

Comparing WAAS and Local DGPS Corrections

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Synopsis:

The MobileMapper CE Network Generation receiver makes it relatively simple to supply and use DGPS corrections. What accuracy improvement should one expect with the MobileMapper CE Network Generation receiver at a static location using DGPS when compared with WAAS?

Test Description:

Two MMCE devices were connected to external antennas on a 20 cm initialization bar. The antennas were placed on a stable platform and provided a relatively clear view of the sky.

The position of each antenna was computed using 1 hour static ProMark 3 receiver sessions, processed against the ZLC1 CORS receiver 12 km distant.

One receiver was configured to use WAAS corrections, while the other receiver used RTCM differential corrections from a ZMax receiver 10 meters distant.

At the beginning of the test a 'Cold Reset' was performed on both receivers. The receivers were allowed to initialize for 15 minutes, then the log function in the 'GPS Status' application was started.

The receivers were allowed to collect data for approximately 9 hours 45 minutes.

After the test was complete, the Ashtech Evaluate program was used to read the log files and compute results.

Test data is available at: http://magprogps.com/ms/mmce_dgps_waas_eval/mmce_compare_raw.zip

Results:

The full results from Evaluate are shown as screen shots on subsequent pages.

Quick results:

				rms of X,Y error	
	CEP	Horz	95%	Herr	Verr
WAAS	1.14 m	1.29 m	2.07	0.71	-2.46
DGPS	0.55 m	0.61 m	0.97	0.04	-0.13

The DGPS corrected receiver enjoyed twice the position repeatability of WAAS.

The DGPS corrected receiver's computed horizontal position error was 17 times better than WAAS.

The DGPS corrected receiver's computed vertical position error was 19 times better than WAAS.

My conclusion is DGPS from a nearby correction source is substantially better than WAAS corrections. The extra accuracy, coupled with the ease of transport via a GSM cell phone data connection is worth the trouble of setting up a local DGPS correction source.

The DGPS real-time corrections are not a substitute for centimeter measurements.

Caveats:

The baseline from the tested receivers to correction was purposely very short. The intention was to test the 'best case' performance of DGPS. The test was performed 12.2 km from ZLC1, Salt Lake City WAAS correction source. No comparison to Coast Guard beacon corrections was performed.

WAAS

Coordinates of WAAS Antenna

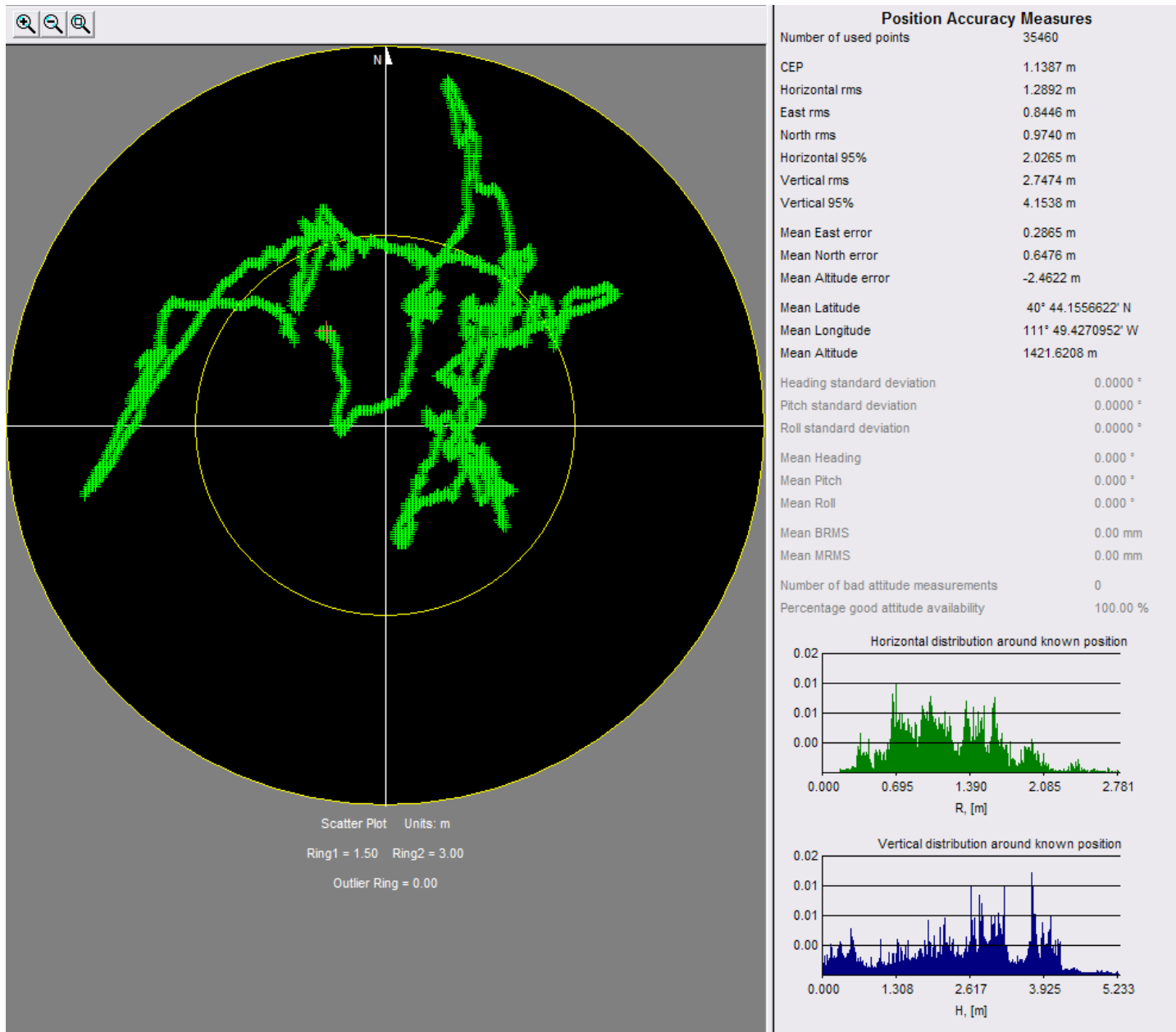
111° 49' 25.58909"W 40° 44' 09.30049"N 1424.083 m NAD83

Since WAAS corrections are ITRF00 reference frame, we need to transform the NAD83 location to ITRF 2000:

111 49 25.63796 W 40 44 9.31876 N 1423.366 m ITRF00

Evaluate needs D M.m formatted position:

111 49.4272993 W 40 44.155312666 N 1423.366 m ITRF00



DGPS

Coordinates of DGPS Antenna

111° 49' 25.58380"W 40° 44' 09.29534"N 1424.075 m NAD83

Evaluate needs D M.m formatted position:

111 49.42639666 W 40 44.154922333 N 1424.075 m NAD83

