

Evacuation Drill Participation App

Senior Capstone Project, Oregon State University

David Kaff, 2 May 2022

The Context

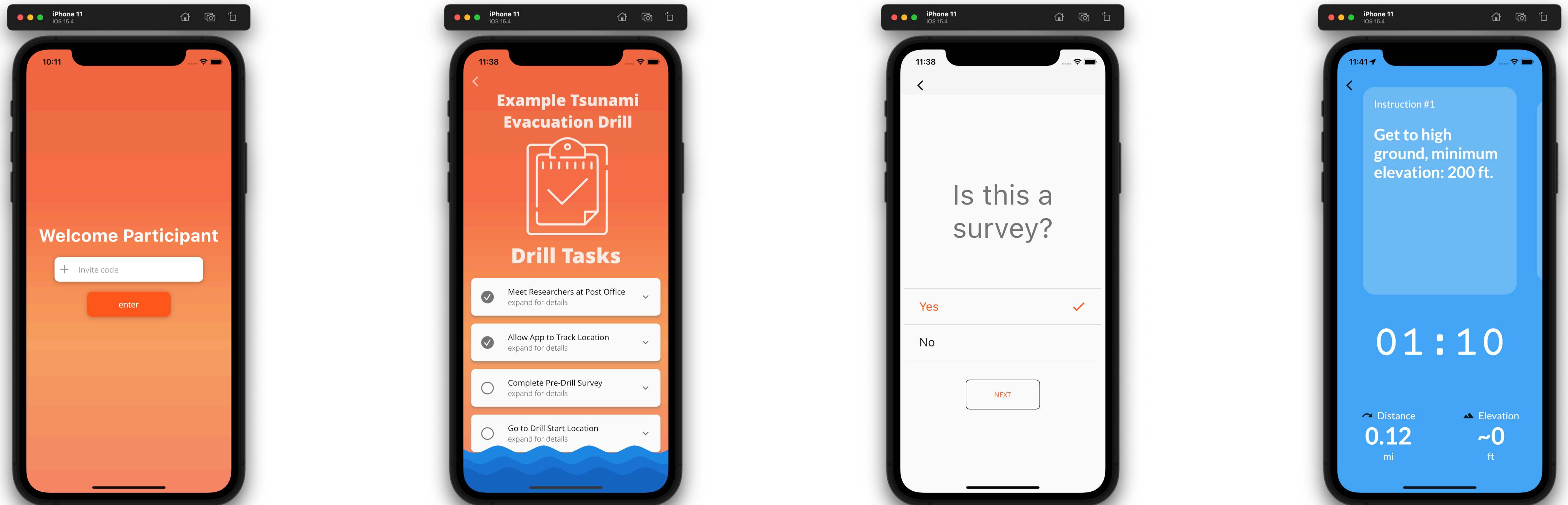
- Evacuation Drills are an effective way to engage and educate community members.
- Trajectory datasets have been generated using “Current Tool” (free exercise tracking mobile app).
- Survey and demographic data has been collected using roundtable discussions.

The Problem

- Exporting data from Current Tool is impractical for community members with low technology-literacy
- Time constraints limit the quality of survey datasets gathered in roundtable discussions

The Solution

- A mobile drill participation app which tracks location, administers surveys, and instructs participants.



What the App Accomplishes

- Removes barriers to generating survey and location datasets while participating in evacuation drills
- Creates a pathway to upload results from the app to the cloud, using public-key encryption to secure data
- Developed in Flutter — Compiles for both iOS and Android
- Releases open-source codebase with MIT License for future iteration

App Features

- Administer Surveys with various question types
 - Chosen Response, True/False, Scale, Free Response, etc.
- Generate Trajectory Data while delivering live Drill Information and Instructions
- Upload results with the tap of a button

Recent Changes

- Updated User Interface
- Changed underlying data structure
 - Now drills can have any combination of available tasks, in any order
 - Can easily code new tasks which have not been foreseen as useful
- Began documentation for project handoff

What the App does not Accomplish

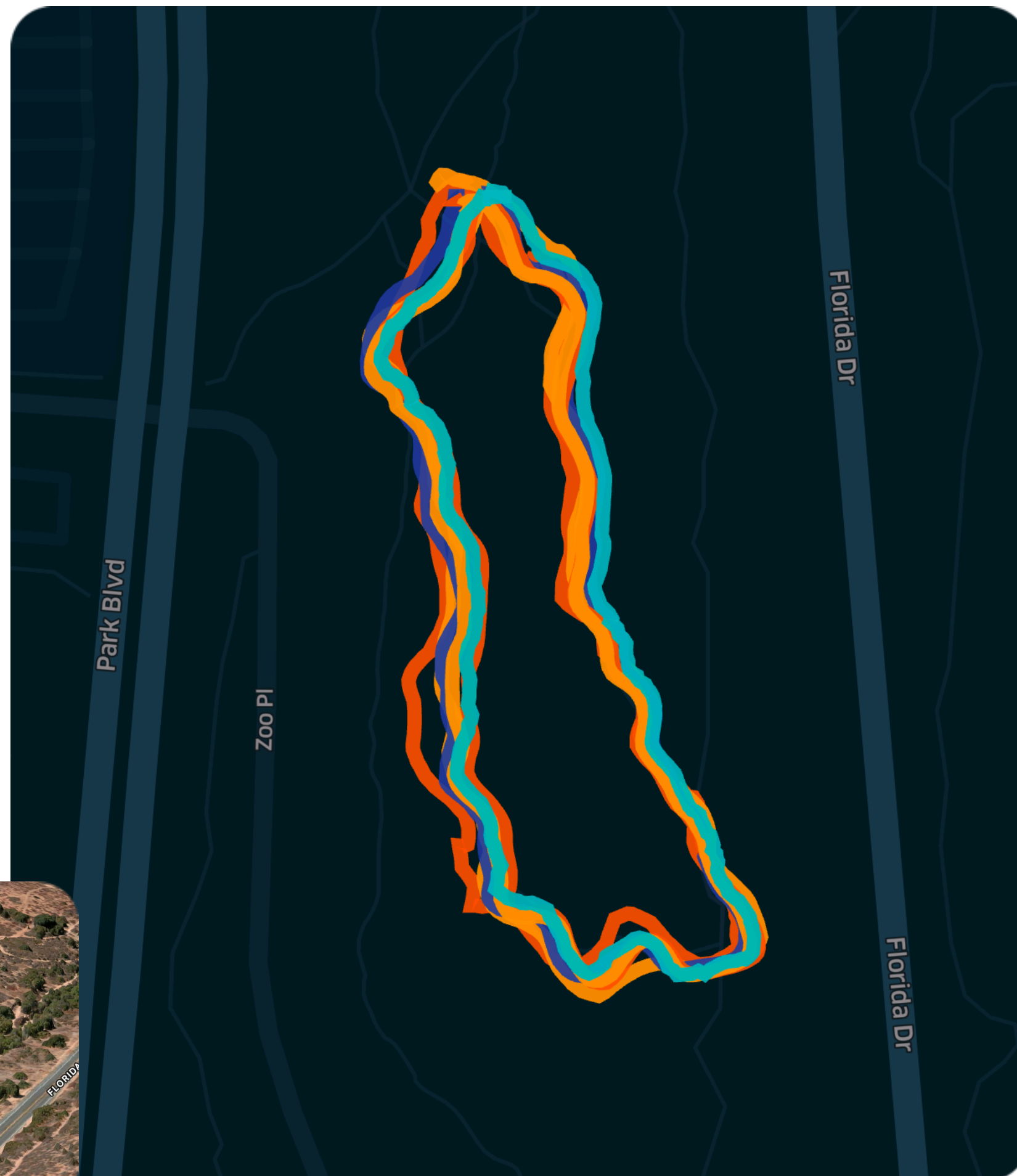
- Does not display live map to drill participants during drill performance
 - Can provide travel instructions and map links before or after drill
- Does not handle crashes and closes gracefully
 - Documented for future development
- Cannot be used by other research team – yet
 - Documented for future development

**What do some example results
look like?**

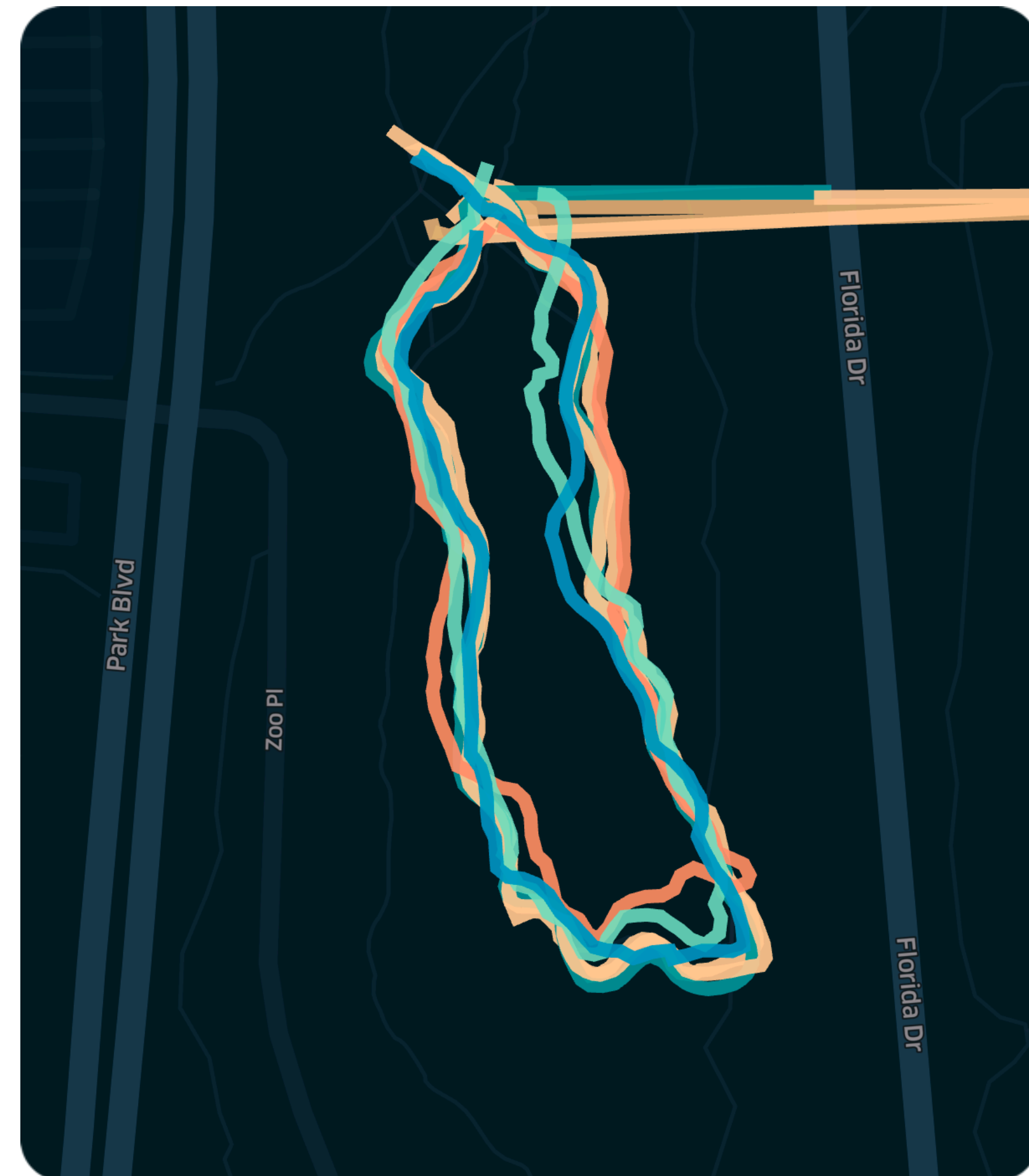
Results: Latitude + Longitude

Current Tool vs. Evacuation Drill Participation App

Current
Tool

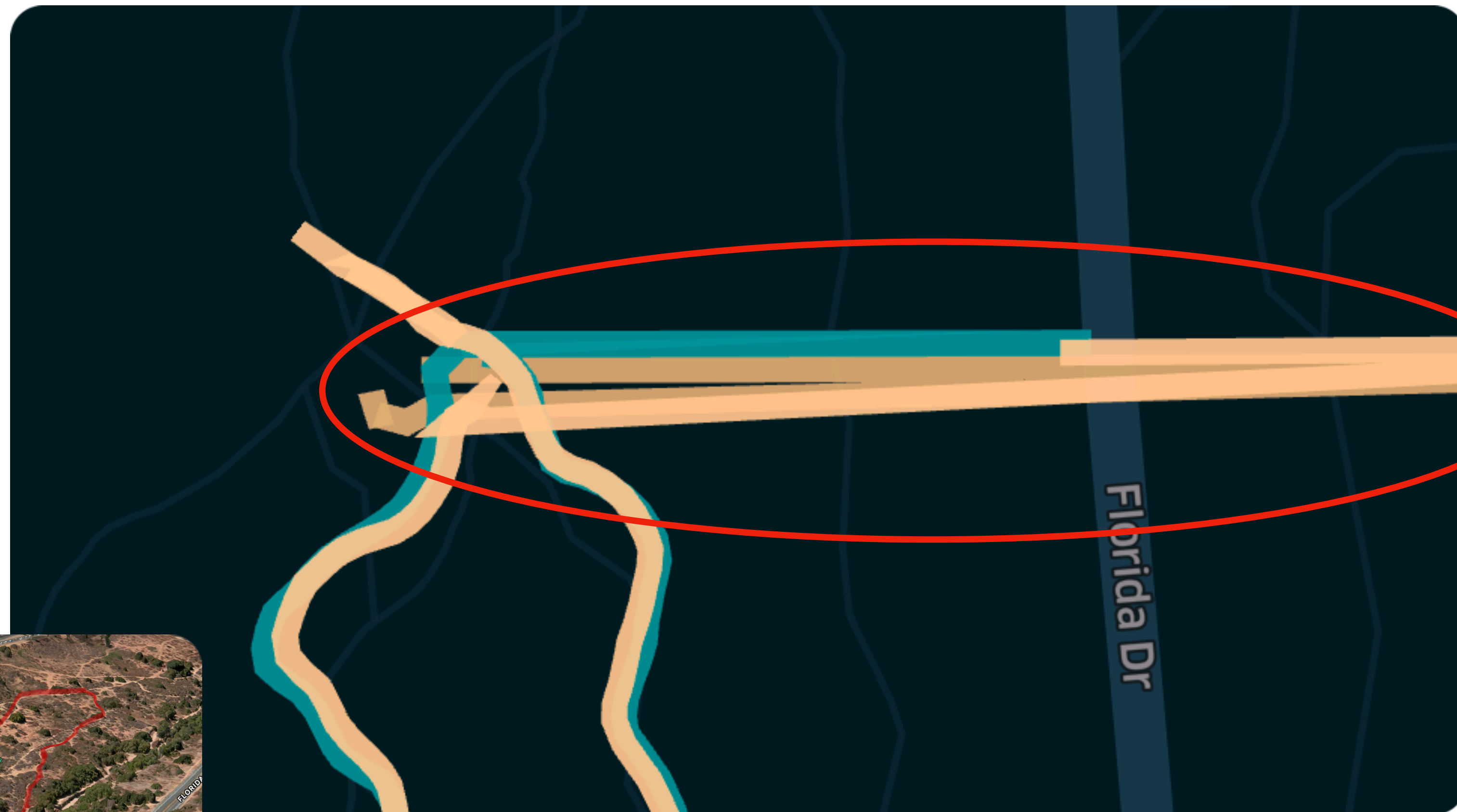


Evac.
App



Conclusions: Latitude + Longitude

Need an “Acquiring GPS Signal” Feature, like Current Tool’s



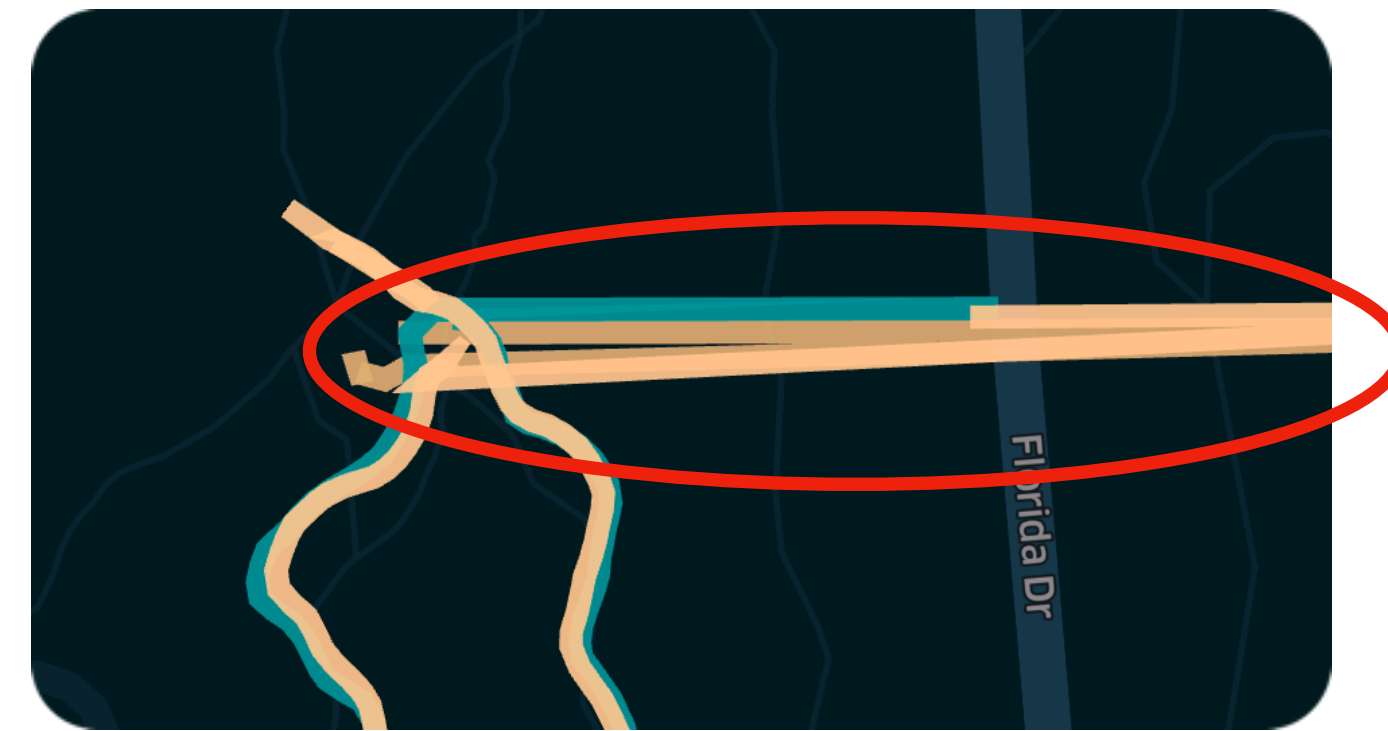
Evac. App
iPhone SE



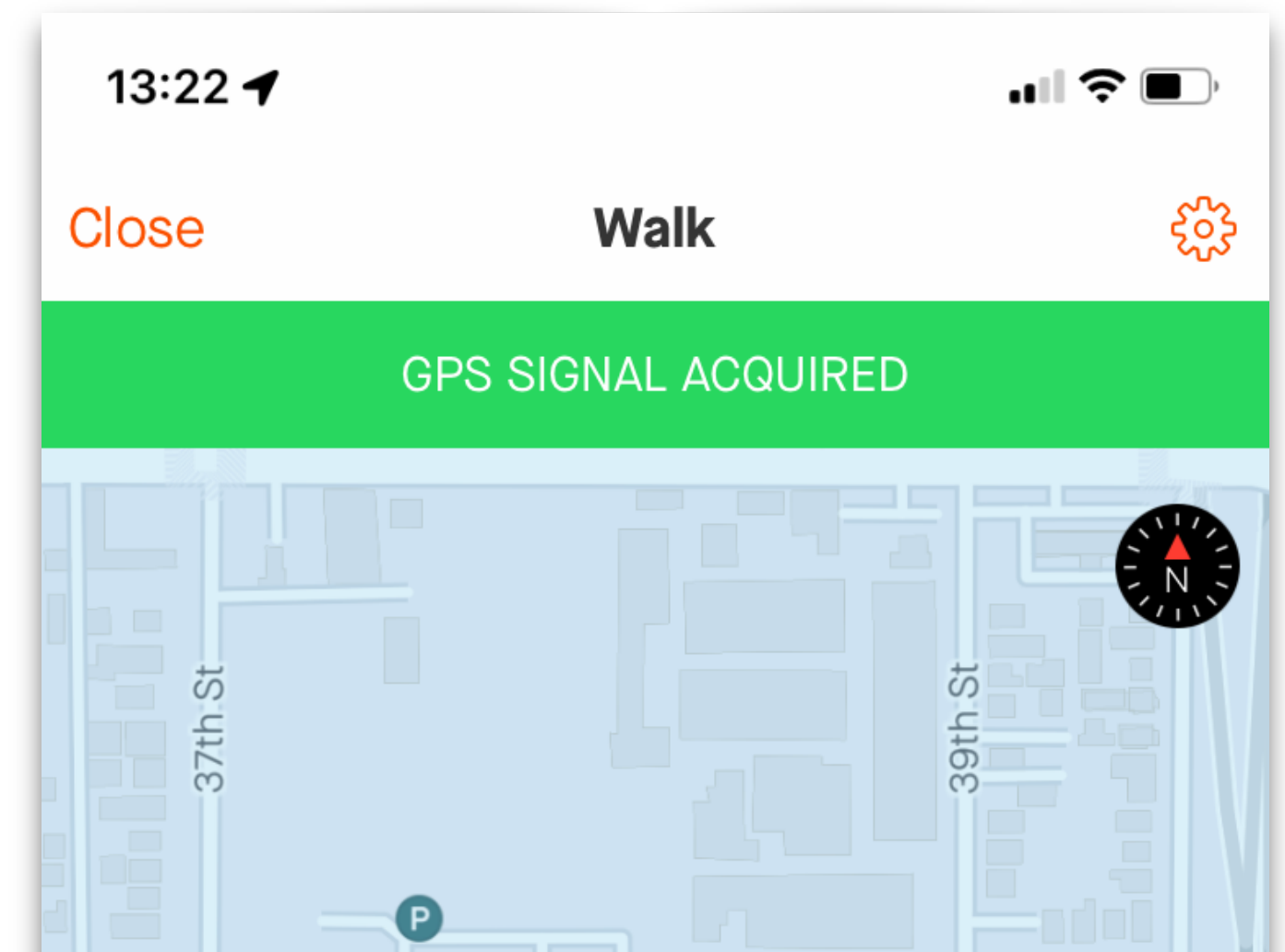
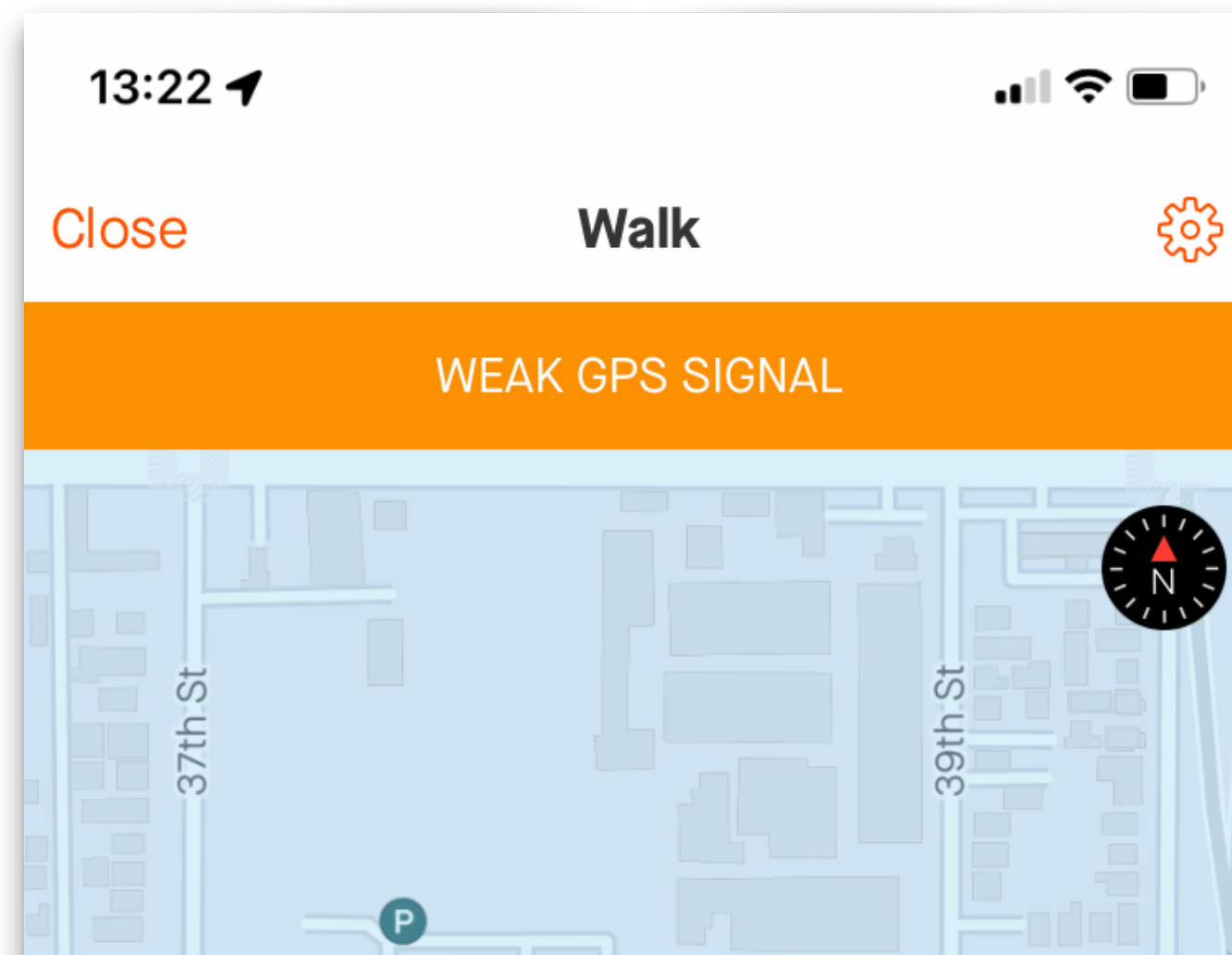
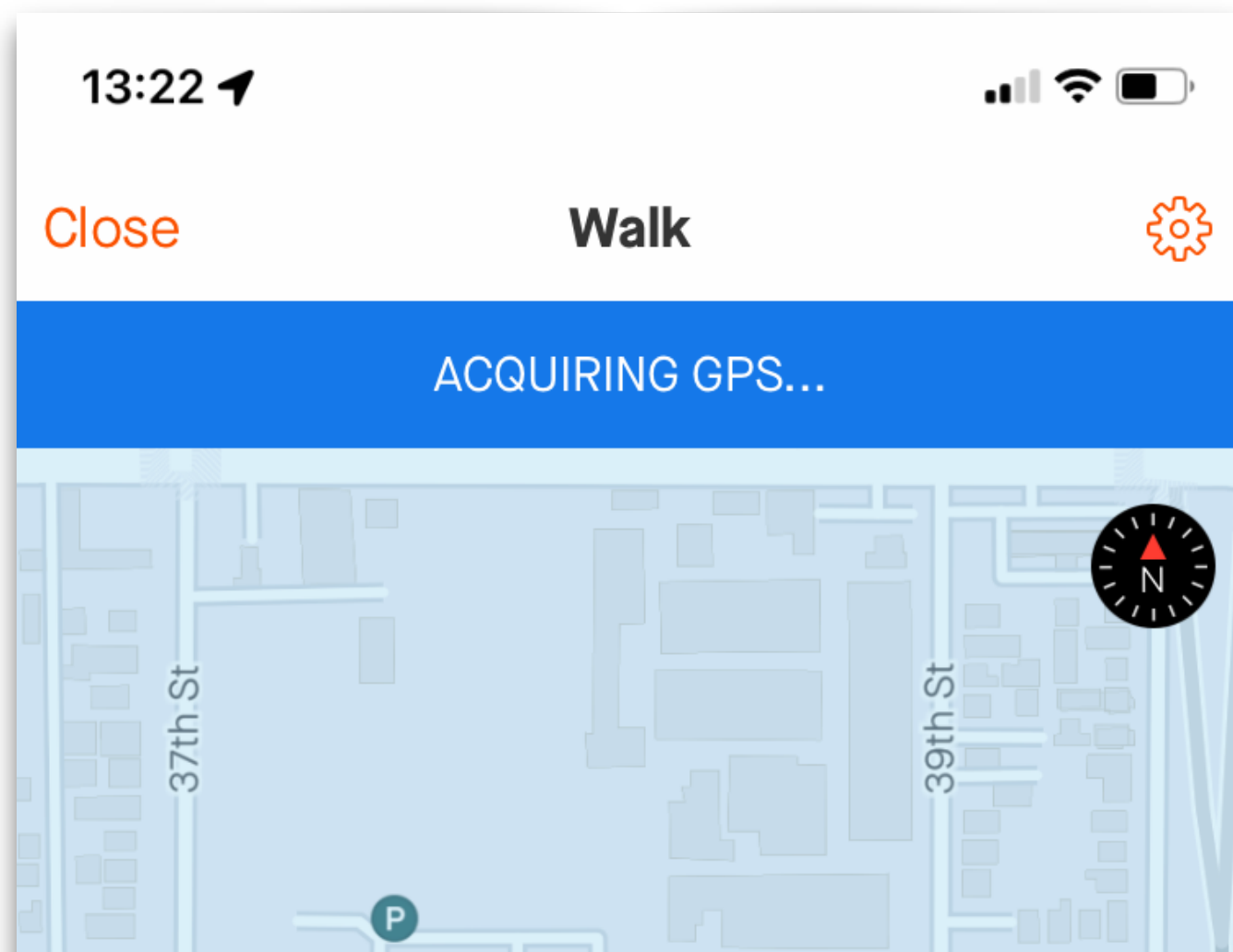
Conclusions: Latitude + Longitude

Need an “Acquiring GPS Signal” Feature, like Current Tool’s

- Add a screen before Drill which:
 - Waits until noise in GPS signal is low
 - Then allows Drill to start

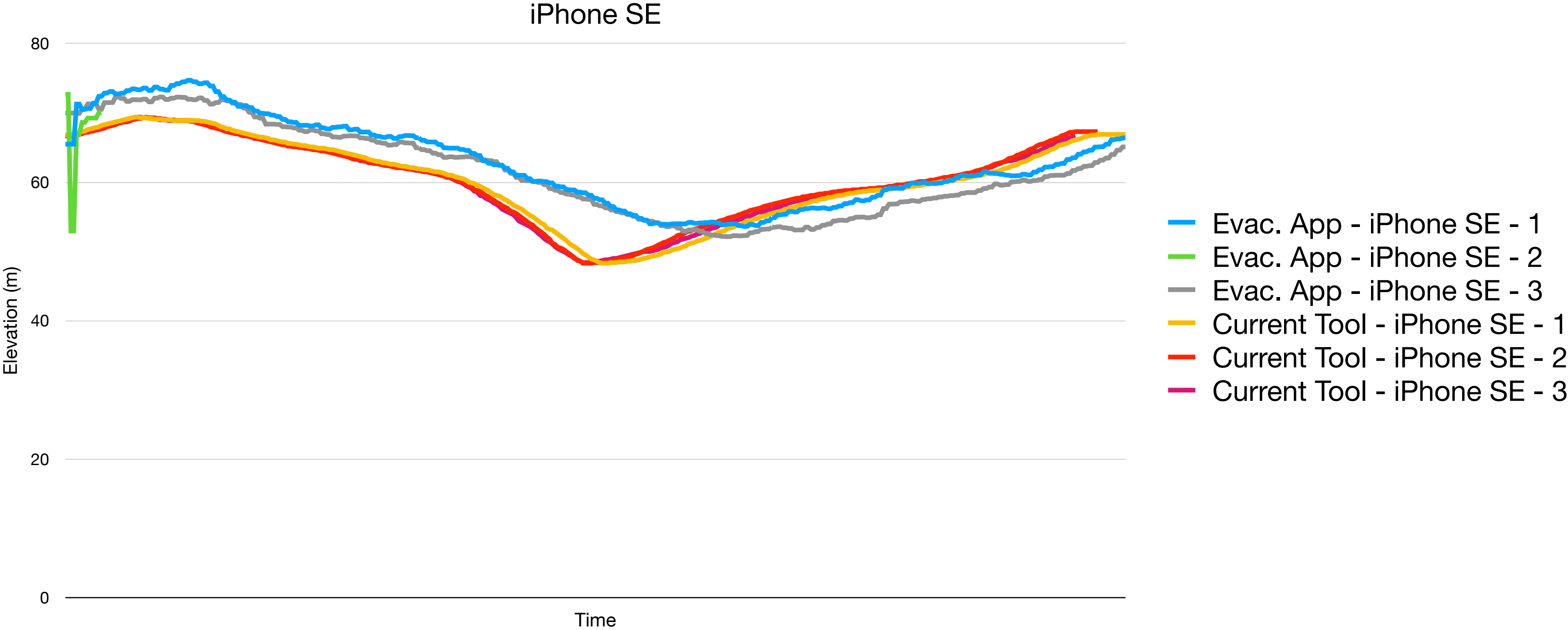


Evac. App
iPhone SE



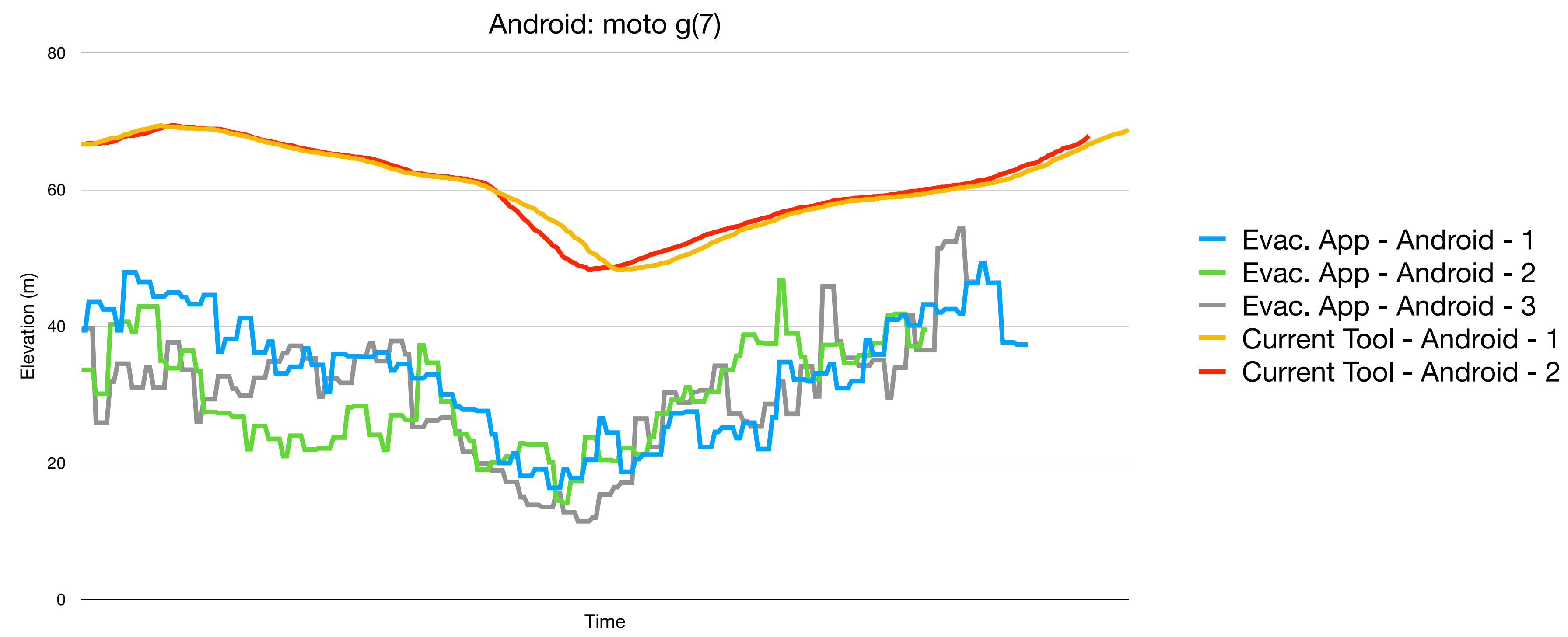
Results: Elevation

iPhone SE



Results: Elevation

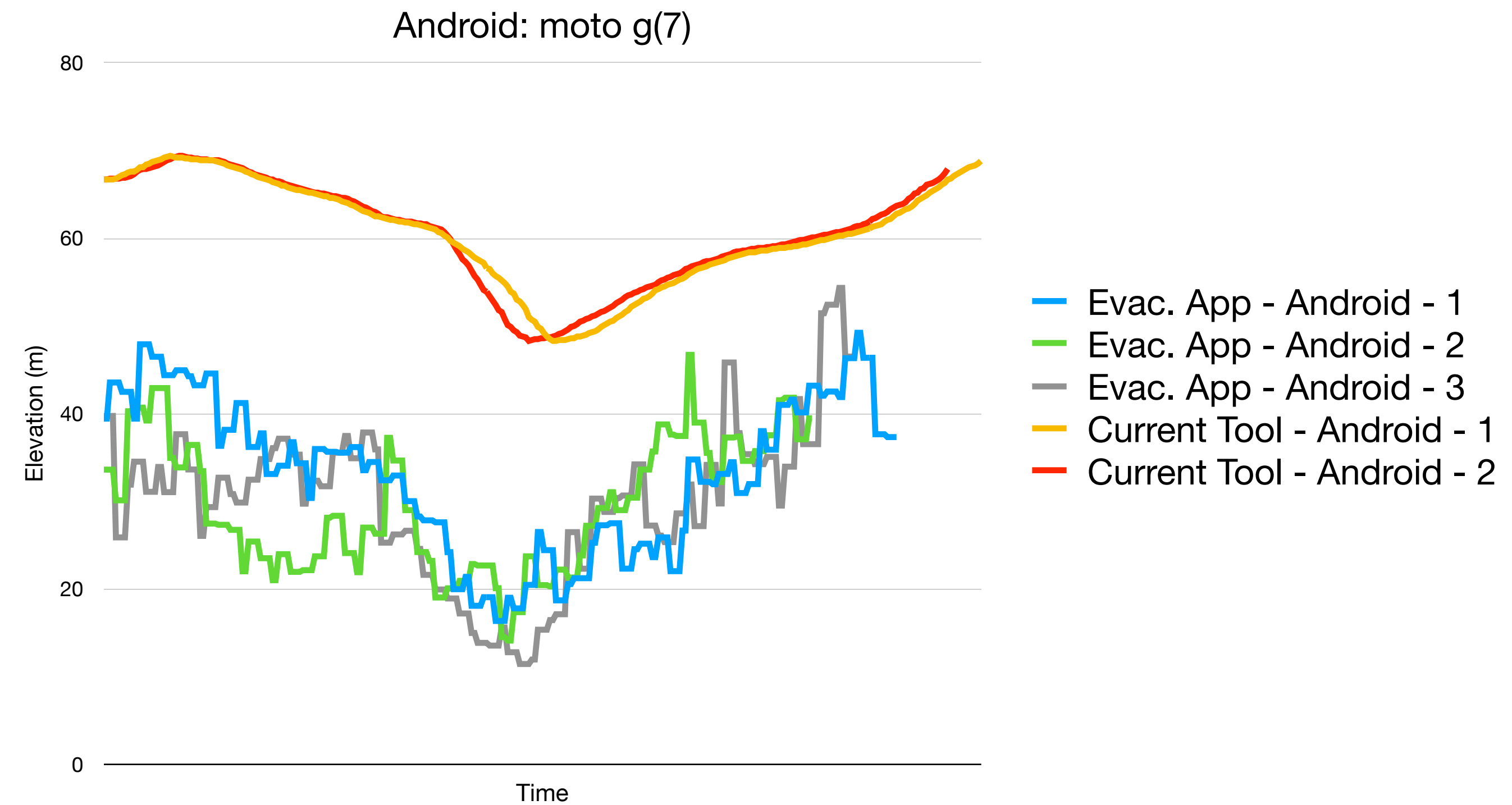
Android: moto g(7)



Results: Elevation

Android: moto g(7)

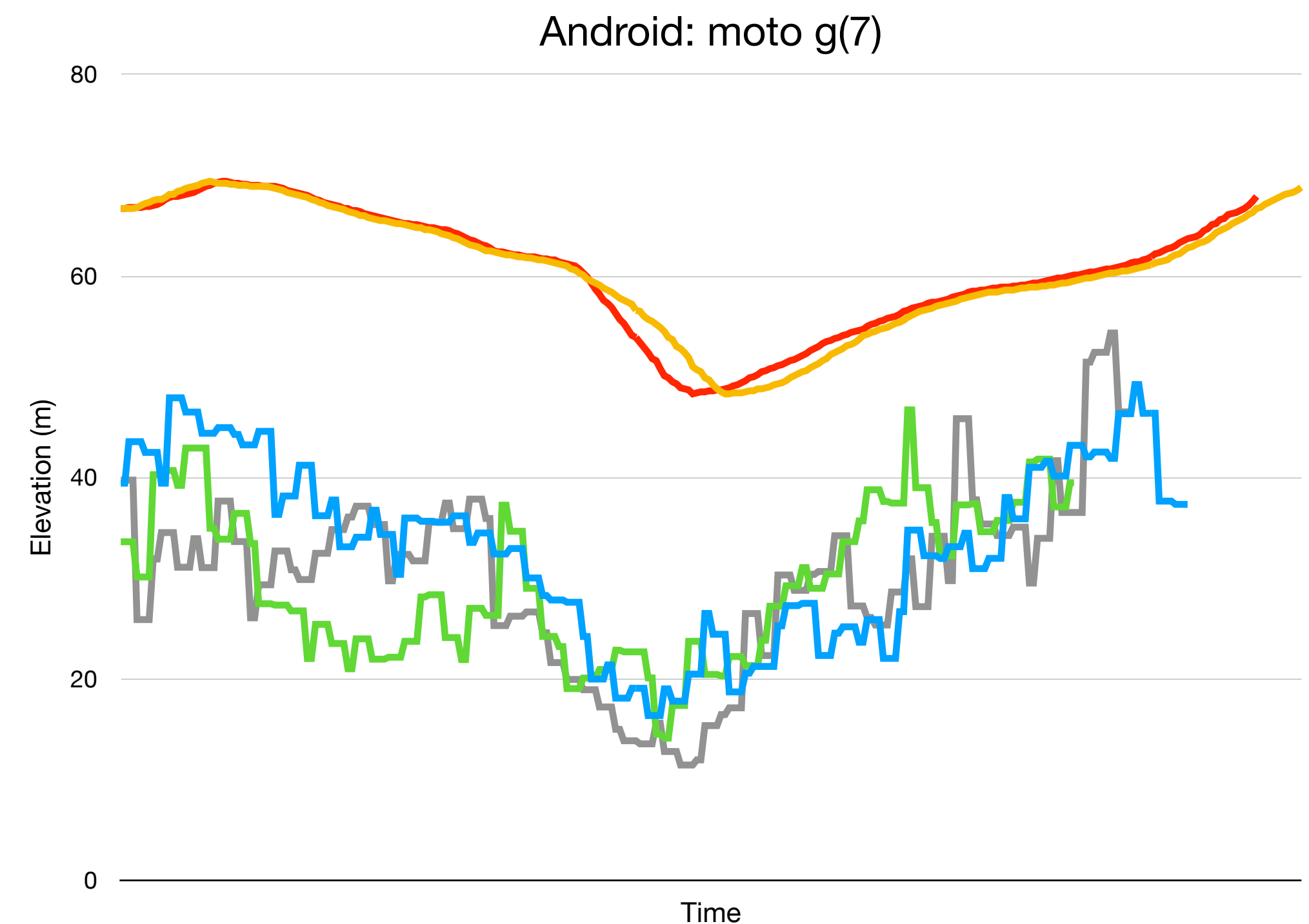
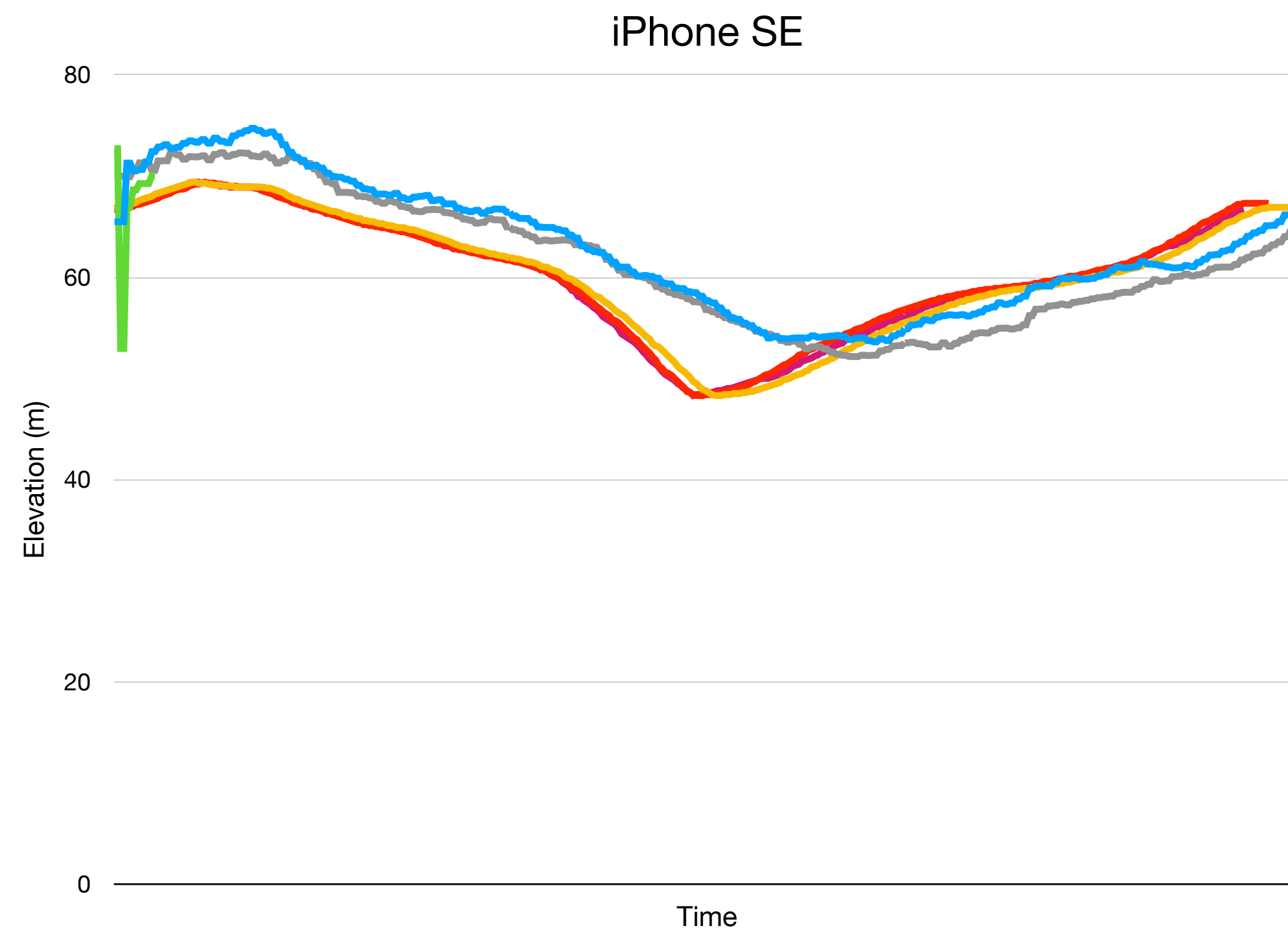
- Offset is known issue in code, which we had hoped could be determined from this test
- Noise in data is unknown issue, may be an issue with the test device



Conclusions: Elevation

Current Tool calculates elevation data from GPS data if device lacks barometric altimeter¹

- Elevation data may not be noisy from *all* devices, but need to prepare for it to be noisy from *some* devices



[1] <https://support.strava.com/hc/en-us/articles/216919447-Elevation-for-Your-Activity>

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