INDEPENDENT NAVIGATION FOR BLIND PEOPLE – NAVIBLIND VERSION 2.0

NaviBlind

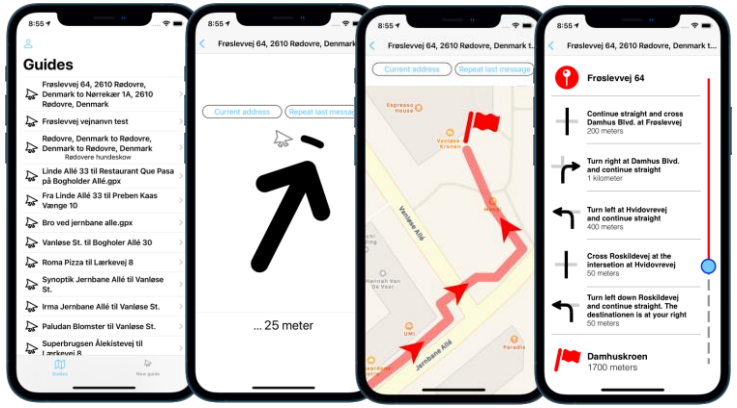
NAVISP EL2-150
PROJECT PRESENTATION

ABOUT US

NaviBlind empowers blind people with the freedom to walk to new and unfamiliar destinations safely, independently, and at any time. With our hyper-accurate GNSS positioning, the tailored routes with live monitoring, and the detailed vocal commands, the visually impaired can quickly reach new places without having to go through lengthy and exhausting orientation and mobility training.

OUR SOLUTION

NAVIBLIND APP

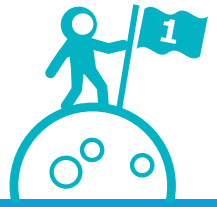


Our mobile phone app enables users to request, store and navigate private and public routes. When users start navigation, their position is determined and they are guided to their destination in real-time.

NAVICAP

Our wearable device includes an antenna and an external GNSS device, which process signals from GNSS constellations and provide centimetres-level positioning accuracy to the mobile app.

ESA'S SUPPORT



Our solution was made possible thanks to ESA's support of entrepreneurship, through the NAVISP programme and the Business Incubation Centres

PROJECT OVERVIEW

The purpose of the NAVISP EL2-150 project was to develop and improve the previous MVP version of our app and wearable device for blind and visually impaired people's outdoor navigation.

WORK PACKAGES

WP1000:
Automated Routes

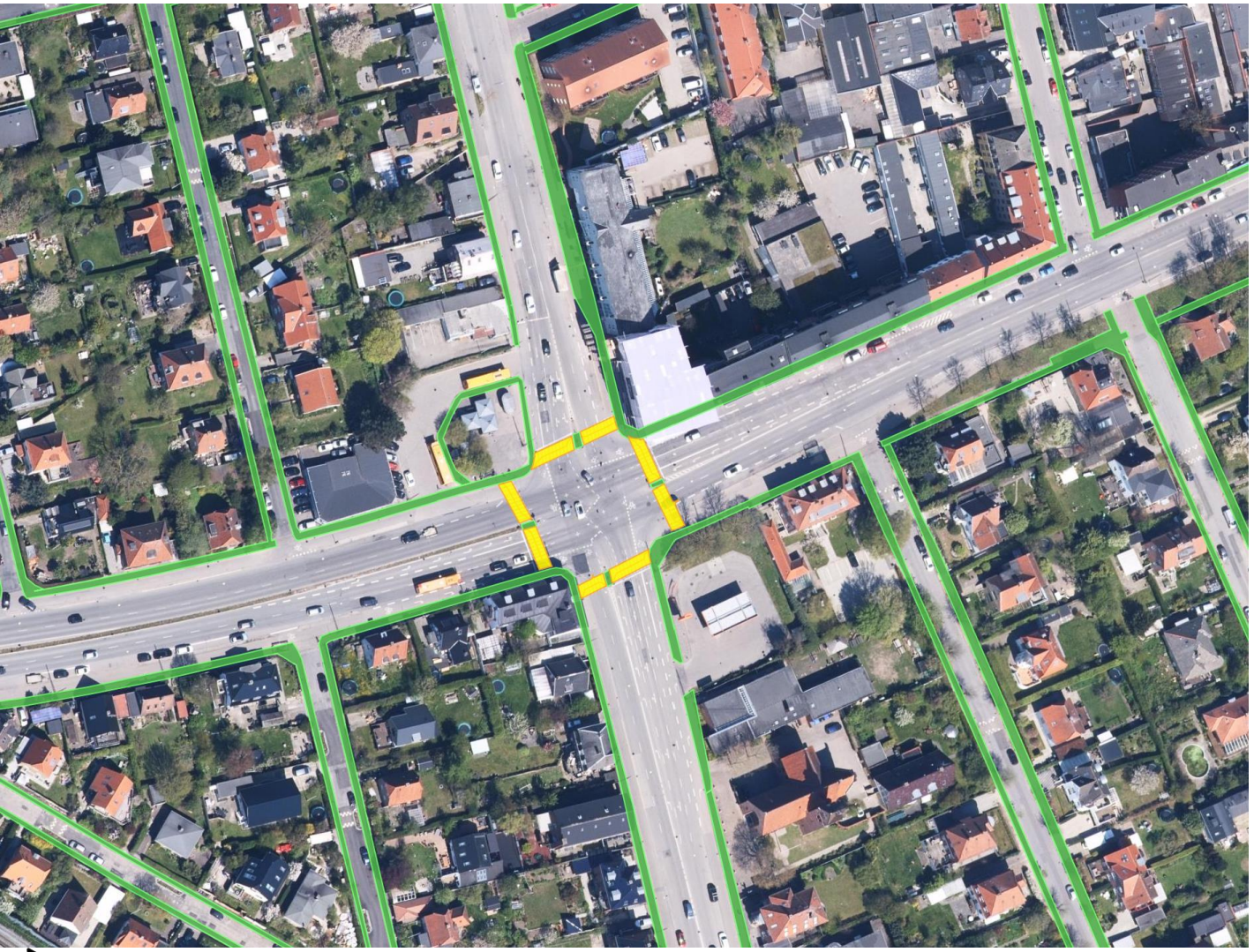
WP2000:
Map Segmentation

WP3000:
New wearable (NaviCap)

WP4000:
NaviBlind Manager and app 2.0

NaviBlind

WORK PACKAGES 2000
Map Segmentation



Magnus

ML Developers

Rasmus

- WP2210 PROTOCOL FOR MICRO-TASKERS
- WP2200 PERFORMANCE REPORT FROM AERIAL IMAGE ANNOTATION, PEDESTRIAN CROSSINGS, APS AND SIDEWALK (DATA COLLECTION)
- WP2100(I) PERFORMANCE STATISTICS OF IMAGE RECOGNITION OF PEDESTRIAN CROSSINGS
- WP2100(II) PERFORMANCE STATISTICS, IMAGE RECOGNITION OF APS AND SIDEWALKS

WORK PACKAGES 1000
Automated Routes

Christian

AI Engineer

Rune

Route designers

Caspar

- WP1100(I) DESCRIPTION OF ROUTE ALGORITHM LOGIC, PROTOTYPE
- WP1200(I) REPORT ON FIELD TEST RESULTS, AUTOMATED ROUTES GENERATED FROM WP1100(I)
- WP1100(II) DESCRIPTION OF ROUTE ALGORITHM LOGIC, FEEDBACK VERSION
- WP1200(II) REPORT ON FIELD TEST RESULTS, AUTOMATED ROUTES GENERATED FROM WP1100(II)

NaviBlind

WORK PACKAGES 3000
New wearable (NaviCap)

Per

Project management

Jacob

- WP3100 REPORT ON NOVEL GNSS* ANTENNA PERFORMANCE
- WP3200(I) DOCUMENTATION, GNSS DEVICE PROTOTYPE
- WP3400 REPORT ON PROTOTYPE GNSS DEVICE FIELD TEST RESULTS
- WP3200(II) DOCUMENTATION, GNSS DEVICE PRODUCTION VERSION

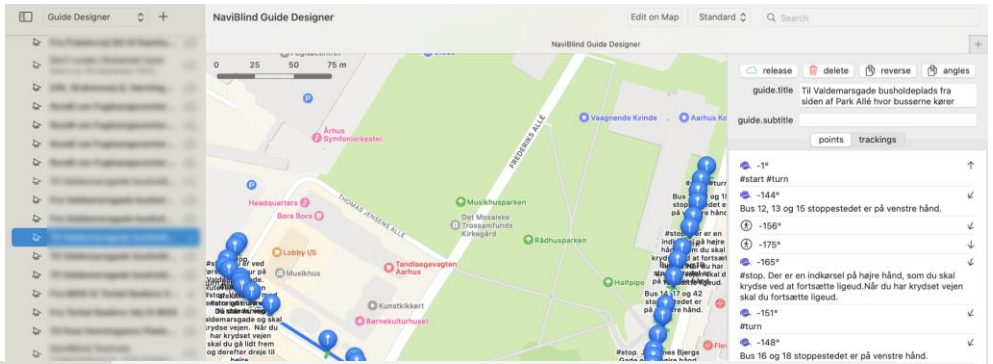
*GNSS: GLOBAL NAVIGATION SATELLITE SYSTEM, SUCH AS GPS AND GALILEO

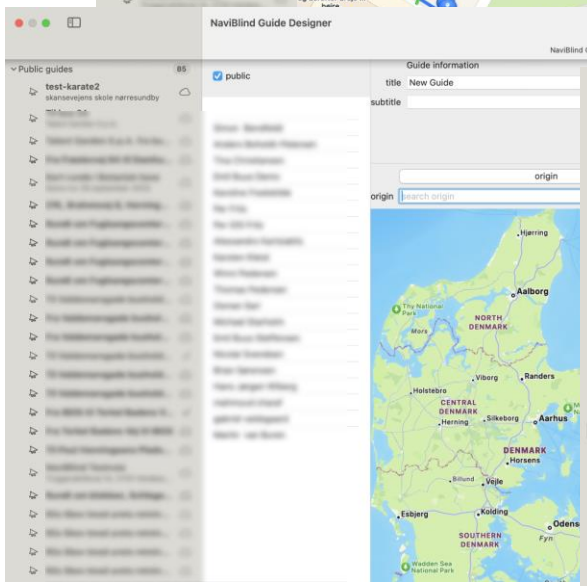
WORK PACKAGE 4000
NaviBlind Manager & App 2.0

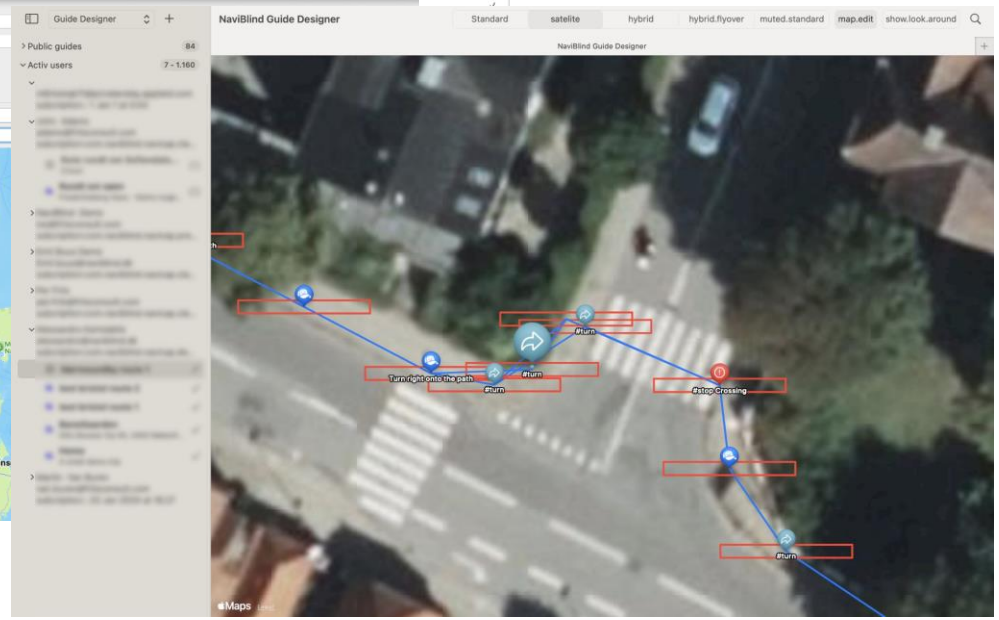
Per Head Developer

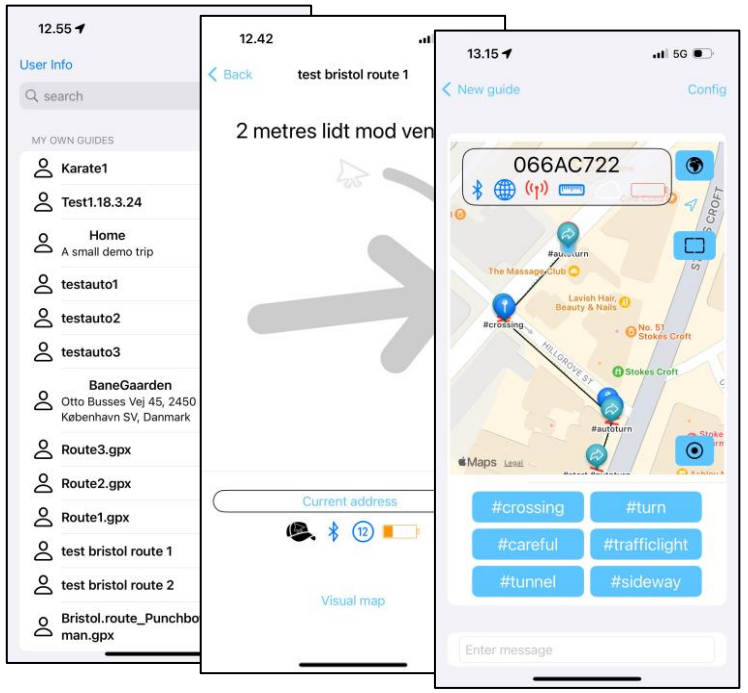
Head of Testing Emil

WP4100 DESCRIPTION OF THE ARCHITECTURE OF THE NEW MANAGER AND NAVIBLIND APP









NaviBlind

KEY ACHIEVEMENTS

TECHNICAL MILESTONES

- Segmentation of crosswalk images and transformation to GIS
- Development of a method for analysis and processing of aerial imagery and open data
- Development of a semi-automated route creation algorithm
- Successful testing of GNSS hardware
- Release of new NaviBlind Manager software
- Release of NaviBlind 2.0 app

FINANCIAL MILESTONES

- Advance Payment (MS1) – Payment of Production setup.
- Progress Milestone payment (MS1) – Payment of SW development, prototyping, 3D printing of GNSS cases, and GNSS module boards.
- November 2023 – Payment of GNSS cases 3D printing, GNSS module boards, GNSS module and NaviCap assembly.
- March 2024 – Payment of remaining GNSS cases, modules, caps and NaviCap assembly.

CHALLENGES AND MITIGATIONS

NaviCap
Design, production and assembly delays.

NaviBlind App
No complications.

NaviBlind Manager
Full automation is not implemented.

Automated route production

Machine Learrning Image Segmentation algorithms
The segmentation algorithm for sidewalks and APS was revisited and modified into three main courses of action:

1. A semi-automated method to extract sidewalks and path data from open-source data
2. The crosswalk segmentation algorithm was repurposed to produce midlines
3. Collaboration with NYU Tile2Net.

Route calculation algorithms
Route calculation was modified to use a network of virtual lines

RECOMMENDATIONS AND FUTURE

Maps and autoroutes

- Enrich maps with new features (e.g., street names, numbers, crosswalk type).
- Automated notifications for critical navigation steps.
- Train Tile2Net model on our data.

Marketing and Visibility

- Robust marketing campaign
- Identify suitable media channels
- Collaborate in events with healthcare and tech companies

NaviCap

- No additional development of GNSS.
- Alternate RTK providers and technologies to reduce user waiting times.
- Investigate other sensor-based solutions (camera, computer vision, lidar).

User Base Expansion

- Reach 100 active users in 2024 for financial sustainability.
- Conduct hardware and software testing in EU countries and the UK.
- Develop a realistic expansion plan to reach these markets and acquire more users.

Thank you ESA!

By the NaviBlind team.

Alessandro Kartsiaklis +45 91805371
alessandro@naviblind.dk www.naviblind.dk