Lau Basin Hydrophone Deployment Narrative cruise report

R/V Marcus Langseth

1/13/09-1/21/09

PI: DelWayne Bohenenstiehl (NCSU)
CoPI: Haru Matsumoto (OSU, CIMRS)
Mooring Tech: John Shanley (PMEL, NOAA)
Graduate students:
Patrick Monigle (NCSU)
Jeff Bowman (NCSU)

Rev. 1/20/2009 4:20PM

1/08/09	11AM Departed NP 2PM arrived Eugene airport Flight delayed. Plane left Eugene 5:10PM 6:20PM Arrived SF 7:00PM Departed SF for NZ
1/10/09	5:00AM arrived Auckland NZ 12 hour layover at Auckland airport 5:30PM flight from NZ to Tonga 8:30PM Arrived Tonga
1/11/09	Sunday, no work day. Some sight seeing. Langseth arrived, but anchored offshore, because no docking on Sunday
1/12/09	2:00PM moved to R/V Langseth Found capstan got soaked by storm, electrical failure, not working After self-test, error- no serial link Email to Nick.
1/13/09	Got e-mail from Nick. Most likely microprocessor of AC-DC controller fried. It is unlikely if we can fix it while aboard. The wet lab where all our equipment was stowed got flooded with 2 ft of sea water during the transit from Samoa to Tonga. We checked inside the battery boxes. Bottom ones got wet a little but looked OK. Checked the battery voltage. Digital voltages were all >15.75V and analog were >12.75V. Novatech flashers got soaked but no damage. There were factory-provided C-cell batteries in. Del arrived 10:30am. Scheduled to depart 1600. 1600 Departed Tonga. Built H24 and HS8 for M1 and M2. ETA 10AM (local) on 1/14. Finally getting NMEA GPS string from the Spectrum GPS. The string coming out was Spectrum's own format. Use the Spectrum's program to change the output to NMEA. Got the ship layout information for Workboat from Anthony. Ted Cazensky has worked on connecting the 8011A to the hull-mounted ITC3013. We could receive but no transmit. Sent an e-mail to Nick.
1/14/09	H24: Q-Tech Timing checked OK. Could not find the 1-Ohm register to check the power consumption of the digital section. Seagate cold temp hard disk failed. Replace with Toshiba 80GB. We have one more Toshiba left. M1 deployment: We were using only one crane on starboard deck. Started out at 8km from the deployment site. Float, hydrophone and 1854m of cable all deployed OK. Secured the cable with chain on the deck while connecting to the release and anchor. Current was strong. Towed about 1 hour to reach to the deployment site. 2:21PM (local) deployed anchor. Found 8011A was not working. It transmitted with our transducer hanging starboard side, but reception was so weak or too noisy, no reply

from the release was detected. It seemed that Enable Code was transmitted, but pre-amp was not working and reply (15 pulses with 1 sec interval) wasn't there. Switched to another deck set, 8011M (battery operated). Detected reply pulses, but Workboat travel time was two-way travel time. 8011M is too new and Workboat is not compatible with. Informed Nick and Jim Ilman. Changed the sound speed to a half (744.5m/s), forced the solution to converge.

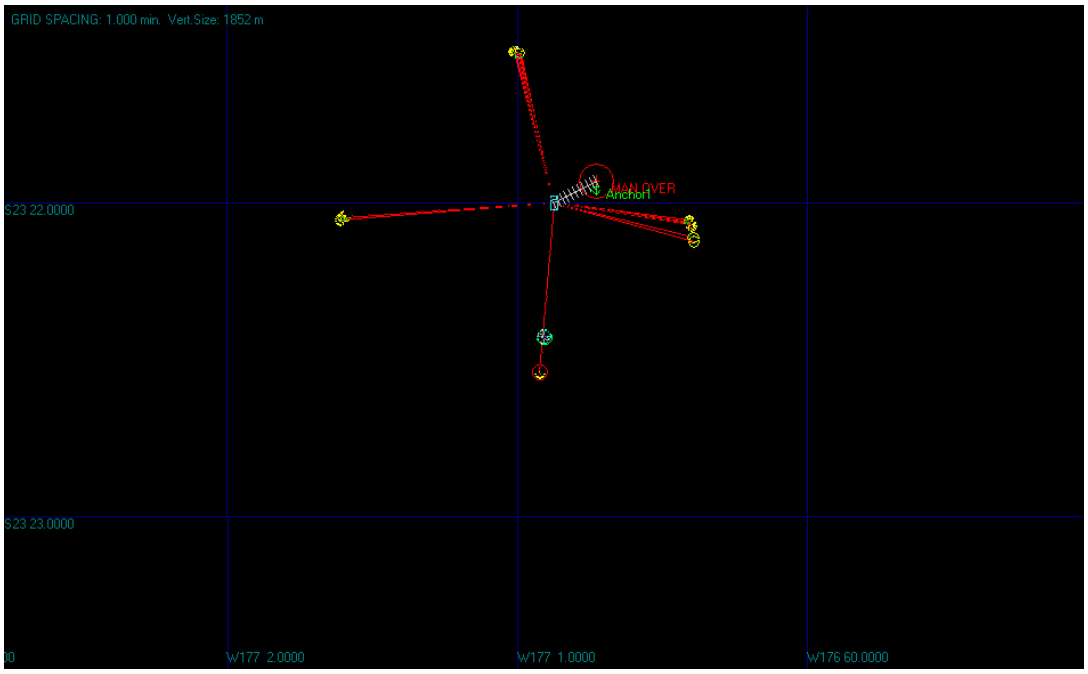

Fig. 1. M1 location by Workboat survey (blue square)
Mooring location 23°22.0003'S-177°00.8751'W (Bottom 3120m)

1/15/09 HS8 hydrophone was prepared. No problem was found. During the M2 deployment sea picked up a little. Also surface current was strong.

Toward the end of deployment when anchor and release were almost ready to deploy, the last 16m section of the Yalex line departed. Yalex line was chafing against a sharp corner of the ship hull where the surface was covered by no-skip-patch. It was a night time deployment, flasher was on, and was easy to spot and recover the float and the hydrophone. Redeployed with two cranes this time, one on the starboard deck and another one from the third deck with an extended arm. With the extended arm, the line was pushed out at least 5 meters from the starboard making the line less likely to be chafed by the ship hull.

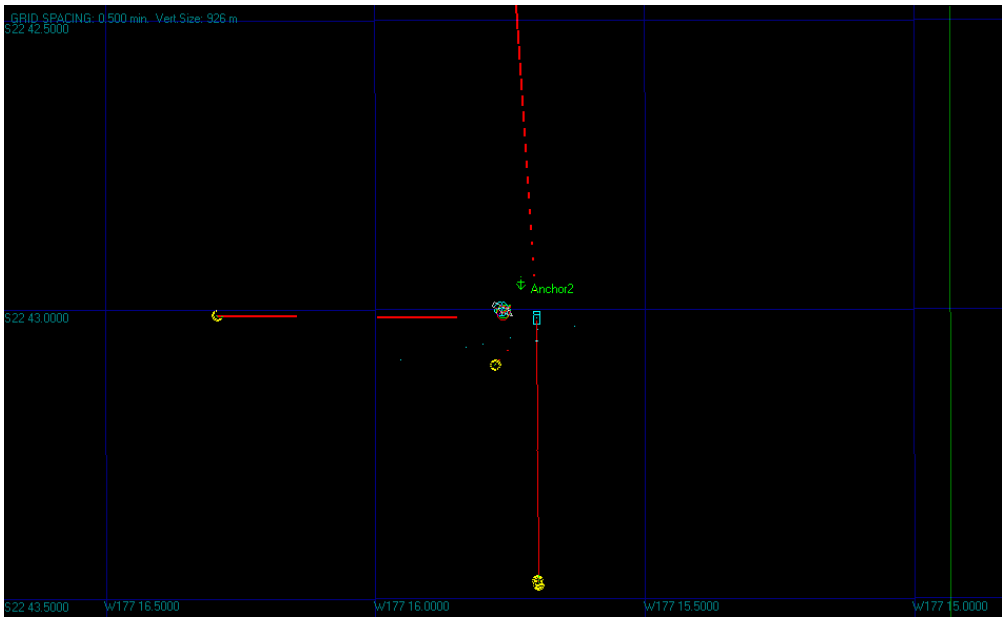

Fig. 2. M2 location by Workboat survey (blue square)
Mooring location 22°43.0139'S-177°15.7004'W (Bottom 2760m)

1/16/2009 Prepared H34 and H41. Current probe was found and the current consumption of the digital section were measured. It was measured 12.6mA and 11.4mA at 250Hz, 2-channel, high precision Q-tech clock. Q-tech clock current consumption was approximately 8.8mA.
M3S and M3E deployment went well. The mooring starting point is about 2 NM from the anchor drop position.

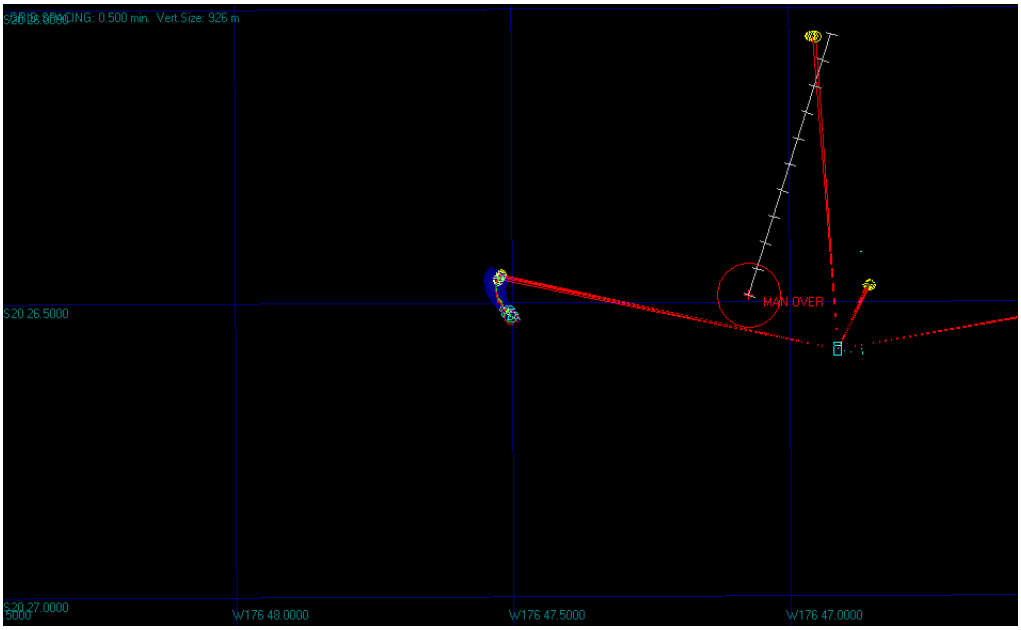

Fig. 3 M3S mooring location (blue square)
Mooring location 20°26.5805'S-176°46.9148'W (Bottom 2750m)

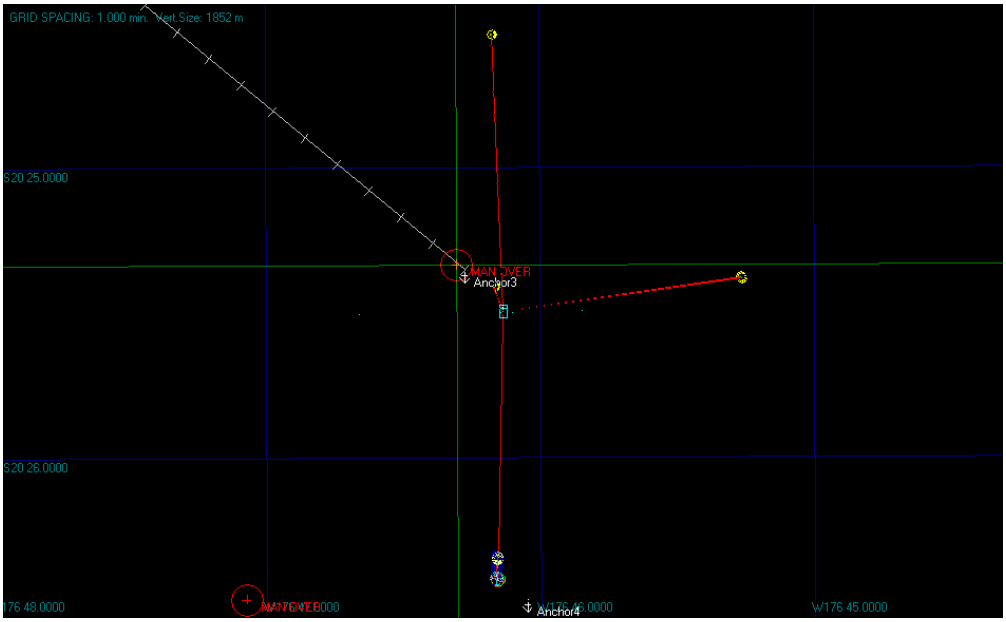

Fig. 4. Mooring M3E location (blue square)
Mooring location 20°25.4970'S-176°46.1343'W (Bottom 2750m)

1/17/2009 Prepared H31 and H36. DAQ board #270 was drawing too much current (about 60mA). Replace with a spare board #277. Deployed M3W and M3N. No problem during the deployments.

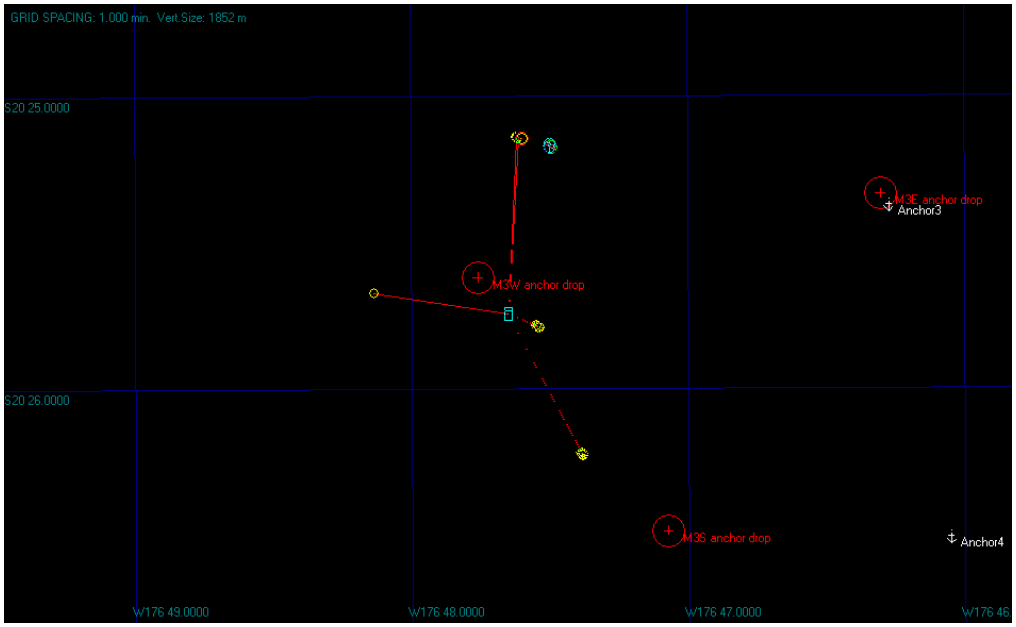

Fig. 5. M3W mooring location (blue square)
Mooring location 20°25.7443'S-176°47.6512'W (Bottom 2750m)

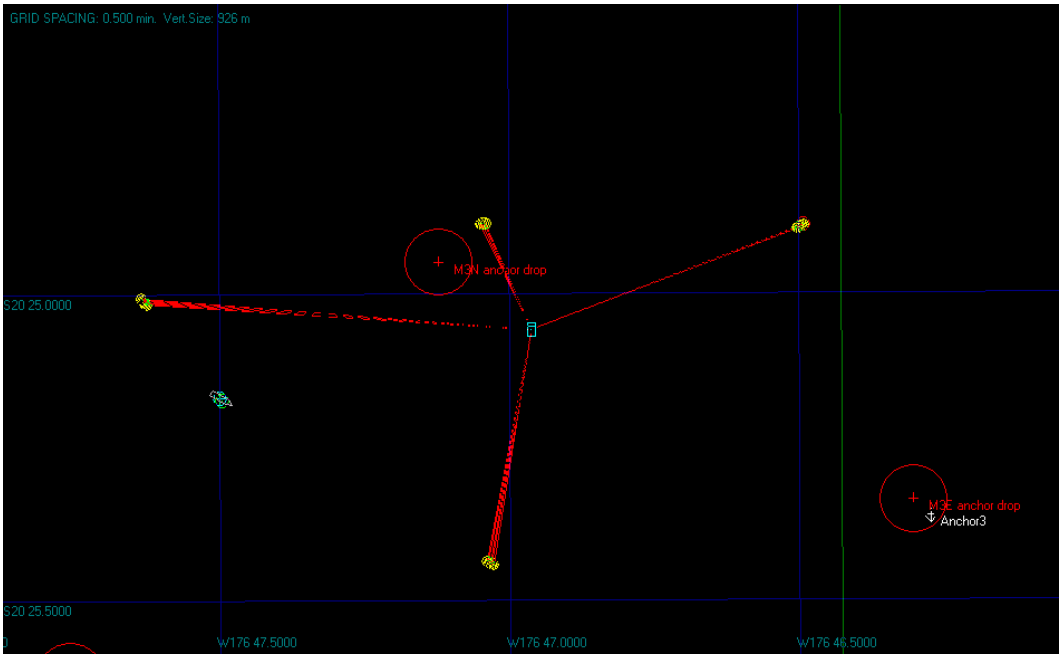

Fig. 6. M3N mooring location (blue square)
Mooring location 20°25.0585'S-176°46.9620'W (Bottom 2750m)

1/18/2009 Prepared H16. Deployed at M4.

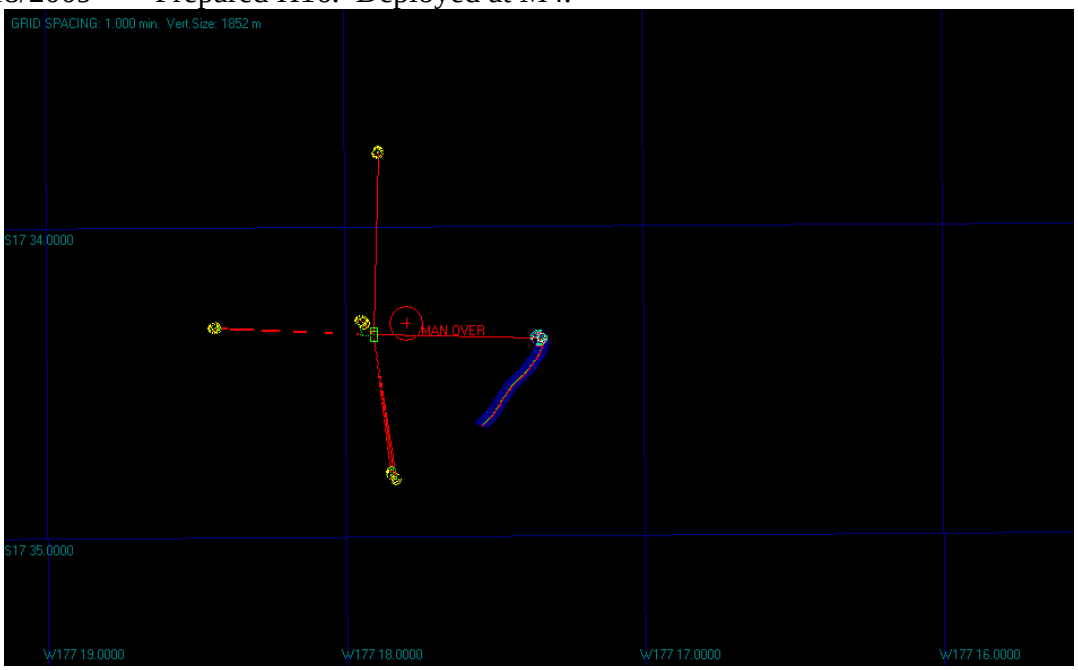

Fig. 7. M4 mooring location (blue square)
Mooring location 17°34.3481'S-177°17.9052'W (Bottom 2430m)

1/19/2009 Prepared H30 and H29. Repeated the clock shift test twice, and in both tests, H29 clock had an initial 360 msec offset. Changed the clock, but the 360msec shift was constant and still there. Seems there was an initialization problem not due to the clock board but by the DAQ board.

Deployed at M5 and M6. We will deal with this initialization problem in the post processing stage.

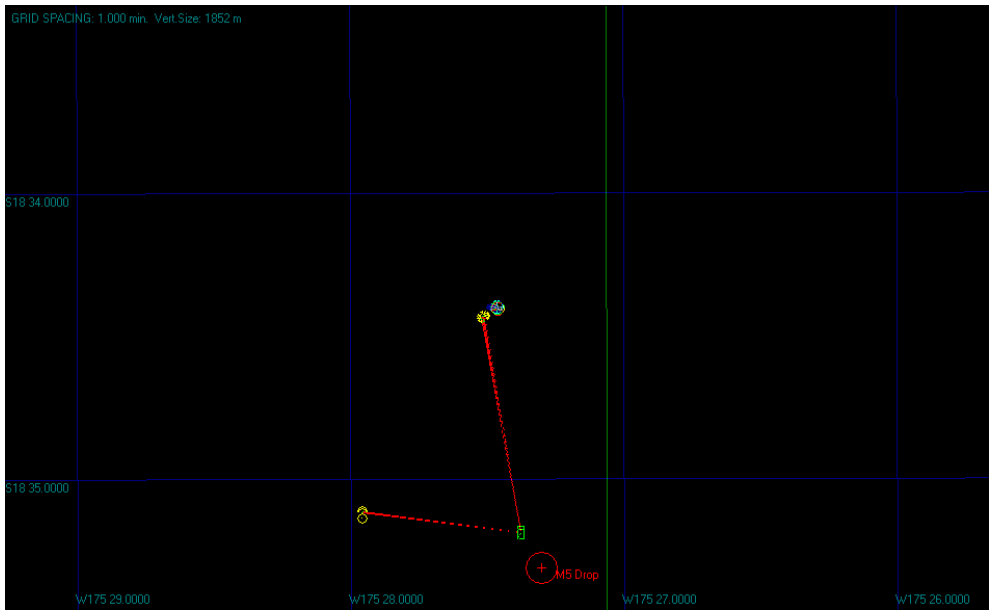

Fig. 8. M5 location (blue square)
Mooring location 18°35.1884'S-175°27.3785'W (Bottom 2475m)

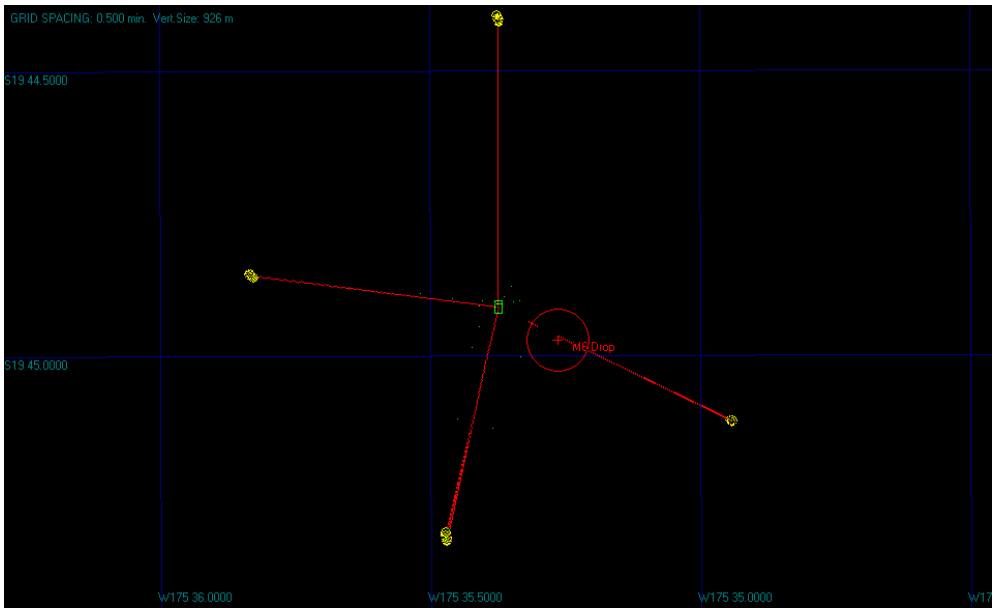

Fig. 9. M6 mooring location (blue square)
Mooring location 19°44.9144'S-175°35.3744'W (Bottom 2240m)

1/20/2009 Multibeaming.
1/21//2009 Multibeaming. Arrived Nuku'alofa.

Appendix: Detailed descriptions on each mooring

M1: Mooring location 23°22.0003'S-177°00.8751'W (Bottom 3120m)
Anchor Dropped 23°21.930S'-177°00.730'W (Ship Course : 62°)
Yalex cable length 1000+500+200+100+100+54+100 (m)
279m offset at 62° from the anchor drop position (1/7 of cable length)
Release disabled – yes
Workboat survey - yes
Sv used : 744.5 m/s

M2: Mooring location 22°43.0139'S-177°15.7004'W (Bottom 2760m)
Anchor Dropped 22°42.9427S'-177°15.7288'W (Ship Course : 338°)
Yalex Cable length 1000+500 +200 (m)
155m offset at 326° from the anchor drop position (1/9.7 of cable length)
Release disabled – yes
Workboat survey - yes
Sv used: 744.5m/s

M3S: Mooring location 20°26.5805'S-176°46.9148'W (Bottom 2750m)
Anchor Dropped 20°26.49S'-176°47.05'W (Ship Course : 300°)
Yalex cable length 1000 + 500 + 100 + 114 (m)
361m offset at 302° from the anchor drop position (1/5.27 of cable length)
Release disabled – yes
Workboat survey - yes
Sv used: 744.5 m/s

M3E: Mooring location 20°25.4970'S-176°46.1343'W (Bottom 2750m)
Anchor Dropped 20°25.3523S'-176°46.2740'W (Ship Course : 300°)
Yalex cable length 1000 + 500 + 100 + 114 (m)
361m offset at 317° from the anchor drop position (1/4.7 of cable length)
Release disabled – yes
Workboat survey - yes
Sv used: 744.5 m/s

M3W: Mooring location 20°25.7443'S-176°47.6512'W (Bottom 2750m)
Anchor Dropped 20°25.62S'-176°47.76'W (Ship Course : 270°)
Yalex cable length 1000 + 500 + 100 + 114 (m)
298m offset at 320° from the anchor drop position (1/5.77 of cable length)
Release disabled – yes
Workboat survey - yes
Sv used: 744.5 m/s

M3N: Mooring location 20°25.0585'S-176°46.9620'W (Bottom 2750m)
Anchor Dropped 20°24.9479S'-176°47.1216'W (Ship Course : 310°)
Yalex cable length 1000 + 500 + 100 + 114 (m)
344m offset at 302° from the anchor drop position (1/4.98 of cable length)
Release disabled – yes
Workboat survey - yes
Sv used: 744.5 m/s

M4: Mooring location 17°34.3481'S-177°17.9052'W (Bottom 2430m)
Anchor Dropped 17°34.3110S'-177°17.7957'W (Ship Course : 130°)
Yalex cable length 1000 + 200 + 44 + 50 + 50 + 50 (m)
205m offset at 70° from the anchor drop position (1/6.8 of cable length)
Release disabled – yes
Workboat survey - yes
Sv used: 744.5 m/s

M5: Mooring location 18°35.1884'S-175°27.3785'W (Bottom 2475m)
Anchor Dropped 18°35.3134S'-175°27.3018'W (Ship Course : 145°)
Yalex cable length 1000 + 100 + 100 + 100 + 100 (m)
265m offset at 149° from the anchor drop position (1/5.28 of cable length)
Release disabled – yes
Workboat survey - yes
Sv used: 747.8 m/s

M6: Mooring location 19°44.9144'S-175°35.3744'W (Bottom 2240m)
Anchor Dropped 19°44.9737S'-175°35.2645'W (Ship Course : 120°)
Yalex cable length 1000 + 100 + 84 (m)
218m offset at 120° from the anchor drop position (1/5.43 of cable length)
Release disabled – yes
Workboat survey - yes
Sv used: 747.8 m/s

M10: Estimated mooring 15°17.2739'S-174°08.9612'W (Bottom 2700m)
Anchor Dropped 15°17.307S'-174°09.087'W (Ship Course : 255°)
Yalex cable length 1000 + 200 + 200 +100+124 (m)
Estimate: 233m offset at255° from the anchor drop position (1/6.11-average ratio)
Release disabled – yes
Workboat survey - **NO**
Sv used: 747.8 m/s

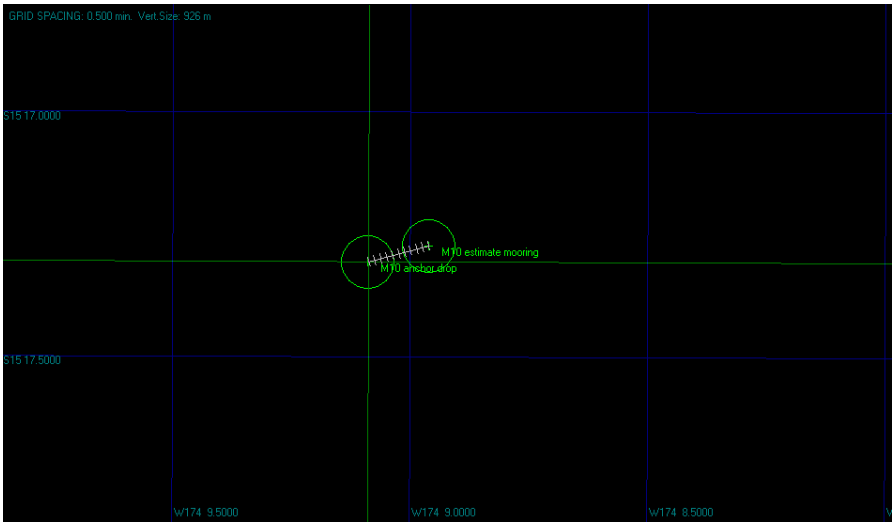

Fig. 10 M10 mooring location estimated based on the cable length and average set back from the other 9 moorings.