



# Wing Watch

# Wing Watch – An app for the planespotter

*Planespotting is more than just a hobby; it is a vibrant community of enthusiasts passionate about observing airplanes.*

The purpose of Wing Watch is to create a dedicated hub where users can...

- Exchange favorite spots
- Discover new planespotting locations
- Connect and share experiences

## Core Features

- Explore Page – Enables users to find new places by searching, filtering, and sorting locations.
- Foster Connection – Allows users to post reviews and upload photos as well as view other reviews.

# User Stories

- As a user, I would like to be able to filter places so I can find spots that cater to my specifications.
- As a user, I would like to be able to see the spots represented as a map along with my location, so I can visualize the locations of these places.
- As a user, I would like to see attributes of each place along with pictures so I can get a feel of the place before visiting.
- As a user, I would like to be able to rate, review, and share photos, so that I can share my own experience.
- As a user, I would like to see other people's ratings reviews and photos, so that I can use other metrics to find places I like.

Wing Watch Search...

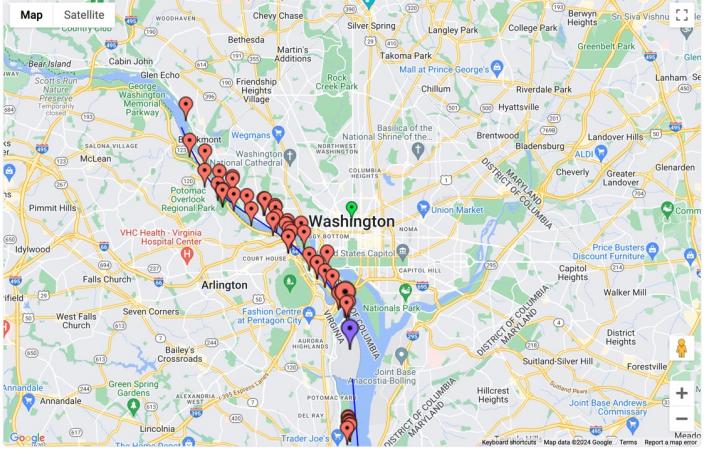
Explore My Places Contribute About Us

Nearby Places Search... Washington D.C., DC, USA X 30 miles Sort by: Best

**Gravelly Point**  
Description: Waterfront park known for its up-close views of planes taking off & landing at Reagan Airport.  
Address: George Washington Mem Pkwy, Arlington, VA 22202, USA  
Airport: Ronald Reagan Washington National Airport  
Distance from Flight Path: 0.11 miles  
Average Altitude: 590 feet  
Distance: 2.87 miles  
[View Details](#)

**Sky Column**  
Address: 333 Long Bridge Drive, Arlington, VA 22202, USA  
Airport: Ronald Reagan Washington National Airport  
Distance from Flight Path: 0.16 miles  
Average Altitude: 887 feet  
Distance: 2.66 miles  
[View Details](#)

**Bicycle Air/Repair & Water Bottle Fill Station**  
Address: 333 Long Bridge Drive, Arlington, VA 22202, USA  
Airport: Ronald Reagan Washington National Airport  
Distance from Flight Path: 0.08 miles  
Average Altitude: 891 feet  
Distance: 2.59 miles



Wing Watch Search...

Explore My Places Contribute About Us

**Gravelly Point**  
Waterfront park known for its up-close views of planes taking off & landing at Reagan Airport.  
Located at: George Washington Mem Pkwy, Arlington, VA 22202, USA  
Airport: Ronald Reagan Washington National Airport  
Distance from Flightpath DCAT: 0.11 miles  
Average Altitude: 590 feet  
Distance from Airport: 0.95 miles

Rating 

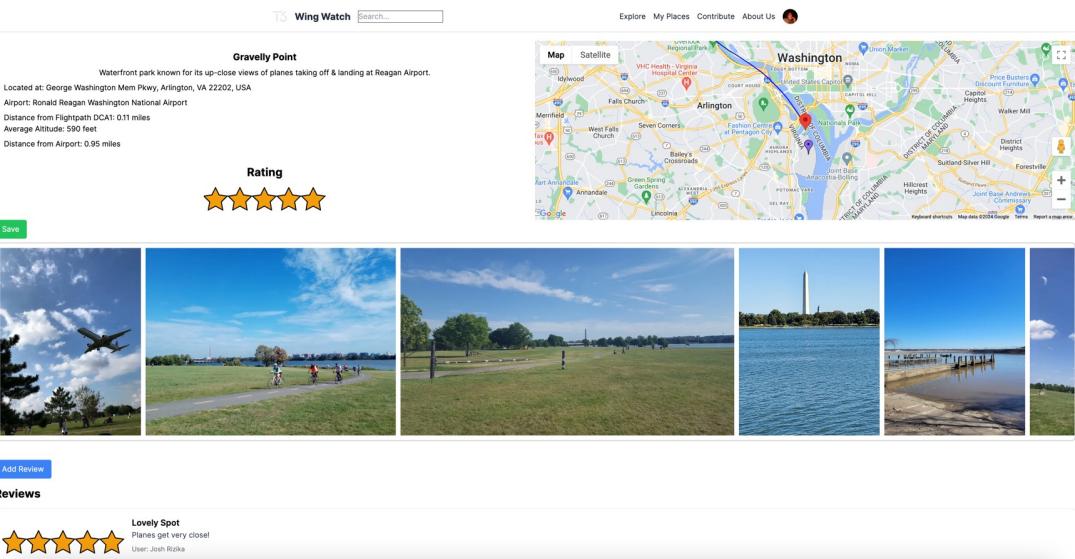
Save



Add Review

Reviews

**Lovely Spot**  
Planes get very close!  
User: Josh Rizka  
Date: Apr 5, 2024



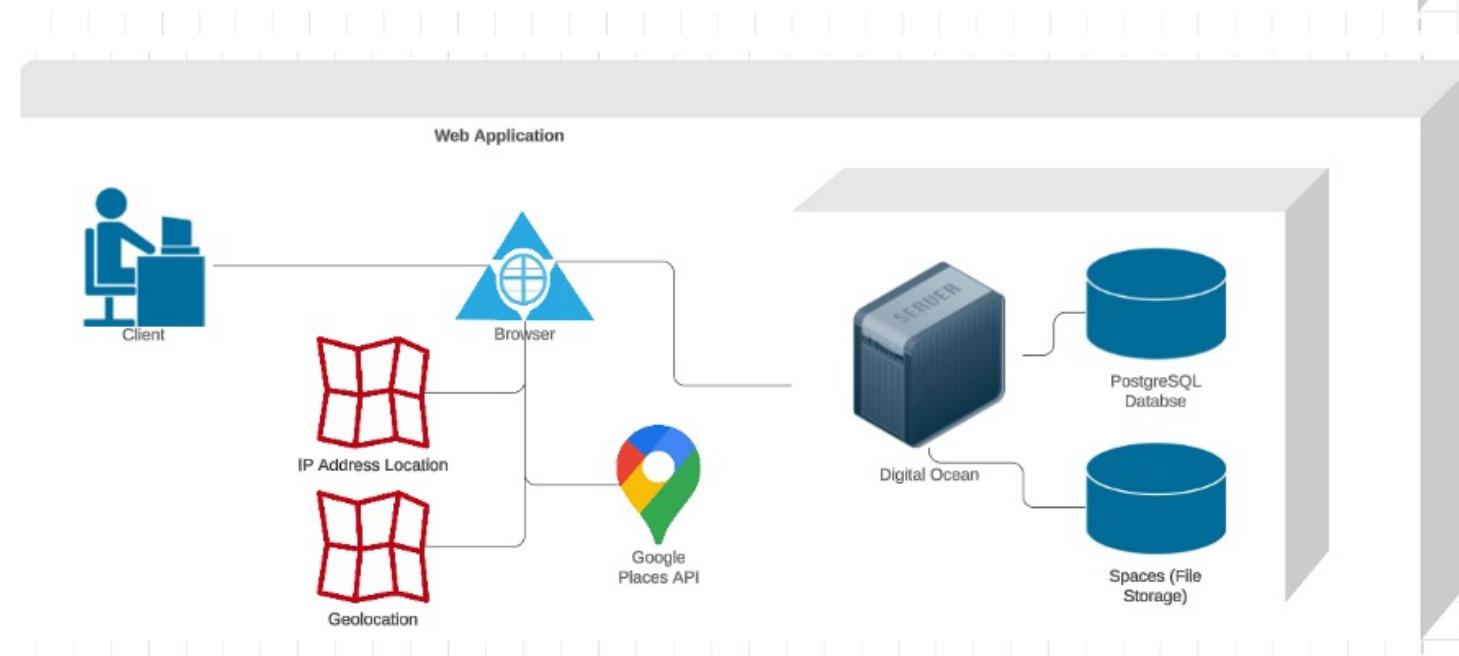
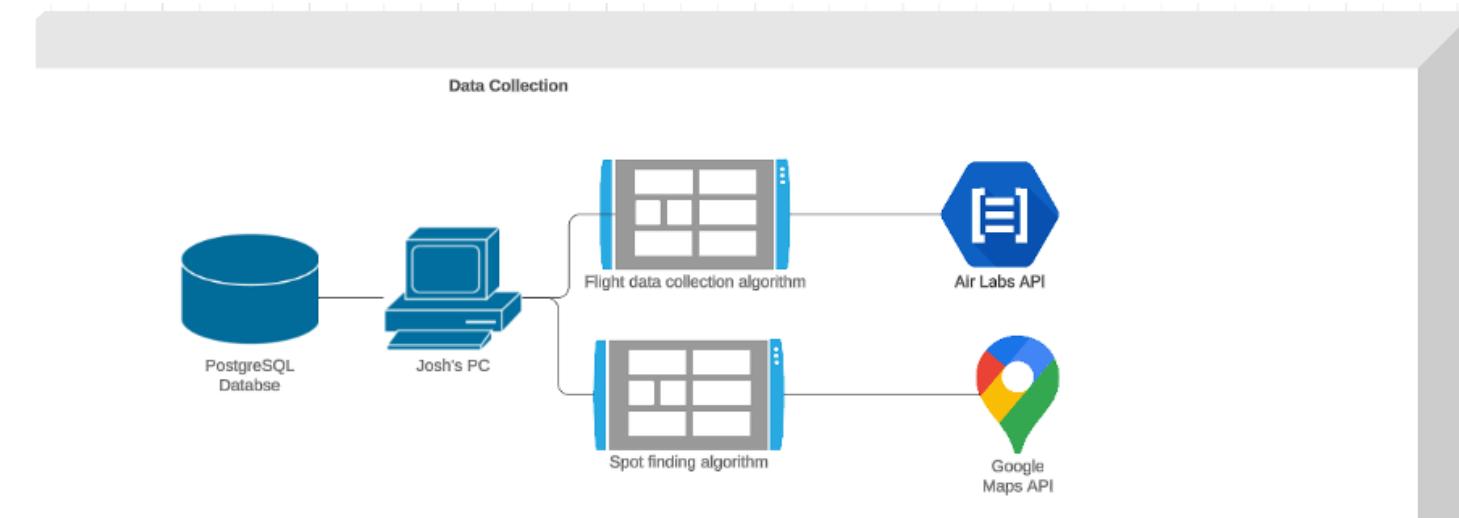
# System Goals

- Functionality
  - Find Plane Spotting locations in my area.
- User Experience
  - Intuitive
  - User-friendly
- Scalability
  - Spot finding algorithm should work on any airport



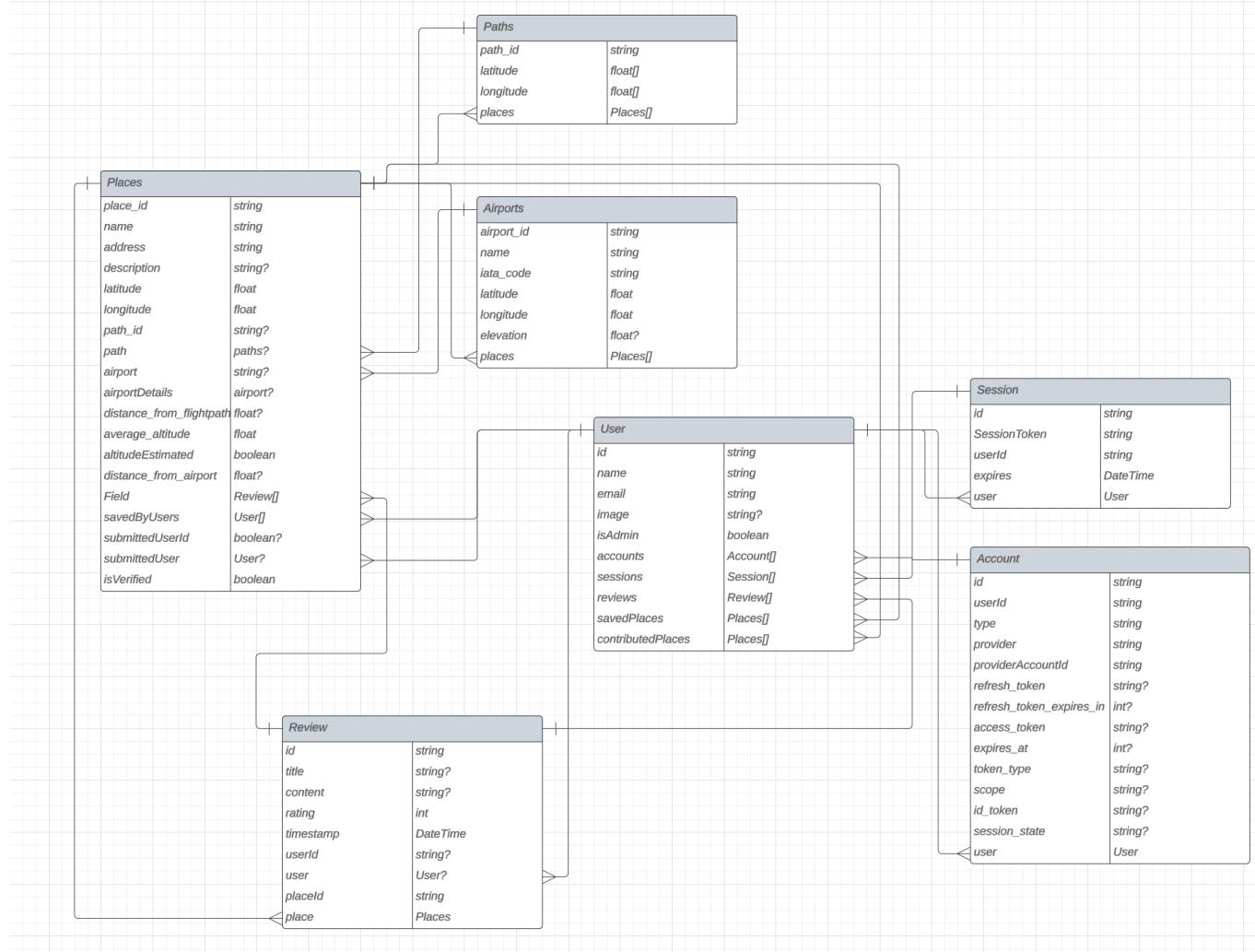
# System Architecture

- Data Sources
  - Data Collection
    - AirLabs Data API
    - Google Maps Nearby Places API
  - Web App
    - Geolocation
    - Google Places API



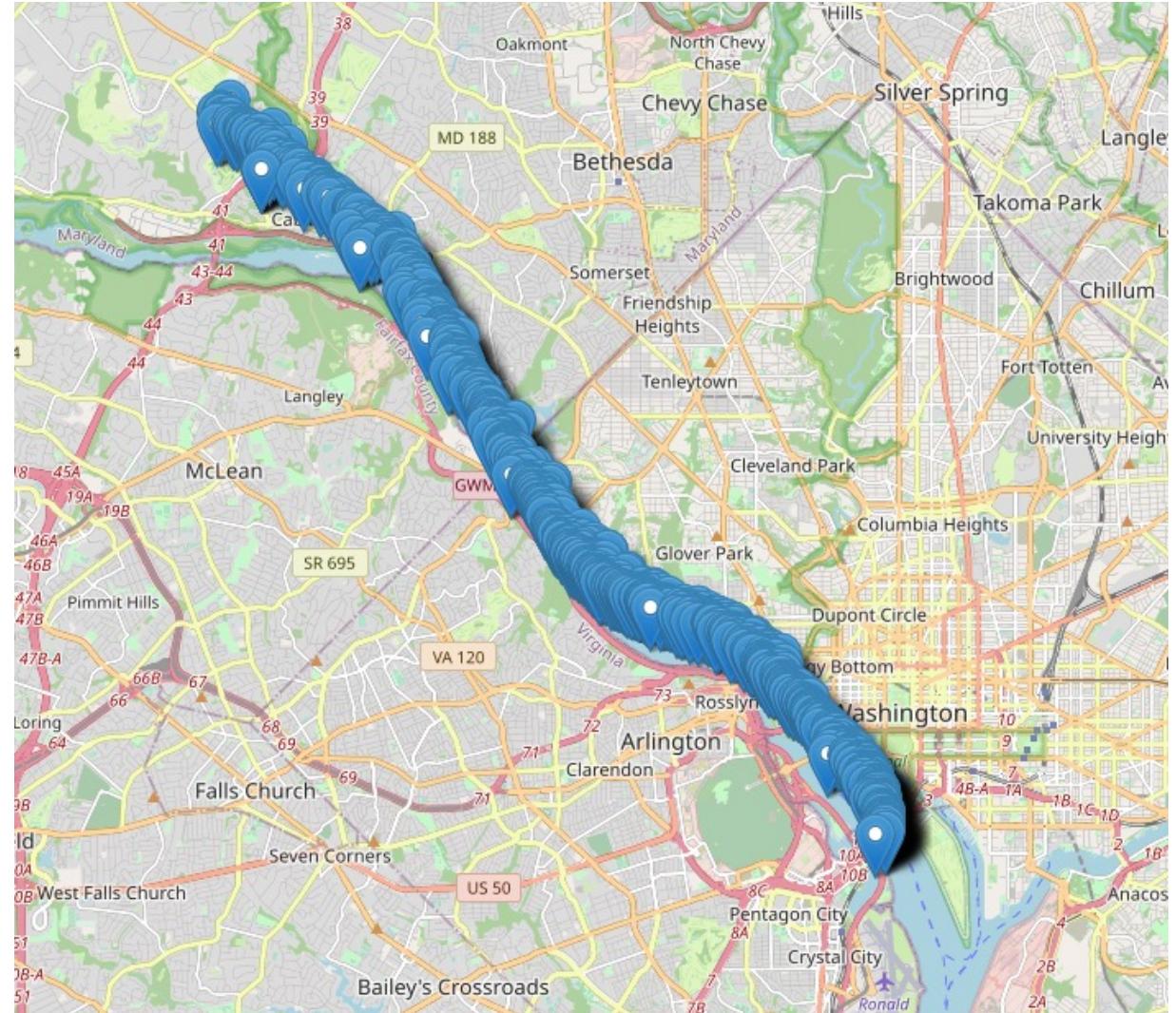
# Database Architecture

- PostgreSQL – hosted on Digital Ocean
- Key Tables
  - Places – stores place attributes
  - Users – user information
  - Reviews – contains ratings and review content



# Technical Innovation

The final approach is the last segment of an airplanes flight. During the approach, planes will spend an extended period gradually descending towards the runway.

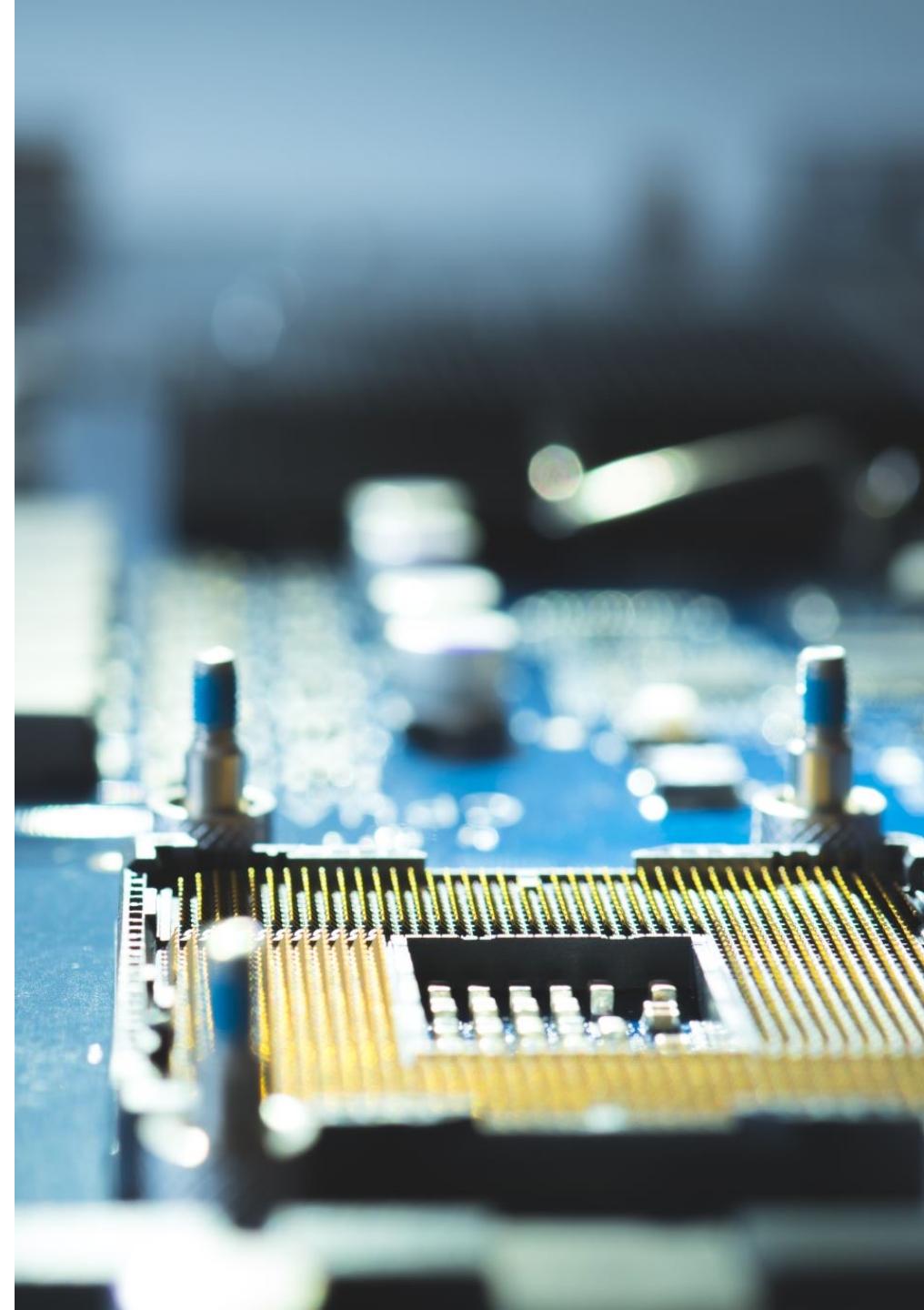


# Technical Components

Flight Paths – Collects data and stores it in a .csv

Clusters – Organizes data into density based clusters and uses regression to calculate a line based on the cluster data

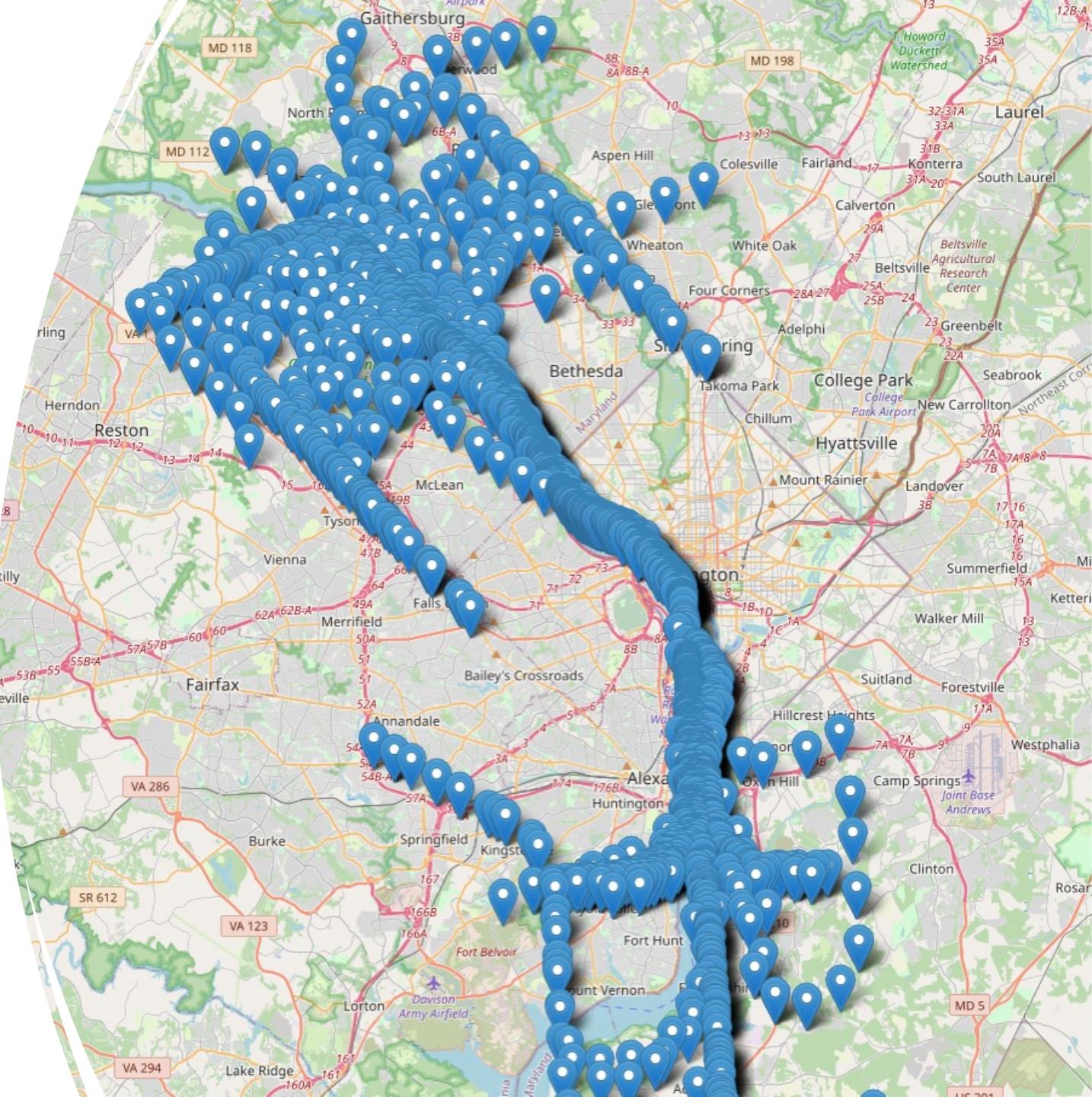
Spots – Searches along this line for parks



# Flight Paths

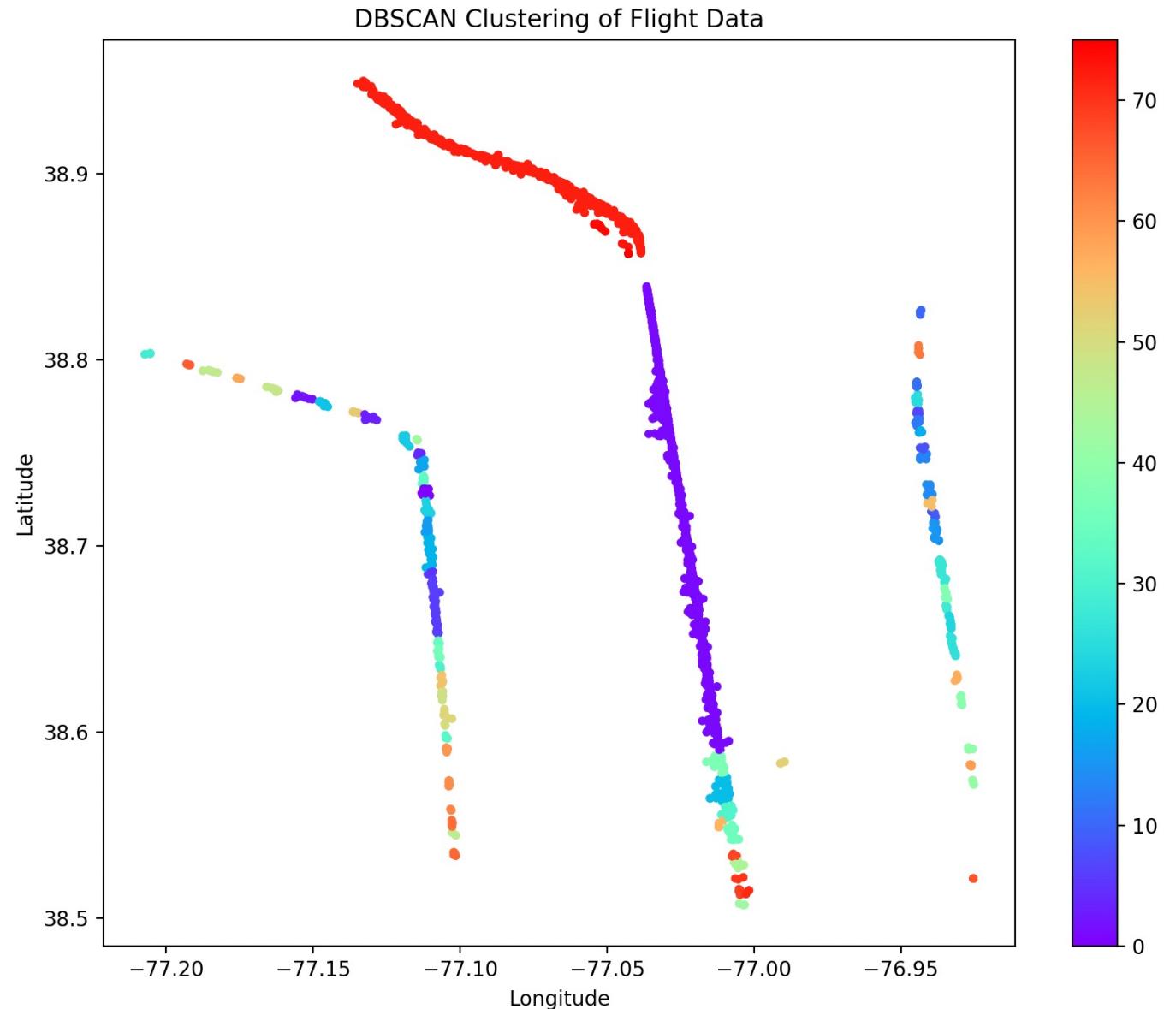
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- Collects data as frequently as possible
- Filters out data not between 30 and 1500 feet
- Requires 5000 datapoints

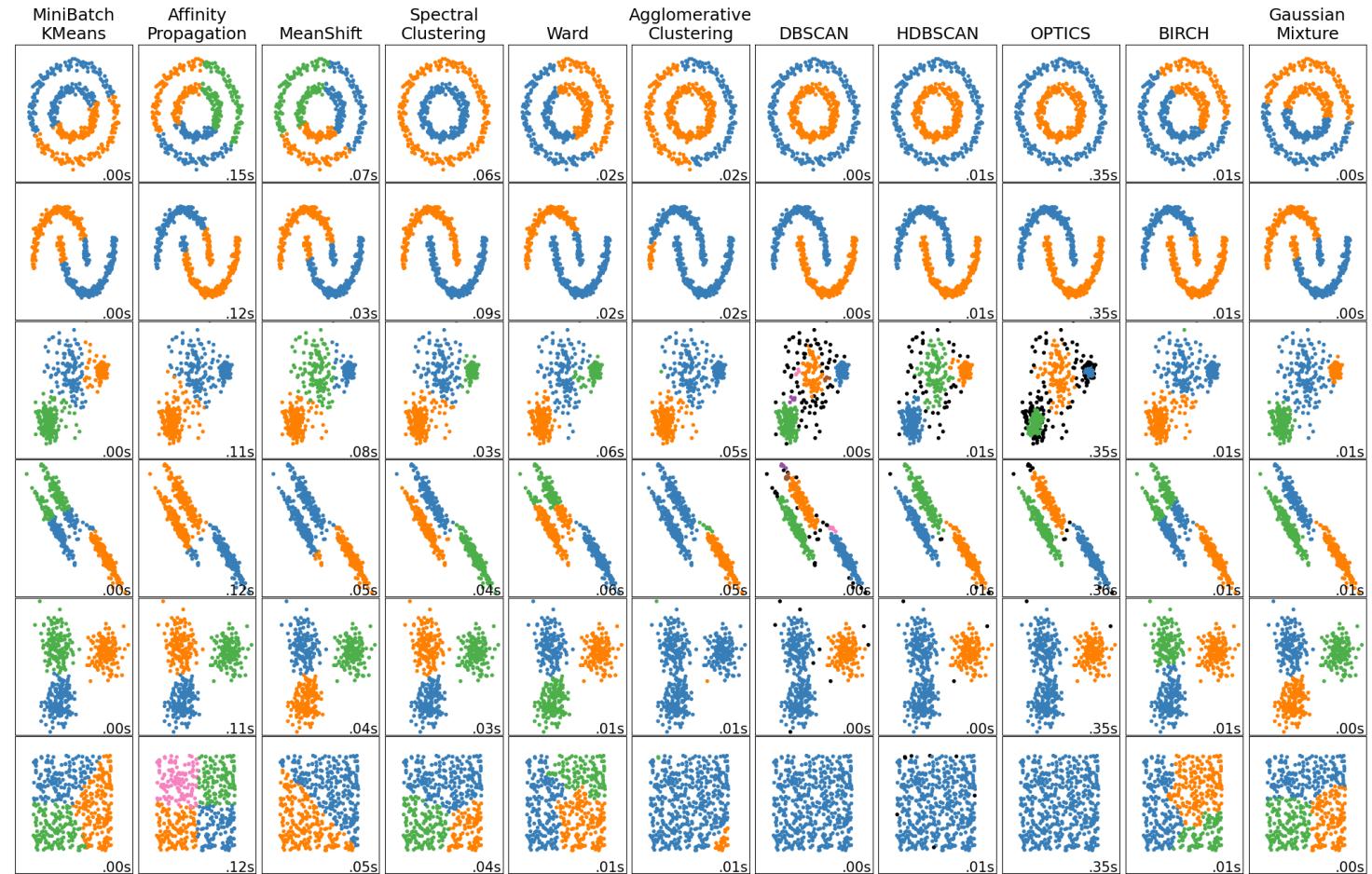


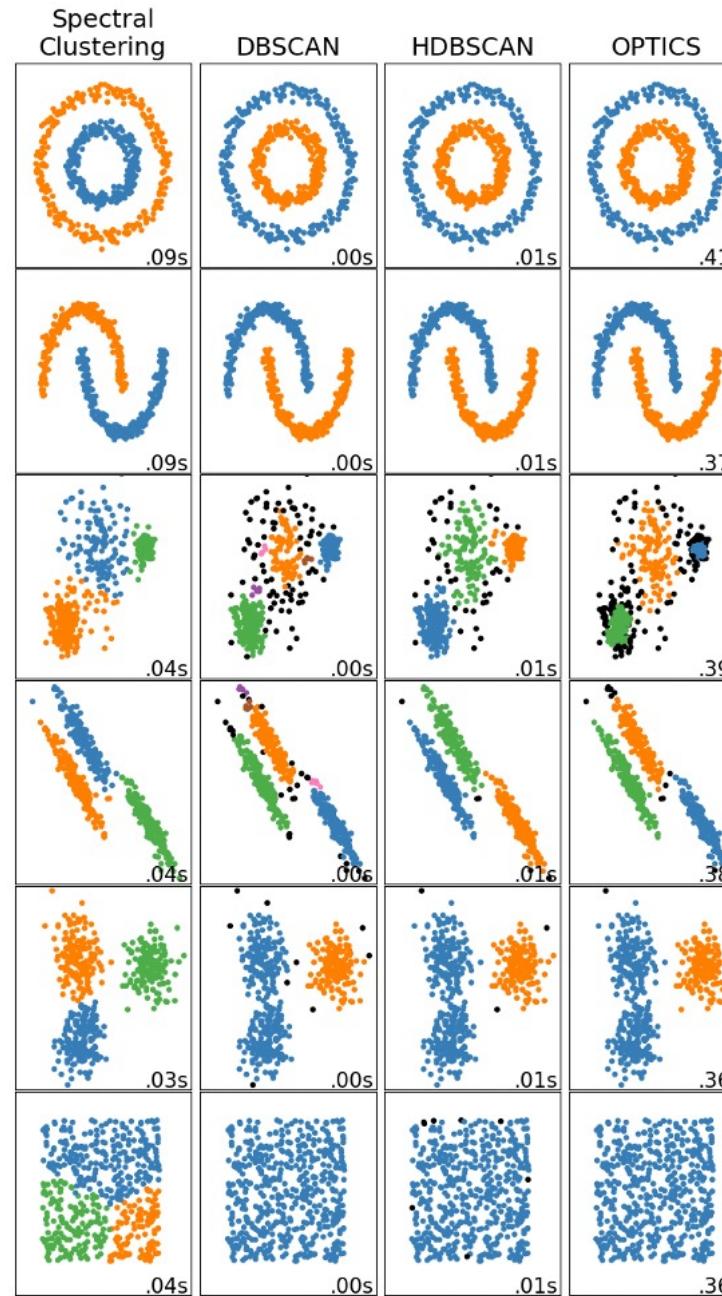
# Clustering

- Clusters data using DBSCAN
  - Density Based Spatial Clustering of Applications and Noise
- Run on arriving and departing datasets
- Most data not visible due to noise being filtered out

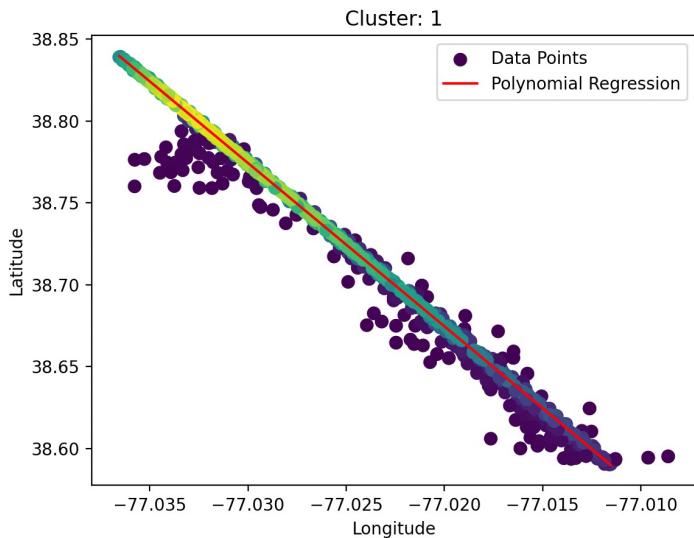
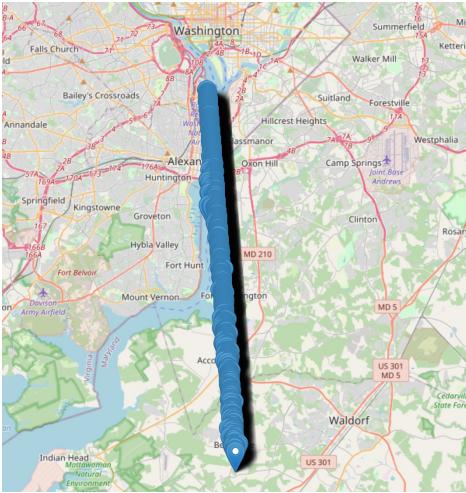


# Choosing an algorithm with SKLEARN





# Clusters

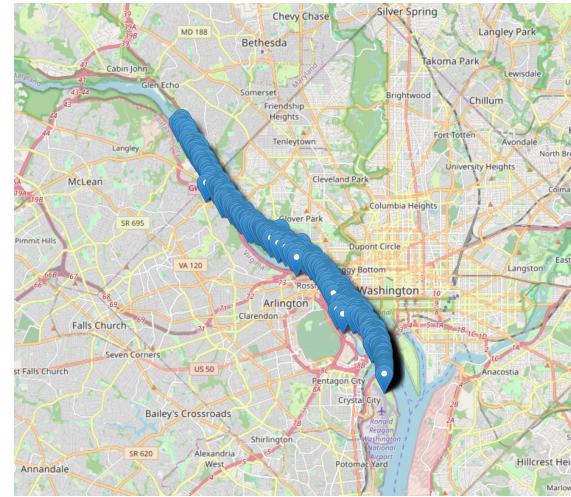


Cluster 1

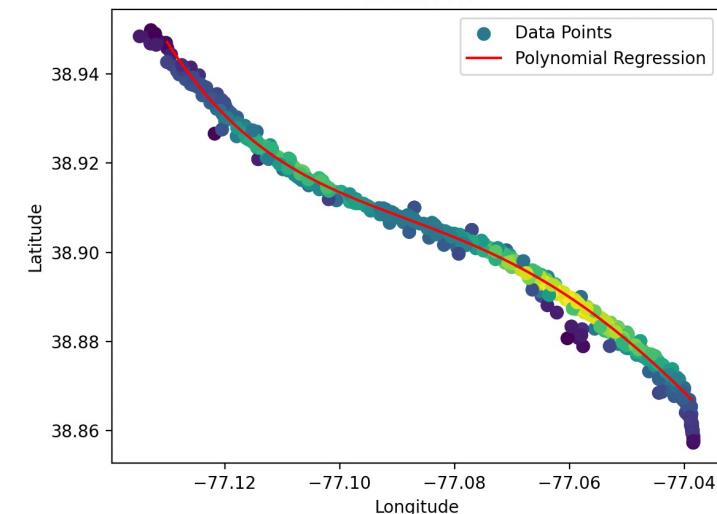
Filter out clusters that contain less than 100 points

Filter out the bottom 10% least dense datapoints to further reduce noise

Perform 20-degree polynomial regression to get an equation representing flightpaths



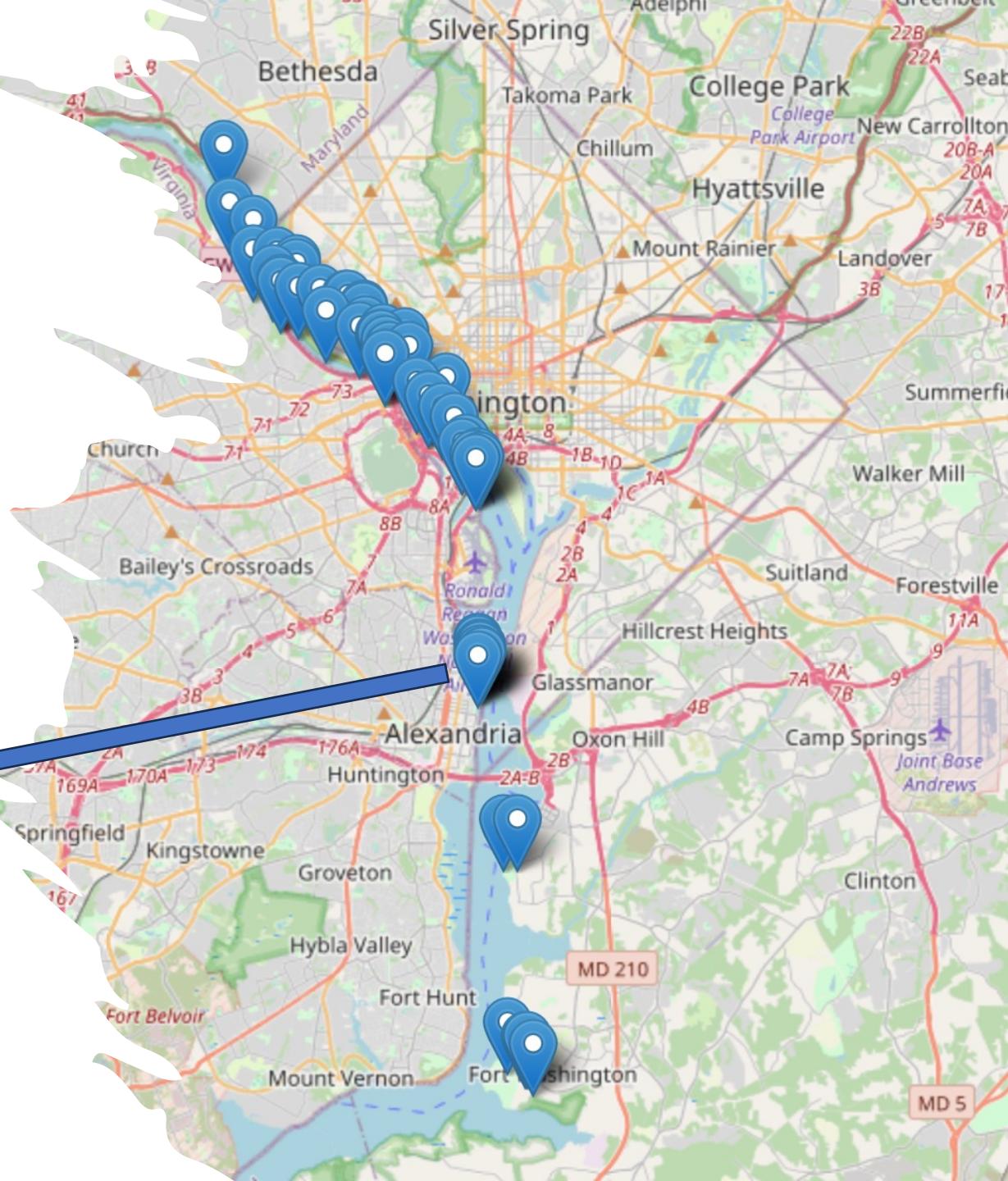
Cluster: 72



Cluster 72

# Spots

- Search along the flightpath in intervals of 0.3 miles
- Find parks using the google maps places API
- Each park has an average altitude and a distance from the flightpath



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# App Development

- T3 App
  - Next.js - Framework
  - tRPC – Procedure calling
  - Typescript - language
  - Prisma - database manager
  - Tailwind - CSS
  - NextAuth.js – User Authentication
- DigitalOcean
  - Postgres – Database
  - Spaces – File Storage
- Deployment
  - Vercel



# Features

- Explore
  - See location data visualized
  - View information about places
  - Utilize filters to get the information you want
- Place Page
  - View user reviews
  - Save and un-save places
- Add a Place
  - Submit your own places
  - They will be reviewed by admins
- My Places
  - See places you have saved and contributed

# Wing Watch Demo

The screenshot shows a desktop application window titled "Wing Watch". The top left displays flight information: "Located at 12 Mi Venon Trail, Arlington, VA 22202, USA", "Airport: Ronald Reagan Washington National Airport (DCA)", "Distance from Flightpath: DCA: 0.1 miles", "Average Altitude: 523 feet", and "Distance from Airport: 0.02 miles". Below this is a "Rating" section with five yellow stars. To the right is a map of Washington, D.C., showing the flight path from Ronald Reagan Washington National Airport (DCA) towards the location. At the bottom, there is a grid of four photographs showing airplanes in flight against a blue sky with clouds, and a Mac OS X dock at the very bottom.



Questions?