DIFFERENTIAL GPS (DGPS) SITE OPERATIONAL ASSESSMENT

NDGPS Site: Myton DGPS Site (873)
Inspector(s): CWO3 Louie Baytan, LT Michael Brashier
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REFERENCES:

(1) DGPS Concept of Operations, COMDTINST 16577.2 (AUG 1995)
(2) 2010 Federal Radio Navigation Plan
(3) Broadcast Standard for the USCG DGPS Navigation Service, CIM 16577.1 (APR 1993).
(4) RTCM Recommend Standards for Differential GNSS Service, Version 2.3.

PURPOSE:

- Validate advertised DGPS coverage of the Myton DGPS site.
- Validate required RTCM message scheduling and delivery.
- Test differential correction accuracy versus a predetermined survey monument.

EQUIPMENT:

Raven INVICTA Receiver
MBA-2 Receive Antenna
Trimble SPS461 Receiver
Trimble GA 530 Antenna
Potomac Instruments 4100 FIM meter

MYTON DGPS SITE PARAMETERS:

Frequency	303 KHz
Forward Output Power	1000 W
Transmission Rate	100 baud
Field Strength/Range	75µV/m at 275 km

RESULTS:

Signal Strength:

A verification of the Myton DGPS coverage area was conducted through very mountainous terrain from Gunnison, CO along Hwy 50 then north to Vernal, UT and south to Cortez, CO. The advertised signal strength range is 275 km. Figure 1 below displays inadequate signal strength through much of the advertized range and throughout the predicted coverage area. Green points represent areas of satisfactory signal strength. Areas of unsatisfactory signal strength are represented with red points. Far-field (FF) signal strength readings were taken

southern point of the advertised range, 260 km away, from both sides of the site (Table 1). The FF readings were well above the required 37.5 dBµV/m signal strength on both sides.

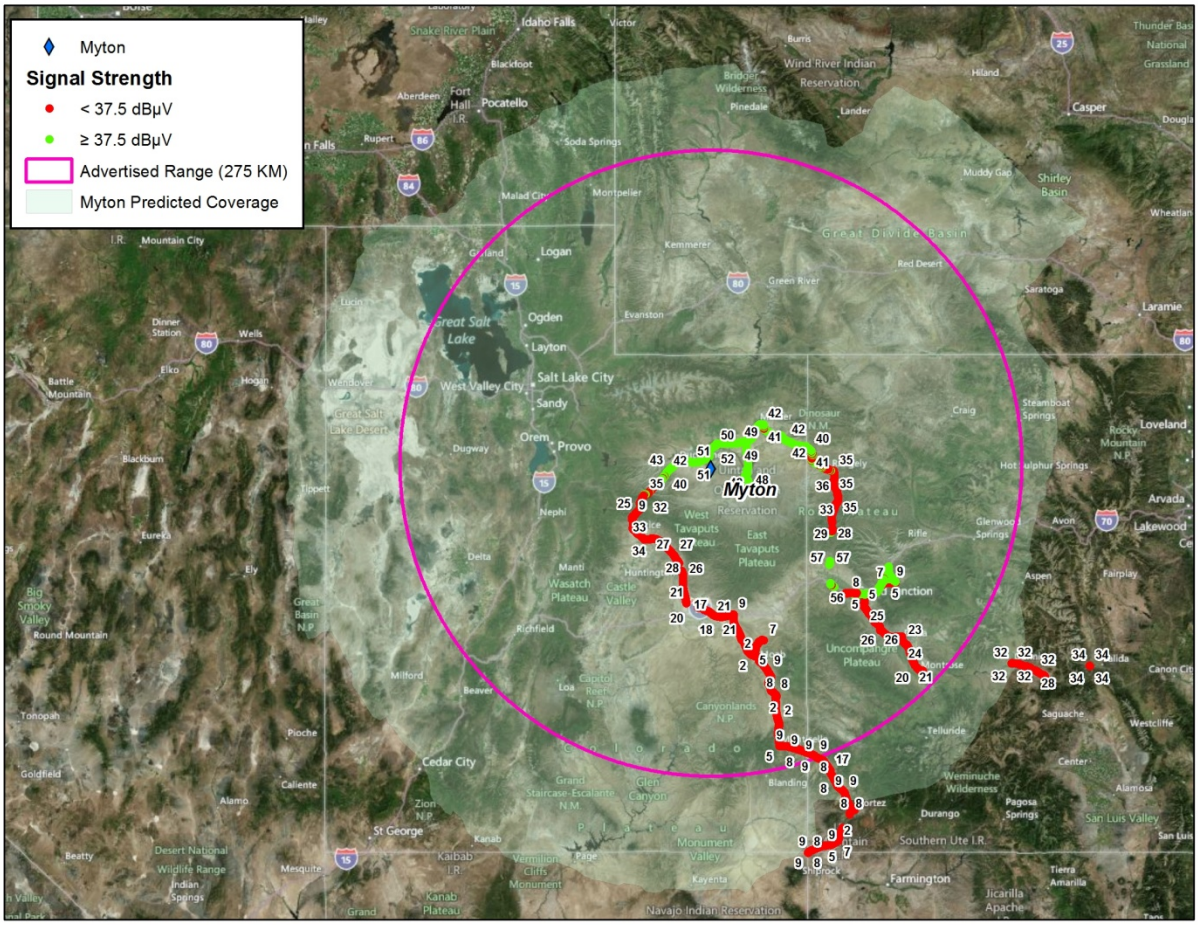

Figure 1: DNAV Signal Strength Results

	POSITION	Trimble SPS461	4100 FIM Meter
Side A SS	38° 39’ 19.9’N 107° 51’ 11.2”W	49.2 dBµV/m, 22 SNR	49.6 dBµV/m
Side B SS	38° 39’ 19.9’N 107° 51’ 11.2”W	39 dBµV/m, 12 SNR	49.2 dBµV/m

Table 1: Far-Field Signal Strength Reading

RTCM Message Verification:

RTCM message scheduling, receipt, and content were checked during the assessment (Table 3 and 4). RTCM message scheduling on both Side A and Side B was validated with the DGPS watch and is in accordance with the Reference (3). Receipt of all RTCM messages was validated utilizing a Raven Invicta Receiver whereby the assessment team witnessed the on-time receipt of all but Type 16 messages on the active and standby Integrity Monitor computers. All message content was verified and is in accordance with Reference (4).

Message Type	Received	Scheduled	Content Verified/Accurate
Type 3	Y	Y	Y
Type 5 (ensure message is not being transmitted)	N	N	N/A
Type 7	Y	Y	Y
Type 9	Y	Y	Y
Type 16	N	Y	N

Table 3: Side A RTCM Message Validation

Message Type	Received	Scheduled	Content Verified/Accurate
Type 3	Y	Y	Y
Type 5 (ensure message is not being transmitted)	N	N	N/A
Type 7	Y	Y	Y
Type 9	Y	Y	Y
Type 16	N	Y	N

Table 4: Side B RTCM Message Validation

Accuracy Validation:

No positional data was collected due to unavailability of survey monuments in the area. The OA team was unable to locate CORS survey monument KM0446.

SUMMARY:

The Operational Assessment of the Myton DGPS site revealed that the site provided inadequate coverage throughout a majority of the sampled area within the advertised range. The far-field signal strength readings were well above the required levels. Additionally, a review of the output/reflected power and near-field signal strength levels was conducted and found to be satisfactory. All but the Type 16 RTCM messages were verified and evaluated and are consistent with the requirements set forth by reference (3) and (4). Finally, accuracy measurements and analysis were not completed due to lack of accessible surveyed monuments.