

Heading Accuracy

This note describes heading accuracy calculations for the Motorola GPS **ONCORE™** receiver. The equation for determining the variation from the readings of the GPS receive in conditions where the receiver is mounted on a moving vehicle is presented. In addition a sample graph showing the typical heading errors to be expected versus vehicle speed is provided.

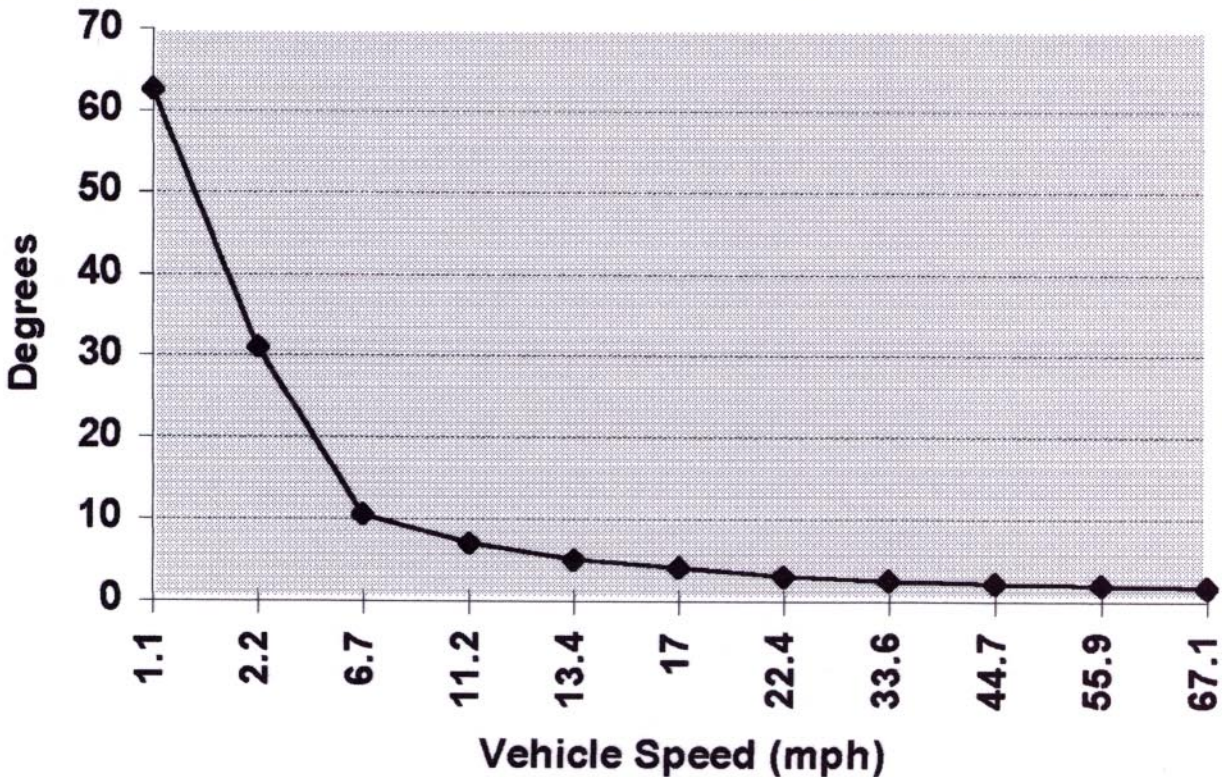
$$\sigma_{\delta H} \approx \frac{(HDOP)(\sigma_{\delta PRR})}{v} (R_to_D)$$

$\sigma_{\delta H}$ ≈ Heading variation in Degrees
 HDOP ≈ 1 to 2 (Horizontal Dilution of Precision)
 v ≈ vehicle speed in mph
 $\sigma_{\delta PRR}$ ≈ 1σ Doppler measurement error in mph
 R_to_D ≈ Radian to Degree conversion
 ≈ 57.3 deg/radian

$$\sigma_{\delta H} \approx \sqrt{(\sigma_{\delta PRRSA}^2 + \sigma_{\delta PRRN}^2 + \sigma_{\delta PRRRA}^2 + \sigma_{\delta PRRSV}^2)}$$

Converted by multiplying the result by (m/s_to_mph)

$\sigma_{\delta PRRSA}$ ≈ 0.25 m/sec Selective Availability
 $\sigma_{\delta PRRN}$ ≈ 0.02 m/sec Noise Composite - Function of SNR
 $\sigma_{\delta PRRRA}$ ≈ 0.01 m/sec Atmospheric Delays
 $\sigma_{\delta PRRSV}$ ≈ 0.10 m/sec Space vehicle velocity error
 m/s_to_mph ≈ 2.237 (Constant used to convert meters per second to miles per hour.)



Note: Material derived from Motorola Heading Accuracy Application Note © Motorola, Inc. 1995, 1996. All rights Reserved
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