

## Case Study: V-Nav Acceptance Trials

October 2014

### APPLICATION:

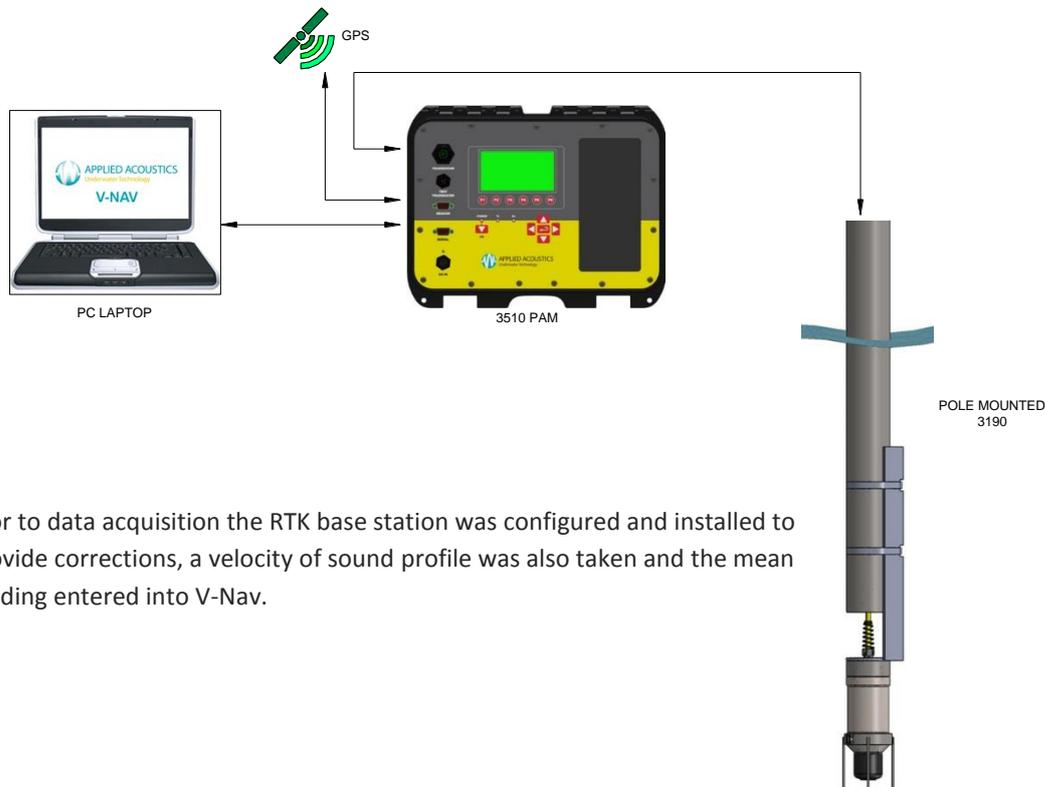
The V-Nav system was selected by our client to accurately position markers on a pipeline to cross reference and provide corrections for the pipeline inspection pig's inertial navigation system. V-Nav was selected primarily due to <0.5m accuracy requirement coupled with the ease of installation and use as field operations are in remote locations on vessels of opportunity without hydrographic surveyors.

To achieve specification the V-Nav system was supplied with a Hemisphere RTK GPS and an AML Sound Velocity Probe.

The Houston based client of our agent Subsea Technologies selected Lake Conroe, TX, USA for the trial location, using Subsea Technologies trials vessel.

### TRIAL CONFIGURATION:

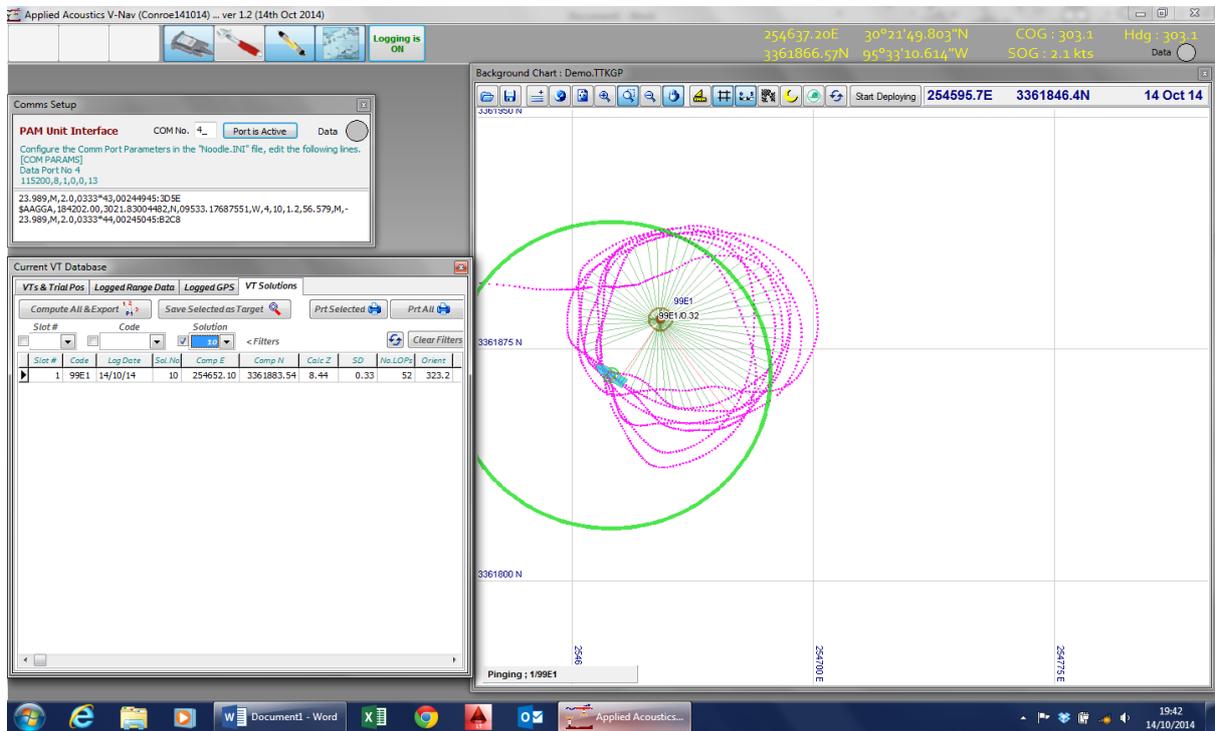
The Model 3190 Dunking Transducer was mounted on the 2.5m over the side pole and interfaced to the Model 3510 PAM deck unit together with the GGA NMEA telegram from the GPS receiver. The GPS antenna was mounted above the 3190 with a small x offset. The V-Nav system was connected to the 3510 and the local projection configured together with the installation offsets (x, y and z (depth)).



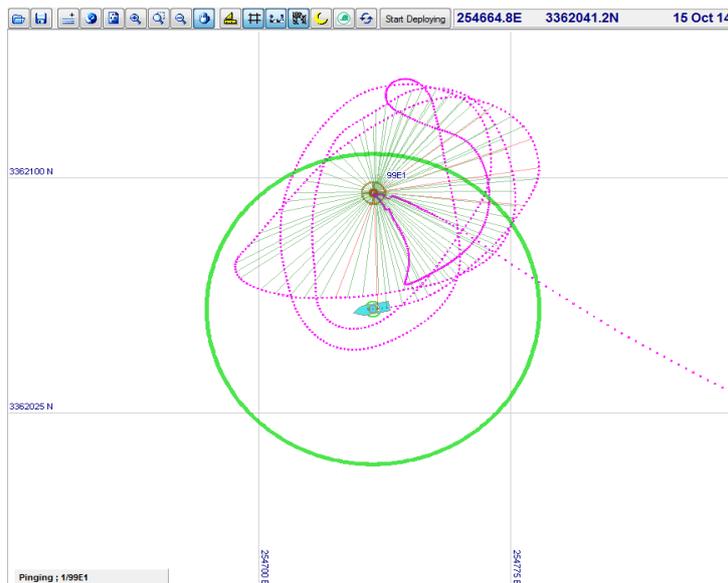
Prior to data acquisition the RTK base station was configured and installed to provide corrections, a velocity of sound profile was also taken and the mean reading entered into V-Nav.

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A model 1019 mini beacon was deployed and the trial position recorded using V-Nav, due to the shallow water (~10m) an active range ring of 50m was set. The 3190 was deployed to a depth of 2.25m and acoustic ranging tested before commencing a solution.



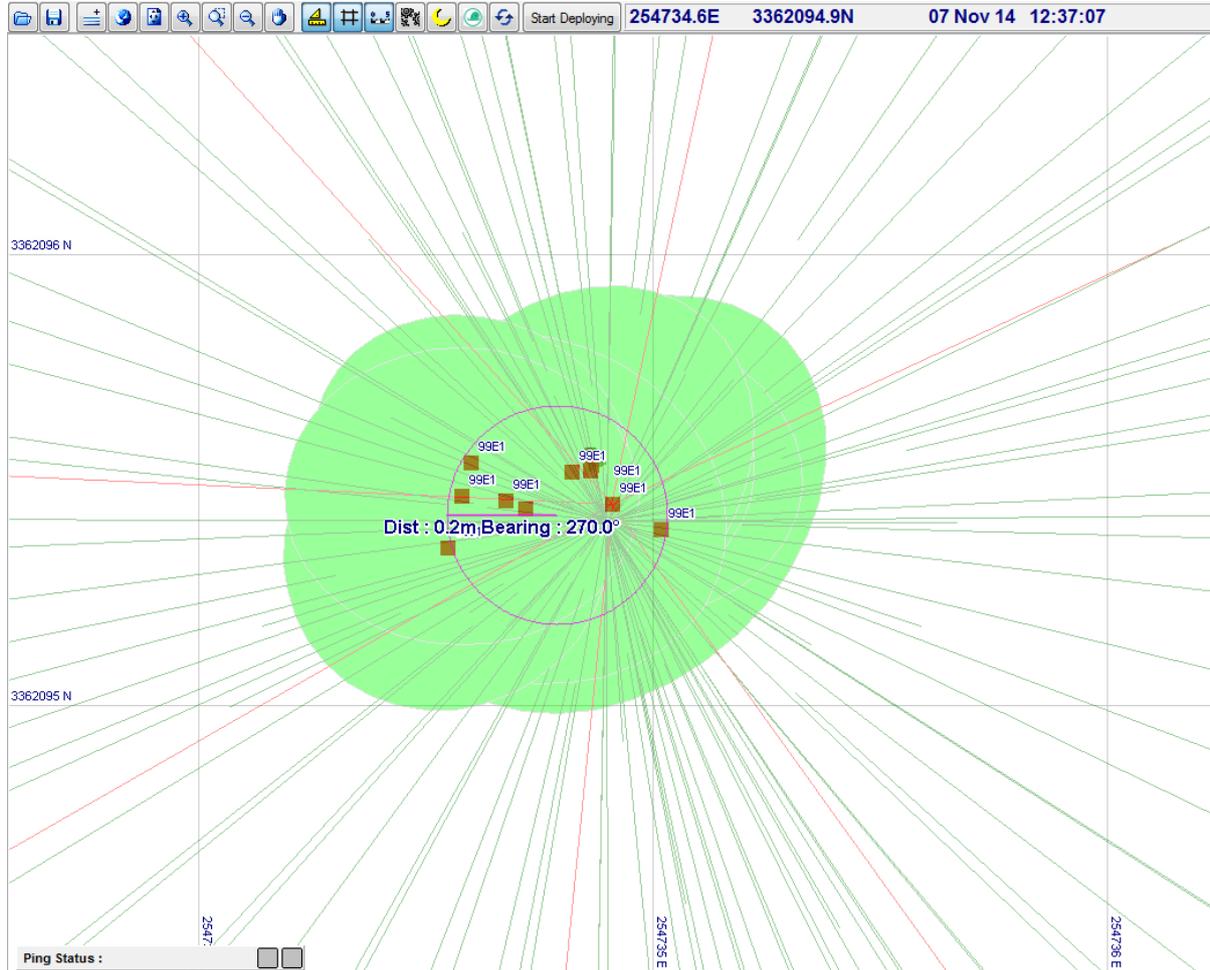
The solution parameters were set to obtain a minimum of 100 LOPs (Lines Of Position (range observations)) with a balanced solution with minimum ratio of 1:0.75 error ellipse, these were set to achieve an accurate solution. The vessel then navigated a circular course using the chart plotter of V-Nav around the stationary beacon, at varying speeds and a total of 10 solutions were recorded for comparison.



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## RESULTS

The below plot shows the centre points of the 10 computed positions from the individual solutions, the individual accuracy from the online solution for each was 0.3m to 0.4m SD (Standard Deviation). By plotting the central point the repeatability of the system can be measured at +/-10cm.



Vector Nav 1.2 (14th Oct 2014)

Computed Solutions for Project : Test Project

Client : Applied Acoustics Job No : 12345

Velocity of 1496.46

X Offset -0.03

Y Offset 0

Slot	Code	Solution N	Logged Date	Comp Lat	Comp Lon	Comp E	Comp N	Comp Dept SD	Num LOPs	Orientation	Semi-Maj	Semi-Min	
1	9.90E+02	10	15/10/2014	30°21.95700'N	95°33.12180'W	254734.6	3362095	11.792	0.339	101	316.3	0.37	0.32
1	9.90E+02	9	15/10/2014	29°51.40140'N	95°44.33700'W	254734.6	3362096	11.652	0.335	101	320.8	0.36	0.32
1	9.90E+02	8	15/10/2014	30°21.94260'N	95°33.11220'W	254734.5	3362095	11.573	0.351	101	313.8	0.37	0.36
1	9.90E+02	7	15/10/2014	30°21.95460'N	95°33.11940'W	254734.7	3362095	11.672	0.397	101	314.5	0.45	0.37
1	9.90E+02	6	15/10/2014	30°41.31600'N	95°33.55440'W	254734.8	3362096	11.604	0.342	110	319.1	0.38	0.32
1	9.90E+02	5	15/10/2014	30°21.95520'N	95°33.12300'W	254734.7	3362095	11.802	0.306	101	320.8	0.34	0.29
1	9.90E+02	4	15/10/2014	30°21.96900'N	95°33.11880'W	254734.9	3362096	11.062	0.333	101	308.9	0.36	0.32
1	9.90E+02	3	15/10/2014	30°21.95520'N	95°33.12120'W	254734.9	3362095	11.147	0.453	101	326.4	0.53	0.4
1	9.90E+02	2	15/10/2014	30°51.14460'N	95°19.85100'W	254734.8	3362096	11.264	0.393	101	326.4	0.45	0.35
1	9.90E+02	1	15/10/2014	30°21.97020'N	95°33.11820'W	254735	3362095	11.289	0.37	101	325.8	0.42	0.33

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### SUMMARY:

The results from a challenging shallow water test provided the client with confidence in the system to provide a repeatable and accurate position system for their application.

The results published are from the online data acquisition system with no post processing applied to the solution.

VNAV is a positioning system for statically deployed AAE Beacons. The system provides a navigation screen for deployment, acquisition and processing of range data to obtain seabed positions for the deployed units. Once processed, exports are provided to feed into seismic processing packages or CAD plotting.

The system can be used to accurately position OBC seismic arrays or multiple seabed objects, quickly and reliably.

### SYSTEM COMPONENTS:

- VNAV Option Enabled PAM 3510.
- VNav Software Dongle C/W Software.
- Model 3190 MF Dunker C/W Deployment bracket.
- GPS receiver. \*
- PC c/w serial port. \*
- Pole mount for 3190 Dunker. \*

\* Client supplied.



Due to continual product improvement, specification information may be subject to change without notice.  
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