

SMART STATIONS IN SMART CITIES

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The background of the slide is a composite image. On the left, there's a blue-toned image of a railway station with a train and a network of glowing nodes and lines, suggesting smart infrastructure. On the right, there's a blue-toned image of people walking in a city, with a city skyline visible in the background, suggesting smart cities.

IMPROVING ACCESSIBILITY FOR VISUALLY IMPAIRED PEOPLE WITH MULTIMODAL WAY-FINDING SOLUTIONS AT STATIONS

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3b. ACCESSIBILITY IN THE INFORMATION ERA

UNDER THE HIGH PATRONAGE OF



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BACKGROUND

- ❖ EU Commission Regulation (EU) N:o 1300/2014 and accessibility challenges particularly with the signage system for visually impaired and blind persons (VI)
- ❖ Lack of qualified user research about the whole signage chain for visually impaired people
- ❖ Design for All and Universal Design perspective
- ❖ Lack of good instructions about the implementation and differences in signage implementations in between different countries in Europe.
- ❖ Possibility to investigate how to support accessible signage systems with new intellectual navigation systems, audio signage, sound beacons and 3 dimensional tactile maps.

MOBILITY AND ORIENTATION

- ❖ Mobility and orientation are challenging for the visually impaired (VI) people as well as they are travelling independently .
- ❖ Expected difficulties in way-finding may cause stress and anxiety.
- ❖ Way-finding refers to how a person orientates and navigates through an area or a space.
- ❖ The way-finding instructional information is mostly presented in a visual form, which means it is not accessible for VI people.
- ❖ When people are finding their way to destination they use four senses - sight, sound, touch, smell to varying degrees and sometimes subconsciously.

CHALLENGES FOR VISUALLY IMPAIRED PERSONS USE PUBLIC TRANSPORTATION

- ❖ planning and creating mental model of a trip
- ❖ finding a stop or station for a vehicle change
- ❖ finding the entrance to a new vehicle or to the station
- ❖ creating overview and navigating inside the station
- ❖ finding the right departure line
- ❖ recognizing when the right vehicle arrives,
- ❖ finding a vehicle entrance, a seat
- ❖ receiving passenger information during the trip
- ❖ stay off at the right stop and finding the destination
- ❖ finding the way back home

The major challenges that professionals are facing is how to support independent navigation when building new railway stations.

MWAY PROJECT

- ❖ This presentation will show multimodal wayfinding solutions developed in a Finnish MWAY-project.
- ❖ By multimodality we refer to several **modes**, modalities (visual, oral, tactual, olfactory, proprioceptive etc.) and **channels** (internet, mobiles, verbal descriptions, tactual maps, etc.) for providing information and thus, expanding access for information.
- ❖ In this project, co-created multi-sensory way-finding solutions, like smart verbal descriptions, landmarks with iBeacons and sound-tactual maps, will be developed with visually impaired (VI) people.

PURPOSES OF THE PROJECT

- ❖ to test different static signage systems available in the European market: tactile directional stripes, warning areas, handrail signage, audio signage and sound beacons, tactile maps
- ❖ to make a wide user test about signage systems for VI.
- ❖ to test and develop new smart phone and iBeacon mediated indoor navigation system.
- ❖ to test new 3-D sound-tactile maps in the station use.
- ❖ to develop further the use and content of verbal description's information as advance preparation for way-finding.
- ❖ to fulfill the EU guidelines about accessible signage system for visually impaired people.

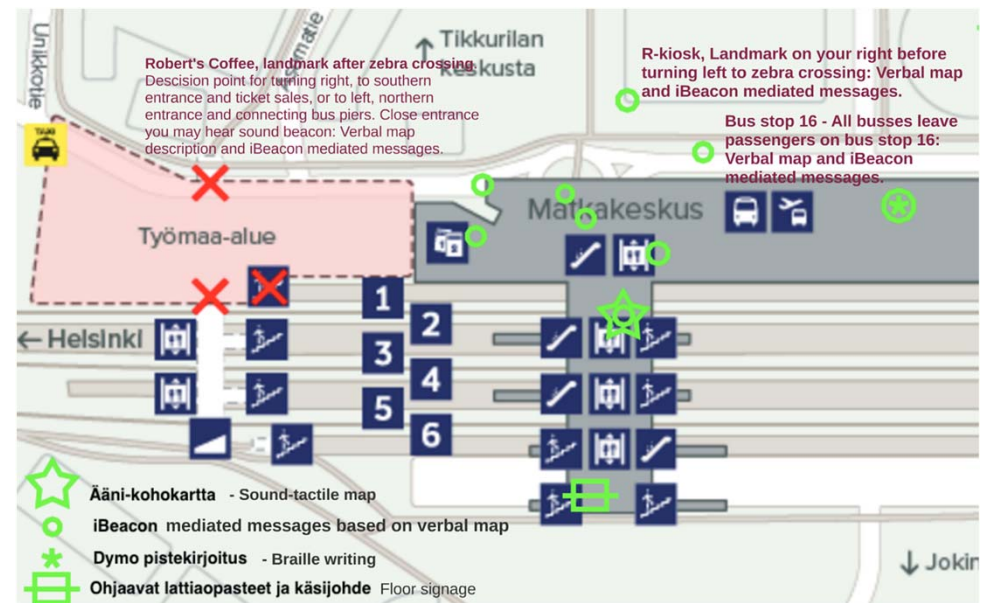
METHODS OF THE MWAY PROJECT

- ❖ The Tikkurila Bus and Train Station and Itäkeskus Metro station were project's test beds

The new Tikkurila Travel Centre in City of Vantaa was taken into use in January 2015. It offers passengers a very pleasant environment with cafés, restaurants and shops.

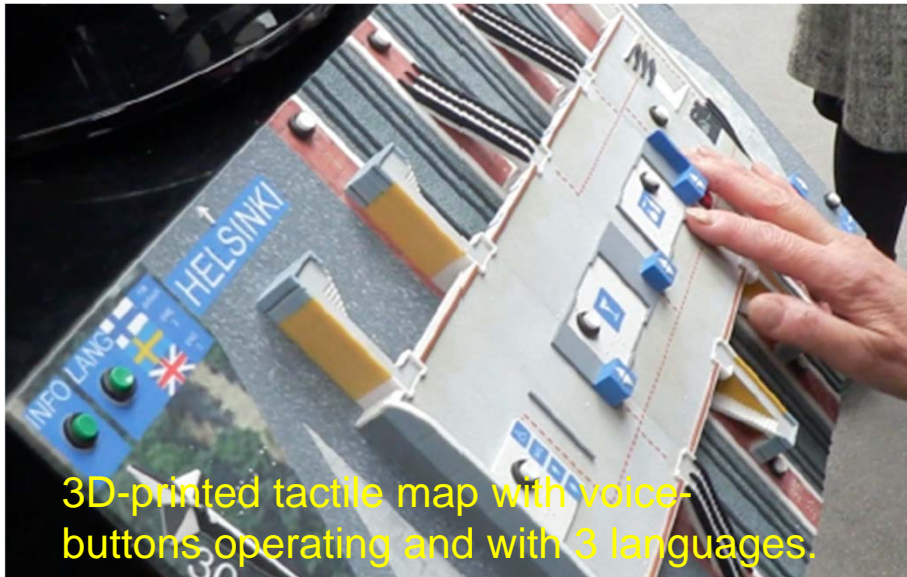


The station bridge will connect the station building to the platforms and to the eastern side of the tracks. The station bridge over the tracks will serve as a waiting area.

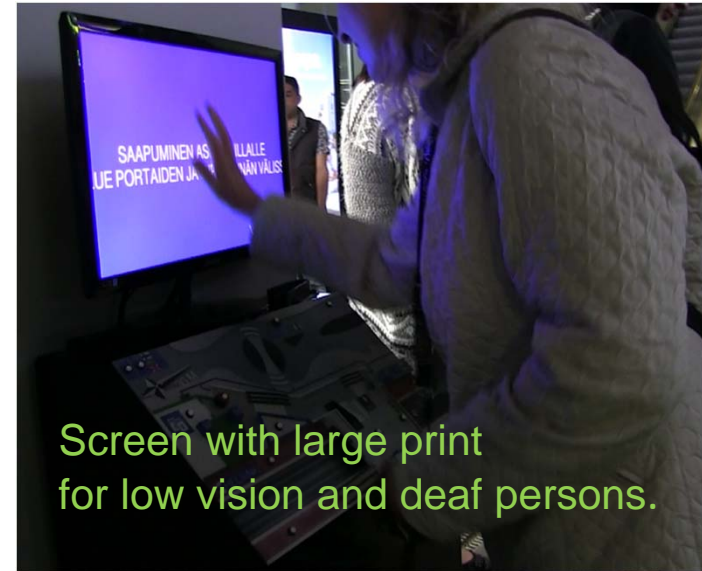


- ❖ VI persons were involved within as informants and co-creators during the whole developmental process
- ❖ The Research setting was action oriented, three round circled and linked closely with the design and development process.
- ❖ Video documented known and unknown route walks to collect wayfinding experiences of VI informants.

DYNAMIC WAYFINDING SOLUTIONS: Multimodal 3-D tactile map versus tactile maps

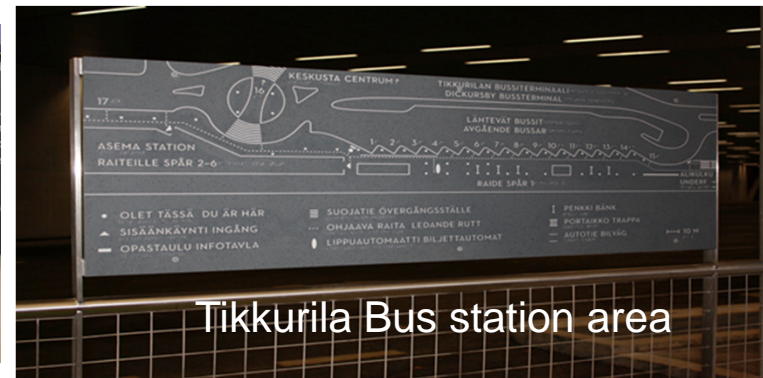
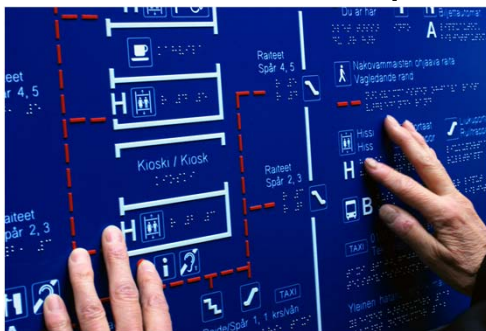


3D-printed tactile map with voice-buttons operating and with 3 languages.



Screen with large print for low vision and deaf persons.

Tactile maps

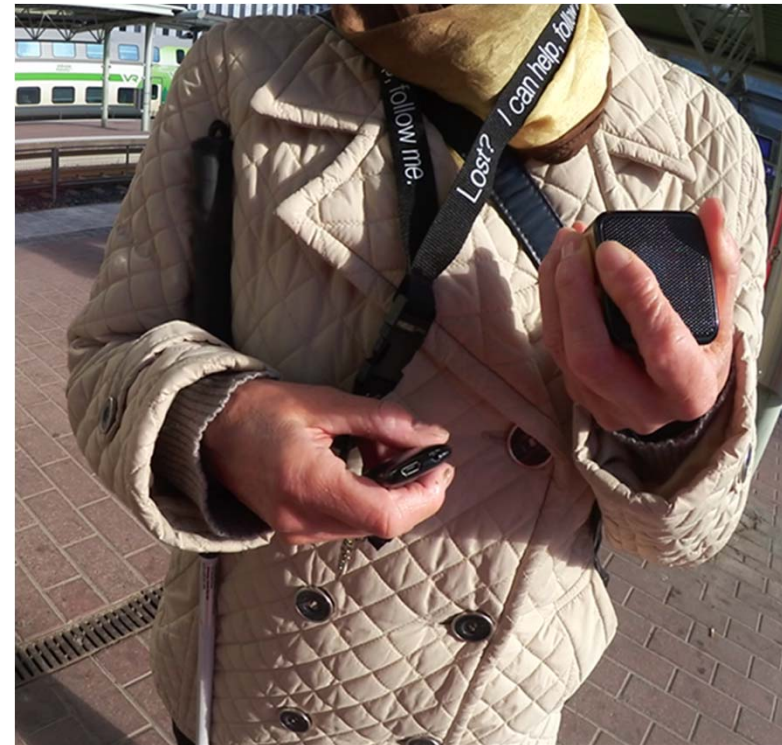


Tikkurila Bus station area

SMARTPHONE, **BlindSquare** app with iBeacon mediated information

BlindSquare is the World's Most Popular accessible GPS application developed for the blind and visually impaired. It describes the environment, announces points of interest and street intersections as you travel. In conjunction with free, third-party navigation apps it is a powerful solution providing most of the information blind and visually impaired people need to travel independently.

iBeacon on a wall



Blind person using remote control during journey.

TESTING OF “TRADITIONAL” STATIC TACTILE SIGNAGES ON TIKKURILA STATION BRIDGE

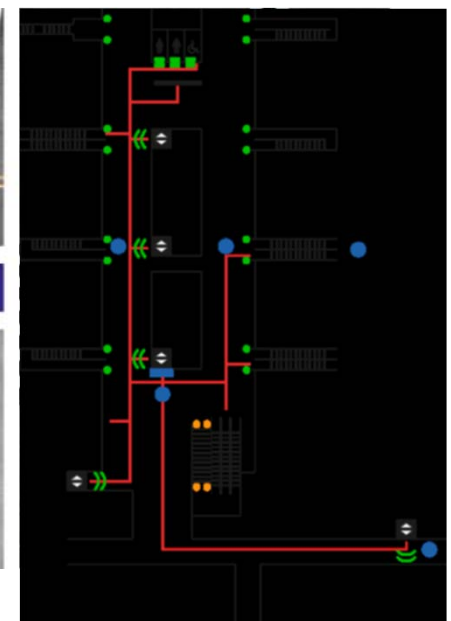


Handrail signs



Directional stripes and warning areas

- 18 products
- 6 European countries: Finland, Sweden, Austria, France, Estonia, Germany
- 5 manufacturers

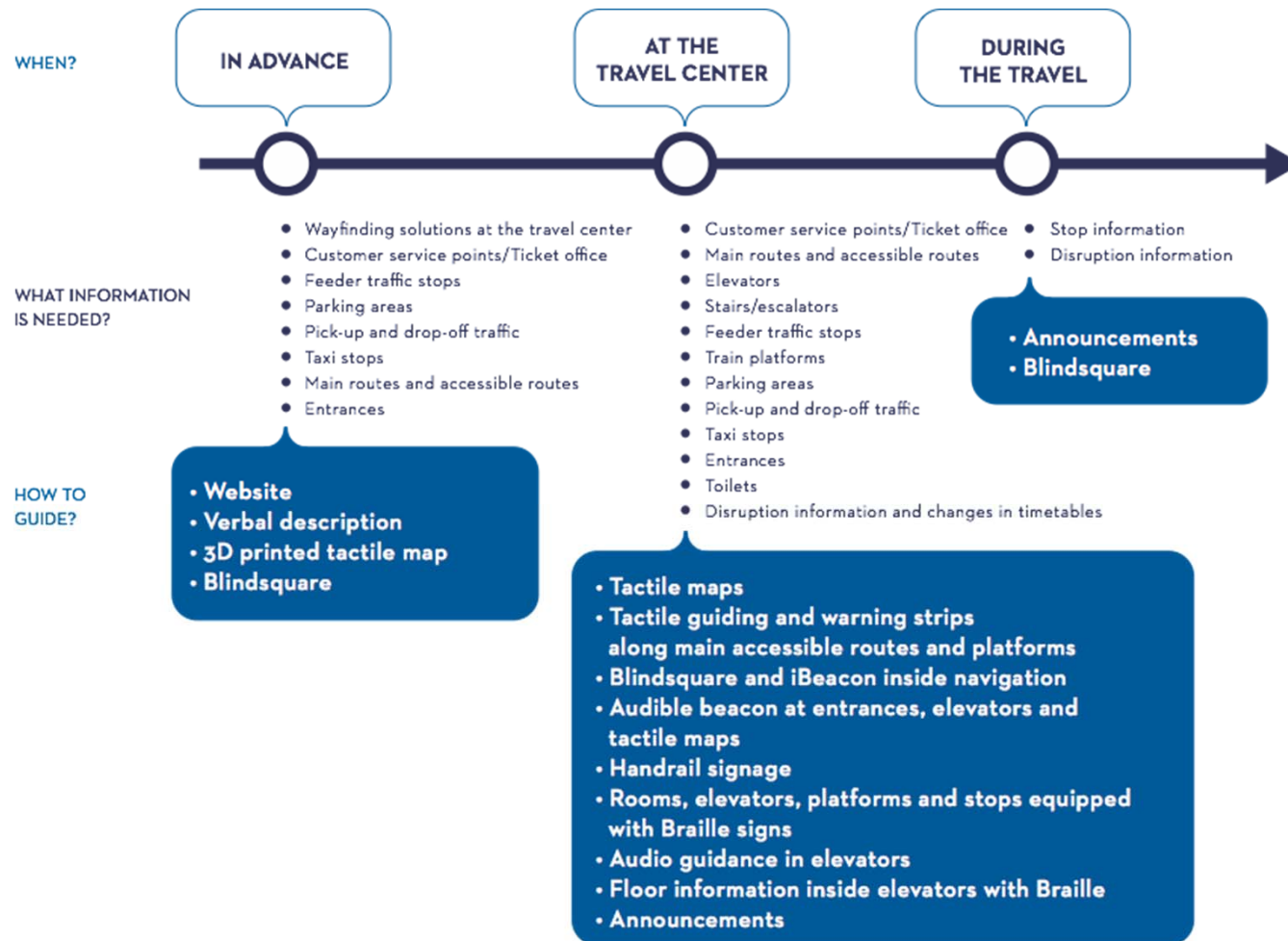


Seamless signage routes helping Visual Impaired People move to the platforms, exits etc.

RESULTS, MAIN FINDINGS

- ❖ Verbal maps are low cost and effective way to provide security and foreknowledge that help VI persons to create pre-images of strange places, environments and plan routes.
- ❖ Verbal information and names of spaces/ places/ landmarks needs to remain same regardless of the device that provides information – coherent information.
- ❖ Combination of traditional static signage systems together with new technology systems supports the orientation in the space more independently.
- ❖ Combination of smart phone, BlindSquare app and iBeacon mediated information has great potential for more reliable, real time and easy to use travel information for VI people.
- ❖ 3-D tactual maps and sound-tactual maps have great potential.

HOW TO GUIDE PEOPLE OF VI AT RAILWAY STATIONS with Multisensory Guidance System



Picture:
MWAY-
project



THANK YOU
GRACIAS

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