

SUBJECT: Youngstown, NY NDGPS Site Operational Assessment

DATE: 03-07 October 2011

INSPECTOR: CWO Greg Sandness

PURPOSE: Validate advertised NDGPS coverage of the Youngstown NDGPS site. Validate required RTCM message delivery. Test differential correction accuracy versus a predetermined survey monument.

EQUIPMENT: DNAV 212 INVICTA Receiver
Invicta GPS Receiver
MBA-2 Receive Antenna

PARAMETERS:

Frequency	322 KHz
Forward Output Power	900W
Transmission Rate	100 baud
Field Strength/Range	75 μ V/m (37.5dB μ V/m) at 241 km

SITE PHOTO:



RESULTS

Signal Strength:

DNAV readings were taken at 241 km east and west from the Youngstown NDGPS site. At both points, the signal strength and signal-to-noise ratio (SNR) were satisfactory in meeting the advertised coverage. Additionally, the measured coverage closely matches the predicted coverage plot of Youngstown. In figure 1 below, the range ring is set to the 241 km advertised range. Green points represent areas of satisfactory signal strength and SNR, while red points represent areas of unsatisfactory signal strength or SNR.

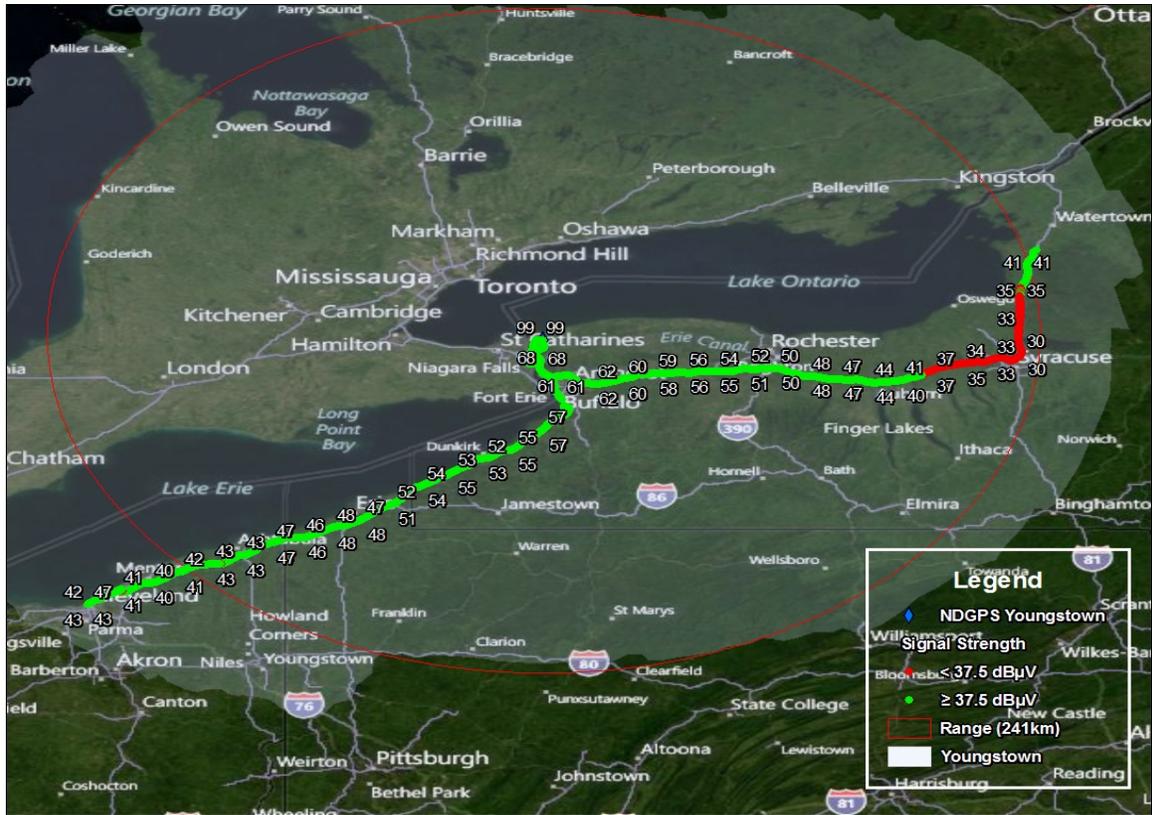


Figure 1.

Far-Field Signal Strength Reading 1:

Receiver:	DNAV 212
Antenna:	MBA-2
Position	43° 13.868554'N 079° 00.60655'W
Signal Strength	85dB μ V/m
SNR	22dB

Far-Field Signal Strength Reading 2:

Receiver:	DNAV 212
Antenna:	MBA-2
Position	43° 13.57049'N 078° 52.23102'W
Signal Strength	77dB μ V/m
SNR	22dB

RTCM Message Verification:

RTCM message were collected from both sides of the NDGPS site utilizing an Invicta GPS Receiver. Not all required message traffic was confirmed and was noted to be reviewed with the NAVCEN Watchstander.

Side A

Type 3	X
Type 7	None
Type 9	X
Type 16	X
Misc	N/A

Side B

Type 3	X
Type 7	None
Type 9	X
Type 16	X
Misc	N/A

Accuracy Validation:

Data was collected for 15 minutes on each side. Positional data was then averaged and compared to the actual monument position to check the horizontal accuracy of the correction.

NGS Monument ID:	US DOI mark along Erie Canal
Monument LAT:	43° 05.156'' N
Monument LON:	078° 44.043'' W

Side A

Averaged LAT:	43° 05.155597'' N
Averaged LON:	78° 44.04345'' N
Distance from DGPS Site:	25.09 km
Distance from Monument:	.96 m (3.16 feet)
Bearing from Monument:	219.20°

Side B

Averaged LAT:	43° 05.155412'' N
Averaged LON:	78° 44.043816'' N
Distance from DGPS Site:	25.03 km
Distance from Monument:	1.55 m (5.09 feet)
Bearing from Monument:	225.38°

OPERATIONAL RECOMMENDATION: Analysis of coverage is consistent with current OPORDER and predicted coverage plot. The red area around the Syracuse, NY area was confirmed not to be an issue to safety of life via the OIC of ANT Buffalo, as he verified operational beacon reception on the waterway side of the signal. The lack of RTCM message 7 needs to be addressed with C3CEN, the message was confirmed to be scheduled by both the NAVCEN Watchstander and the onsite computer. Multiple equipment resets and side switches did not correct issue.