



GPS Data is Very Difficult to Understand

We Developed An Application to Make it Trivial

REPLAY POSITIONING SYSTEM



Motivation

TripSpark Technologies is a company that creates transportation software. Many of their solutions include an in vehicle component which depends on the vehicles' locations. Working with GPS presents multiple problems:

- Software that depends on GPS data is hard to test, maintain and fix because it often depends on a large aggregation of GPS data
- Customers blame TripSpark's software for poor GPS performance
- GPS data is hard to visualize and understand

With no existing tools that can mitigate or solve all of these issues, TripSpark proposed a project to create one.

Raw GPS Data for a Single Point

```
#GNRMC,140000.00,V,,,,,290722,,N*6A
#GNVTG,,,,,,N*2E
#GNGGA,140000.00,,,,,0,00,99.99,,,,,*7D
#GNGSA,A,1,,,,,,99.99,99.99,99.99*2E
#GNGSA,A,1,,,,,,99.99,99.99,99.99*2E
#GPGSV,4,1,15,02,40,202,,03,11,031,,06,70,109,,11,48,185,*76
#GPGSV,4,2,15,12,57,299,,17,24,073,,19,50,067,,20,05,162,*72
#GPGSV,4,3,15,22,04,337,,24,35,235,,25,18,305,,32,03,314,*71
#GPGSV,4,4,15,46,31,201,,48,32,196,,51,33,173,*4C
#GLGSV,3,1,09,68,09,357,,69,11,045,,75,48,167,,76,65,302,*6B
#GLGSV,3,2,09,77,17,326,,84,07,044,,85,66,032,,86,60,239,*6B
#GLGSV,3,3,09,87,01,229,*5B
#GNGLL,,,,,140000.00,V,N*51
```

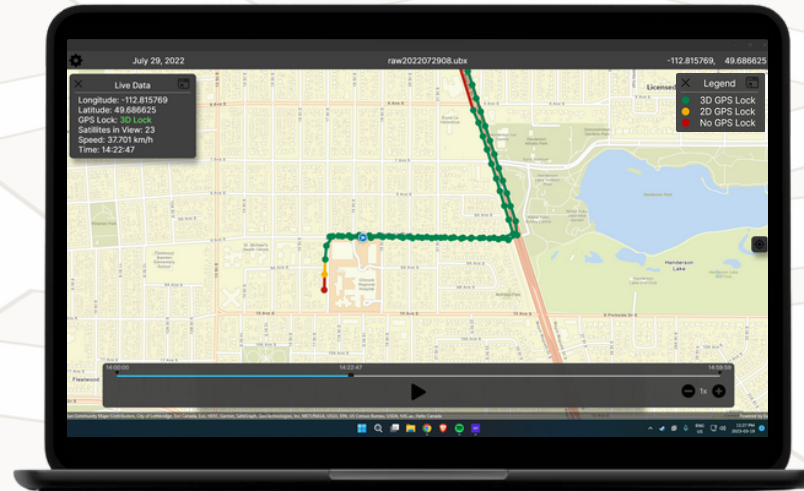


1 hour of data contains
3600 data points!

1. Load GPS data



2. Visualize and playback the data



Features



Input raw GPS files



Visualize GPS data



Playback GPS data



Simulate output



Inspect data point



Scrollable timeline



Playback speed



Configurable settings

What will the app be used for?

- Visualizing GPS data
- Visualizing the vehicle movement on a route
- Validating and testing in-vehicle software
- Reproducing and fixing bugs in GPS dependent features
- Explaining GPS reliability and behaviour to customers
- Helping customers decide how to improve GPS in their fleet (what hardware to install)
- Finding locations with poor GPS connection



How do we know the app can do all this?

- In-house testing to identify, prioritize and fix issues as they appear
- Regular demos and meetings with the project sponsors
- End user testing
- Cross testing performed on all major features to find issues and ensure requirements are met
- User survey circulated to solicit feedback
- Code reviews performed on all major development tasks
- Unit tests added to reduce regression bugs