



## DGPS SITE OPERATIONAL ASSESSMENT

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**NDGPS Site:** *Cape Mendocino DGPS Site*

**Inspector(s):** LT Michael Brashier

**Date:** 30NOV11

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**PURPOSE:**

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

**EQUIPMENT:** STARLINK DNAV-212 DGPS Receiver  
Raven INVICTA RPR 210 DGPS Receiver  
Hemisphere R110 USB DGPS Receiver  
Trimble MBA-2 Receive Antenna

**PARAMETERS:**

Frequency	292 KHz
Forward Output Power	900W
Transmission Rate	100 baud
Field Strength/Range	75 $\mu$ V/m (40 dB $\mu$ V/m) at 333 km

**SITE PHOTO:** (29NOV2011)



## RESULTS

### Signal Strength:

A verification of the Cape Mendocino Differential GPS (DGPS) coverage area was conducted from the western most point through the city of Cape Mendocino to the eastern most point of the coverage area. Far-field signal strength readings taken from the western region exceeded system specifications while the eastern regions results were unsatisfactory by approximately 40km. Figure 1, below is a pictorial representation of the readings taken during daylight hours. The outer purple ring represents the published coverage area of the Cape Mendocino site, 75uV/m (37.5dBuV/m) at 333 km. The Green points indicate satisfactory signal strength and the red points are unsatisfactory.

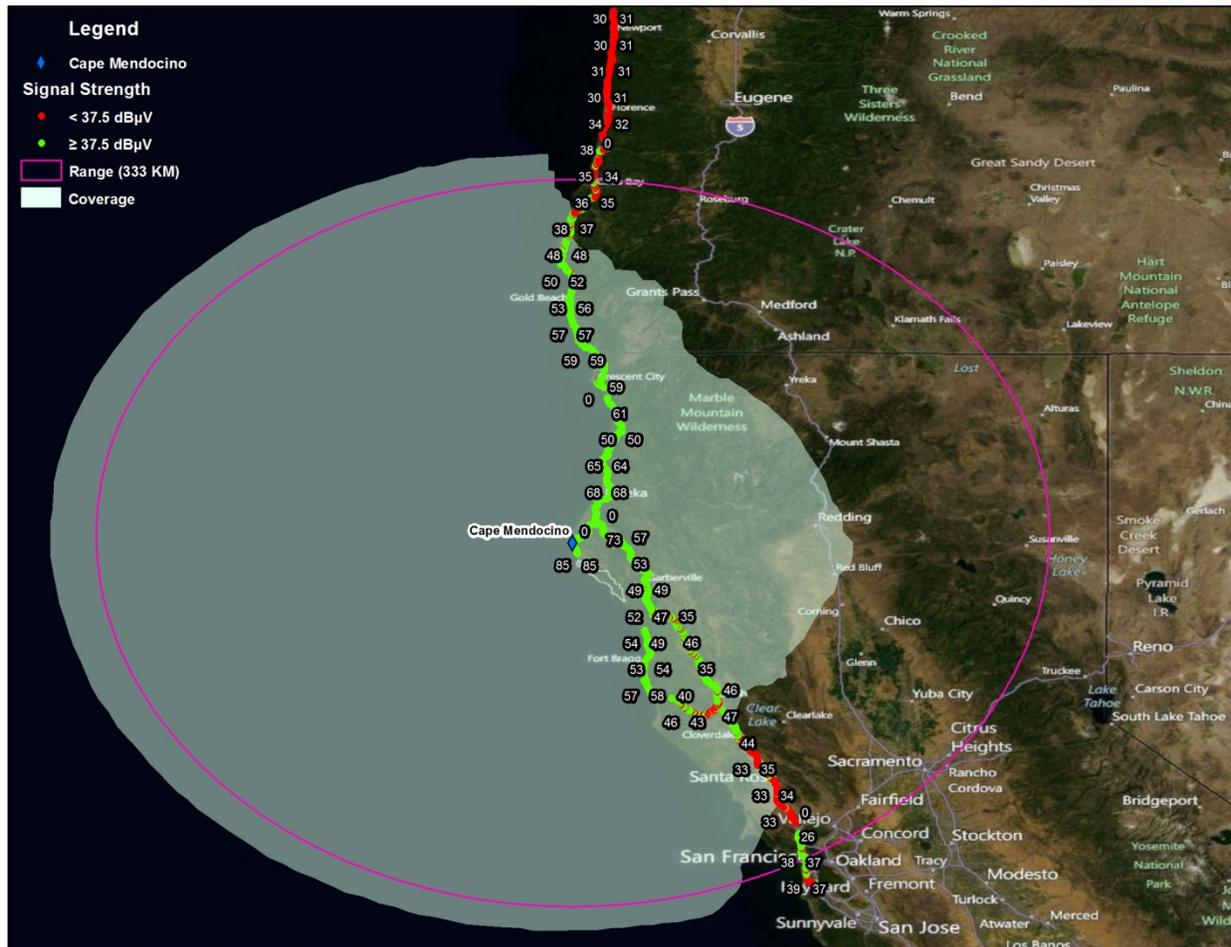


Figure 1.

Far-Field Signal Strength Reading 1:

Receiver:	STARLINK DNAV-212
Antenna:	Trimble MBA-2
Position	38° 14.32310N, 088° 00.10170W
Side A Signal Strength	43 dB $\mu$ V/m

Far-Field Signal Strength Reading 2:

Receiver:	STARLINK DNAV-212
Antenna:	Trimble MBA-2
Position	38° 28.865955"N 082° 38.260246"W
Side A Signal Strength	33 dB $\mu$ V/m

**RTCM Message Verification:**

RTCM messages were collected for sixty minutes from each side of the DGPS site utilizing a RAVEN INVICTA DGPS Receiver. All messages were received in accordance with the Commandant Instruction Manual 16577.1 DGPS Broadcast Standard schedule for RTCM messages. Type 5 messages were received from Side A but discontinued by the DGPS watch stander upon request. Chart 1 below displays the message verification results:

Side A

Message Type	Received
Type 3	Y
Type 5 (ensure message is not being transmitted)	Y
Type 7	Y
Type 9	Y
Type 16	Y

Side B

Message Type	Received
Type 3	Y
Type 5 (ensure message is not being transmitted)	Y
Type 7	Y
Type 9	Y
Type 16	Y

Chart 1

**Accuracy Validation:**

Positional data was collected for 10 minutes per side using a Hemisphere RPR 210 DGPS receiver with a Trimble MBA-2 DGPS Receive antenna. The data was then post processed and compared to a National Geodetic Survey (NGS) marker to verify the horizontal accuracy of the broadcast correction. *Side A and Side B accuracy check data is unreliable due to a discrepancy with the position of the NGS monument.*

<b>NGS Monument ID:</b>	OA0790
<b>Monument LAT:</b>	42° 44' 20.21110"N
<b>Monument LON:</b>	-124° 29' 57.25626"W

Side A

<b>Averaged LAT:</b>	42° 44.35966314' N
<b>Averaged LON:</b>	124° 29.98637' W
<b>Distance from DGPS Site:</b>	
<b>Distance from Monument:</b>	N/A NOAA documented monument position is inaccurate by up to 200ft.
<b>Bearing from Monument:</b>	

Side B

<b>Averaged LAT:</b>	42 44.336851667N
<b>Averaged LON:</b>	124 29' 57.954271"W
<b>Distance from DGPS Site:</b>	
<b>Distance from Monument:</b>	N/A NOAA documented monument position is inaccurate by up to 52ft.
<b>Bearing from Monument:</b>	

**OPERATIONAL FINDINGS:** Analysis of the Cape Mendocino coverage area reveals that the actual coverage is consistent with the predicted coverage plot but does not meet the required specifications of the current OP ORDER on the eastern side of the specified coverage area.