



RTK “Gotchas”

By Judy Bragg

In case you’re unfamiliar with the term ‘Gotcha’, it’s a lax pronunciation of ‘got you’ and means (among other things) ‘an unexpected problem or drawback’. In this case, (and to borrow from Wikipedia) ‘an unexpected or unintuitive, but documented, behavior in a computer system (as opposed to a bug)’.

I understand that our Technical Support staff have fielded a few questions about configuring RTK (Real Time Kinematic) positioning systems that have brought a couple of ‘gotchas’ to light. This article is just to touch on those points; more complete explanations of RTK Tide Corrections can be found in the HYPACK® User Manual and Help files under Tide Corrections in the Utilities section, as well as in numerous *Sounding Better!* articles that you can most easily find through a simple Web search.

BASE STATION OUTPUT

The HYPACK® drivers that support RTK positioning include the GPS (GPS NMEA-0183), POS MV (Applanix POS M/V Network) and F180 (Coda Octopus F180) drivers. All of them expect to receive positioning data from the base station in WGS-84, *regardless of what your final project geodesy may be*. SURVEY converts the WGS-84 data to your project geodesy according to your geodesy settings (from the GEODETIC PARAMETERS module).

If your project references an ellipsoid other than WGS-84, and you set both your base station and your geodesy to that ellipsoid, SURVEY converts your data twice and your final position is incorrect.

GGA FORMAT

GGA data strings are the only NMEA string that report altitude. They can come in other, non-standard formats and not all of them conform to the NMEA standard that HYPACK® SURVEY expects. Some may not even include all of the information required to make an accurate RTK calculation.

Important: Accurate RTK tide calculations require latitude, longitude, ellipsoid height *and* undulation (geoid height above the WGS-84 ellipsoid) from the GGA string.

The standard NMEA format is as follows:

Sample String: \$GPGGA,123519,4807.038,N,01131.000,E,1,08,0.9,545.4,M,46.9,M,,*47

Where:

\$GPGGA	Tag for Global Positioning System Fix Data
123519	Fix taken at 12:35:19 UTC
4807.038, N	Latitude 48 deg 07.038' N
01131.000,E	Longitude 11 deg 31.000' E

1	Fix quality: 0 = invalid 1 = GPS fix (SPS) 2 = DGPS fix 3 = PPS fix 4 = Real Time Kinematic 5 = Float RTK 6= estimated (dead reckoning) (2.3 feature) 7= Manual input mode 8 = Simulation mode
08	Number of satellites being tracked
0.9	Horizontal dilution of position (HDOP)
545.4,M	Altitude, Meters, above mean sea level
46.9,M	Height of geoid (mean sea level) above WGS84
empty field	time in seconds since last DGPS update
empty field	DGPS station ID number
*47	Checksum. Always begins with *