For example, for a distance of 10 km between lines, a 100-m radial fix error causes an error of 1% in velocity calibration or 0.01 rad = 0.57° in heading calibration.

The calibration method is independent of the actual travel path between fixes because deterministic errors compensate when traveling in opposite directions. In this respect, closed-loop navigation never reflects deterministic error, and the error at loop closure results from accumulated random errors. Thus, separate measurement of deterministic velocity and heading errors derived from position fixes of known accuracy have been established. At each satellite fix GeoNav prints out the estimated fix accuracy, the distance between fixes, and the calibration factors, plus all other necessary position update information, therefore providing continuous performance evaluation.

This velocity/heading calibration principle has been exercised extensively: first, in testing doppler sonar and gyrocompass instrument errors in the Gulf of Mexico in March 1970 by sailing between oil rigs, where the accurately known positions were substituted for satellite fixes; second, in the same period with a simulated seismic survey performed against electronic positioning; and third, by continuous data collection from actual worldwide field operations. Table II shows that the calibration factors obtained from the test run between known, fixed positions agree with the instrument errors specified.