

MBARI Memorandum

Dorado-008

TO:	Dorado/Altex Team	DATE: March 1, 2001
FROM:	Rob McEwen	
SUBJECT:	Plots of Monday's LBL Data	
REVISION:	1.0	

Objective

The following plots show vehicle position and range to the various LBL beacons from the missions executed during last Monday's sea-trial. Drew, Hans, and Rob should review the data below, and diagnose why the vehicle was not receiving all beacons, and for what reasons.

Summary

In the position plots, the blue locus is dead-reckoned vehicle position. The magenta locus indicates GPS updates, which implies that the vehicle was on the surface at that point.

In the Range-to-Beacon plots, the blue locus is computed from the times-of-flights, and the green is computed from the dead-reckoned vehicle position.

- Run 03: Began near Beacon 1 and headed East. The kalman filter was disabled, but the ps8000 was logging the return times. It was able to receive 4 of the beacons. See Figures 1 and 2 for the beacon numbers and locations.
- Run 04: Surface run with propulsion off, in the Eastern side of the array. Figure 3 shows the vehicle position on the surface as determined by GPS. Figure 4 shows the location within the array. Note the constant offsets between the computed and measured ranges.
- Run 10: Surface run with propulsion off, just outside of the Western edge of the array. Figure 6 shows the vehicle position on the surface as determined by GPS. Figure 7 shows the location within the array. The vehicle received 3 beacons. The Kalman filter was providing a partial solution, which is strange considering that only a few hits from the third beacon were received, and near the end of the run. See Figures 8 and 9.

- Run 11: This run began on the western edge of the array, and headed south-east with a depth of 20 meters. See Figures 10 and 11. The Kalman filter appeared to initialize.
- Run 12: Surface run with propulsion off, located near Beacon 2 in the south-west quadrant. The vehicle received sporadic responses from 4 beacons. See Figure 15. The Kalman filter did initialize and compute a fix, which appears to be in error from the GPS position by about 150 meters. See Figures 14 and 16.
- Run 13: This run begins in the south-west corner and heads north-east directly over Beacon 1. The vehicle receives returns from 4 beacons at various times during the run; see Figure 18. The Kalman Filter appeared to initialize, but didn't compute any fixes.

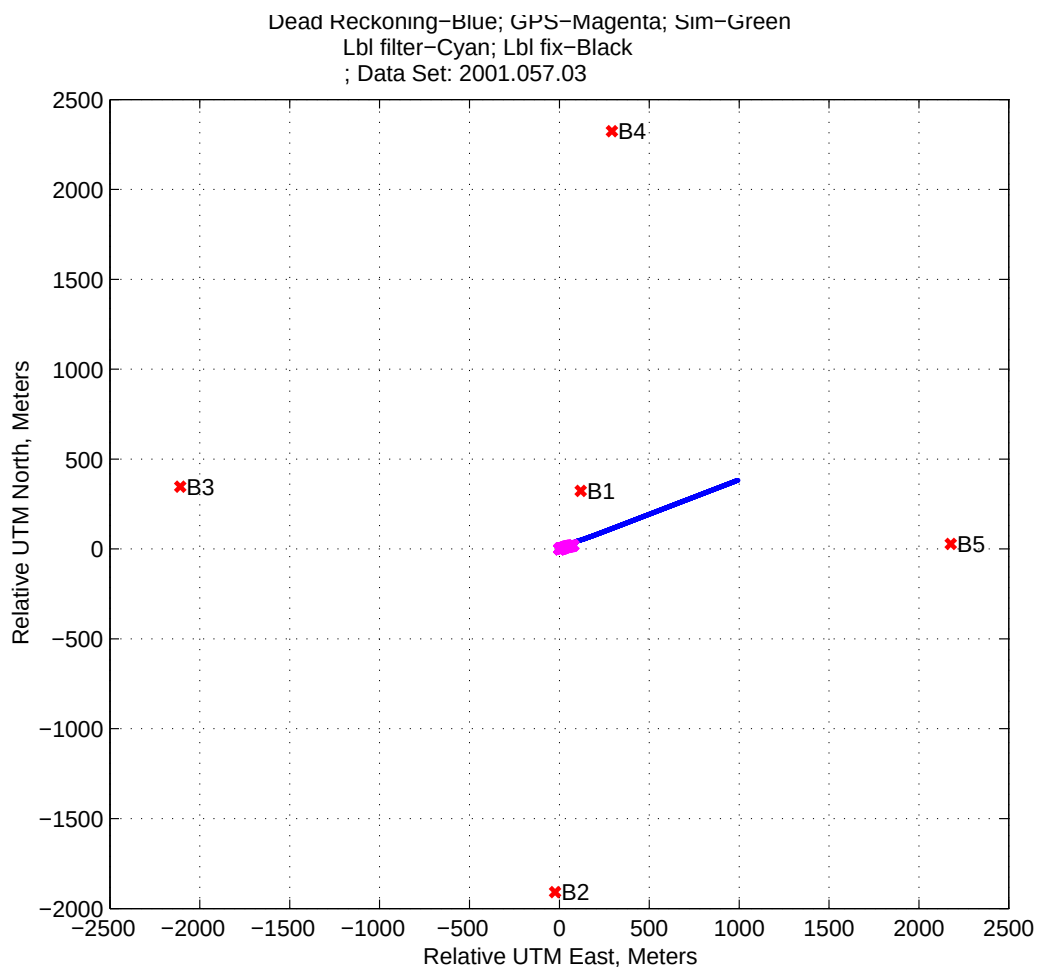


Figure 1: Dead Reckoned Vehicle Position

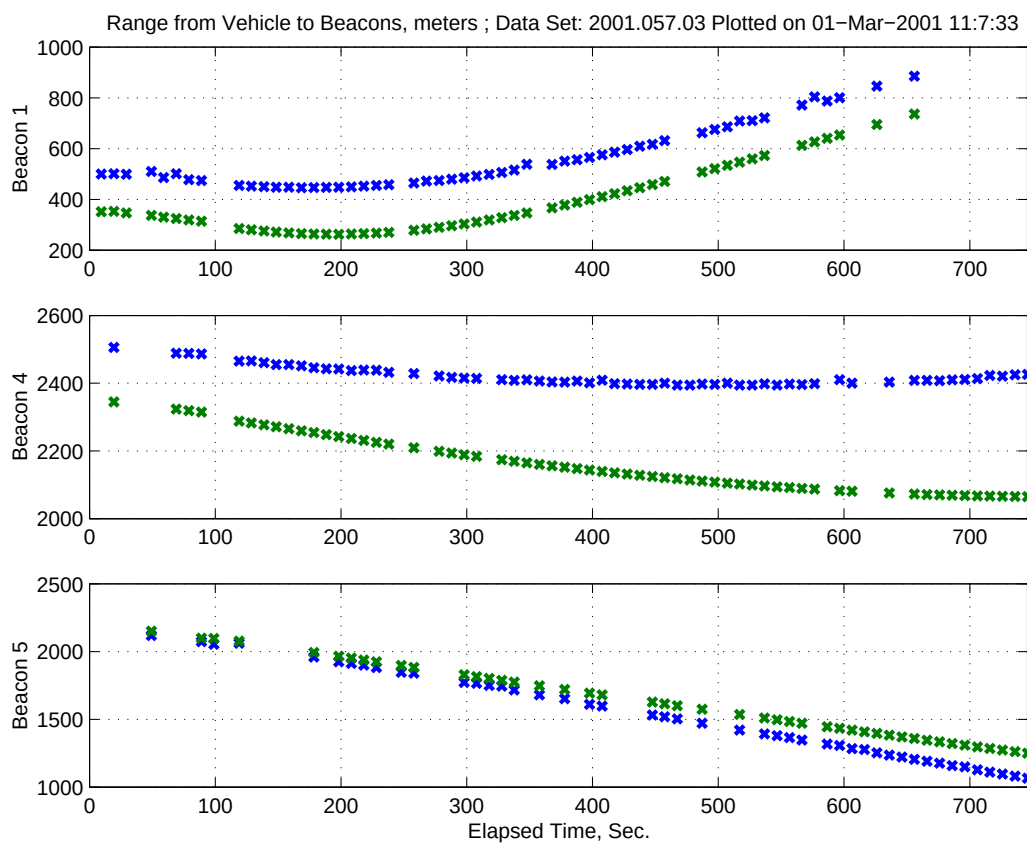


Figure 2: Measured and Computed Range to Beacons

Dead Reckoning-Blue; GPS-Magenta; Sim-Green
Lbl filter-Cyan; Lbl fix-Black
; Data Set: 2001.057.04

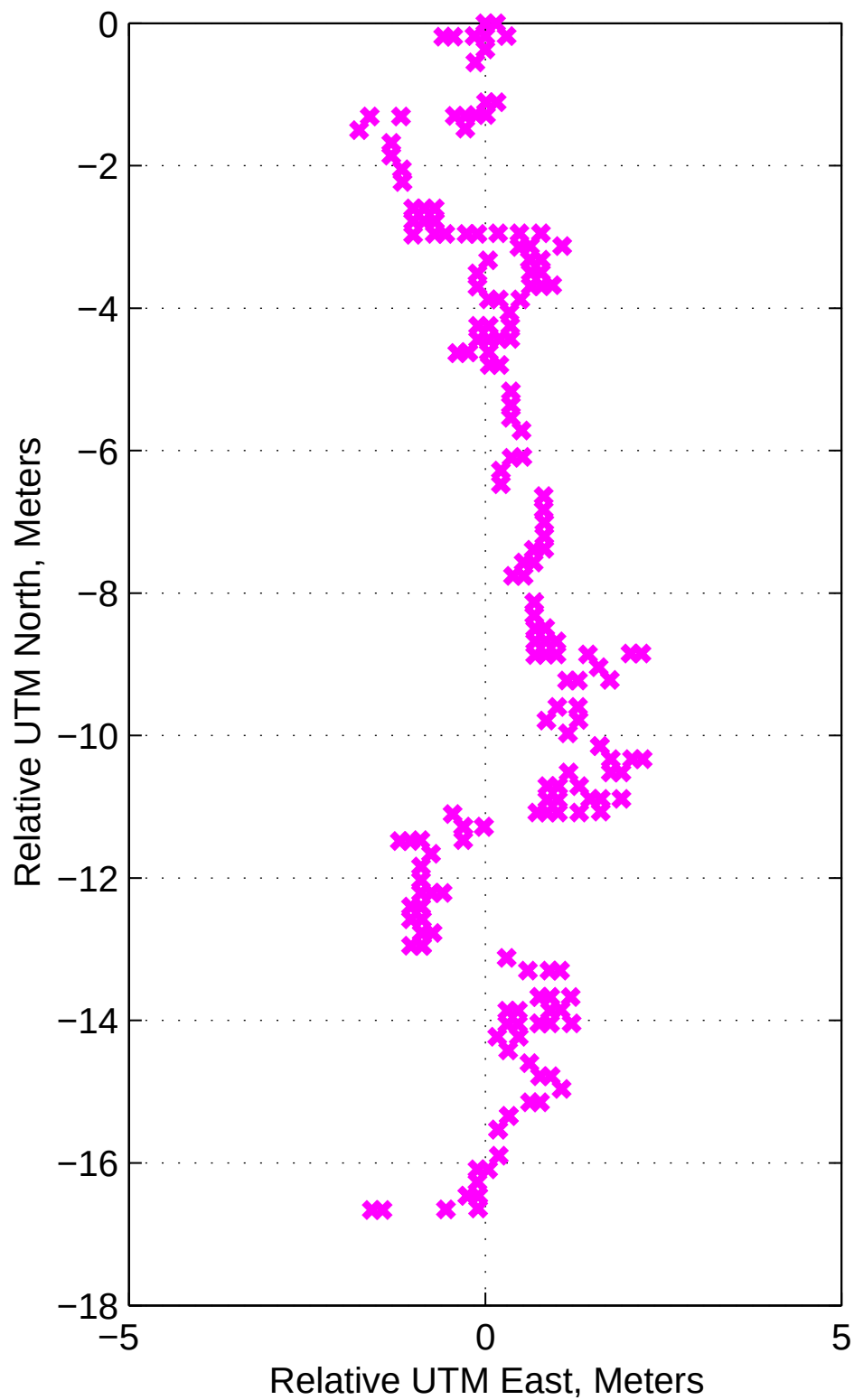


Figure 3: Dead Reckoned Vehicle Position

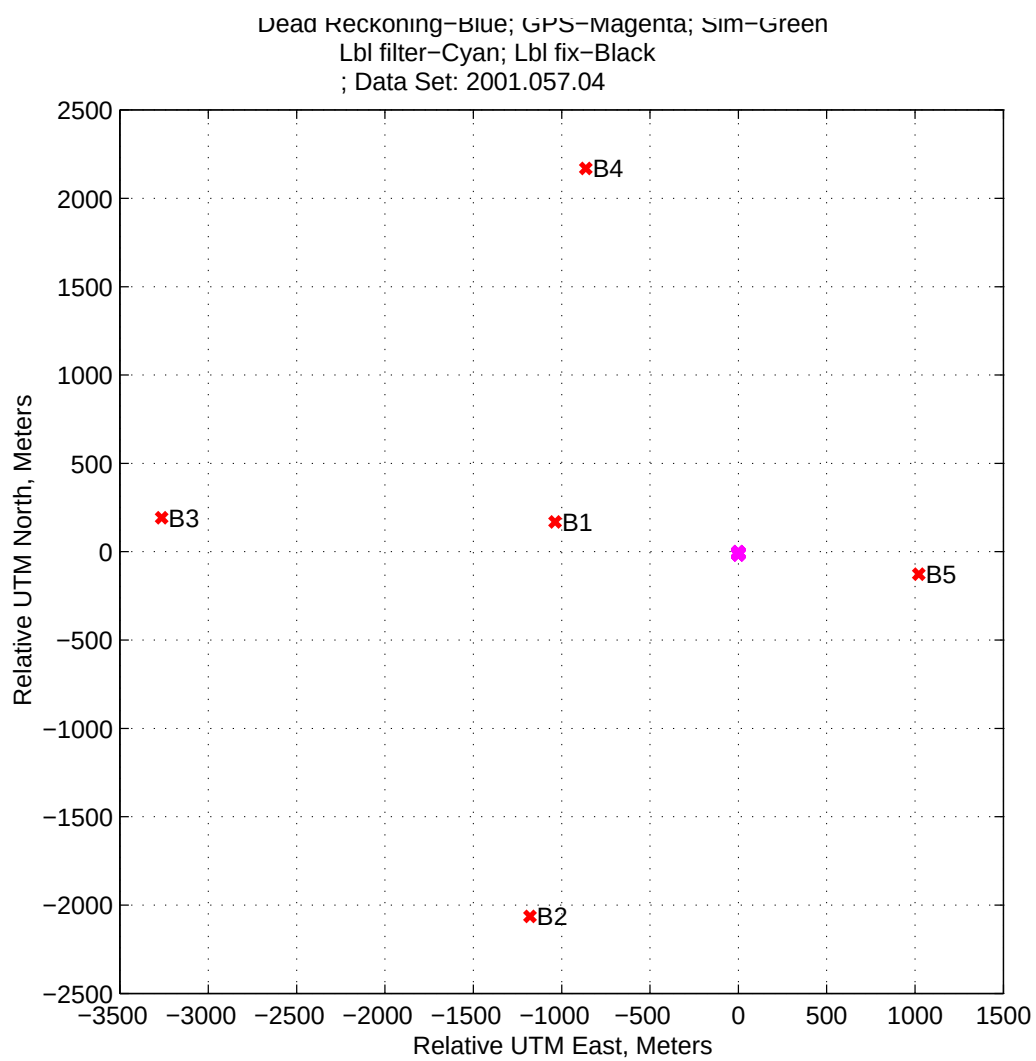


Figure 4: Dead Reckoned Vehicle Position

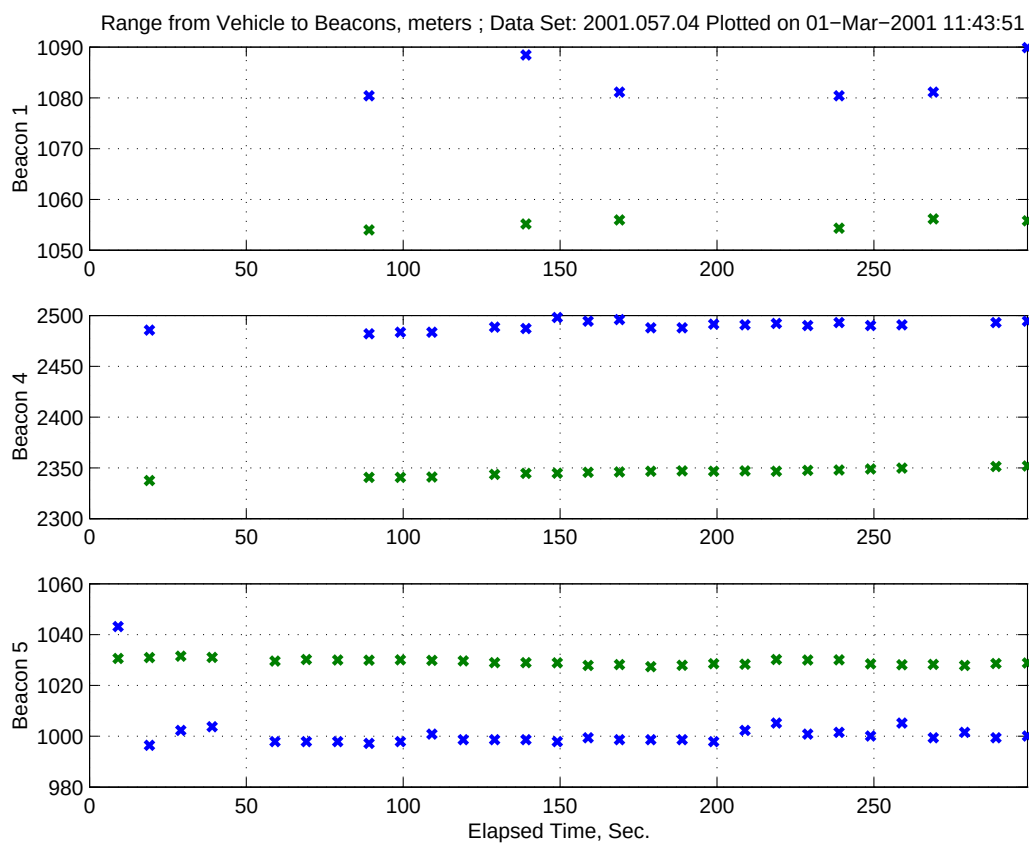


Figure 5: Measured and Computed Range to Beacons

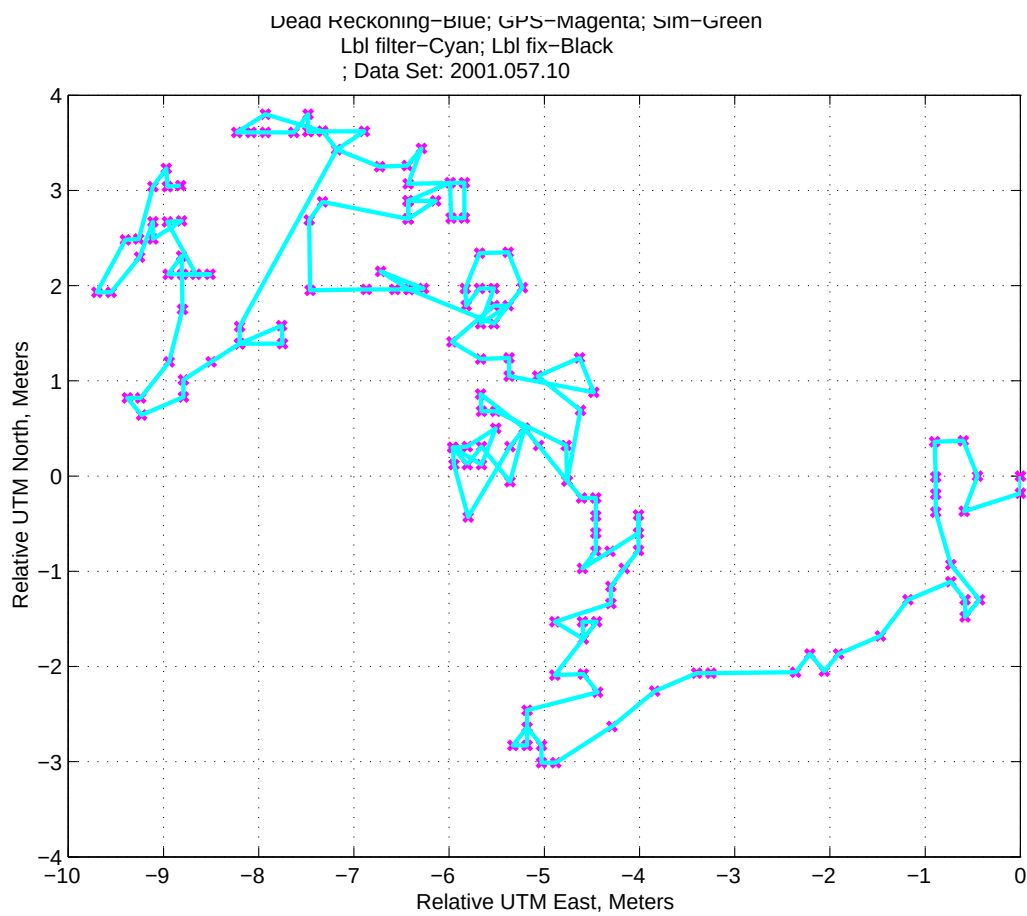


Figure 6: Dead Reckoned Vehicle Position

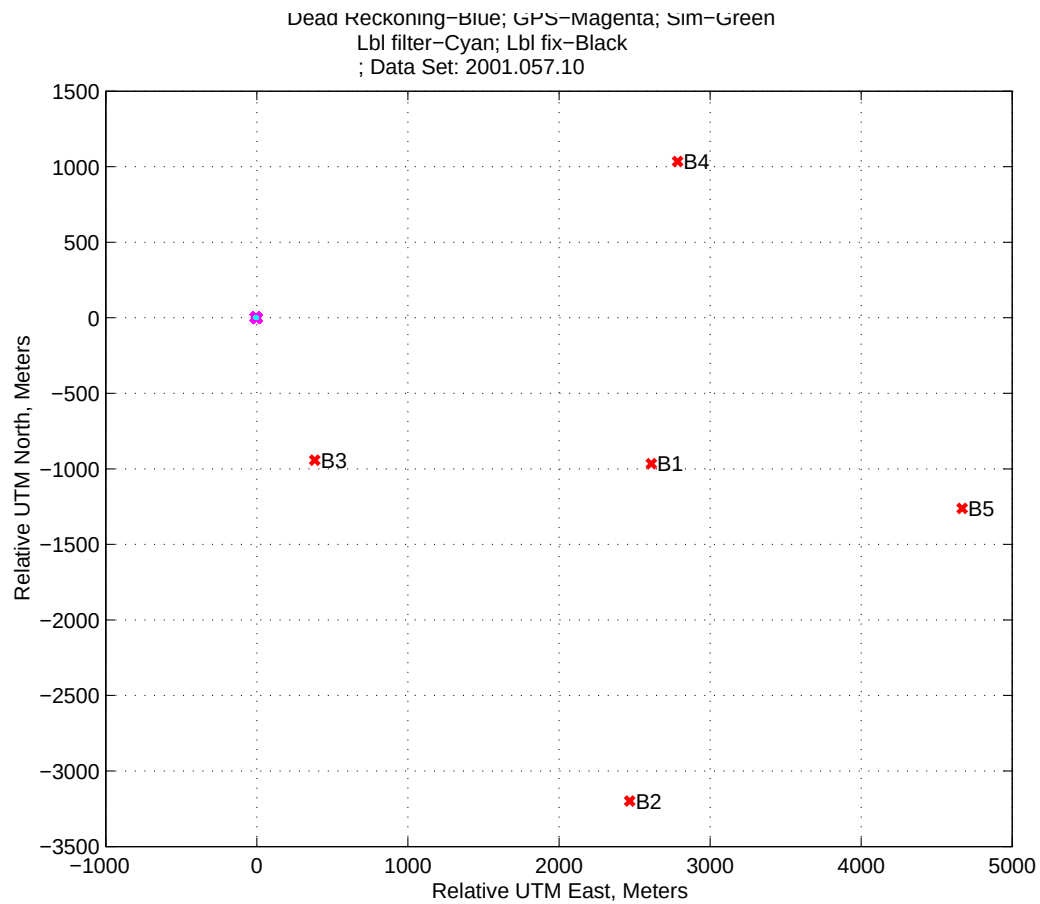


Figure 7: Dead Reckoned Vehicle Position

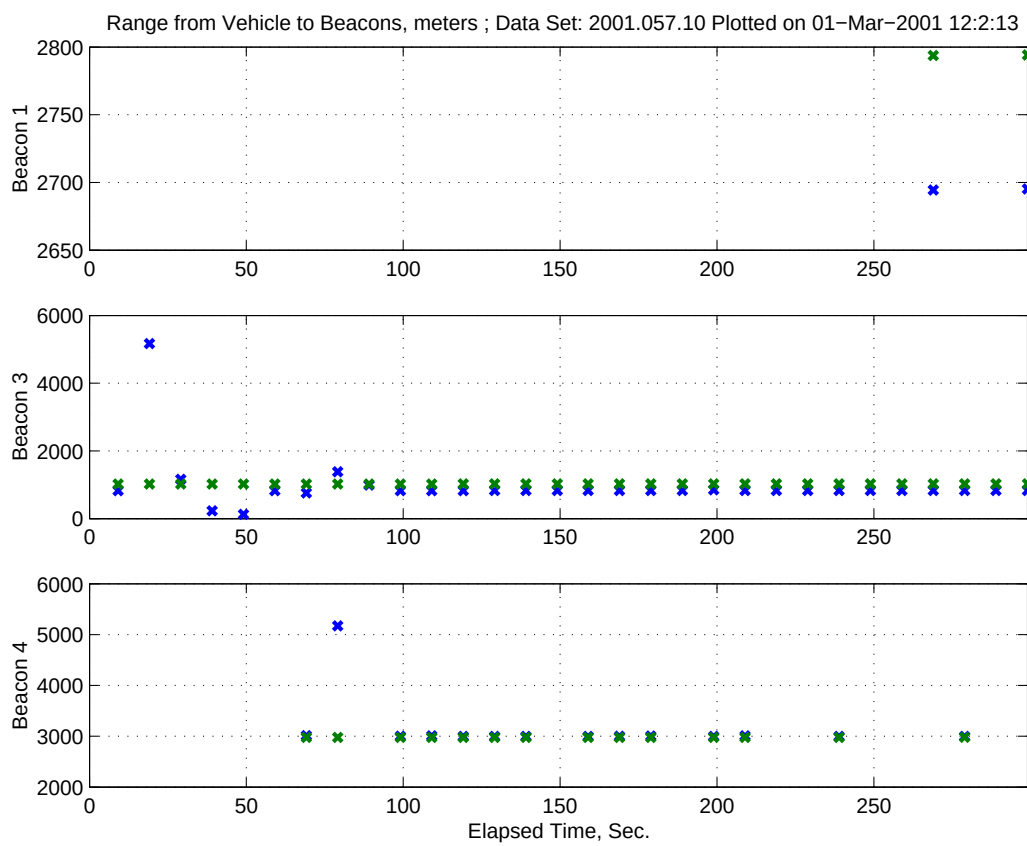


Figure 8: Measured and Computed Range to Beacons

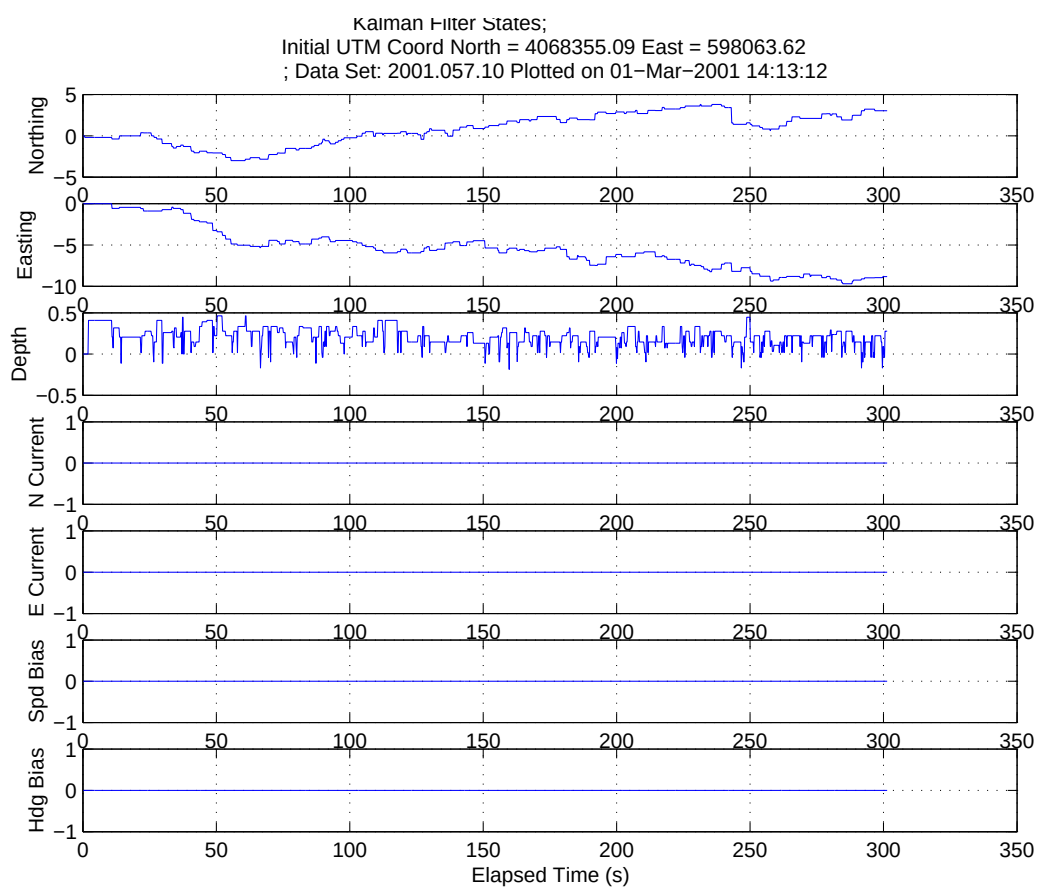


Figure 9: Kalman Filter States

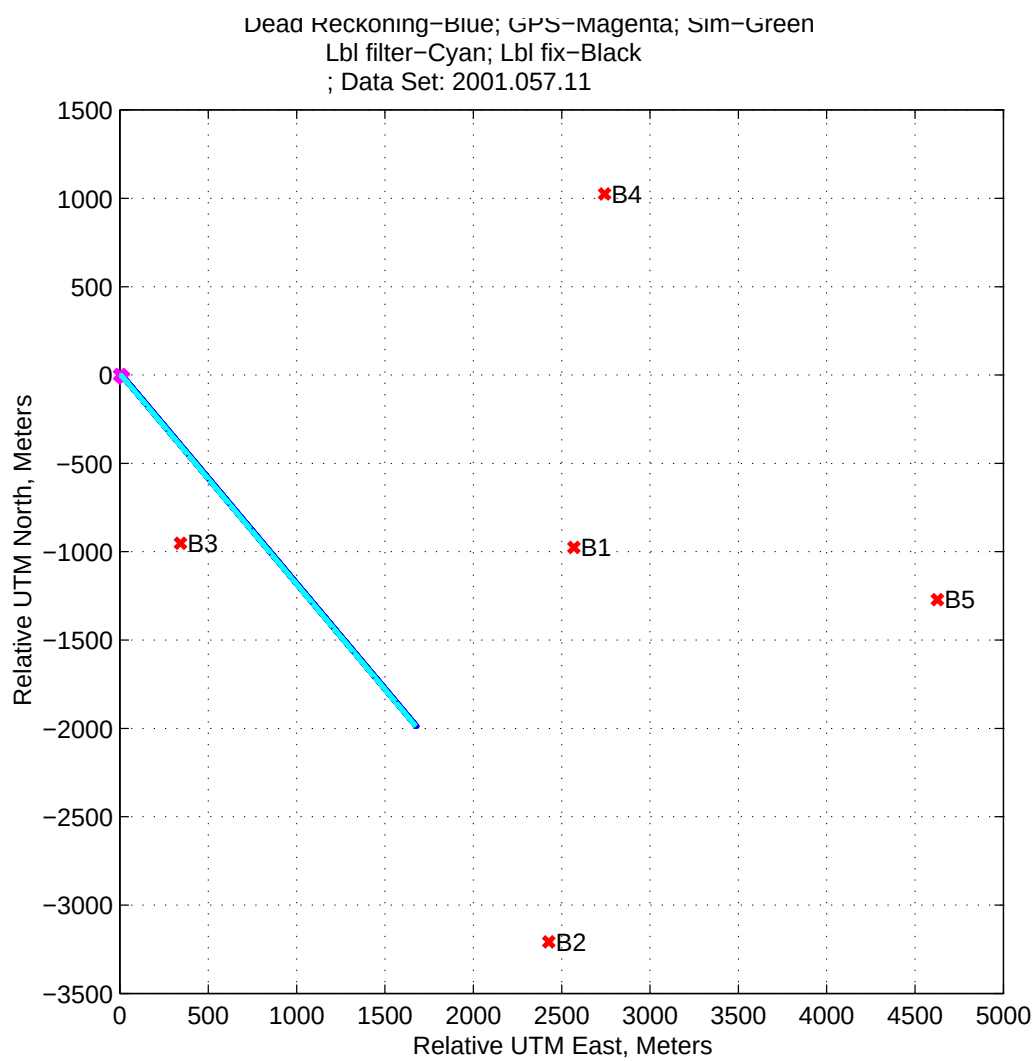


Figure 10: Dead Reckoned Vehicle Position

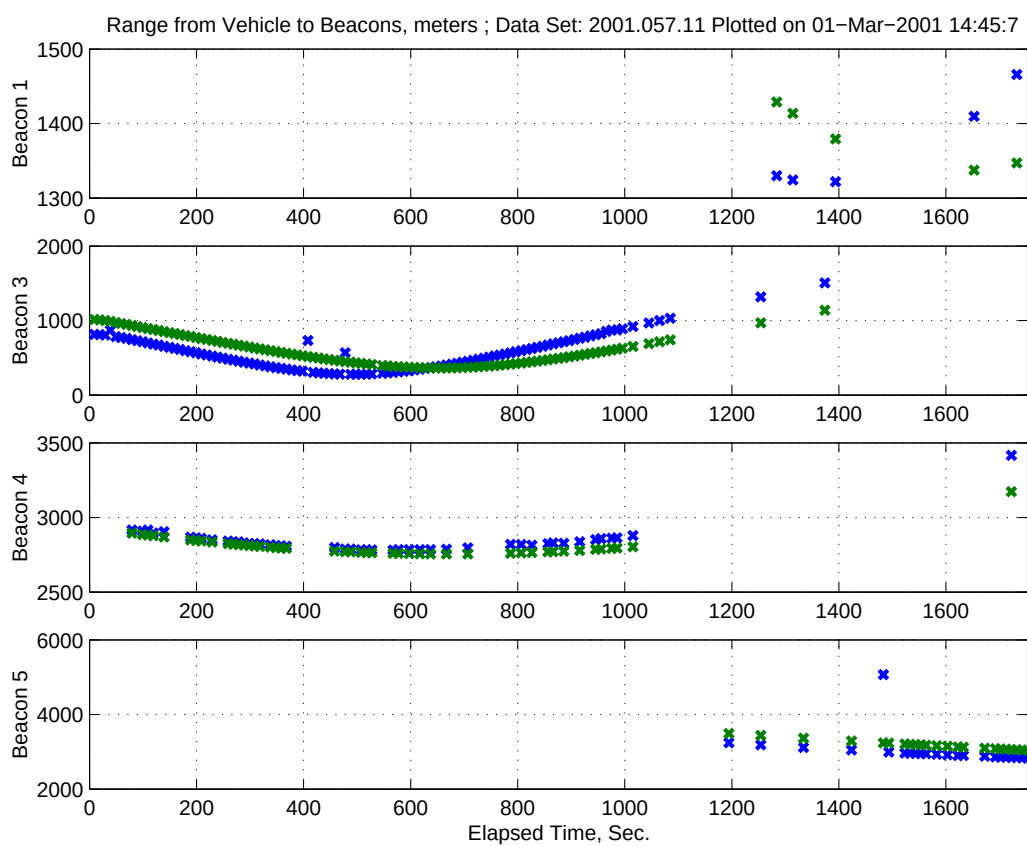


Figure 11: Measured and Computed Range to Beacons

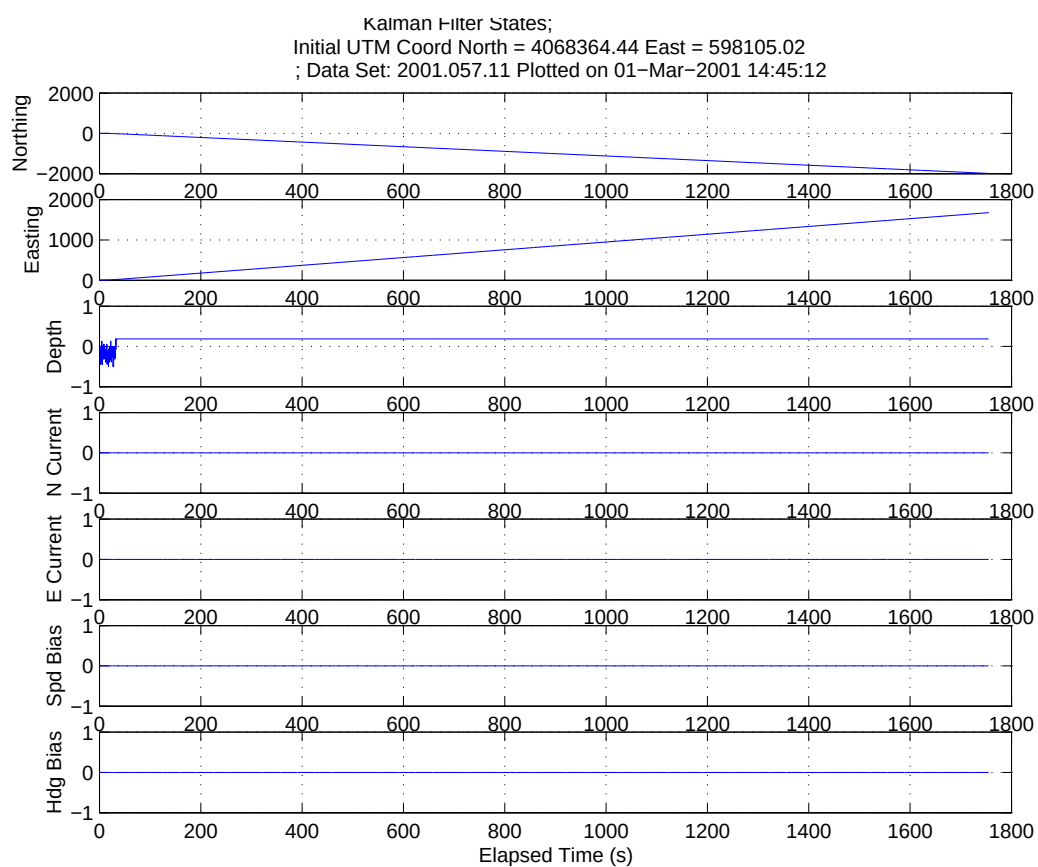


Figure 12: Kalman Filter States

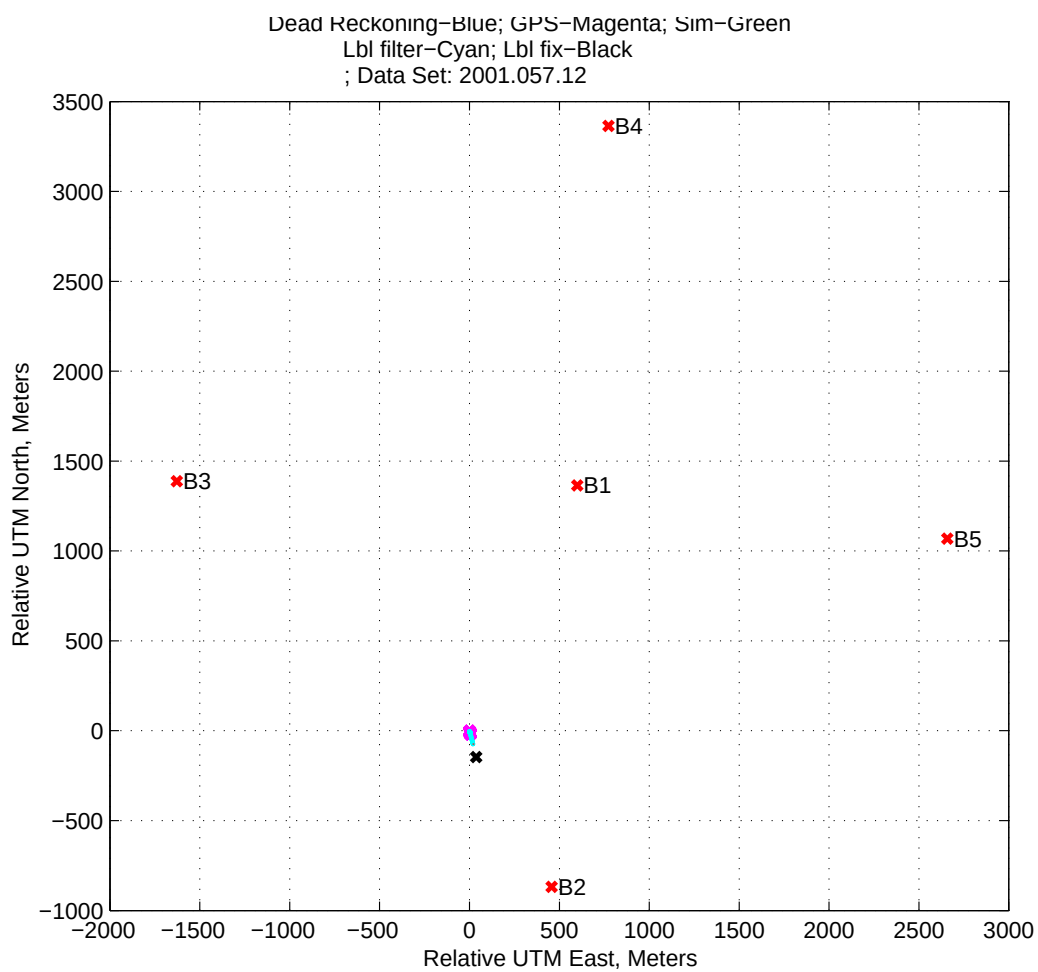


Figure 13: Dead Reckoned Vehicle Position

Initial UTM Coord North = 4066024.79 East = 600074.62
 Dead Reckoning-Blue; GPS-Magenta; Sim-Green Lbl filter-Cyan; Lbl fix-Black
 ; Data Set: 2001.057.12

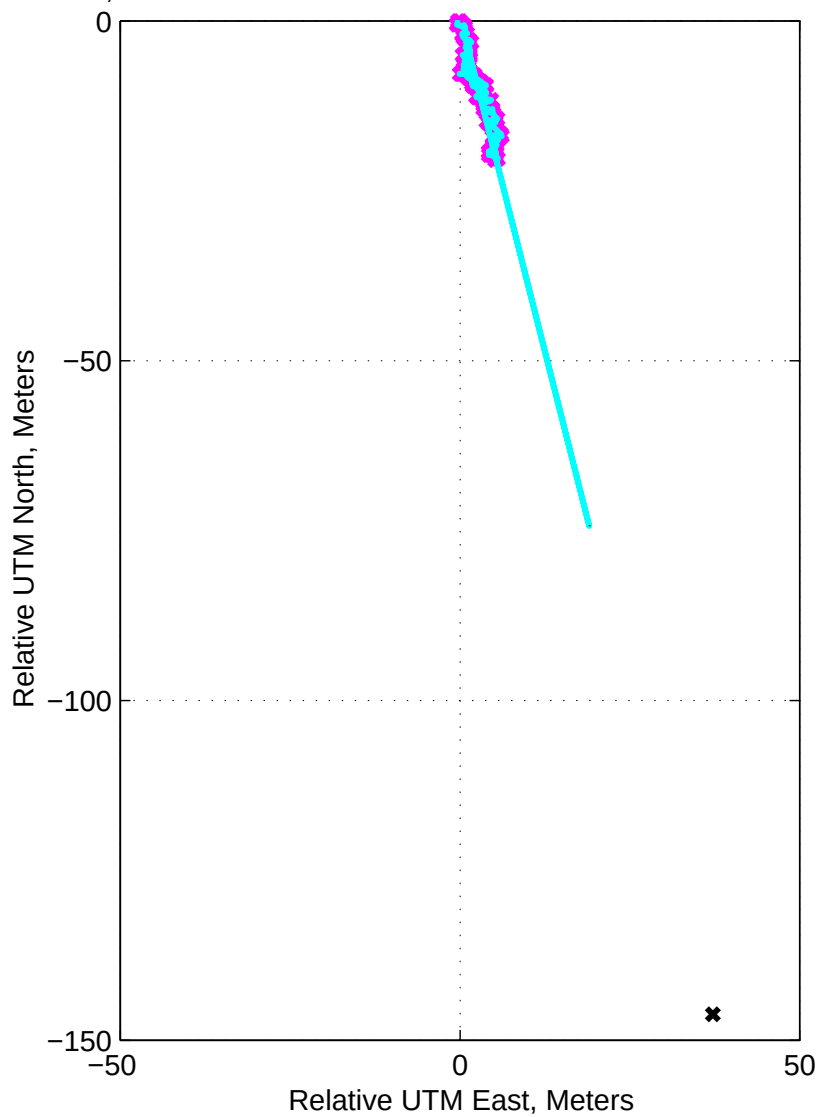


Figure 14: Dead Reckoned Vehicle Position

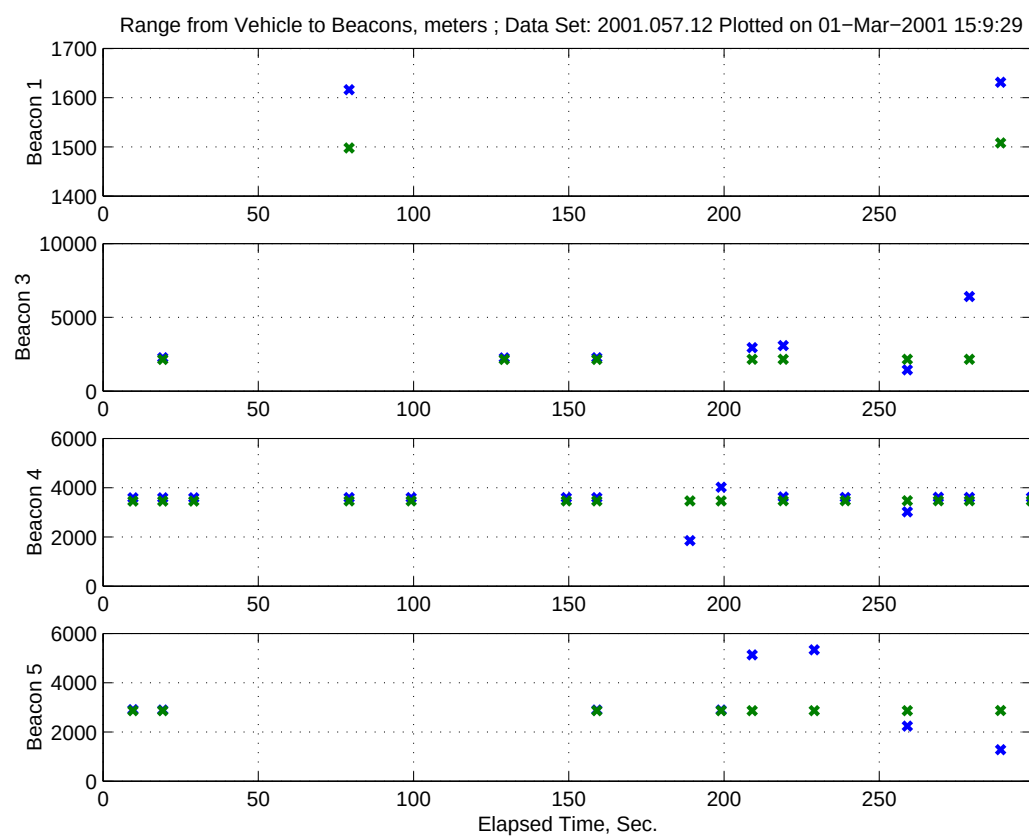


Figure 15: Measured and Computed Range to Beacons

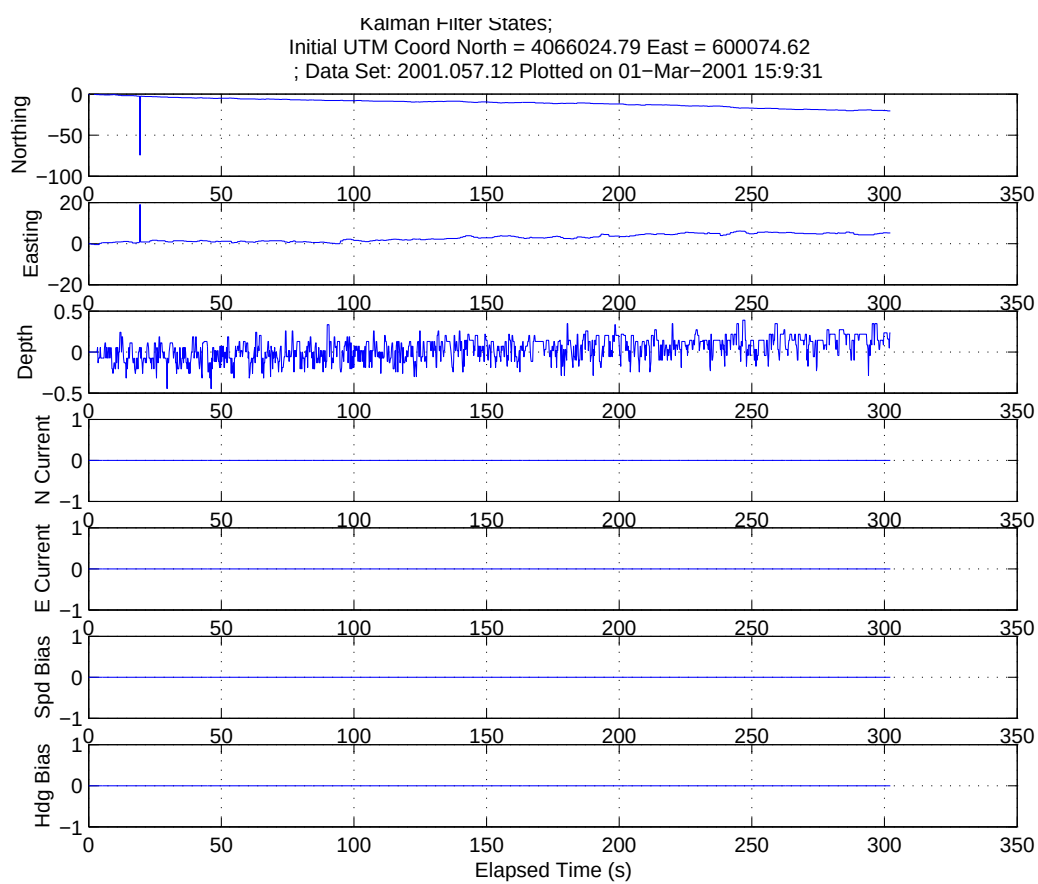


Figure 16: Kalman Filter States

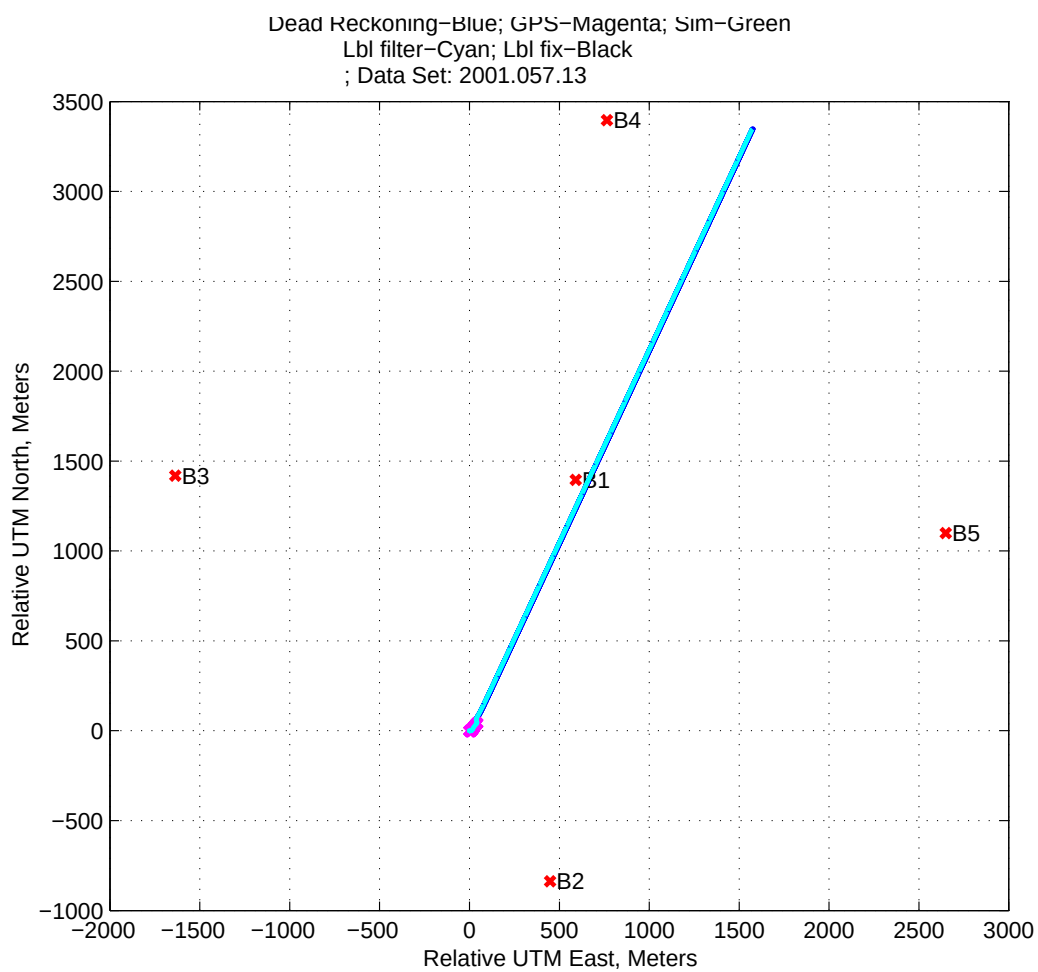


Figure 17: Dead Reckoned Vehicle Position

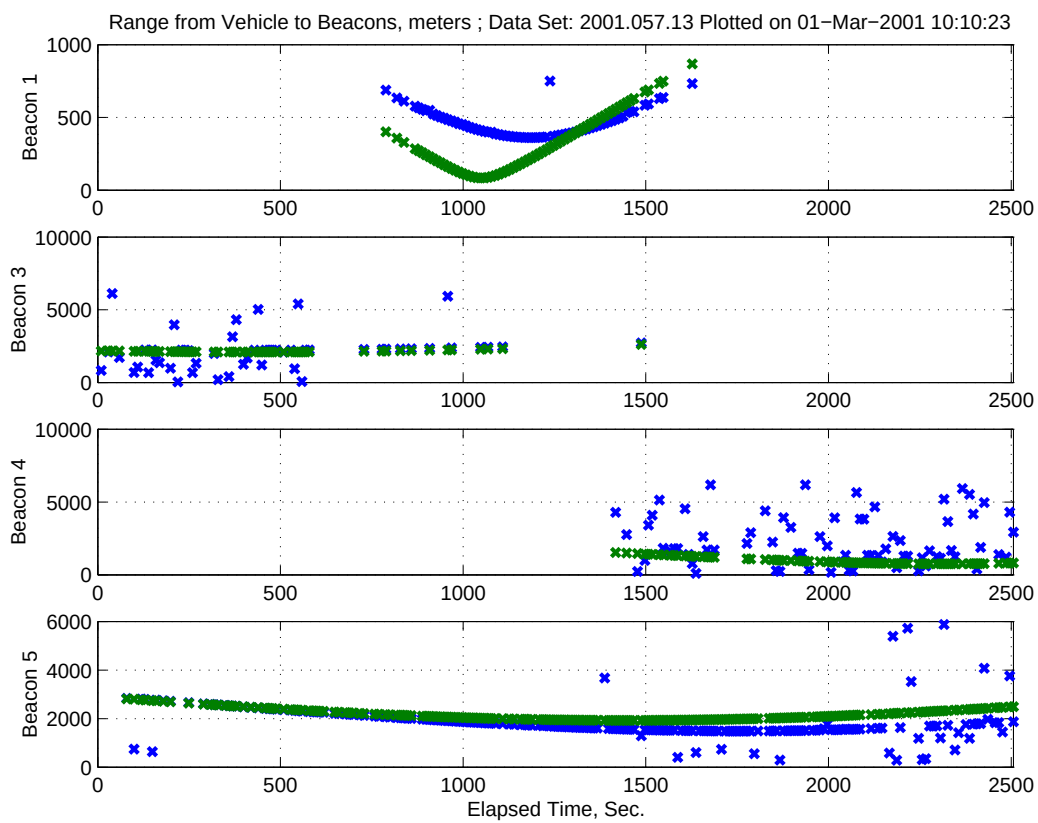


Figure 18: Measured and Computed Range to Beacons

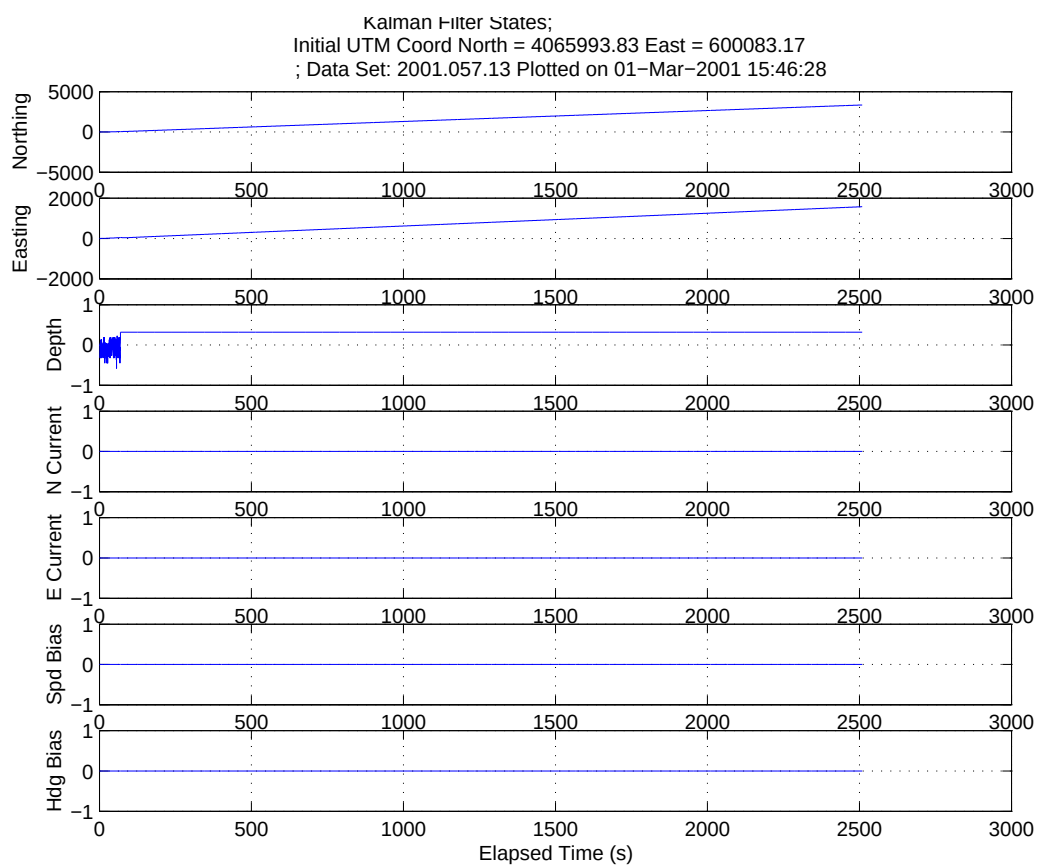


Figure 19: Kalman Filter States