

GPS2Quantum™ Case Study

Dual Simulation & Comparison: Navigation Without GNSS

Scenario Overview

An emergency response team is traversing a dense forest where GNSS signals are intermittently blocked. Using the GPS2Quantum mobile app, the team simulates their position twice: once at the point of initial GPS loss (Point A), and again several minutes later at a new location (Point B). The app helps compare the two quantum-derived positions and estimate how far they've drifted.

Setup in the App (Point A)

1. Open GPS2Quantum and tap **Search Location**.
2. Enter last known GNSS fix: **37.7749, -122.4194** (San Francisco, CA).
3. Set **Custom Altitude** (e.g., 10 meters).
4. In **Settings**:
 - Sensor: Tactical Grade
 - Condition: Automotive/Urban
 - Drift Time: 90 seconds
5. Tap **Simulate Quantum Coordinates** and view Point A.

Repeat Steps at Point B (New Location)

1. After moving to a new estimated location, repeat **Search Location**.
2. Input GNSS fallback estimate: **37.7755, -122.4185**.
3. Update drift time to **210 seconds**.
4. Keep same sensor and condition, then simulate Point B.
5. Save both results or screenshots for comparison.

Behind the Scenes

Drift calculations at each point:

- Point A: $0.1 \text{ m/s} \times 90 \text{ sec} = \mathbf{9 \text{ meters}}$
- Point B: $0.1 \text{ m/s} \times 210 \text{ sec} = \mathbf{21 \text{ meters}}$

The app renders uncertainty circles at both points, allowing comparison of spatial displacement and cumulative drift.

User Interpretation

The user may estimate heading or trajectory by comparing the ECEF or spherical position of Point A and Point B, even in the absence of live GNSS. The increasing uncertainty radius helps model growing error bounds over time.

Why This Matters

Dual simulations enable relative drift comparison, path estimation, and navigation continuity in GNSS-denied environments. The app is ideal for first responders, researchers, and defense scenarios requiring self-contained location awareness.

Learn more at: gps2quantum.com