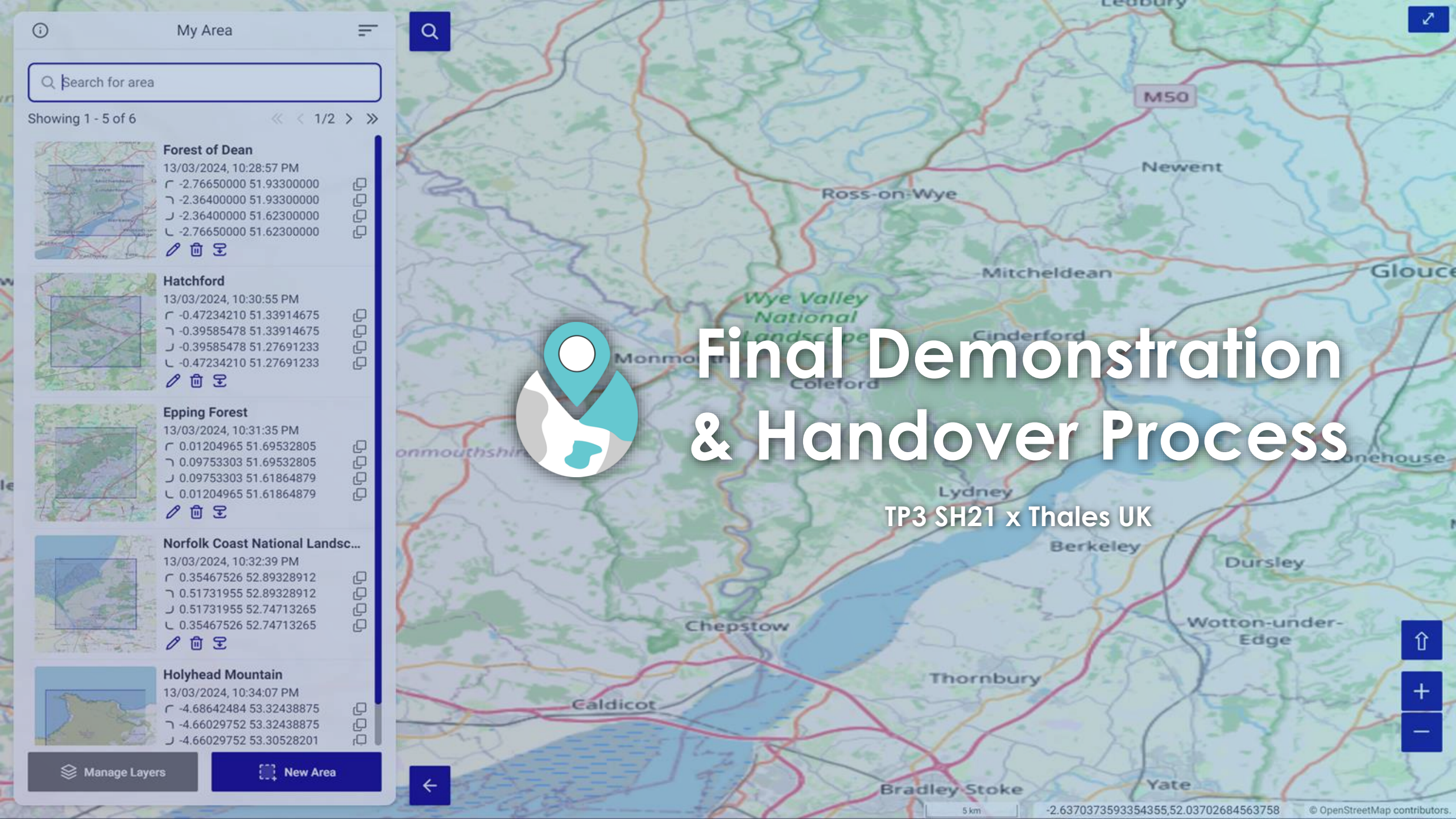
My Area
Search for area
Showing 1 - 5 of 6
1/2
Forest of Dean
13/03/2024, 10:28:57 PM
-2.76650000 51.93300000
-2.36400000 51.93300000
-2.36400000 51.62300000
-2.76650000 51.62300000
Hatchford
13/03/2024, 10:30:55 PM
-0.47234210 51.33914675
-0.39585478 51.33914675
-0.39585478 51.27691233
-0.47234210 51.27691233
Epping Forest
13/03/2024, 10:31:35 PM
0.01204965 51.69532805
0.09753303 51.69532805
0.09753303 51.61864879
0.01204965 51.61864879
Norfolk Coast National Landsc...
13/03/2024, 10:32:39 PM
0.35467526 52.89328912
0.51731955 52.89328912
0.51731955 52.74713265
0.35467526 52.74713265
Holyhead Mountain
13/03/2024, 10:34:07 PM
-4.68642484 53.32438875
-4.66029752 53.32438875
-4.66029752 53.30528201
Manage Layers
New Area
M50
Newent
Ross-on-Wye
Mitcheldean
Wye Valley National
Cinderford
Coleford
Lydney
Berkeley
Dursley
Chepstow
Wotton-under-Edge
Thornbury
Caldicot
Bradley Stoke
Yate
Final Demonstration
& Handover Process
TP3 SH21 x Thales UK
5 km
-2.6370373593354355,52.03702684563758
© OpenStreetMap contributors.

Today's Agenda

> Motivations and Objectives (2 minutes)

> Key Achievements (2 minutes)

> Major Contributions (2 minutes)

> Product Features (2 minutes)

> Technical Features (4 minutes)

> Technical Challenges and Decisions (2 minutes)

> Live Demonstration (5 minutes)

> Completion of Hand Over Process (1 minute)

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Motivations and Objectives

Motivations

Customer is often asked to provide maps for various projects.

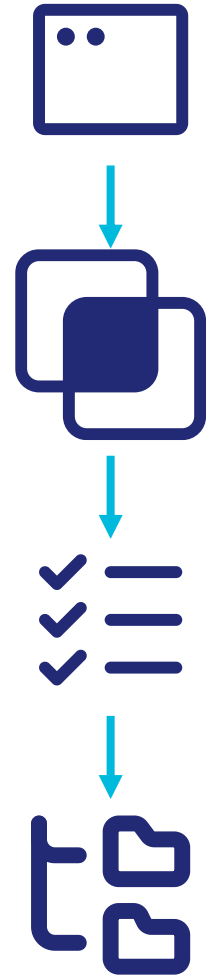
123 They will give customer a Latitude and Longitude and say “Give me what you have got”.

Customer has many sources of map data spread around on laptop, Hard Disks, on the internet

It always takes customer several attempts to find maps that are in the area requested.

Objectives

- Create a web application to identify files that have geographic content which is crossed or contained in an area defined by a user
- Gives a preview of what has found so customer can select what to copy/move
- Able to copy and move selected files into a well-defined directory structure
- The application should have a User Interface with a simple map
- The application should be branded in the Thales style
  - Later dropped by customer, but we decided to still adopt it



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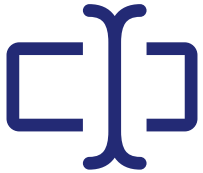
Key Achievements and Overview

Key Achievements

> Completed customer requirements

Define area of interest on the map by drawing



Define area of interest on the map by inputting coordinates

See files that are crossed or contained in the defined area

Import and manage multiple layer folders

Key Achievements (continued)

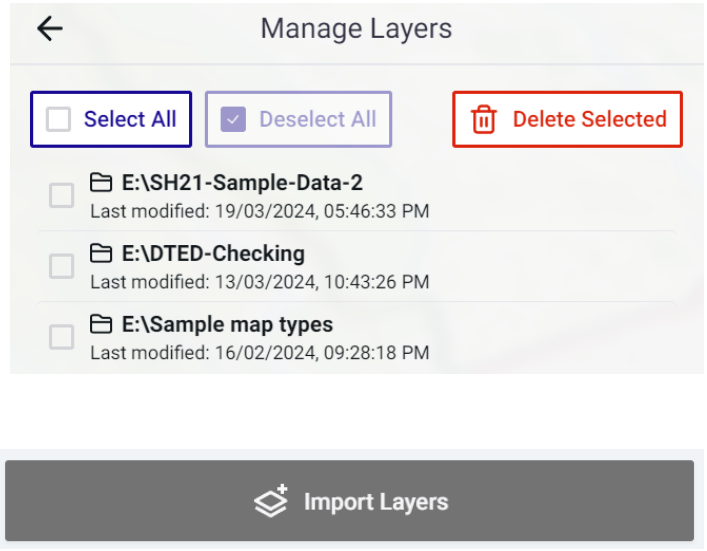
> **Added quality-of-life features**

Save defined area for later

Quickly search places and coordinates on the map

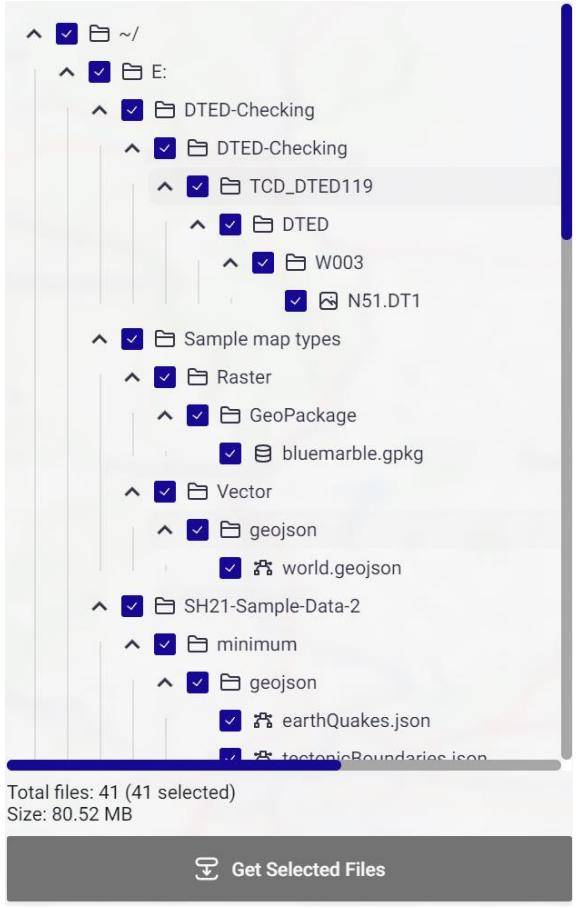
Pin multiple coordinates on the map

Overview



1. Import Layer

2. Define Area



3. Get Intersecting File

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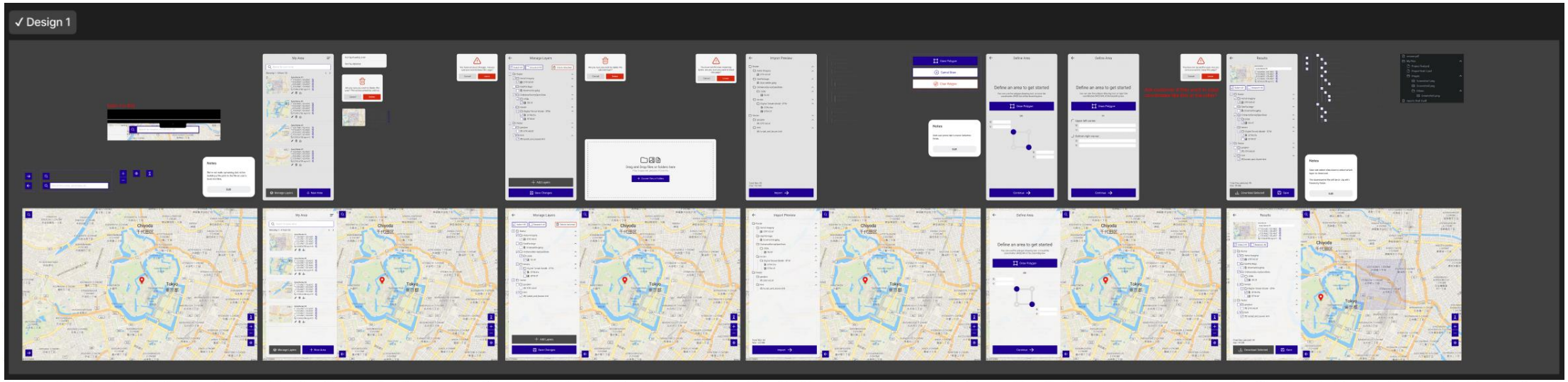
Major Contributions

Major Contributions

> Dulapah Vibulsanti 2920990v (scrum master, frontend developer)

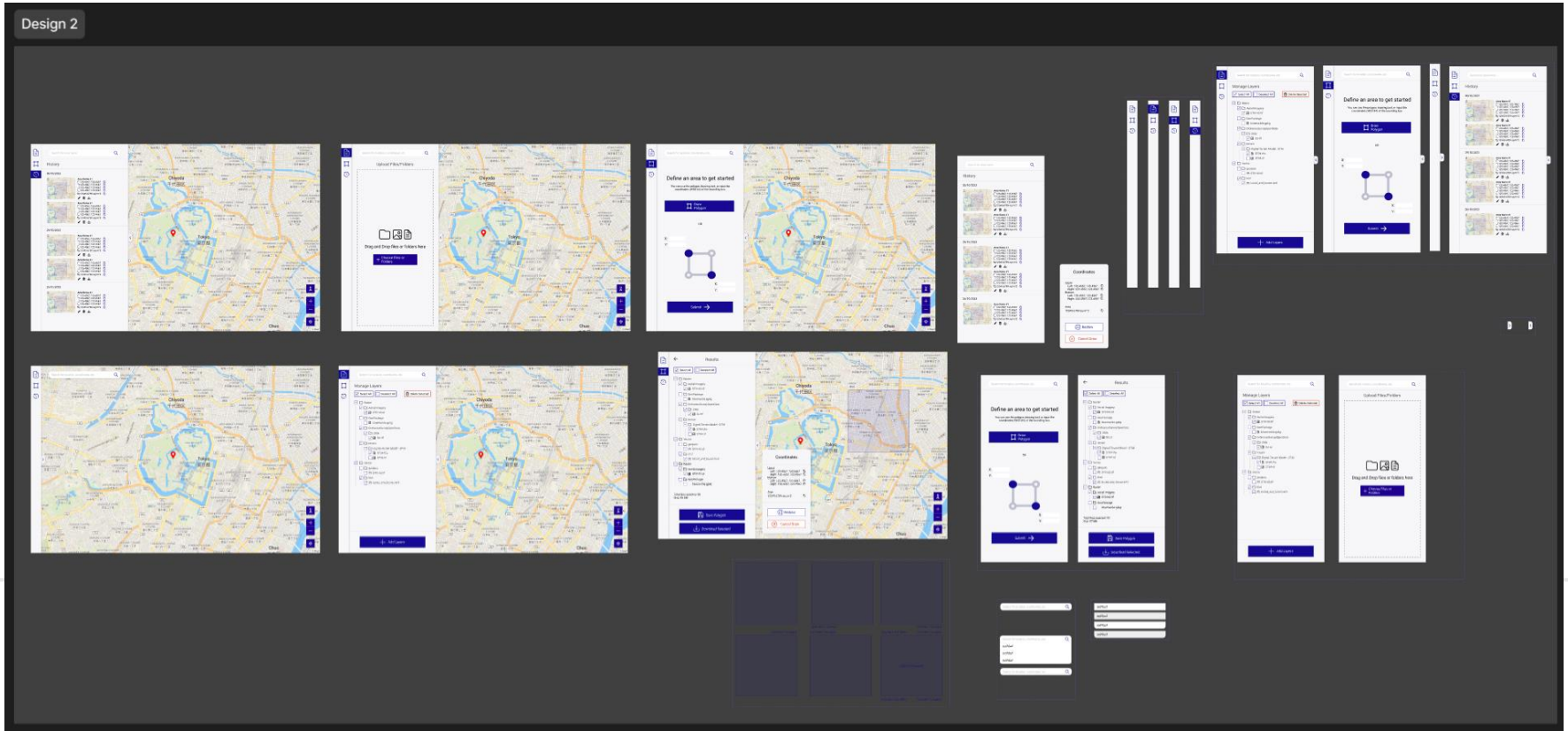
- Frontend Implementation (build reusable components, integration with backend)
- Integrate Electron.js and SQLite
- Design a schema in Figma



Major Contributions (continued)

> Mahnun Saratunti 2914049s (product owner, frontend developer)

- Frontend Implementation (build reusable components, integration with backend, fix defects)
- Code review (for the frontend part)
- Design a schema in Figma



Major Contributions (continued)

> Bin Zhang 2941833z (documentation, backend developer)

- GitLab ReadMe File and Wiki Page
- Software Documentation
- Most part of Dissertation

> Luowan Xu 2710660x (documentation, backend developer)

- Designed the logo
- Create a User manual for user
- Some part of Dissertation

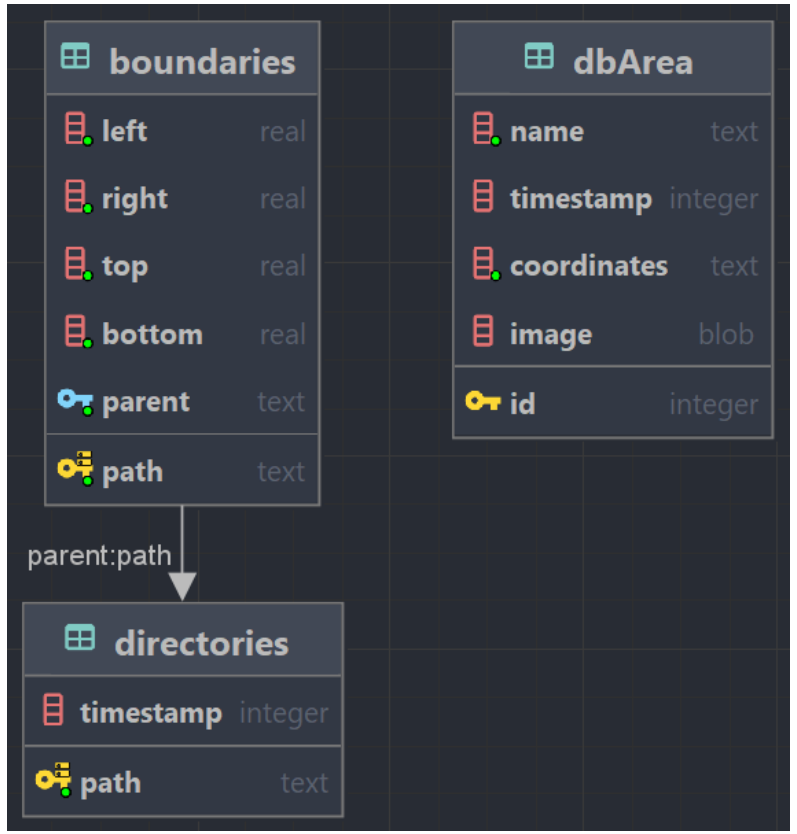
Major Contributions (continued)

> Reuben Spivey 2664429s (backend developer, note taker)

- Backend Implementation (Finding boundaries of files, Searching for valid files)
- Database and query design

> Zofia Bochenek 2580917b (backend developer)

- Backend Implementation (Updating database, File Selection)
- Database integration



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Product Features

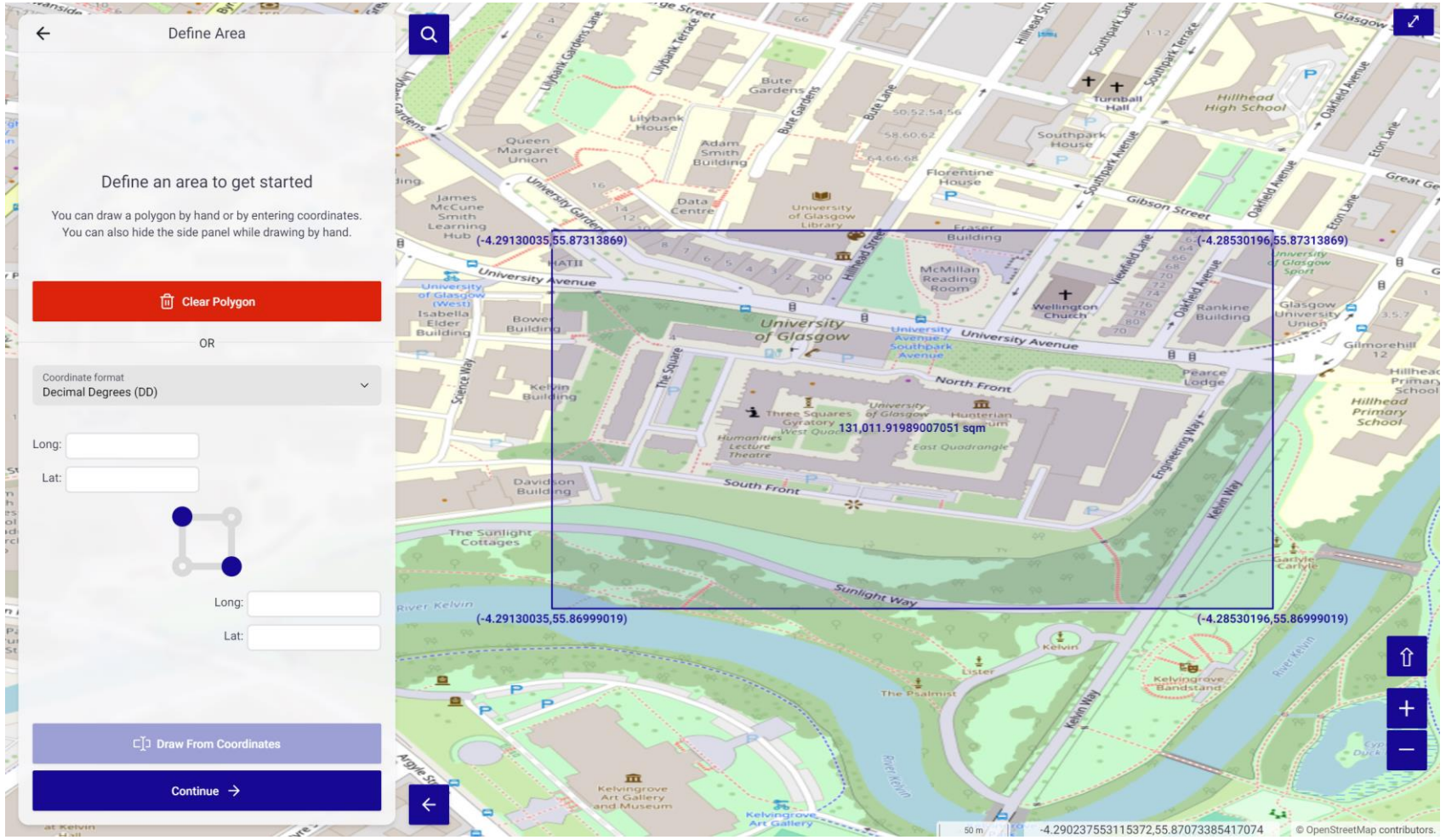
Product Features

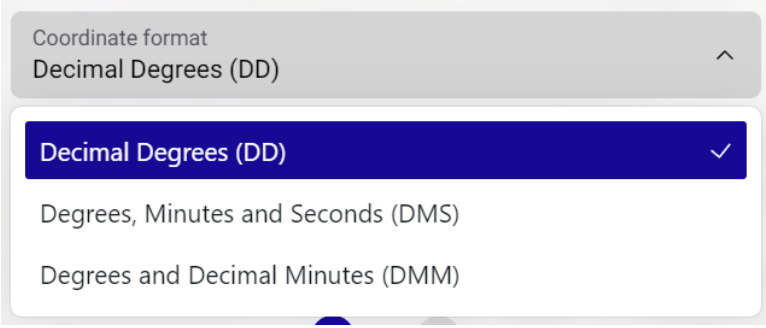
> **Draw area by hand**

> **Draw area from coordinates**

- Decimal Degree (DD)
- Degrees, Minutes and Seconds (DMS)
- Degrees and Decimal Minutes (DMM)

> **Hover over polygon to see coordinates and area**



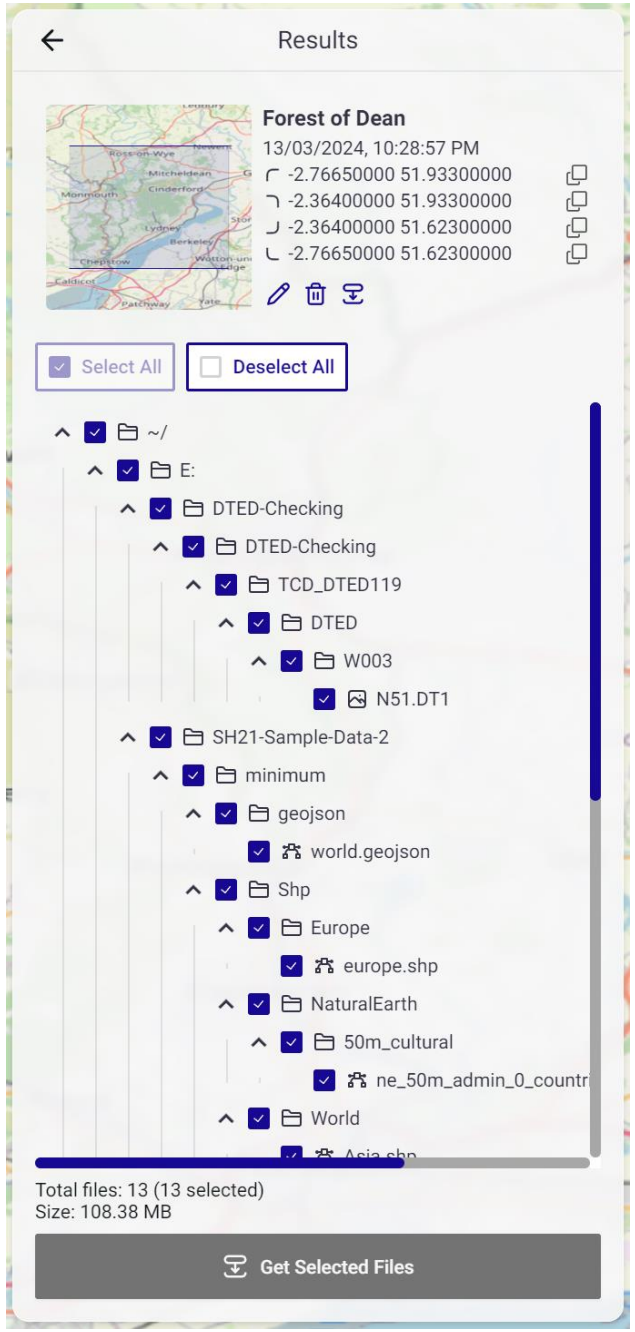


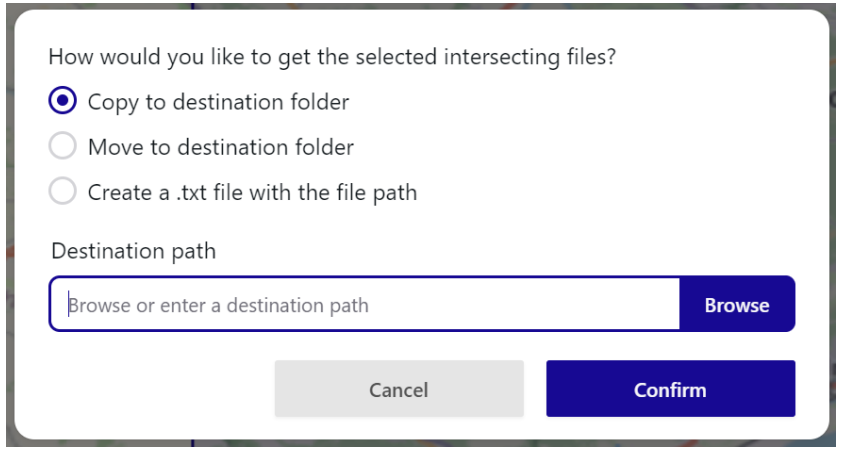
Product Features

> **View Intersected files**

> **Get Selected files**

- Copy to destination folder
- Move to destination folder
- Create a .txt file with the file path





Product Features

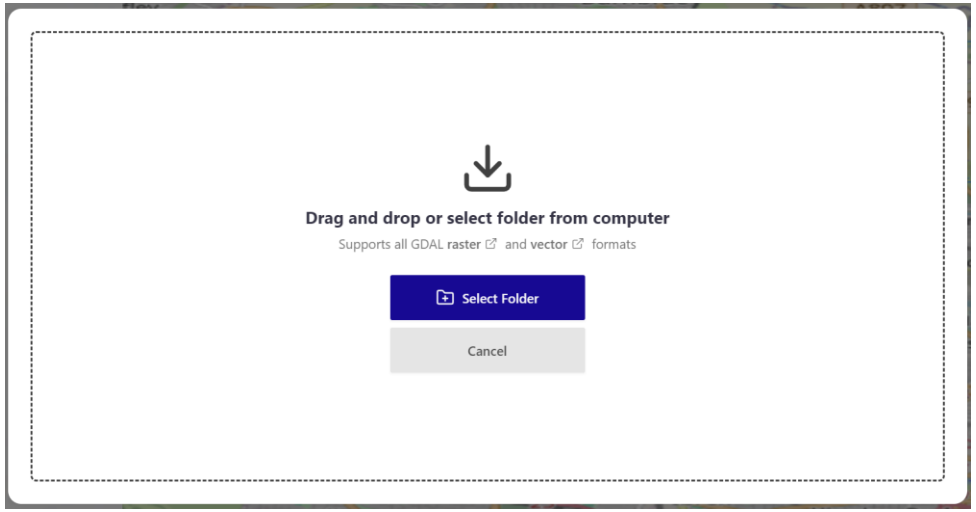
> Import layers

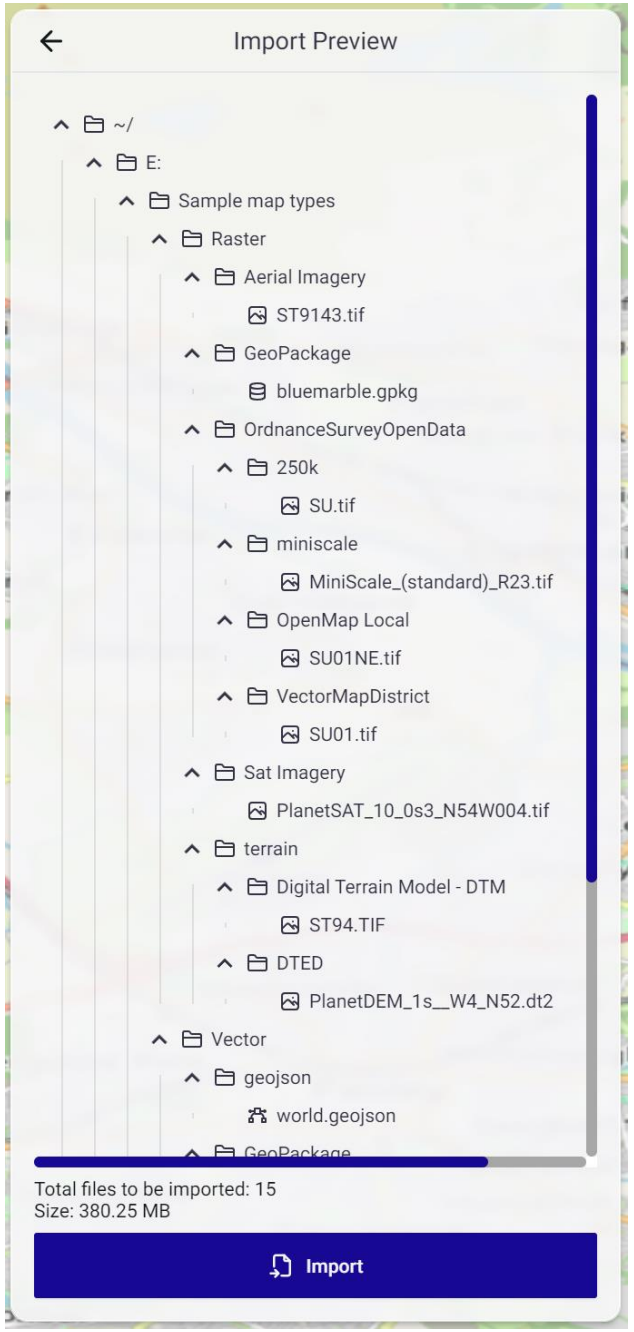
- ▸ Drag and drop
- ▸ Select folder

> Delete layers

> Import preview

> Undo and save changes





Product Features

> **Save and View Area**

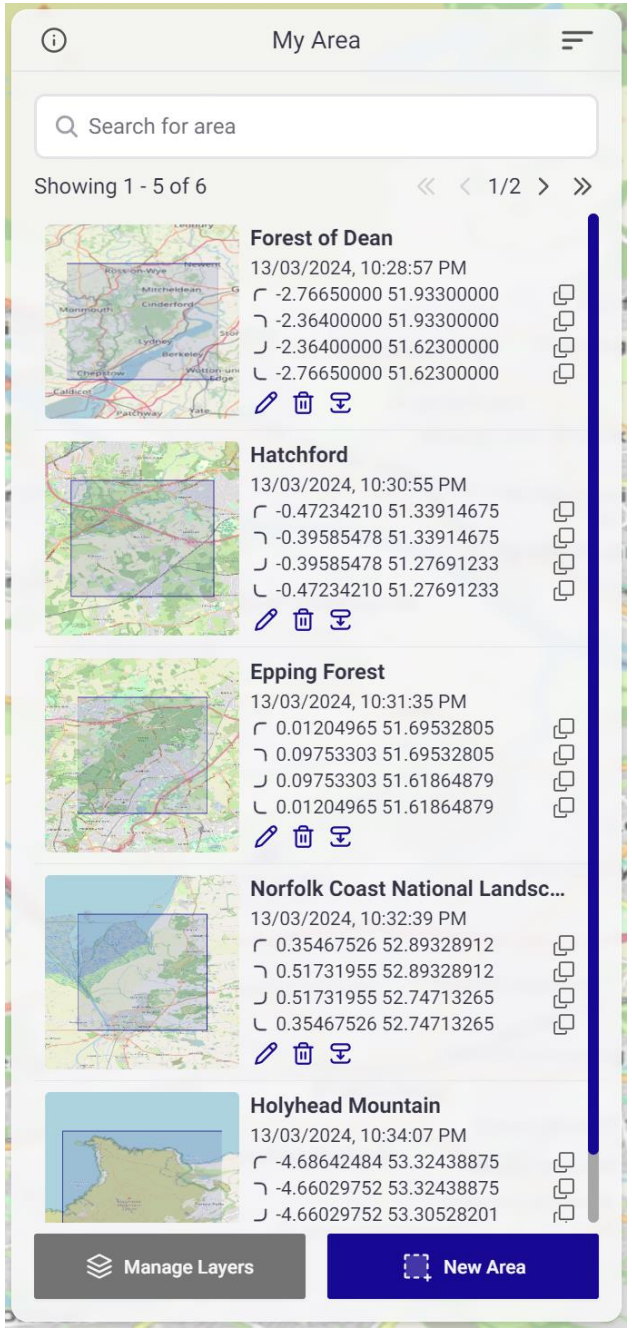
> **Search area**

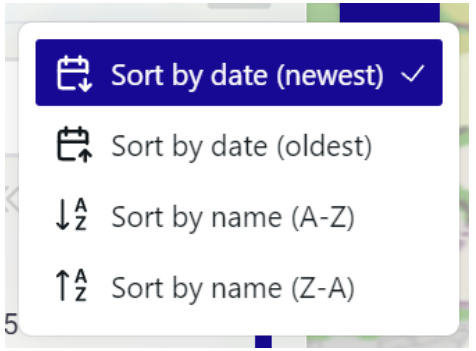
> **Sort Area**

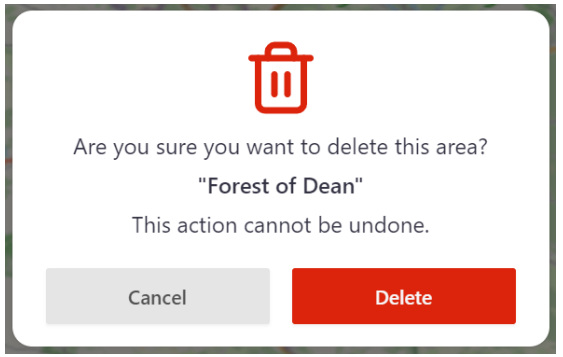
- ▸ Sort by date (newest)
- ▸ Sort by date (oldest)
- ▸ Sort by name (A-Z)
- ▸ Sort by name (Z-A)

> **Rename area**

> **Delete area**



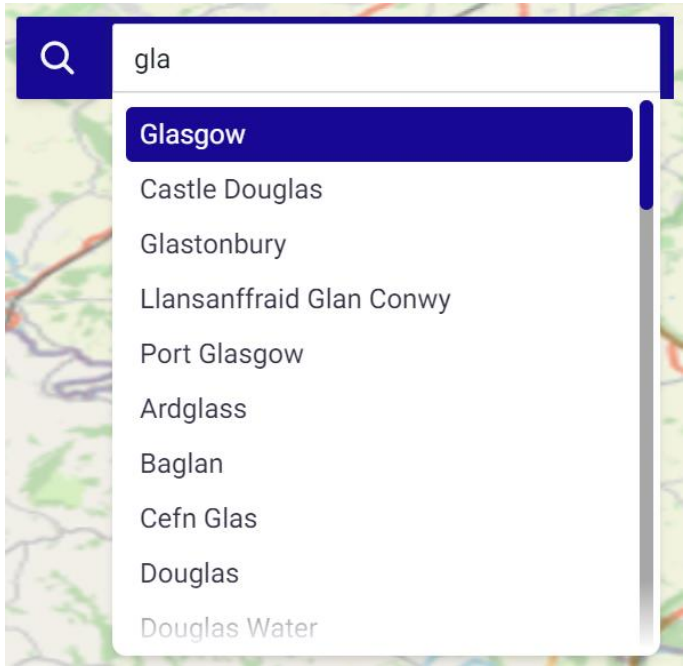




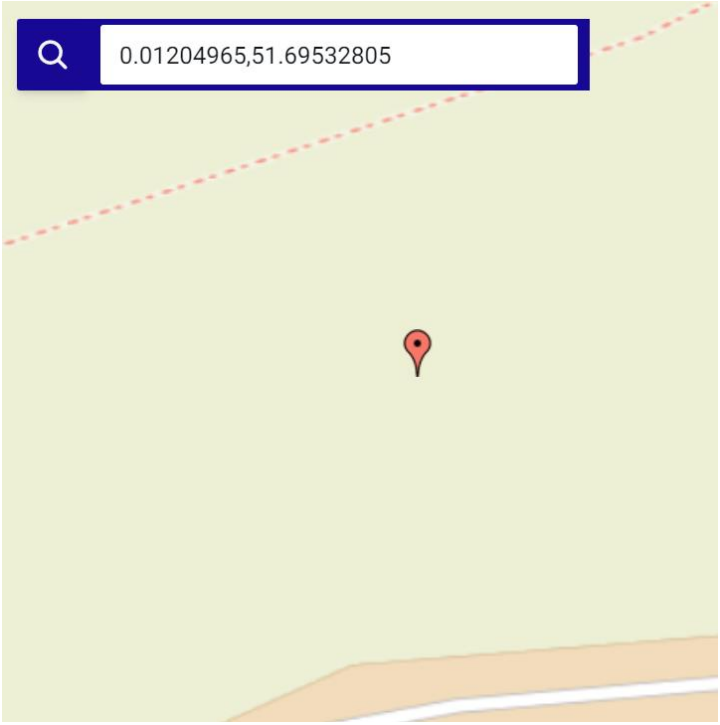
Product Features

> Search for

- ▸ Cities (UK)
- ▸ Towns (UK)
- ▸ Villages (UK)
- ▸ Hamlets (UK)
- ▸ Countries



> Search and pin multiple coordinates (DD, DMS, DMM)



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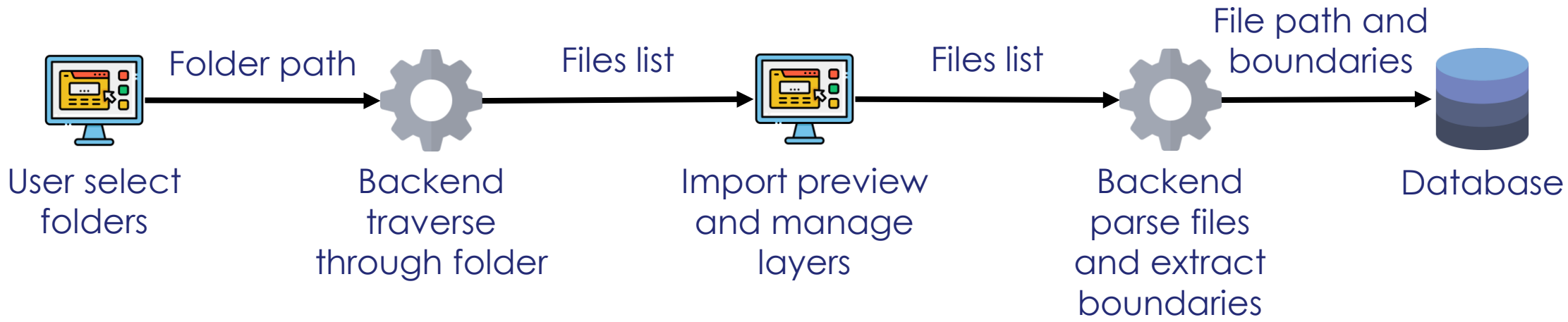
Technical Features

Technical Features

- **Supports all GDAL raster and vector formats**
- **Fast**
  - Uses the fastest SQLite3 library, better-sqlite3, for storing and querying area history and boundaries
  - Little to no delay to see files that are crossed or contained in the defined area
  - Only map tiles need to be fetched from online server, everything else is completely offline
- **Open-source software (MIT license)**
- **Frontend web based 2D (Next.js)**
- **Backend open-source map (OpenLayers)**

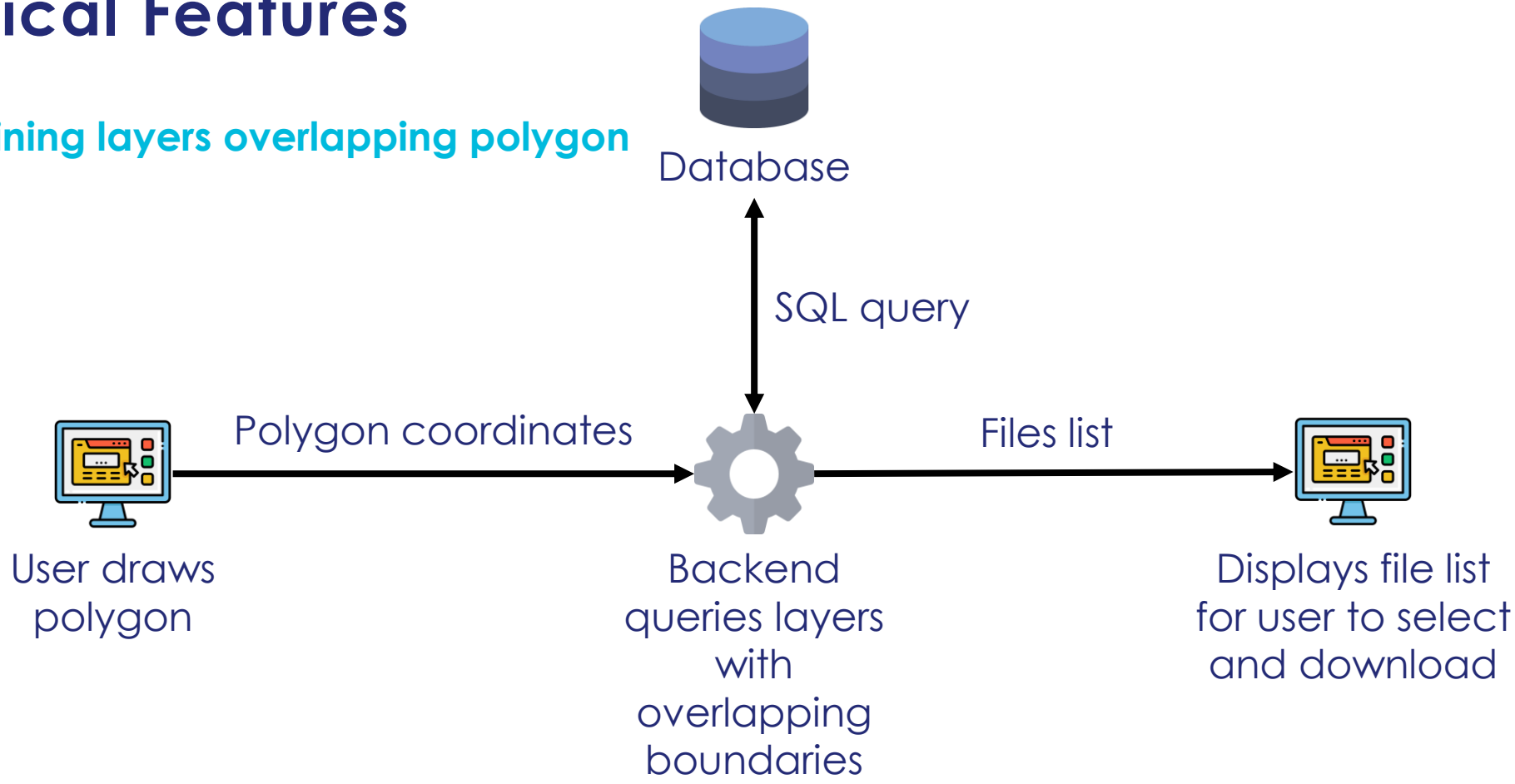
Technical Features

> Selecting, Parsing and Storing coordinates/file paths



Technical Features

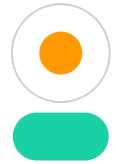
> **Determining layers overlapping polygon**

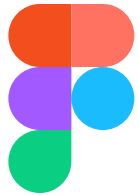


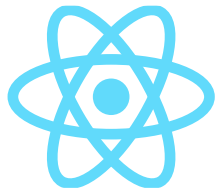
Technical Features (continued)

> Frontend Development

- Next.js
- React.js
- Tailwind CSS
- NextUI
- DaisyUI
- TypeScript
- Figma







NextUI

Technical Features (continued)

> Backend Development / General Purpose

- Python
  - GeoPandas
  - RasterIO
  - GDAL
- Turf.js
- JavaScript
- SQLite

Technical Features (continued)

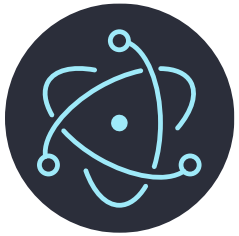
> Mapping

- OpenLayers
  - No API key required
  - No usage limit
  - Open-source

Technical Features (continued)

> Desktop Application Development

- Electron.js
- JavaScript



Technical Features (continued)

> Website Deployment

- Vercel
  - Build automatically when pushed to “main” or “dev” branch
  - “main” branch url:

    https://sh21-deployment.vercel.app/
  - “dev” branch url:

    https://sh21-dev.vercel.app/
  - URL can only be accessed through desktop Electron.js app

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Technical Challenges and Decisions

Technical Challenges and Decisions

> **Situation: Initially designed the app to run in the browser**

> **Problem: No file access API support (browser security)**

> **Decision: Migrate to Electron.js**

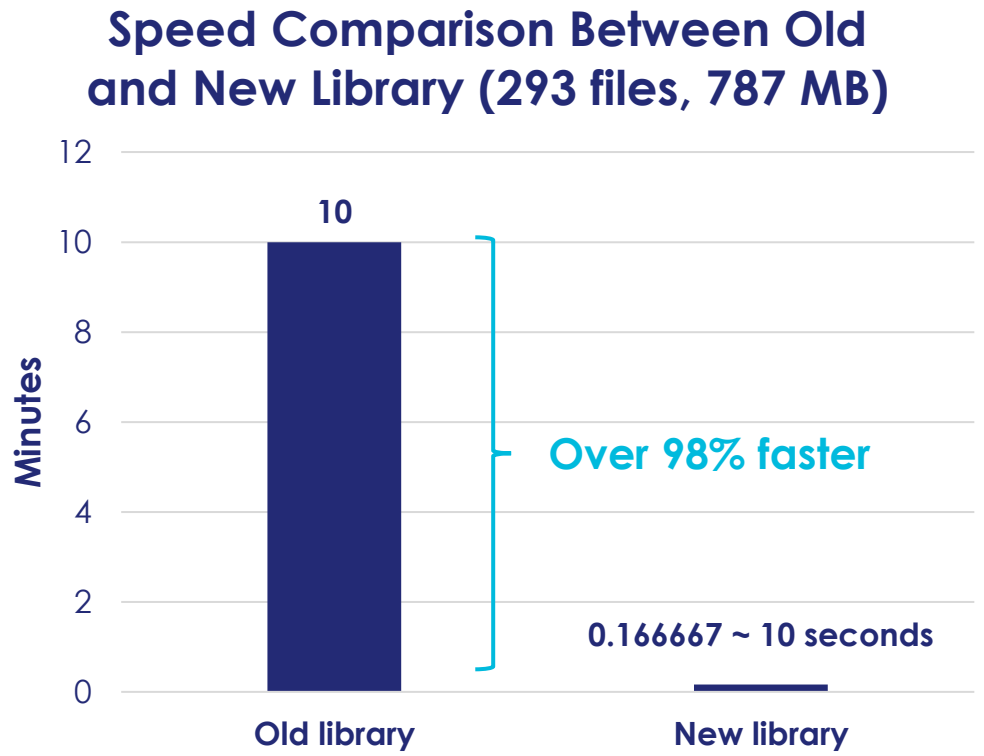
- File access API support
- Minimal code changes
  - Still uses same tech stack as customer specified (React.js)

Technical Challenges and Decisions (continued)

> Situation: Initially we parsed the user's files with 2 python packages geopandas for vector files and rasterio for raster files

> Problem: We realized this was very slow when running on large files/folders.

> Decision: We fixed this by rewriting the majority of the backend to use a different package called gdal which has less features but runs significantly faster for the majority of the backend, But we are still using geopandas/rasterio for some parts.



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Live Demonstration

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Completion of Hand Over Process

Completion of Hand Over Process

Transferred repository from Uni's GitLab to customer's personal GitHub account

Transferred Vercel deployment project to customer's personal Vercel account

Gave customer packaged Windows app

Created User Guide and documentation

Added comments to code

Thank you!

TP3 SH21 x Thales UK