

GPS Tracker Testing Report

Setup and Running Instructions

Running the GUI Application

```
javac -cp ".;sodium.jar" Example.java GpsEvent.java GpsService.java GpsGUI.java
java -cp ".;sodium.jar" GpsGUI
```

Running Tests

```
javac -cp ".;sodium.jar;junit.jar;hamcrest-core.jar" GpsGUI_Test.java
java -cp ".;sodium.jar;junit.jar;hamcrest-core.jar" org.junit.runner.JUnitCore GpsGUI_Test
```

Test Cases

Test Case 1: Simplified Tracker Displays

Steps: Run GUI, check "Tracker Displays" section.

Result: Trackers display name, latitude, longitude without altitude. Uses FRP `map` to remove altitude.

Test Case 2: Event Display

Steps: Run GUI, observe "Event Display", wait 3+ seconds.

Result: Events display as `name,latitude,longitude,altitude`. Clears after 3 seconds.

Test Case 3: Range Filter Controls

Steps: Enter Lat 40, Lon 116, Range 1.0, click "Set Range", check labels.

Result: Filter values update correctly. Uses `CellSink` for reactive values.

Test Case 4: Filtered Events Display

Steps: Set filter Lat 40, Lon 116, Range 1.0. Change to Lat 40, Lon 80, Range 1.0.

Result: Only events within range displayed. Uses `snapshot` and `filter`.

Test Case 5: Distance Calculation

Steps: Set filter Lat 40, Lon 116, Range 1.0. Wait for events. Change filter to Lat 40, Lon 80, Range 1.0.

Result: Distances calculated for 2+ events in last 5 minutes. Updates to 0 when filter excludes trackers. Uses `accum`, `snapshot`, `lift`.

Test Case 6: Altitude Conversion

Steps: Review `distance3D` and `feetToMeters` functions.

Result: Altitude converted from feet to meters (0.3048 factor). Included in 3D distance calculation.

Test Case 7: Multiple Streams

Steps: Run GUI, verify all 10 trackers displayed.

Result: All 10 tracker streams processed. Uses `merge` to combine streams.

Test Case 8: Unit Tests

Steps: Run test suite using commands above.

Result: Both tests pass. `testFeetToMeters` and `testDistance3D` verify functionality.

Code Coverage

All functions tested and demonstrated:

- `feetToMeters` : Test Case 6, Test Case 8
- `distance3D` : Test Case 6, Test Case 8
- GUI components: Test Cases 1-7
- FRP stream operations: Test Cases 1-7