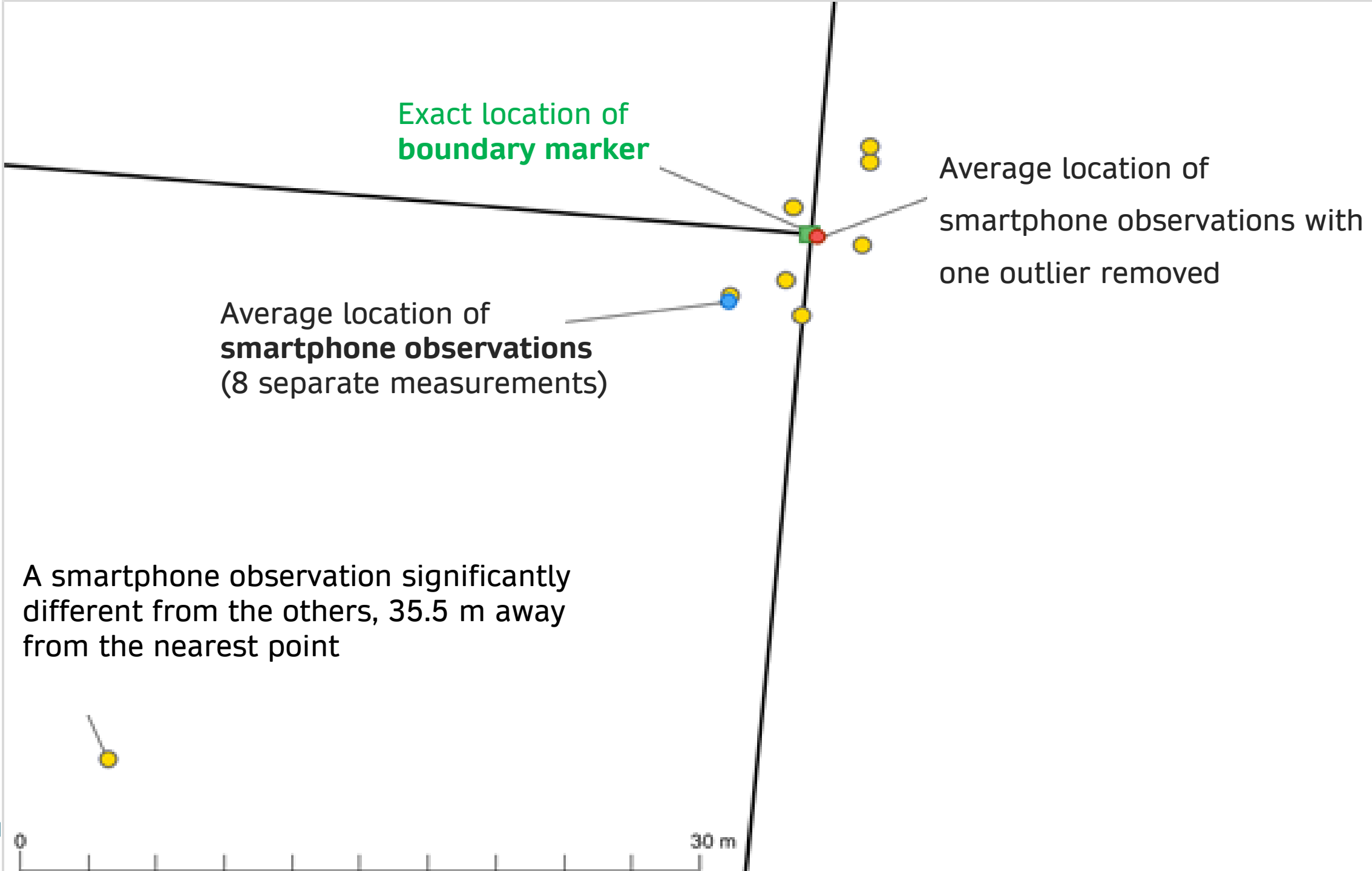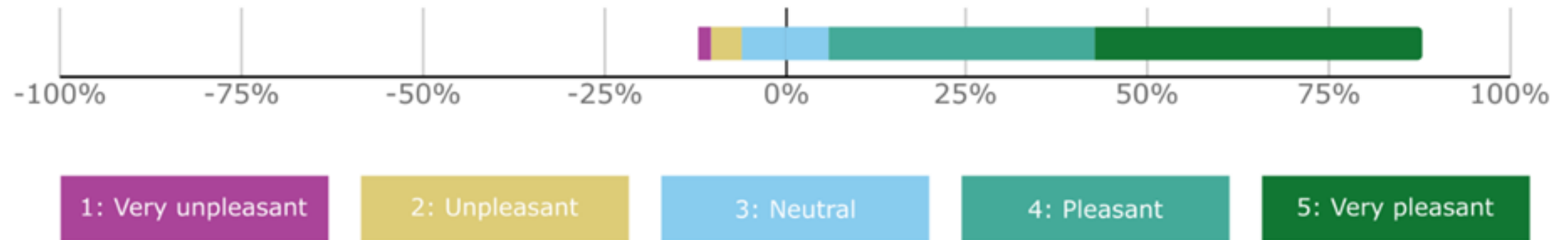
- Almost all boundary marks that previously had a positioning accuracy of more than 5 m, the positioning accuracy was improved with smartphone measurements.

- Accuracy inside 1 meter was rarely achieved

- Two successes stood out:

  - Application "Pyykkijahti" developed for the pilot!

  - Strong public engagement driven by social media, radio, and newspaper marketing

Exact location of **boundary marker**

Average location of smartphone observations with one outlier removed

Average location of **smartphone observations** (8 separate measurements)

A smartphone observation significantly different from the others, 35.5 m away from the nearest point

NATI

0                                                      30 m

# Evaluation Results



What was the artifact experience like?

1: Very unpleasant    2: Unpleasant    3: Neutral    4: Pleasant    5: Very pleasant

# Pyykkijahti Users' Profile Types (1/2)

**We asked …**

**"Which of the profile types below best describes you?"**

The nine most common profiles: **Are interested in …**

22% Beneficiary     - improving the property register

18% Developer       - how society works

15% Adventurer      - the wilderness

# Pyykkijahti Users Profile Types (2/2)

10% Researcher        - researching the forest

9% Protector          - protecting forests

9% Achiever           - finding different types of boundary mark
                        brands

8% Reward Chaser      - winning product awards

7% Co-operator        - communities of people moving in nature

2%                    - none of these describes me

# Key Lessons Learned: Successful Policies and Practices (1/2)

- **Communication was successful**

- For projects like this, where participant numbers and commitment are critical:

  - Marketing and communication efforts should be managed by the National Land Survey's communication department

  - This aspect of the project requires significant expertise and resources

- **Subcontractor performance is crucial**:

  - The 'Pyykkijahti – Boundary Mark Hunt' application successfully met the initial goals defined for the project

# Key Lessons Learned: Successful Policies and Practices (2/2)

- **Questionnaire feedback provided valuable insights into crowdsourcing:**

  - Offered a clear understanding of users and their level of knowledge

- **These findings can be put to good use in:**

  - Improving the production and marketing of similar services in future projects.

# Main Results

- Position accuracy did not meet our needs:

- The best accuracy achieved was around 2.0 meters

- To reach the target of 1.0 meter accuracy, we will need to:

  - Explore new methods

  - Await advancements in mobile technology