Twichell/ FARNELLA Gulf of
Schwab FRNL F3-90-GM Mexico
March 25-April 8, 1990
INTERNATIONAL DEEP SEA SURVEY/
WILLIAMSON LOG

104746

RECORD

INTERNATIONAL DEEP
SEA SURVEY, INC.
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SEATTLE, WASHINGTON 98103
(206) 547-1133

To

SeaMARC 1A Survey for USGS
Eastern Gulf of Mexico aboard
R/V FARNELLA March-April 1990

Farnella 7/19 - 7/26

Eastern Gulf of Mexico

SeaMARC 1A Survey for U.S.G.S.

March - April 1990

R/V FARNELLA

British Registry 1431 gross tons, 560 register tonnage
official # 342737

Tampa FL to Tampa FL

Master - John Cannan
Chief Officer - Albert Fuller
2nd - David Shaw
Bosun - Alan Thompson

Chief Eng Michael Baldwin
2nd " William Angus
3rd " Arthur Green

USGS Investigators

Dave Twitchell - Mosaicking
Bill Schwab - mosaicking
Tom O'Brien - Processing
Tom Dettwyler - Processing
William Danforth - Processing
Barry Irwin - Nav
David Lubinski - seismic
David Mason - winch
Lisa Bader - seismic
Michael Hamer - Nav
Larry Kocker - seismic
Tom Crook - Nav

IOS
Neil Kenyon - mosaicking

IDSS Crew
Mike Williamson
Kevin Redman
Nick Lesnikowski
John McDonell

2

Cruise objectives: Investigate in detail recent depositions on the lower Mississippi fan which has been image GLORIA during the Gulf of Mexico survey in Several channels and areas of low reflectivity will examined in detail with SeaMARC 1A and site coring will be selected. Acoustic navigation not be used in the 2 sites of coring and only nav plus range to pinger on towfish will be o for the remainder of the survey. Initially, a c line will be run out to a point approximately 60 of the survey line (to correspond with a previou seismic line run by USGS).

Thursday - March 15

Contract negotiated with USGS and authorization to proceed issued (contract to follow).

Nick & Kevin transit to Lamont (Palliseder NY) to assist in spooling cable onto the Ryan winch for use on the cruise.

Truck with SeaMARC 1A and towpoint loaded at IDSS and underway for Tampa. (One day delay from proposed schedule due to contract negotiations).

Friday March 16

Leithauser cable spooling and tensioning device trucked from URI to Lamont for use in putting 2 cables on winches; one for FARNELLA cruise and one for use on a Lamont cruise aboard the Maurice Ewing.

Saturday - March 17

Shorter of the 2 cables (4400 meters) spooled onto the Lamont winch for the Ewing and a tensioning gear breaks in the process. Result is inadequate line-tension & poor lay-up on drum.

Sunday - March 18

FARNELLA arrives at International Ship Repair, Tampa FL

Attempts to use Leithauser on winch/cable we intend to use breaks another gear & further spooling not possible. Leithauser agrees to machine new gears and air-ship to Lamont in 48 hrs.

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Monday March 19
Nick & Kevin still at Lamont awaiting Leithauser gears. Don Craft to Tampa to coordinate the period with the shipyard

Tuesday March 20

Mike enroute to Tampa via Halifax (presentations to AGC and Canadian Navy). Larry Patterson to Tampa

Leithauser gears flown to NY, Nick, Kevin, John Debernardo and Dale Chayes install em in tensioner

Wednesday March 21

Cable spooling not going well at Lamont – either cable is out of round or not enough tension is avail from the Leithauser (although 3000# tension is indicated). Trucks loaded at Lamont & sent w. winch/ca (over weight, so 2nd truck required). John enroute Tamp

Thursday March 22
John, Nick & Kevin in Tampa. MEW ~~and John~~ enroute. Craft and Larry Patterson already at ship.
Seattle truck arrives & is unloaded. SeaMARC g installed aboard FARNELLA.

Friday March 23
All HDSS personnel in Tampa for mob. The 2 truck from Lamont arrive. John Debernardo arrived from Lamont for winch installation. Built foundation for win

Saturday March 24

Winch installed aboard FARNELLA & by 1900 hours w work by shipyard complete.

day March 25

1020 Yard work on winch installation complete.

1416 Completed trim & balance of SeaMARC towfish (the transponder to be used on SeaMARC is a Benthos expendible which is particularly bouyant (we were trimmed for OCEANO at 70 lbs neg).

1435 Underway from Tampa for 1st task, the gravity line.

Because considerable time was lost due to spooling problems and late start caused by contract negotiations, it was decided to use an existing "A"-frame on the FARNELLA rather than the IDSS tow point (saved yard installation time). Because the A-frame was higher, the tow block had to be suspended from a chain with preventers – a strange-looking rig. Launch and recovery will be difficult if seas are rough.

1830 Scientists Meeting. Discussed cruise objectives and schedule. First order of business will be to run a gravity line (approx 17 hrs). This will leave us ~ 60nm north of the survey area. During transit, we will stream the tow cable with no weight (other than the cable), and respool. We hope that cable wt. and drag will be sufficient to get the cable to lay-up properly (the job the Lathauser was to have done). Upon retrieval, ship will go to the western coring site and lay bottom transponders and calibrate the net. During this operation, the tow cable will be terminated (potting takes 10-12 hrs to cure). Survey will start with the western site, then a line connected to the eastern site, lay transponders there, then survey of the eastern site. Any additional cruise time will be spent surveying between the 2 coring sites. As data is gathered shipboard, mosaicking will be done by the USGS folks.

2000 Commenced gravity line.

Monday March 26

0000 Continue gravity line.

0811 End of gravity line - rig for cable pay-out.
0840 Begin pay-out of cable
1128 8300 meters of cable out (down to last course on Leibus). Rig fleet angle compensator for pay-in
1240 Begin cable pay-in with fresh water wash and oil spray using 90 wt. gear oil cut with fuel oil (cable very dry)
1350 At ~ 4100 meters a bad wrap developed - need to pay out & use packing to compensate. This wire has never been run on this winch before and wire size may be slightly out of spec.

2002 Cable back aboard. No abrasion or damage to end & at 51 w. 9000m of cable paid out in 3200m of water we must have drug bottom for awhile. Ships 3.5 indicates a soft bottom as we MUCH trouble with cable for last 4000 meters. This cable must be out of round and out of spec. The fleet angle compensator on the winch was unable to level wind cable, and since the winch has no means to independently advance/retard the compensator many times we had to remove the chain from the gear drive shaft & adjust by hand. Toward the last 8 or so courses, this adjustment was required on every 2nd course. We are not as impressed with this winch as we have been in the past (we have used Ryans winch on 5 other cruises, but each time with a cable that fit).

Working on PML termination & potting of splice. Ship is conducting a bathy survey of the area to be used as the western test site

~~2150~~

TUES 27 MARCH - JD86 (Mike/John 1200 → 2400)

0000 Continue working on SeaMARC splice. USGS begins deployment of acoustic net for the western site

0150 completed the cable termination for SeaMARC

Net of 3 transponders deployed at west site. Calibration should continue until mid-morning.

1100 Problems with XBT casts and calibration caused the evolution to take up most of the night & morning. Now finished & need ~ one hour to transit to launch point. Rigging for deployment

1200 Deck checks completed & briefing held for those involved with the launch (bridge, crane operator, line handlers and winch operator).

During preparation for launch, the tow cable was damaged when it became fouled in the fleet angle compensator sheave. No electrical damage was apparent, and armour rods were bent, but not broken. We determined that we could continue with launch without re-termination.

1236 Deploy SMIA - Electrical checks OK, no leaks (ground faults) indicated, so continue down with the fish. Because of bad wraps in the cable, we had to disconnect the fleet angle compensator. For safety, the winch operation will be conducted on deck, linked to the instrument room via radio.

1435 Mark cable @ 4000 m. w/ red tape

1458 Mark cable @ 5000 m w/ yellow tape
fish depth 1683 m.

1510 Power failure when EPC plugged in. Eliminated Nav. system.

Tues. March 27 (Continued)

1605 winch stopped @ 5913 m, telemetry jumpy

1630 brake set on winch at 5947 m out - power unit secured. Heading east on Line 1. Towfish z = 2658 m aft = 620.6 meters, heading 092°

1720 Cable in to 5638 meters

1840 Drop-outs in SeaMARC data plus occasional telemetry hits. Also, processed subbottom is displaying the same problem that was seen on the OSU cruise (I thought that had b fixed!)

1906 End of Line 1, turning to line 2. This line has been a turning run & USGS may not have been saving data.

2006 Cable in to 5460m. Fish dropped like a rock durin turn. Fish may have hit bottom. Ship on line 2, 27

2023 Cable in to 5226m

2125 Cable out to 5464 m - cable at port flange at end 1st bad ~~wrap~~ course, ie if we paid out one more cow we should be down to a good one (no stuff in the cracks. Still looking for the "sweet spot". SOG = 2.5 to 2.8 K

2312 Cable out to 5657 m

2350 Cable out to 5889 m NOTE: With cable at stbd flange, meter reading is 5740m.

Both SBP and sidescan records are good now. Rx was to reduce the power supply current to 0.9 Telemetry gets a bit flakey, but sonar signals are sol

0000 Continue Line 2 in western survey area, speed 2.8 kts & towfish stable at 640m altitude w. 5889m out.

0030 Checked hydraulic accumulators on brakes - they had leaked pressure from 1100 psi to 600 psi in 40 minutes & drum had begun to creep (diesel secured). With brakes set, we must leave the power unit running at idle to keep brakes pressurized, BUT the controller must be in the "off" position so the winch motor doesn't work against the brakes.

0107 Begin a slow turn to re-run Line 1. No acoustic navigation was acquired on line 2, so we will try running slower with less scope. Slowly cabling in to increase altitude in turn. We will make this turn slower, will try 5° turn each 5 min (3 hr turn). Cable in at ~ 8m/min.

0156 5466m on port flange - 6m difference could be point at which measurement was taken, or difference due to tightness of wraps, esp at stbd flange - or error in calibration (6m in 850m = 0.7%).

0215 Stop cable at 5306m. Still in turn, but increased rate to 10° each 5 min (turning 60° away from course, then 240° to new course).

0501 Ship slowing to 2.0 Knots SOG, cabling in, finished turn

0527 cable in to 4815 m., cable not laying on winch properly - crossing wraps & gaps. Increasing ship speed to 3.0 Knts to payout cable & try diamond screw and/or packing rope in order to cable in enough to slow to 2.0 Knts w/ship.

0658 after connecting diamond screw, & pounding rope cable in to ~4662 m., slow ship to 2.0 Knts

0730 continue cable in 4430 m., alt. 610 m, depth 2630 m

Wed. March 28 (cont.)

0800 continue to cable in 4100 m.
Nav. (Subsurface) has been working for nearly

0840 reset counter @ 4000 m. mark (off by 200

0856 stop winching & set brake. Alt 630 m, depth 2595
3891 m cable out. Leaving nav. net, may be able
to slightly increase ship speed.

0940 Start turn, increase ship speed to 3 Knts &
turn 10° each 5 min.
Alt. 710 m., fish depth 2497 m.

1010 FISH JUST STARTING TO TURN. Z = 1952 m ALT = 1016
CABLE OUT = 3891 M.
COG = 117° GYRO = 132° FISH = 092° SOG = 2.9

1135 SHIP O/C, R/S 2.5 KTS. FISH @ 223° Z = 1905.
ALT = 1300 m. CABLE OUT = 3891 m.

1153 BUMP UP STARBOARD GAIN TO 4. SHIP O/C BUT FISH
STILL HIGH. MAY REDUCE SPD SOME MORE TO LOWER
TO DECK.

1207 R/S 1.5 KTS. SONAR WATCH PROPERLY RELIEVED
BY JOHN AND MIKE.

Record quality is very sensitive to system current. Signal lev
just barely above noise floor. Telemetry is flakiest, as would
be expected since it uses the highest uplink freq. (600 kHz
The port SSS (at 213 kHz) is gain-limited, whereas the stb
(at 105 kHz) is not. Everything points to too much atten
in the cable.

From the dielectric wrap on cable, it is

▷ WED 28 MARCH

The Rochester specification for this cable is UNOLS

- core of 6/.0226" hard drawn BC in 1st layer & 12/0.0226" hard drawn Bare Copper around a central .022" nylon monofilament

- shield of 60/0.159" hard drawn Copper, 99% covered & 2 layers of .0017" copper polyester return tape

- armor 24/.060 galv. right lay & 30/.060 galv. left lay

697 lb/kft in air 551 lbs/kft in seawater

dc resistance ≤ 1.27 Ω/kft conductor, ≤ 0.80 Ω/kft return, ≤ 2.07 Ω/kft loop. Characteristic impedance = 45 Ω

Attenuation @ 0.5 MHz ≤ 1.2 dB/kft, 1 MHz ≤ 1.65 dB/kft

Discussions w. Dave Twitchell & Tom Deffeyeler as to options to improve data. covered the following - we actually seem to have 2 problems, ① drop-outs in data and flaky telemetry probably due to the high attenuation through this cable, and ② clipping of data being sent to QMUPS (it is set up to receive 0-5V signals, and the outer portions of the sidescan records ramp up to 6V or so).

Problem ①

We need to determine what the actual attenuation is in this cable and decide what reduction would be necessary to produce solid data free from drop-outs and telemetry glitches. The only way to reduce attenuation is to shorten the cable, for which we need permission from Don Mother at WHOI. The plan is to continue surveys until ~ 3am, then bring up the fish and test the cable end-to-end. Once we determine its condition, we calculate how much we need to chop to produce a significant gain in signal quality, esp. at the high frequency end of our spectrum. Options to be discussed w. Don tomorrow morning include a minimal chop of 1000m or so (an empty reel is in the ships hold & excess could be spooled on for return to shore), or perhaps select a chop that would result in

Wed March 28 (cont)

2 lengths which might be useful (in the middle?), or chop length useful to IDSS & we buy it (if we can afford it). This is one of 4 cables bought by WHOI in 1985. One was used on the Titanic search (but was chopped to 6000m), one was sold to Scripps, this one, which has only been used once before, and the 4th which is still in storage. Utilization has not been high on these wires, and few systems can put a signal through 9000m of it. IDSS does not need another short cable – we have 2300m (Harvey), 1400m (NOAA), 2400m (Shell) and 400m (NOAA), and currently have wire capacity for ~ 4200m of .68".

Problem (2)
With towfish on deck, John can set the ramp on the TVC while hooked up through the cable into QMPS to make sure that data can be provided without clipping. Simply turning down the receiver gains on the topside rack results in loss of data at the beginning of each sweep.

1530 USGS sent telex to WHOI office to notify Don Mottler that we will call tomorrow morning with questions about wire.

1615 Went back to high xmit power in an attempt to maximize dynamic range. SBP looks good, SSS maybe somewhat better, but still plagued with dropouts. SSS with long g

(*) Note: When towfish on deck, the Stbd array should be shimmed to aim downward more to both reduce strength of the sea surface return & apply more energy beneath the towfish. Shimming the top of the transducer approx 1/4" will give about 3° of deflection, but we seem to require more (i.e. 11-12°).

PARTIAL LOADS OF WIRE ROPE... WOULD HAVE TO RIG BLOCKS...

1830 Discussed cable options with Capt. Cannan. Empty wire spool in the hold is down for repair, but 2 other reels have

Wed March 28 (cont)

1845 The USGS QMUPS has been locking up periodically all cruise, but this watch it has been particularly difficult. The favored mode is a series of red-colored blocks on the upper-left corner of the alpha-numeric display, followed by a yellow block and a "7" displayed on the upper right. At this point the keyboard is locked up & a full system reset is required to get rolling again. These problems are occurring so frequently that we have yet to store a full screen of SeaMARC data between problems... Sure hope Triton has an Rx before the Exxon cruise! This is the same version of QMUPS we now have.

Paid out several meters of cable to prevent flat spots over sheave, then reset brakes on winch.

1912 EOL, turning for line 3. Increasing ship speed to 3 kts.

2048 Paid out 1-2 m of cable to move wire off sheave.

2110 Ship having trouble getting on line - strong current (Loop?)

USGS called Ron at Triton RE error message & lock-up of QMUPS. Ron thinks it is a prob. with the telemetry block being sent by SeaMARC & it might help to cool the SeaMARC rack. Nothing to lose, so vented AC into SeaMARC rack.

2118 Ship on line - reducing speed.

2345 EOL 3F4, OUT OF NAV NET.

2350 DECIDE TO BEGIN RETRIEVING CABLE NOW, NOT ENOUGH TIME TO TURN AND RUN ANOTHER LINE.

2355 CABLE OUT = 3891 m, FISH Z = 2727 m, ALT = 530 m
FISH HDG = 082° SHIP GYRO = 104° COG = 101° SOG 2.2°

continue cable-in

0350 Cable stopped @ 145 m., assemble crew for recovery

0426 SMIA on deck

0510 Test on spare umbilical - no improvement.

0600 Set up towfish electronics on bench, noise still exists. Gain in towfish is so high that even hand-held radio emits creates noise.

0700 Bypass tow cable & umbilical, install cable simulator.

Deck checks of gear uncovered a noise source in the +15 power supply in the topside rack. These power spikes appear cause the errors in both uplink and downlink telemetry, wh resulted in both drop-outs in data and the timing lock-u in QMIPS. Powered rack from an external lab supply a data looks good.

1200 System has been running for ~ an hour through the cable with no drop-outs using the lab supply (although QMIPS has had 2 fatal "divide by zero" errors). Looks like the cable is not the culprit.

1220 Using spare power supply, system checks all OK running through cable to dummy loads, at full power.

1300 System run in with no errors or QMIPS crashes. We will use the spare supply & button it up. Ship is currently running a bathy line which will take another 2-3 hours, ~~after~~ and then we will launch.

1525 Will run 6nm west of line 3, deploy seaMARC & run Line 3 eastbound.

2158 Z

~~1587~~

1658 Launched SeaMARC

JD 88

Thurs March 29 (continued)

1707 two orange marks on cable @ 178 m

1727 four orange marks on cable @ 491 m.

~~1510Z~~
JD89 2010
0110Z Cable stop at 3934 m. Current & wind may make it difficult for ship to hold line at slow speed (we are on line 3 eastbou

1616Z
2116 QMUPS error R6003 divide by zero error (again). USGS talking to Ron about problem. SeaMARC data looking good, but QMUPS only getting 1/4 of a screen of data bef crashing (if it ain't one thing...).

Analog SBP is being output onto a 19" Raytheon. We tried our processed SBP, but some timing glitch, possibly has something to do with our flaky bottom detect?

The first indication from Triton was the error on QMUPS could be array processor (SERIOUS) & Fred was going to call Ron & get back to us. In the meantime, SMUPS was set up to acquire data as a backup. The newer versions of SMUPS would not sync to the 5000 m map scale, but the older ones work fine (?). The problem with running SMUPS is ① its processed data & USGS wants raw, and ② we are not sure how to get nav data into SMUPS (& of course we have no documentation). Anyway, we are making pretty pictures until we hear from Triton.

1820Z
2320 Call from Fred. Thinks problem is on the host (CPU), not the array processor & may be related to a conflict in the 2 altitudes being collected (one from SeaMARC and one from the first return from sidescan as calculated by QMUPS)

With new things to try, we will set up both SMUPS and QMUPS & see what can be figured out.

FRIDAY 30 MARCH

0000 Continue with line 4 (old line 3) while fighting the processor battle. QMIPS & SMIPS both set up with SeaMARC BUT, seems they don't like to live together on the GPIB bus.

To test if SeaMARC telemetry is confusing QMIPS & causing the error, will try QMIPS treating SeaMARC as a dumb sonar (no telemetry) & see if we get the same error.

0030 Checked winch, paid out 2 m of cable.

0035 Drop-outs are back. New power supply fried? Symptoms are the same, ie telemetry hits, SSS & SBP hits. HOWEVER, on the plus side, QMIPS not showing errors when only take sonar data, so indications are the SeaMARC telemetry string is the culprit. BUT, the errors on QMIPS occurred earlier when the power supply was good.

0108 Power supply on rack looks OK. Downlink seems alright, but uplink telemetry has gone to hell again.

0245 Seamarc telemetry more off than on, but more than a full screen of fair QMips data without telemetry. Ship speed and course very erratic causing a roller coaster ride for the towfish.

0300 Checked winch - O.K.

0318Z ~~0311~~ End of line 4, start turn towards line 5

0320 USGS NOW ABLE TO INPUT GPS/LORAN SHIP NAV INTO QMIPS. FISH HDG NOT CRITICAL NOW.

0415 SMIPS V5.0 UP AND RUNNING ON AST. HAD TO GO BACK TO FLOPPY DISK BACKUP BECAUSE OPTICAL BACKUP DISK CANNOT BE READ. TELEMETRY FLAKY, MAG. OK?, IMAGERY GOOD. Smips depth wrong!

FRIDAY 30 MARCH

FISH RIDING TOO HIGH. BEGIN PAYING OUT CABLE.

0500 ON LINE 5 HDG WEST. FISH STILL TURNING

0618 Stop winch @ 5000 m. cable out.

0622 ALL DATA ON SMIPS LOST @ PING 1024. SYSTEM LOCKED UP. THE WAY IT SEEMS WE HAVE TO RUN SMIPS IS BY USING SMIPS V5.0 WHICH IS ON THE AST UNDER D:\USGS\SMIPS. PRIOR TO PING 1024 DO AN ALT F-10 TO GET OUT. IT WILL LOCK UP BECAUSE IT CAN'T READ OR WRITE TO THE OPTICAL SO DO A CTRL-ALT-DEL TO REBOOT. WHEN SYSTEM COMES UP USE XCOPY TO COPY FISH1.DAT TO E:\. THEN GO TO D:\SMIPS WHICH IS SMIPS VERSION 5.11 IN ORDER TO READ THE DATA ON E:\. NOW, WASN'T THAT EASY.

0655 * NOTE: WHEN YOU REBOOT AST YOU HAVE TO RESET TIME TO ZULU.

LINE USGS5F1A TIME IS OFF. 03:54:30 = 11:57:42

0725 RESTART SMIPS, WILL BE LOGGED A USGS5F1B.DAT

FISH DROPPING SLOWLY, ALT = 475 m. SHIP INCREASING

0805 SPD SLIGHTLY.

0810 SMIPS HUNG UP, AGAIN @ PING ~812. NON RECOVERABLE. SYSTER RESTARTED, FORGOT GMT TIME SO 05:11:10 = 13:14:13 Z

08210 FISH CLIMBING, SHIP R/S. C/O = 5000 m.

LOGGED SMIPS DATA TO E:\USGS5F1C.DAT.

03 * NOTE: WHEN EXITING SMIPS AND CAN'T WRITE TO OPTICAL JUST DO A CTRL-C, SAVES TIME.

Friday March 30 (cont.)

~0630 Increased subbottom pulse width to 1 (.4ms improved good record to very good.

1245 Nice image of main channel in port record (will be SMUPS file USGSSFIH.dat)

1330 SMUPS crashed & lost the great file mentioned above. USC should also have the main channel — LOCKED up, prog & data lost!

1433 SMUPS lock up memory parity interrupt 2A13: 2E2C

1540 Cable in to 3978m for turn to line 6

1658 Cable out to 4356m

1723 Cable out to 4478. Sonar & telemetry went to hell during pay-out. Slip rings getting crudd? No, slip rings prob OK, drop-out is due to nose dive as fish screams down the bottom.

Line 6 is off to a shaky start. Wind & seas have picked up, and are heading right into it. A couple of consecutive wave-troughs in the way of the ship & the fish drops — takes a while to recover. Is satisfactory, but not a good as line 5.

2100 SMUPS crashed again.

2115 Paid out a couple of meters to put dif. wire on sheave.

2302 SMUPS crashed.

2337 Checked winch & paid out ~ a meter of cable.

continue line 6 SAT 31 MARCH

0044 End of line 6, start turn

0120 cable in to 4436 m.

0345 BEGIN LOGGING LINE 7 ON SMIPS. FISH VERY HIGH SHIP ~~[illegible]~~ R/S TO 2.5 KTS.

0415 slow ship to 2.0 Kts, fish settling nicely

0510 Cable out slowly

0545 Stopped paying out @ 5070 m.

0630 CABLE IN TO 4890 m.

0720 Cable in slowly.

0735 Cable stopped @ 4691 m.

0752 FISH ALT ~ 475m, SHIP INCR. SPD. ALSO PREPARING FOR SLOW TURN TO PORT FOR SW LINE.

0818 End of line 7, beginning of line 8

1030 CABLE IN 4555 m

1057 Cable in to 4330 m.

1244 Cable in to 4089 m

SMIPS time was wrong – don't no how long we have been running on local rather than GMT.

1322 Cable out to 3813 m

1505 EOL 8, starting turn

1715 Cable out to 4935 m, on line #9

Sat	March 31 (continued)
1905	transition from line 9 to line 10 (slight jog to east line connecting the western and eastern sides).
2014	Cable out to 5152 m
0330Z 2230	EOL 10-1, BOL 10-2
2400	SET ALL WATCHES AHEAD BY 1 HOUR

o eastern
).

Sunday April 1

0015 KEVIN AND NICK BEGIN WATCH BY DOING 500 BRISK PUSH UPS, EACH.

0600 NICK AND KEVIN RATTLE OFF A COUPLE OF HUNDRED ONE HANDERS. *

0730 NICK AND KEVIN EAT BREAKFAST.

* NOTE: NOT TO MENTION THE THOUSANDS AND THOUSANDS OF HAND GRIPS TO HELP DEVELOPE VISE-LIKE GRIPS AND STEVE GARVEY FOREARMS.

1200 MIKE AND JOHN RELIEVE THE WATCH.

1621 Paid out ~ one meter of cable & checked winch.

2320 1920 Eol 10, start turn to line 11 southbound

0038 2038 Cable in to approx 4900m - NOTE when extreme wire angl the chain pendent lays against the hall effect sensor, so no cable counts. We will reset meter when we get to either 5000m or 4000m marks.

0134 2134 Cable in to counter reading of 4768m (actually ~ 150m less) in preparation for a turn to the north into the current which seems to be ~ 2.2 to 2.5 kts out of ~ 330°. The transition to line 12, northbound.

0216 2216 Cable in to 4400 on the meter

0354 2354 Cable out to 4429 on meter - on line 12

Monday April 2

0000 Continue line 12 northbound

0040 Cable out to 4718 m.

0314 Cable out to 4925 M., reset counter

0610 Paid out ~ 1 meter cable

1120 Paid out ~ 1 meter cable

1200 Start turn to line 13 — EOL 12. Strong (up to current for N is going to make line 13 (southbound).

1450 Paid out cable to ~ 5800m (5660m on the meter, precounter up against the counter & lost ~ 200m.

1558 Began cable in - EOL 13

2057 SeaMARC on deck, prepare to deploy acou transponders for Nav net at eastern site.

TUES 3 APRIL

000 Setting/calibrating acoustic nav net.

015 SeaMarc II towfish rigged & ready for deployment. Emergency beacons tested O.K. w/ new batteries.

1245 launched SeaMARC for survey of eastern site, paying out cable for line 14 (a repeat of line 13, but northbound into the current).

1505 4000m of cable out & still going (meter & cable tape match to within 2m). Bol 14.

1549 5000m of cable out, still high (alt = 1030m).

1605 5235m with wire at the stbd flange

1622 Cable stopped at 5528m, wire at the port flange.

1900 John discovered that open collector on bottom detect missing a pullup resistor necessary for proper operation. Installed a 22ke resistor & bottom detect now seems pretty solid. Omission of this resistor was a design screw-up, as it was not called out on the schematic. This explains the touchy bottom detect that has been giving us trouble since day one!

1954 (2354 GMT) USGS14fb.dat has nice image of a sand channel which was very interesting in the SBP. Hard bottom as we crossed the narrow channel, but otherwise soft bottom (transparent layer).

Bottom detect SOLID since John installed the pullup resistor. Guess John has earned an "on-site bonus".

2250 Cable in to 5227m

0325Z Cable in to 4908m

WED 4 APRIL

0023 BEGIN CABLE IN SLOW.

0033 STOP WINCH @ 4770m

0050 HOLDING @ 4685m

0145 Start turn.

0235 Begin cable out, ship on line 15, minimum speed ~ 3.3 Knts w/ 50°-60° crab angle..

0321 Stop cable @ 6000m. and mark w/ black tape

0335 Stop cable @ 6331m.

0555 BEGIN CABLING IN SLOWLY.

0610 STOP CABLE IN @ 6245m

0637 BEGIN TO CABLE IN SLOWLY. PREPARING FOR TURN TO STARBOARD ONTO WEST BOUND LINE 16.
AT THIS TIME: FISH Z = 2465m ALT = 892m
HDG = 171° M

0744 STOP WINCH @ 5247m CABLE OUT. FISH COMING AROUND NOW @ 222°. ALT = 589m SOG ≅ 3.0 Kts.

0800 Cable out slow, on line 16. SOG ~3.0 Knts fish rising.

0836 Stop cable @ 5761m. fish z = 2644m alt = 723m
Hdg = 288°

0838 Cable out slow, fish rises w/ cable stopped.

0851 Cable stopped @ 6000m. (counter reset)

1205 WATCH RELIEVED BY JOHN.

1518 Paid out ~ one meter of cable

1816 Cable in to 4977m for turn to BOL 17 eastbound

2150 Cable out to 5512m

Telex fm Bill Ryan to MEW requesting he be reached at the Omni International Hotel, Norfolk between 10pm & midnight EDT on April 4. Phone 804-622-6664. Called 2 times, @ 2230 & 2330 but he was not in his room. Left the ships COMSAT number.

Kevin called the office & asked Ferry to confirm the Truck for Monday April 9 to load our container. Kevin also requested that airline reservations for Mick, John & Kevin be switched fm Tue nite to Mon, if no substantial penalty involved. Also asked that SS make 2 50 m umbilicals for us as soon as possible

2340 Seem to have hit the "sweet spot" in terms of ship speed & wire out. Fish has been flying nicely with no adjustments since the last pay-out at 2050.

THURS 5 APRIL

0000 Continue line 17 eastbound

0050 Begin cable out slow.

0126 Stop cable @ 6000 u. (reset counter - 24u.)

0305 Cable out slow.

0315 Cable stopped @ 6188 u.

0347 Start cable in, preparing for turn

✓ 0500 Stop Cable @ 4800 u.

0538 Cable out slow, ship on line 18 westbound

0620 Cable stopped @ 5778 u.

1405Z 1005 Cable out to 6000 u.

1440 Cable in to 5759m

Telex fm Jerry. Exxon may authorize today. Need list of duplicat gear to ship w. winch/cable to UK

1815 COMSAT telecon w Jerry. Exxon still in negotiations, but w the more quickly our acoustic nav gear will be gone. Jerry wil order container & send telex when confirmation received on tru Harveys lawyers want my deposition, but Norfolk does not fit int our present schedule.

1816 EOL 18, cable in for turn to BOL 19 eastbound

1849 Cable in to 5075m

2023 Cable out to 5667 m - On line 19 eastbound

2206 Cable out to 5785m

FRIDAY 6 APRIL

27

0320 Cable out to 6045 m.

0523 Begin cable in slow, preparing for turn.

0625 Stop cable @ 4951 m.

0801 Ship on line 20 northbound

0835 Switch to 1 km swath, GAINS 8 70-20
TRANSMIT PWR - HI, BW 2K, PW 4,4,0

0907 Cable in to 4845 m.

0931 Cable in to 4814 m.

1012 Cable in to 4793 m.
Alt = 166 m. z = 3226.5

1030 Cable in to 4718 m.

1048 Cable in to 4685 m.

1117 Cable out to 4806 m.

1150 CABLE OUT SLOW.
1154 HOLD @ 4847 OUT. ALT = 153m

1233 Cable in to 4576 m for turn to line 21 westbound
(back to 5 km swath mapping)

1254 Changed sss pulse length to 7 (1.6 ms), bandwidth to 1kHz

1415 Cable out to 5656m - on line 21 west

Telex from Terry. Truck is confirmed for Mon 9 April at 0800 for Seattle run. More hassels w the lawyers in Norfolk. Called Baz Trafford & left the FARNELLA COMSAT #. Still no definative word on Exxon, plus hassels with the Taiwan job. Terry wants a call back this afternoon.

Friday 6 April (Continued)

1730 ComSAT Call w. Jerry - Exxon not tied down yet they are sending a contract for our approval. Passed o of trucking Companies to ship Barko to Hamma (Gal

1731 QMIPS crashed & graphics not coming back up.

1810 QMIPS problem traced to card edge connector o SeaMARC rack (detector/low pass filter card). Aga the damn back plane on the SeaMARC is the cau grief. Back on line

1903 Cable in to 5175m for turn to line 22

2050 Cable out to 5700m — on line 22
Ship has squall line passing over our position. Heavy rain high noise level on subbottom record. SSS still OK. must be associated with the cold front we've been expect 2 days.

2315 Ship has been unable to hold line. Squall accom by 40 kt winds. Making 4 kts over ground & still co to the line. Fish alt ≈ 1000m, but records still OK. long as the ship is unable to hold line, we will stay our current cable-out (5700m).

SAT 7 APRIL

0000 Continue line 22

29 well on 19-7/26

0012 RAIN STOPPED, SB RECORD IMMEDIATLY CLEANED UP.

0215 END OF LINE 22. BEGIN TURN TO NORTH TO CATCH LINE 23 HEADING WEST.
FISH Z = 2402 HDG = 102.0 ALT = 950m

0330 STOP CABLE IN @ 4750m

0400 APPROACHING LINE 23. BEGIN TO CABLE OUT SLOWLY.

0500 STOP CABLE @ 6000m. FISH ALT = 500m.

1000 Bridge informs us a fleet of fishing boats are approaching and not answering radio.

1015 Begin to cable in, preparing to maneuver around and thru fishing boats.

1018 Cable in to 5926m. Bridge established contact with fishing boats - they are not towing gear and will give right-of-way.

1130 END LINE #23. BEGIN CABLING IN FOR TURN TO THE SOUTH. PLAN TO RERUN LINE #22 CALLING IT #24.

1140 BEGIN TURN TO PORT (SOUTH), LINE #24 WILL RUN W→E.
FISH Z = 2419 ALT = 913 HDG = 275°

1158 Cable out to 5238m. Checked optical, we have about 9.6 M left, which should be enough to finish out the cruise. It is certainly handy to be able to store data for an entire cruise on a single disk.

We anticipate problems similar to the last attempt to run this line. Currents & wind will make it quite difficult to keep our SOG down. Anticipate that

Sat 7 April (Continued)

the ship will have to use the bow thruster to ma
an appropriate crab angle to stay on line.

1415 Cable out to 5982m. Ship was on bow thrus
only (mains secured) when 500 hp electric mote
in thruster went out (stalled by fouling of screw or
toasted motor?). Went back to mains & are now
struggling to get back to the line. Alt = 1035m
speed up to 4 kts! Looks like this line just does
want to be surveyed.

1441 Cable out to 6050m. We have an extreme crab a
Ship holding 035° to make good ~ 100°. Tow shewa
over to port. Fish alt. holding ~ 1020m, but sonar r
look pretty good.

1700 End of line 24, increase ship speed to straighte
tow block so we can bring in wire

1730 Begin cable in for towfish retrieval.

2146 Sea MARC on deck - ONCE AGAIN WE'VE CH
DEPTH.

Ship U/W for Tampa

0000 U/W as before

Cruise Summary

15 Mar - USGS Authorization to proceed, SeaMARC shipped fm Seattle, Nick & Kevin enroute to Lamont to spool cable

16 Mar - Cable work at Lamont

17 Mar - Cable work at Lamont

18 Mar - Cable work at Lamont (tensioning equip breaks)

19 Mar - Cable work at Lamont, Don Craft arr. Tampa to coordinate with shipyard

20 Mar - Cable work at Lamont, Larry Patterson arr. Tampa to assist

21 Mar - Winch/cable shipped fm Lamont, Nick, Kevin, John arr Tampa

22 Mar - Seattle truck arr. Tampa, SeaMARC gear installed on FARNELLA, Mike arr. Tampa

23 Mar - Lamont trucks arr Tampa, John Debernardo (Lamont) arr. Tampa

24 Mar - Winch installed on FARNELLA

25 Mar - Shipyard work completed, FARNELLA U/W at 1435, transit, running gravity line

26 Mar - Pay-out & respool cable (to tension it on winch), make electrical termination, begin deploying acoustic net at western site

27 Mar - Complete acoustic cal., transit to launch point, deploy SeaMARC, run lines 1 & 2

Sunday 8 Apr. Cruise Summary

28 Mar - Continue survey, run line 2, re-run line 1, line 3, decide to bring up SeaMARC to work on noise problem.

29 Mar - 0426 - SeaMARC on deck; 1525 - repairs and tuning complete, ~~SeaMARC ready to launch~~; 1658 SeaMARC launched, run lines 3 & 4

30 Mar - continue line 4, 5, 6

31 Mar - continue line 6, 7, 8, 9, 10-1

1 Apr - line 10-2, 10-3, 10-4, 11, 12

2 Apr - line 12, 13, recover SeaMARC for deployment and calibration of eastern acoustic net

3 Apr. - continue acoustic calibration, 1245 launch SeaMARC run lines 14

4 Apr - run lines 15, 16, 17

5 Apr - continue 17, 18, 19

6 Apr - continue 19-20, 21, 22

7 Apr. - continue 22, 23, 24. Survey complete, recover SeaMARC at 2146, transit to Tampa.

8 Apr - Transit to Tampa

The total survey provided imagery of approximately 3500 km^2, discounting data obtained in turns and launch/recovery.

Sunday 8 Apr. Cruise Summary

A total of 13½ at-sea "operational" days were provided by SeaMARC and the IDSS crew, plus ½ day of "downtime", as defined in the USGS contract.

Signed

IDSS USGS

M. E. Williamson David C. Twichell

HRG