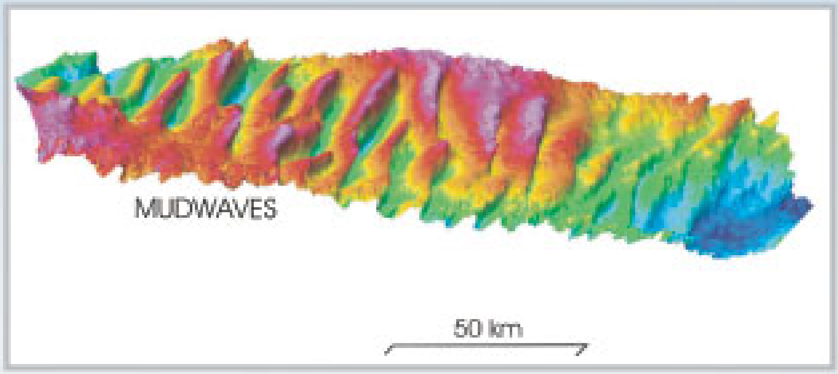


JR96 / JR103

30/12/2003
to
20/01/2004

JR96 Introduction

The main aims of the short JR96 cruise have been:

- To use multi-frequency acoustics to estimate the biomass of Antarctic krill in the Western Core Box (WCB) at South Georgia
- To sample with RMT8 net hauls to characterize the dominant zooplankton and obtain representative length frequency of krill
- To carry out an oceanographic survey of WCB using Undulating Oceanographic Recorder (UOR) and CTD.
- As part of AFI-3-16 to recover and deploy moorings within WCB.

The JR103 swath-bathymetry cruise has also taken place during this period and the ship has made logistic calls to Bird Island and King Edward Point (KEP).

Cruise narrative

27 – 29 December 2003: Science team travel from Cambridge to Stanley with overnight stops in Brize Norton and Ascension Islands.

30 December 2003: Mobilization with equipment from container unpacked. Ship sails at 13:00 (L) for South Georgia. During afternoon visited by RAF rescue helicopter that winches 3 people on to and then off the port quarter of the JCR.

31 December 2003 – 1 January 2004: On passage to first swath-bathymetry survey box located in SE approaches to South Georgia (see cruise track figure). Test deployment of UOR.

2 – 5 January 2004: Mid-afternoon start steaming SE swath bathymetry box. Continuing until late evening on 5 January.

6 – 7 January 2004: Relocate to start of second swath bathymetry survey box to south of Bird Island (see cruise track figure). Finish survey by mid-afternoon on 7 Jan and then move up to WCB (north of Bird Island) overnight. Opportunity to undertake some more swath prior to start of WCB transects on 8 Jan at 06:00 (L).

8 January 2004: Starting WCB on transects W1.1 and W1.2. Lots of ice around start of W1.1 so W1.2 run first from northern end. UOR taken out of water before end of transect W1.2 because of too much ice. Redeployed later once transect W1.1 started. Extensive deep targets seen during the day around the shelf break so once transects finished ship steamed to shelf-break to carry out target RMT that caught myctophid fish. Overnight carried out CTD's and RMT at stations W1.2N and W1.2S.

9 January 2004: Acoustic transect W2.1 started at southern end by 10:00 (L). UOR not deployed until second acoustic transect. Again lots of ice along transects and some significant deviations from planned track lines were necessary. Overnight returned to stations W2.2S and W2.2N to carry out CTD and RMT sampling.

10 January 2004: Weather deteriorated overnight and not suitable for UOR. Winds around 30 knots causing very poor quality acoustic data and so decided to head for

Rosita Harbour to undertake an acoustic calibration. Arrived at Rosita by 12:00 (L) and ship positioned on DPS in 25-30 knots of wind. Successful calibration carried out by 18:30 (L) and ship anchored overnight.

11 January 2004: Left Rosita at 05:00 (L) and at southern end of Transect W3.1 by 08:45 (L). Transect abandoned after couple of hours due to high winds and waves resulting in very poor acoustic data. Ship hove to until early evening. At 18:30 (L) attempted to complete W3.1 by starting from northern end but after an hour light fading and so acoustic run stopped and ship repositioned to undertake night time sampling with CTD and RMT at stations.

12 January 2004: Transects W3.2, W4.1 and first half of W4.2 run in relatively poor weather. UOR working well but quality of acoustic data generally very poor. By 19:00 (L) weather too poor to continue work and activities stopped.

13 January 2004: Ship hove to until 05:30 (L). Conditions then improved and moved down to site of shallow mooring. After acoustic runs either side of mooring conditions suitable for mooring recovery. Mooring did not respond to release signals and only appears at surface after lengthy but successful session trawling for gear with grapnel. CTD over mooring while mooring data downloaded. Mooring redeployed during dark.

14 January 2004: set of short acoustic transects over deployed mooring before moving out to site of deep mooring. Deep mooring recovered at first light without problems and redeployed over lunch. Ship then proceeded to Bird Island to pick up Jaume Forcada and Dave Molynaux. Ice everywhere and ship waited to north of Bird Sound while workboat took engineers and doctor ashore. Left Bird Island to return back to shallow mooring site by 21:00 (L). RMT alongside shallow mooring followed by set of acoustic transects either side of mooring.

15 January 2004: Acoustic transects continued until 04:00 (L) then ship proceeded to Cumberland Bay and KEP. Arrived in Cumberland Bay in time for lunch and then chance for people to go ashore while ship conducted small boat training in Morraine Fjord. Left KEP by 16:00 (L) to return to shallow mooring. RMT next to mooring carried out prior to more acoustics over the mooring.

16 January 2004: In excellent weather ship repeats transects W3.1, W3.2 and W4.1 before night fall. Ship then turning for Stanley and weather deteriorated rapidly.

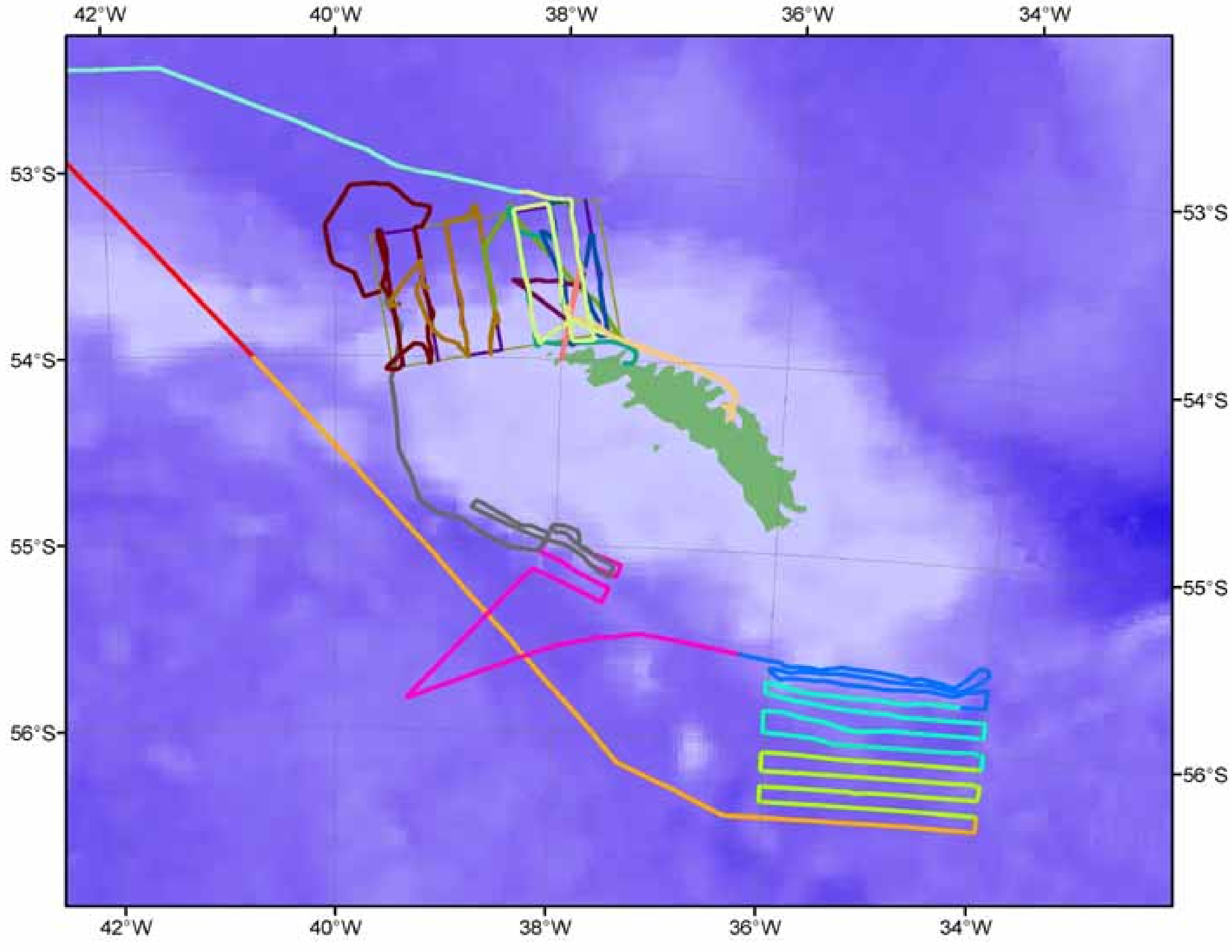
17 – 19 January 2004: On passage to Falkland Islands. Arrive Falklands at 21:00 with more than 45 knot wind in Port William. Anchor overnight.

20 January 2004: Ship alongside FIPASS and demobilizing prior to departing ship on 21 January.

21 – 26 January 2004: Science team off ship and taking the South American route home.

JR96 & JR103
December 2003 – January 2004

Saturday	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday
27 Leave home Overnight at Brize	28 Flight to and overnight at Ascension	29 Flight to MPA. On ship at 17:30 (local time)	30 Sailed at 13:00 RMT rigged Buzzed by chopper	31 Magnetometer deployed	1 First swath transect started Trial UOR deployment	2 *Arrival SE swath box (evening)*
3 *Swath day 1*	4 *Swath day 2*	5 *Swath day* 3	6 *Swath day 4*	7 *Swath day 5,*	8 *Transit to KEP*	9 *KEP* *Transit to Core box*
10 *Core programme Day 1*	11 *Core programme Day 2*	12 *Core programme Day 3*	13 Shallow mooring	14 Deep Mooring Bird Island Night net & acoustics	15 Visit to KEP	16 *Bird Island*
17 *Passage to FI*	18 *Passage to FI*	19 *Passage to FI*	20 *Due to arrive FI*	21	22	23
24 *Flight to Chile*	25	26 *Arrival UK*				



42°W
40°W
38°W
36°W
34°W
53°S
54°S
55°S
56°S
53°S
54°S
55°S
56°S
42°W
40°W
38°W
36°W
34°W

OCEANLOGGER (UNDERWAY MEASUREMENTS)

Throughout JR96, underway measurements were made with the ship's oceanlogger. The oceanlogger system is comprised of a thermosalinograph and fluorometer connected to the ship's non-toxic pumped seawater supply, plus meteorological sensors measuring duplicate air pressure, duplicate air temperature, duplicate humidity, duplicate total incident radiation (TIR) and duplicate photosynthetically available radiation (PAR). There were 18 sensors logged in total within the oceanlogger system. To complete the meteorological data set I merged in the windspeed and direction from the anemometer. Data are time-stamped using the ship's master clock.

Calibration details

Up to date calibration certificates for all sensors was provided by Jim Fox (ETS).

Data Processing

Oceanlogger data were processed in 12 hour segments throughout the course of JR96. Three Unix scripts calling PSTAR software routines were used for this processing:

`96oclexec0`: Reads the oceanlogger data streams into a PSTAR format and merges in relative wind speed and direction from the anemometer data stream. Output files are 96ocl[jday][a/p].raw and ocl961. The former of these is the 12-hour data segment for morning (a) or afternoon (p) of Julian day jday. The latter is the master file to which successive 12-hour sections are appended.

`96oclexec1`: Divides the data into ocean data and meteorological data files, writing meteorological data to a separate file. Output file is 96met[jday][a/p].raw (containing the meteorological data).

`twvelexec`: Merges the met data file with gyrocompass and navigation data streams in order to calculate ship motion and true wind velocity. Output file is 96met[jday][a/p].true.

Problems

The only problem with the system was during bad weather (before the mooring recovery) the severe pitching of the James Clark Ross lifted the underway system pump intakes out of the water and stalled the pumps. We waited until the weather calmed somewhat before re-starting the system.

JR96 CTD Operations

Summary

This report describes the method of acquisition and calibration of 9 CTD stations collected on JR96. The system performed excellently throughout the cruise with no serious problems encountered.

The CTD equipment

The CTD unit used for the measurement program was a Sea-Bird 911 plus with a dual temperature and conductivity sensors, an altimeter, dual SBE 43 oxygen sensors and a par sensor. The configuration and serial numbers of the sensors used are in table 1 below. A copy of the full calibration coefficients for the CTD is in appendix A.

Table 1: CTD configuration throughout JR96

CTD sensor	Serial Number	date last calibrated
Sea-Bird 911 plus	09P15759-0480	24-Jul-03
Series 410K-105 Digiquartz pressure transducer	67241	24-Jul-03
Primary SBE 4C conductivity sensor	042255	14-May-03
Primary SBE 3 plus temperature sensor	032679	13-May-03
Primary pump SBE 5 T submersible pump	2395	
Secondary SBE 4C conductivity sensor	042813	22-Nov-02
Secondary SBE 3 plus temperature sensor	034235	04-Dec-02
Secondary SBE 5 T submersible pump.	2400	
Tritech PA200/20-5 Altimeter	2130.27001	28-Jan-00
Primary Seabird SBE 43 Oxygen sensor	0245	27-Aug-02
Secondary Seabird SBE 43 Oxygen sensor	0242	07-Jul-03
Biospherical Instruments Par Sensor	7235	22-Aug-03

All calibration coefficients are given in Appendix A.

The CTD was connected to an SBE 32, 12 position carousel water sampler (S/N 3215759-0173) carrying 12 10 L bottles. In addition the CTD was connected to an SBE 35 Reference Temperature

Sensor (S/N 0315759-0005).

Deployment of the CTD package was from the mid-ships gantry and A-frame, on a single conductor torque balanced cable connected to the CTD through the BAS conducting swivel. This CTD cable was made by Rochester Cables and was hauled on the 10T traction winch. There were no problems deploying the CTD package and no re-terminations were required throughout the cruise.

The CTD data were logged via an SBE 11 plus deck unit to a 1.4GHz P4 PC, running Seasave Win32 version 5.28e (Sea-Bird Electronics Inc.). This new software is a great leap forward compared with the DOS version in that one can draw several graphs of various recorded parameters in real time, as well as having numerical lists of data to the screen. The data rate of recorded data for the CTD was 24 Hz.

A full station list is given in table 2 below.

Table 2: Full details of CTD measurements taken on JR96

STATION	YYYY/MM/ DD	Day of Year	HH:MM	decimal Long	decimal Lat	Long deg.	long min	Lat	lat min	uncorr wdept	ctd Max P
96ctd016	09/01/2004	009	03:33	-39.250610	-53.492980	-39	15.04	-53	29.58	3154	1014
96ctd018	09/01/2004	009	08:11	-39.144390	-53.839730	-39	8.66	-53	50.38	283	269
96ctd020	09/01/2004	009	22:00	-38.583440	-53.785400	-38	35.01	-53	47.12	211	198
96ctd023	10/01/2004	010	04:47	-38.693360	-53.432370	-38	41.60	-53	25.94	3498	1015
96ctd024	10/01/2004	010	16:43	-37.435640	-54.016900	-37	26.14	-54	1.01	53	46
96ctd026	11/01/2004	011	23:20	-38.081650	-53.362490	-38	4.90	-53	21.75	2670	1015
96ctd027	12/01/2004	012	06:20	-37.966130	-53.714270	-37	57.97	-53	42.86	138	121
96ctd032	13/01/2004	013	13:30	-37.935790	-53.798210	-37	56.15	-53	47.89	305	283
96ctd035	14/01/2004	014	14:34	-37.844160	-53.513260	-37	50.65	-53	30.80	1322	1295

Calibration of the CTD data

Four files were created when the Seasave Win32 version 5.28e module was exited at the end of each CTD cast: a binary data file, with the extension .dat, an ascii configuration file containing calibration information with the extension .con, an ascii header file containing just the sensor information with the extension .hdr, and an ascii file containing the data cycle numbers at which a bottle was closed on the rosette, with extension .bl. After the CTD the data was converted to ascii and calibrated by running the Sea-Bird Electronics Inc. Data Processing software version 5.28f *Data Conversion* module. Finally the data was processed to take into account the thermal mass of the CTD cell using the Sea-Bird Electronics Inc. Data Processing software version 5.28f *celltm* module. The full data processing path is described below.

The calibration for each sensor was as follows:

For the Pressure Sensor:

$$P = C\left(1 - \frac{T_o^2}{T^2}\right)\left(1 - D\left(1 - \frac{T_o^2}{T^2}\right)\right)$$

Where P is the pressure, T is the pressure period in μS, D is given by

$$D = D_1 + D_2U$$

U is the temperature in degrees centigrade, T_o is give by

$$T_o = T_1 + T_2U + T_3U^2 + T_4U^3 + T_5U^4$$

and C is

$$C = C_1 + C_2U + C_3U^2$$

all other coefficients are listed in Appendix A

For the Conductivity Sensor:

$$cond = \frac{(g + hf^2 + if^3 + jf^4)}{10(1 + \delta t + \varepsilon p)}$$

Where the coefficients are given in Appendix A, δ = CTcorr and ε = Cpcorr, *p* is pressure and *t* temperature.

For the Temperature sensor:

$$Temp\ (ITS-90)=\left\{\frac{1}{g+h(\ln(f_o/f)+i(\ln^2(f_o/f)+j(\ln^3(f_o/f)}\right\}-273.15$$

Where all of the coefficients are given in Appendix A, and *f* is the frequency output by the sensor.

This output an ascii file, with the extension cnv. Then the Sea-Bird Electronics Inc. Data Processing software version 5.28f *Cell Thermal Mass* module was used to remove the conductivity cell thermal mass effects from the measured conductivity. This correction followed the algorithm

dt = temperature - previous temperature

ctm = (-1.0 * b * previous ctm) + (a * dcdt * dt)

and

corrected conductivity = c + ctm.

and

a = 2 * alpha / (sample interval * beta + 2)

b = 1 - (2 * a / alpha)

dcdt = 0.1 * (1+ 0.006 * (temperature - 20)

with alpha set to = 0.03, beta set to = 7.0.

This routine output a file also with extension cnv, but with a different filename.

SBE35 High precision thermometer

Every time a water sample is taken using the rosette, the SBE 35 recorded a temperature in EEPROM. This temperature was the mean of 10 * 1.1 seconds recording cycles (therefore 11 seconds) data. The thermometer has the facility to record 157 measurements but we downloaded the data approximately every 5 casts (60 measurements) using the Sea-Bird Electronics Inc. Terminal programme. Data were converted to temperature using the Sea Bird calibration routines:

$$t_{90}=\frac{1.0}{a_o+a_1\ln(n)+a_2\ln^2(n)+a_3\ln^3(n)+a_4\ln^4(n)}-273.15$$

and

$$t_{90}=slope\times t_{90}+offset$$

and n is the output from the SBE 35, the other constants are listed in appendix A..

CTD Data Processing

In the following notes the term CC refers to the cruise number, and the term NNN refers to the event number.

The CTD data is recorded using the Seabird data module ***seasave***. The raw data files created are: **CCctdNNN.dat** (raw data file), **CCctdNNN.con** (configuration file), **CCctdNNN.bl** (bottle information file), **CCctdNNN.hdr** (header information file).

1. To process the data in the ctd unit

The raw data is stored as binary files. These are converted to ASCII data files for further processing.

***Data Conversion* module**

This program converts the binary file to ASCII. Although it can be used to derive variables, we only use it to convert the file. The variables output at each station were:

Variable 1 = timeS: Time, Elapsed [seconds]
Variable 2 = prDM: Pressure, Digiquartz [db]
Variable 3 = ptempC: Pressure Temperature [deg C]
Variable 4 = t090C: Temperature [ITS-90, deg C]
Variable 5 = c0mS/cm: Conductivity [mS/cm]
Variable 6 = t190C: Temperature, 2 [ITS-90, deg C]
Variable 7 = c1mS/cm: Conductivity, 2 [mS/cm]
Variable 8 = sbeox0ML/L: Oxygen, SBE 43 [ml/l]
Variable 9 = sbeox0V: Oxygen Voltage, SBE 43
Variable 10 = sbeox0dOC/dT: Oxygen, SBE 43 [doc/dt]
Variable 11 = sbeox1ML/L: Oxygen, SBE 43, 2 [ml/l]
Variable 12 = sbeox1V: Oxygen Voltage, SBE 43, 2
Variable 13 = sbeox1dOC/dT: Oxygen, SBE 43, 2 [doc/dt]
Variable 14 = par: PAR/Irradiance, Biospherical/Licor
Variable 15 = altM: Altimeter [m]
Variable 16 = flag: 0.000e+00

***Cell Thermal Mass* module**

This program takes the output from the datcnv program and re-derives the pressure and conductivity, to take into account the temperature of the pressure sensor and the action of pressure on the conductivity cell. The output file is of the form CCcnvNNNtm.CNV. A second file of the form CCctdNNN.ros is also created. The variables output were the same as for the CNV program.
These files were saved on the D:\ drive of the CTD PC with a separate folder for each CTD.

2. To process the SBE35 data

Communication must be established between the CTD PC and the SBE35 by switching on the deck unit. The program used to process the data is:

Seabird terminal programme
This is a simple terminal emulator set up to talk to the SBE35. Once you open the program the prompt is ">". You can ask the SBE35 how it is by typing DS:
ds This stands for ***d****isplay* ***s****tatus*. The SBE35 responds by telling you the date and time of the internal clock, and how many data cycles it currently holds in memory.
The next thing is to click the capture toolbar button and enter a sensible filename. Once done the data can be downloaded by typing
dd This stands for ***d****ump* ***d****ata*. The data currently held in the memory is listed to the screen. This can be slow due to the low data transfer rate.
Once finished downloaded one clicks on the 'capture' button to close the open file, and the clears the memory of the SBE 35 using the command
samplenum=0
Finally one should type ***ds*** to check that the memory is clear before shutting down the system.

Problems during JR96
There is a problem with the system caused by I assume electrical spiking in the instrument. The error shows up as a large spike in the altimeter and only appeared twice on this cruise, and both times on the downcast. The result is that the pumps on the CTD shut down, and so the conductivity and derived salinity become very noisy. The cure is to stop lowering the CTD and simply wait the fifteen or so seconds it takes for the pump to turn back on before re-starting.

Appendix A: Calibration data.

Configuration report for SBE 911/917 plus CTD from JR96.con

Date: 01/19/2004
ASCII file: D:\data\JR96\JR96.con
Configuration report for SBE 911/917 plus CTD

```
Frequency channels suppressed : 0
Voltage words suppressed      : 0
Computer interface            : RS-232C
Scans to average              : 1
Surface PAR voltage added     : No
NMEA position data added      : No
Scan time added               : No
```

1) Frequency, Temperature

```
   Serial number : 032679
   Calibrated on : 13-May-03
   G             : 4.36448805e-003
   H             : 6.44268079e-004
   I             : 2.37330434e-005
   J             : 2.31496586e-006
   F0            : 1000.000
   Slope         : 1.00000000
   Offset        : 0.0000
```

2) Frequency, Conductivity

```
   Serial number : 042255
   Calibrated on : 14-May-03
   G             : -1.02537060e+001
   H             : 1.41054885e+000
   I             : -1.91533552e-003
   J             : 2.35323689e-004
   CTcor         : 3.2500e-006
   CPcor         : -9.57000000e-008
   Slope         : 1.00000000
   Offset        : 0.00000
```

3) Frequency, Pressure, Digiquartz with TC

```
   Serial number : 09P15759-0480(67241)
   Calibrated on : 24-Jul-03
   C1            : -4.461418e+004
   C2            : 3.038286e-002
   C3            : 1.224130e-002
   D1            : 3.645500e-002
   D2            : 0.000000e+000
   T1            : 2.999608e+001
   T2            : -3.512191e-004
   T3            : 3.729240e-006
   T4            : 4.918760e-009
   T5            : 0.000000e+000
   Slope         : 0.99995000
```

```
Offset         : -0.96490
AD590M         : 1.283280e-002
AD590B         : -9.474491e+000
```

4) Frequency, Temperature, 2

```
Serial number : 034235
Calibrated on : 04-Dec-02
G             : 4.34551188e-003
H             : 6.45187364e-004
I             : 2.21136893e-005
J             : 1.74596052e-006
F0            : 1000.000
Slope         : 1.00000000
Offset        : 0.0000
```

5) Frequency, Conductivity, 2

```
Serial number : 042813
Calibrated on : 22-Nov-02
G             : -9.74925216e+000
H             : 1.45147141e+000
I             : -4.32229127e-003
J             : 3.61714849e-004
CTcor         : 3.2500e-006
CPcor         : -9.57000000e-008
Slope         : 1.00000000
Offset        : 0.00000
```

6) A/D voltage 0, PAR/Irradiance, Biospherical/Licor

```
Serial number        : 7235
Calibrated on        : 22/8/03
M                    : 1.00000000
B                    : 0.00000000
Calibration constant : 34129690000.00000000
Multiplier           : 1.00000000
Offset               : -0.04191480
```

7) A/D voltage 1, Free

8) A/D voltage 2, Oxygen, SBE 43

```
Serial number : 0245
Calibrated on : 27/8/02
Soc           : 4.0080e-001
Boc           : 0.0000
Offset        : -0.4413
Tcor          : 0.0014
Pcor          : 1.35e-004
Tau           : 0.0
```

9) A/D voltage 3, Free

10) A/D voltage 4, Oxygen, SBE 43, 2

```
Serial number : 0242
Calibrated on : 7/7/03
Soc           : 4.6410e-001
Boc           : 0.0000
Offset        : -0.4707
Tcor          : -0.0001
Pcor          : 1.35e-004
Tau           : 0.0
```

11) A/D voltage 5, Free

12) A/D voltage 6, Altimeter

```
Serial number : 2130.27001
Calibrated on :
Scale factor  : 15.000
Offset        : 0.000
```

13) A/D voltage 7, Free

Navigation data

There were six navigational instruments for scientific use on the RRR *James Clark Ross* (listed in Table 1 below). Although the five instruments appear in some cases to be similar, they are all unique. As well as the three GPS systems listed in Table 1, there are additional GPS systems on board the JCR for the ship's use. These are a Leica MX400 and two Ashtec G12 receivers as part of the dynamic positioning system. In addition, there is a Racal Satcom, which receives GPS SV range correction data via INMARSAT B. This data is passed to the Trimble, Leica and G12 receivers allowing them to operate in Differential mode (DGPS). During JR96 the DGPS reference station at Stanley was used.

Table 1: Scientific Navigation instruments on JR96

Instrument	Type	Code	Use
Trimble 4000	GPS receiver	gps	Primary positional information
Ashtec GG24	GLONASS / GPS receiver	glo	Positional information
Ashtec ADU-2	GPS receiver	ash	Attitude information
Seatex	GPS Receiver	swn	For EM120
Gyrocompass	Sperry Mk 37 model D	gyr	Heading information
Electromagnetic Log	Chernikeeff log Aquaprobe Mk V	eml	Velocity information

The collection and use of all of the navigation data are linked. All of the instruments are currently logged to the SCS system and then transferred to the old RVS Level C system where they are currently read.

During cruise JR96, the data for all six instruments and the standard editing procedures were done in one Unix script called *jr96_nav_go*. This script requires the Julian day and am or pm selection as input and then executes a further 8 C shell scripts to read in 12 hours of data and edit where necessary, all five streams. This report briefly describes each instrument and explains the processing as was performed on cruise JR96.

The instruments

Trimble 4000

The Trimble 4000 receiver in differential mode, was the primary source of positional information for the scientific work on JR96.

The data were logged at 1 second intervals and read into pstar files in 12 hour periods from the SCS derived Level C stream using the Unix script *gpsexec0*. Individual steps in this exec are as follows.

**** = 3 digit Julian day plus a or p for am or pm

gpsexec0 - Reads Trimble data into pstar format

Steps:

datapup	-	transfers the data from RVS binary files to pstar binary files
pcopya	-	resets the raw data flag on the binary file
pheadr	-	sets up the header and data name of the file
datpik	-	removes data with a dilution of precision (hdop) greater than 5

Output files: 96gps****.raw (just before editing stage)
96gps**** (following *datpick*)

Ashtec GLONASS (GG24)

The Ashtec GG24 works by accepting data from both American GPS and the Russian GLONASS satellite cluster, this extends the constellation of available satellites to 48 and should, theoretically, be significantly more accurate. However, experiments on previous cruises have suggested that the accuracy is significantly lower than the differential GPS.

Data were logged routinely using *ggexec0*, called from *jr96_nav_go*, but were not used in the processing of other data streams.

Output files: 96glo****.raw
96glo**** (following basic quality control of raw data)

Ashtec ADU-2

The Ashtec ADU-2 GPS is used to correct errors in the gyrocompass heading that are input to the ADCP. The configuration of the receiver is complex, made more so by the fact that the receiver can only be configured with the use of a laptop running a terminal emulation program.

Configuration data for the Ashtec aerial configuration is shown in Table 2. The port-aft antenna is designated number 1, port-fwd is number 2, stbd-fwd is number 3 and stbd-aft is number 4. the XYZ vectors have been adjusted so that heading is defined by the direction normal to the 1-4 baseline (i.e. that baseline has Y = 0)

Vector	X(R)	Y(F)	Z(U)
1-2	2.938	4.748	0.027
1-3	1.478	4.749	0.011
1-4	13.210	-0.0000	-0.036
offset	0(H)	0(P)	0(R)

**** = 3 digit Julian day plus a or p for am or pm

Max cycle	0.2 cyc	smoothing	N
Max mag	0.08	Max angle	10

Table 2

The Ashtec functioned well during JR96 apart from a number of periods when no data was received (see Table 3 for times and durations). This was very unfortunate because of the implications for ADCP processing. It also could have been easily avoided if we had maintained regular watches.

Our complex data processing is designed with using the Ashtec to correct the gyrocompass error in mind. There are were three execs involved in the processing: *ashexec0*, *ashexec1* and *ashexec2*.

ashexec0 - Reads in data from the GPS3DF into pstar format

Steps:
- *datapup* - transfers the data from RVS binary files to pstar binary files
- *pcopya* - resets the raw data flag on the binary file
- *pheadr* - sets up the header and data name of the file

Output files: 96ash****.raw

ashexec1 - Merges Ashtec data to master gyro file from gyroexec0

Steps:
- *pmerg2* - merges the Ashtec file with the master gyro file
- *parith* - calculates the differences in the Ashtec and gyro headings (delta heading)
- *prange* - Forces delta heading to lie around zero

Output files: 96ash****.mrg

**** = 3 digit Julian day plus a or p for am or pm

ashexec2 - Complicated exec as it edits the merged data file

Steps: *datapik2* - rejects all data outside the following limits:

heading outside 0^o and 360^o
pitch outside -5^o and 5^o
roll outside -7^o and 7^o
attf outside $–0.5^o$ and 0.5^o
mrms outside 0.00001^o and 0.1^o
brms outside 0.00001^o and 0.1^o
delta heading outside -5^o and 5^o

pmdian - removes flyers in delta heading of greater than 1^o from a 5 point mean

pavrge - sets the data file to be on a 2 minute time basis

phisto - calculates the pitch limits

datpik - further selection of bad data outside the following limits:

pitch outside the limits created
mrms outside the range 0 to 0.004

pavrge - again, sets the data file to be on a 2 minute time base

pmerge - merges the heading data back in from the master gyro file

pcopya - changes the order of the variables

Output files: 96ash****.edit
96ash****.ave

A manual editing procedure was then performed, as described in the ADCP data processing report.

Gyrocompass

The gyrocompass is a fundamental data stream. It is used by the RVS program *bestnav* to derive dead reckoning in the absence of GPS data, as well as being used for ADCP processing (ADCP report) and derivation of true wind velocity (ocean logger report). For JR96, the gyrocompass data was read in 12 hour time periods using the Unix exec *gyroexec*.

**** = 3 digit Julian day plus a or p for am or pm

gyroexec0 - Reads in the gyrocompass data and removes the inevitable bad data

Steps:
- *datapup* - transfers the data from RVS binary files to pstar binary files
- *pcopya* - resets the raw data flag on the binary file
- *pheadr* - sets up the header and data name of the file
- *datpik* - forces all the data from the gyro to be between 0^o and 360^o

Output files: 96gyr****.raw

The script also appends the day file to the master file called *96gyr01*

Electromagnetic Log

The Electromagnetic Log gives water velocity relative to the ship in both the fore-aft and port-starboard direction. This data was read in 12 hour time periods using a simple exec *emlexec0*.

emlexec0 - Reads in data from the Electromagnetic Log into pstar format

Steps:
- *datapup* - transfers the data from RVS binary files to pstar binary files
- *pcopya* - resets the raw data flag on the binary file
- *pheadr* - sets up the header and data name of the file

Output files: 96eml****.raw

Doppler Log

The Doppler Log gives water velocity relative to the ship in both the fore-aft and port-starboard direction. This data was read in 12 hour time periods using *dopexec0*.

dopexec0 - Reads in data from the Doppler Log into pstar format

Steps:
- *datapup* - transfers the data from RVS binary files to pstar binary files
- *pcopya* - resets the raw data flag on the binary file
- *pheadr* - sets up the header and data name of the file

**** = 3 digit Julian day plus a or p for am or pm

Daily navigation processing

As stated above, the data was read in as twice daily (12 hour) files; the time periods being either from 00:00Z to 11:59Z or 12:00Z to 23:59Z. Our primary navigation data was taken from the RVS file bestnav. This program uses the navigation data from various streams to construct a file with 30 second fixes. For JR96 the primary input to bestnav was the Trimble 4000 DGPS. This navigation file was read into a pstar file using the script *navexec0*.

navexec0		- Reads in data from the bestnav stream into pstar format
Steps:	*datapik2*	- transfers the data from RVS binary files to pstar binary files
	pcopya	- resets the raw data flag on the binary file
	pheadr	- sets up the header and data name of the file
	posspd	- here we calculate the east and north velocities from position and time
	papend	- output file is added to the master file
	pdist	- recalculates the 'distance run' variable
	pcopya	- takes out the RVS calculated 'distance run'

Ouput files: abnv961

The output master file, abnv961, is used for all pstar required navigation information (e.g. ADCP processing).

The processed data was then averaged and filtered using *navexec1*.

navexec1		- Averages and filters navigation data
Steps:	*pcopya*	- copies output file from navexec0 (abnv961) and changes data name
	pmdian	- removes spikes in velocity data
	pintrp	- interprets and replaces missing velocity data
	pfiltr	- data smoothed using top hat

Output files: abnv961.av

**** = 3 digit Julian day plus a or p for am or pm

JR 96 Acoustic Report

Jon Watkins

Introduction

This report should be read in conjunction with ETS report which gives details of changes to set up of EK60 system.

This is the second season the EK60 has been used on JCR. However this is the first cruise that new software (ER60 software version 2.0.0) has been used. A manual for this is in the EK60 drawers in the UIC and also an electronic version can be found in on the APC10 machine. The majority of the set up and operation followed the methods described in JR92 and JR82 cruise reports. Here I detail only significant changes from these previous reports.

SSU settings

The ER60 has been run successfully with the EM120 swath bathymetry and TOPAZ systems. Pings are co-ordinated using the Simrad SSU. The following settings provided a reasonable compromise for all sounders when using swath in deep water.

Three SSU groups are set up: (i) EM120 and EA500 (passive), (ii) EK60, (iii) Topaz. Order of pings - group 1, 2, 3, 2, 1, 2, 3, 2, 1, 2, 3, 2 etc. Resulting ping intervals (seconds) for EK60 (taken on 3/1/04 at 13:19) are: 12, 6, 14, 6, 13, 6, 12, 7, 13, 6, 13, 6, 14 etc. Time delay decreases in shallow water. These settings were used until 8 January when EM120 and TOPAZ were switched off and ER60 run on a 2 second ping interval.

Master clock synchronization

A programme to pick up time from network (**k9nt**) has been installed. This program will update time every few seconds so that there is no need to synchronize PC clocks. The program is installed in the PC startup directory so there is no need to reinstall if machine rebooted.

Data logging

At the start of the cruise APC10 (the main ER60 computer) was running the Simrad ER60 software and EK60 workstation 2 (EK60-2) was running Echolog and live viewing. The disadvantage of this set up is that the processing load on EK60-2 is such that any additional data-processing (for instance editing in echoview) is both slow and may put the data logging at risk.

From 19:14 (Z) on 3 January the system was reconfigured so that APC-10 runs ER60 and Eklog software. Data from this machine are written to network drive U:ek60. EK60-2 runs Echoview liveview module and can also access the main network so that data on all common drives can be accessed. This means that EK60-2 can be used for data processing without compromising the data logging occurring on APC-10.

With all acoustic data being logged directly to network drive it is no longer necessary to back data up onto CDs written locally. All acoustic data are now backed up daily as part of the general backups of jruf.

A transect log for acoustic transects can be found at the end of this cruise report.

Setup files

Seup files for cruise are contained in APC10 *C:\Program Files\Simrad\Scientific\EK60\settings\JR103_*.set* or *JR96.set*

Key settings of ER60 prior to calibration on 10 January are shown below in Table 1.

Acoustic calibration

The acoustic calibration was undertaken in Rosita Harbour on 10 January 2004. Standard ER60 calibration procedures were used and have been well documented for JR82. Copper calibration spheres provided by Simrad were used. This was the first calibration of the new 200 kHz split beam transducer. Calibration was undertaken with the ship on DPS initially under very windy conditions. No problems were encountered and each frequency was calibrated at the operating pulse duration of 1 ms. Conditions within Rosita Harbour were excellent with a very uniform salinity and temperature profile from surface to deeper than 30 m. Sound velocity determined from CTD varied by less than 1 m s^{-1} through the water column. With maximum depths reaching more than 50 m within the harbour this is an excellent location for future calibration.

After calibration the values for echo-sounder settings were automatically loaded into the ER60 (Table 2).

Calibration files (10010438.dat, 100104120.dat, 100104200.dat) for Rosita Harbour calibration can be found on APC-10.

Problems

Few problems with the system have been detected. The machine crashed several times during the cruise, however, no significant loss of logging time has occurred. Interference has been detected in shallow water although, as commented on in previous cruise reports, this can be reduced by running the EA500 (bathymetric sounder) on the reduced power setting (see ETS cruise report for further details).

Table 1: Echo-sounder settings used prior to calibration on 10 January

Transducer frequency (kHz)	38	120	200
Gain	24.19	22.43	27.0
Sa correction	-0.07	-0.42	0.00
2-way beam angle	-20.7	-20.7	-19.6
Angle sensitivity Alongship	22.0	21.0	23.0
Angle sensitivity Athwartship	22.0	21.0	23.0
Angle offset Alongship	0.07	0.05	0.00
Angle offset Athwartship	0.03	0.15	0.00
3 dB beam Alongship	7.02	7.92	8.00
3 dB beam Athwartship	6.94	7.74	7.90
Pulse duration (μs)	1024	1024	1024
Power (watts)	2000	500	300
Sample interval (m)	0.187	0.187	0.187
Receiver bandwidth kHz	2.43	3.03	3.09
Sound speed (m s^{-1})	1461	1461	1461
Absorption coefficient	10.11	27.22	40.6
Noise estimate	~140	~152	~
Maximum ping range	300	300	300

Table 2: Echo-sounder settings loaded into ER60 after calibration on 10 January 2004.

Transducer frequency (kHz)	38	120	200
Reference target strength	-33.80	-40.30	-44.80
Sphere distance	24.5 m	24.5	25.02
New Gain	24.18	21.25	23.79
New Sa correction	-0.61	-0.42	-0.33
New 2-way beam angle	-20.7	-20.7	-20.7
New Angle sensitivity Alongship	22.0	21.0	23.0
New Angle sensitivity Athwartship	22.0	21.0	23.0
New Angle offset Alongship	-0.06	-0.02	-0.22
New Angle offset Athwartship	0.01	-0.11	-0.11
New 3 dB beam Alongship	7.02	7.54	6.66
New 3 dB beam Athwartship	7.06	7.53	6.83
Pulse duration (μs)	1024	1024	1024
Power (watts)	2000	500	300
Sample interval (m)	0.187	0.187	0.187
Receiver bandwidth kHz	2.43	3.03	
Sound speed (m s^{-1})	1454	1454	1461
Absorption coefficient	10.2	27.3	
Noise estimate	~140	~152	
Maximum ping range	300	300	300

JR96 Net sampling

Jon Watkins

Introduction

Net sampling for krill, micro-nekton and macro-zooplankton has been undertaken with a standard BAS multiple RMT8 rigged to fish with two independent nets. Net hauls have been conducted either as double oblique hauls or as target hauls. Table 1 shows details of net hauls undertaken during the cruise.

Net sorting

All nets were sorted onboard JCR. For large catches subsamples of catch were taken for detailed analysis. Fish and fish larvae have been frozen at -80°C for identification back in Cambridge (Table 2 provides details of frozen samples).

All catches have been documented using digital photography (Table 3 documents photographic id and net numbers). No samples have been preserved in formalin.

Krill length frequency

Samples of krill have been measured and where possible maturity staged. A total of 308 krill were processed. An unweighted length frequency plot is shown below.

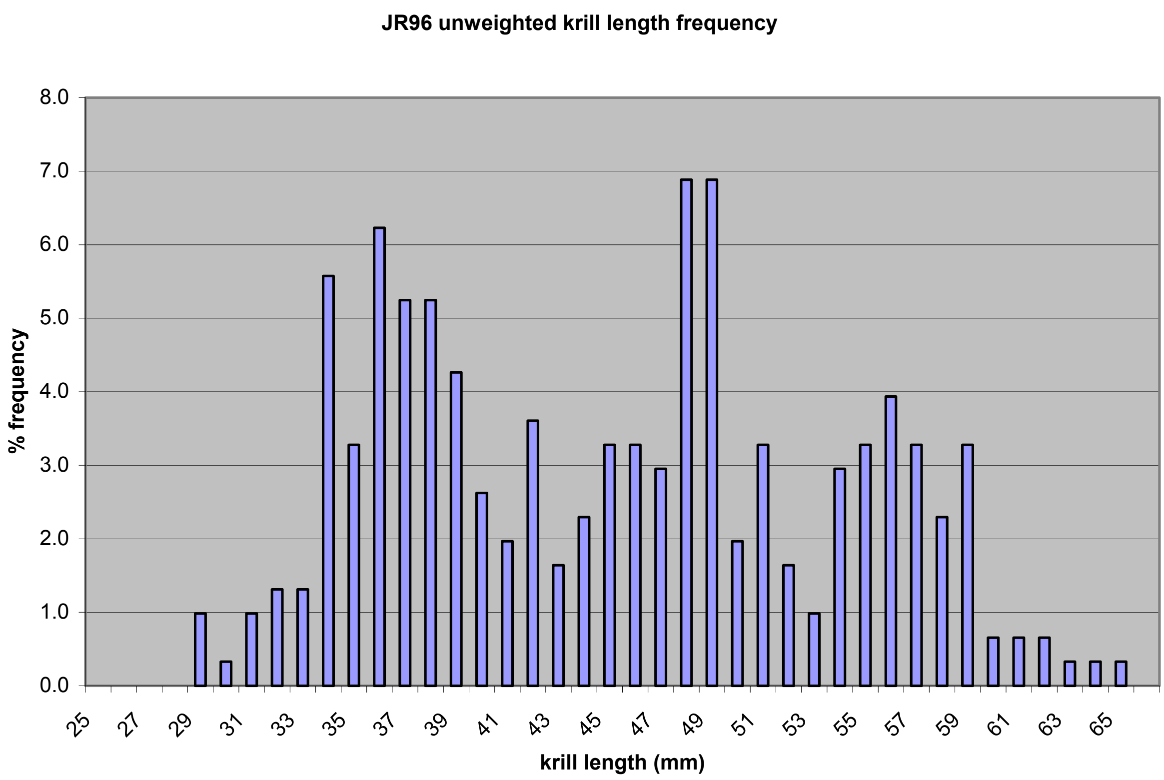


Table 1: Details of RMT8 net hauls taken during JR96

Event number	Date Time of first net open	Date Time of second net closed	Depth range sampled	Haul type	Location
15	040109 0016	040109 0038	20 -155	ID	Shelf break T1.1
17	040109 0602	040109 0631	27 - 66	ID	Shelf break T1.2
21	040109 2245	040109 2329	12 - 170	DO	2.2S
22	040110 0246	040110 0346	10 - 250	DO	2.2N
27	040112 0102	040112 0202	6 - 200	DO	3.2N
28	040112 0504	040112 0541	0 - 130	DO	3.2 S
36	040115 0005	040115 0045	9 - 206	ID	Shallow mooring
37	040116 0110	040116 0140	20 - 150	ID	Shallow mooring

Table 2: Details of frozen samples in -80°C deep freeze. Note that numbers in parenthesis are uncorrected event numbers that are marked on labels in freezer bags and on bill of lading.

Event	Net type	Net number	Date	Time	contents	Container	Location
E27(26)	RMT8	1	12/01/2004	01:02	Myctophid fish (15)	plastic bag	Box 1
E27(26)	RMT8	2	12/01/2004	01:34	Myctophid fish (9)	plastic bag	Box 1
E28(27)	RMT8	1	12/01/2004	05:04	Juvenile icefish (5), fish larvae (34)	plastic bag	Box 1
E28(27)	RMT8	2	12/01/2004	05:25	juvenile icefish (6), fish larvae (7)	plastic bag	Box 1
E36(32)	RMT8	1	15/01/2004	00:05	mysids & small krill (500 ml)	plastic bag	Box 2
E36(33)	RMT8	2	15/01/2004	00:30	juvenile fish (10)	plastic bag	Box 1
E37	RMT8	1	16/01/2004	01:10	fish larvae (7)	plastic bag	Box 1
E37	RMT8	1	16/01/2004	01:10	mysids (1 litre subample)	plastic bag	Box 2
E37	RMT8	2	16/01/2004	01:23	fish larvae (23)	plastic bag	Box 1

Table 3: Details of identification photographs taken by JL Watkins. Original raw photo files are available from JLW.

Event number	Net number	Subject	Photo id
15	1	Main sample - myctophids	Crw_1023, crw 1026
15	1	Main sample - krill	Crw_1024
15	1	Subsample – all species	Crw_1025
15	2	Main sample - myctophids	Crw_1027, crw_1028
15	2	Main sample - krill	Crw_1029, crw_1030
15	2	Remainder of sample once krill & myctophids removed	Crw_1031, crw_1032, crw_1033
17	1	Larval fish	Crw_1037
17	1	Remainder of catch: Themisto – 2 separate trays	Crw_1038, crw_1039
17	2	Remainder of catch after fish and krill removed	2 pictures of same tray crw_1041, crw_1042
17	2	Larval fish and salps	Crw_1043, crw_1044
21	1	Krill from whole sample	Crw_1056 – crw_1058

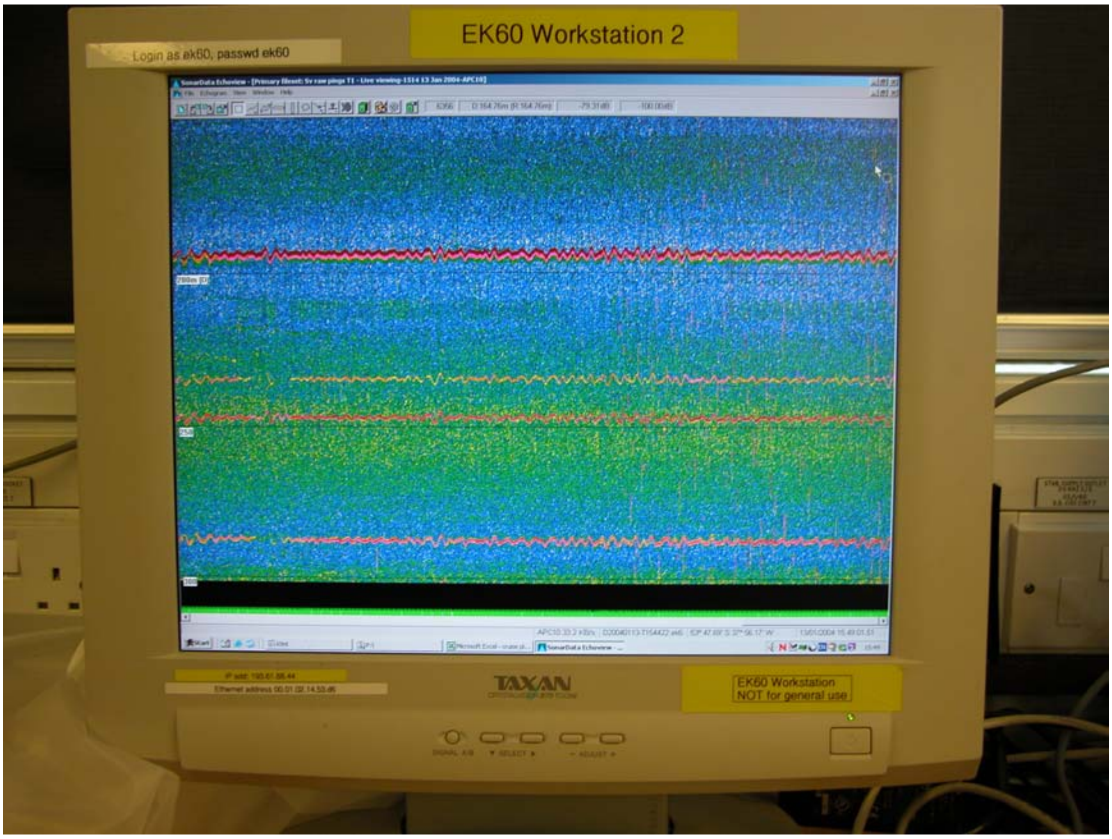
21	1	Themisto from whole sample	Crw_1059 – crw_1060
21	1	Large zooplankton from whole sample	Crw_1061 – crw_1064
21	1	Subsample 1	Crw_1065
21	1	Subsample 2	Crw_1066
21	2	Subsample 1	Crw_1067 – crw_1069
21	2	Subsample 2	Crw_1070 – crw_1071
21	2	Fish from whole sample	Crw_1072
22	1	Subsample 1	Crw_1087
22	1	Fish and large plankton removed from total net catch	Crw_1088
22	2	Myctophids and larvae from whole catch	Crw_1089
22	2	Krill and jellies from whole catch	Crw_1090
22	2	Subsample 1	Crw_1091 – crw_1092
27	1	Large zooplankton and fish removed from total catch	Crw_1132, crw_1133
27	1	Whole of subsample 1	Crw_1134, crw_1135
27	2	Myctophids, krill and large zooplankton from total catch	Crw_1138, crw_1139
27	2	Whole of subsample 1	Crw_1140, crw_1141
28	1	Icefish, larval fish, krill and squid from whole catch	Crw_1142, crw_1143
28	1	Whole of subsample 1	Crw_1145
28	2	Fish and large zooplankton	Crw_1147
28	2	Rest of whole sample	Crw_1148
36	1	Mysids from subsample 1	Crw_1618 – crw_1620
36	2	Large zooplankton and fish from total	Crw_1621 – crw_1624
37	1	Larval fish from subsample 1	Crw_1726 – crw_1727
37	1	Krill from subsample 1	Crw_1728
37	1	Larval fish from remainder	Crw_1729
37	1	Krill from remainder	Crw_1730
37	2	Fish larvae and krill	Crw_1731 and crw_1732
37	2	Detail of some fish larvae	Crw_1734
37	2	Detail of notocrangon	Crw_1733

AFI 3/16 mooring cruise report *JR 96*

Peter Enderlein & Doug Bone

recovery and redeployment:

The shallow water mooring recovery started 11:00 GMT of Jan. 13th with EK 60 acoustics on the dropping point of the mooring for 1 hour, followed by acoustics along the transect for another hour. The weather was good (force 4-5), moderate sea, and good visibility. At 13:15 a CTD to 200m was done 2 cables from the dropping position. The releases were first activated at 13:40 and a positive response “hook released” was received. Nothing happened, so the second one was released, again provoking a positive answer, but again nothing happened. After trying it again several times and waiting for nearly an hour a decision was made to try to find the mooring on the ecosounder because the release electronics told us it was only 470 m away. So the ship relocated to the dropping position and we were able to locate the mooring. The whole mooring appeared very nicely on the screen, the main buoy, the trimsim buoys below and even the acoustic releases near the bottom:



This time the decision was made to use the grapnel to get the mooring up. After getting the dragging rig ready it was lowered @16:43 and the ship moved in a circle around the mooring. At 18:40 the mooring appeared at the surface. After getting the grapnel gear back in, the whole mooring was recovered without any problems.

After the data download and a check of all instruments the shallow water mooring was redeployed **on 14.01.2004, 0038 GMT at 53° 47.69'S & 37° 56.31'W.**
The WCP had not worked again, so decision was made NOT to redeploy the instrument!

The deep water mooring was released at 07:30 GMT on the 14th of Jan. and surfaced just 2 min later. At 08:15 the mooring was successfully recovered without any problems. The rapid recovery gave us some time to try to recover the lost releases at the site. So the grapnel rig was deployed again for two attempts (first until 11:50, second until 13:50). Both were unsuccessful. Afterwards the CTD was deployed followed by some acoustics. After the final data download and a check of all instruments the deep water mooring was redeployed **on 14.01.2004, 1625 GMT at 53° 30.66'S & 37° 51.087'W**.
On this mooring again the WCP had not worked, so again the instrument was NOT redeployed!

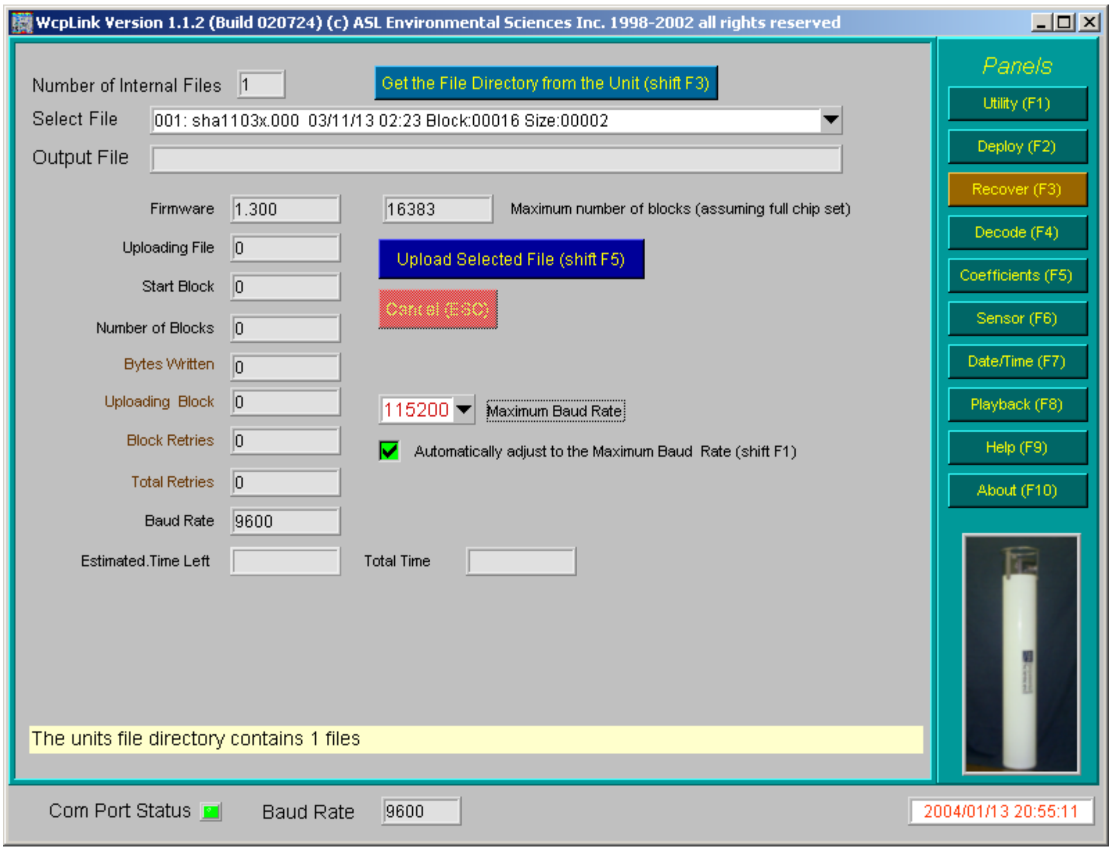
Both deployment took place as described in the second deployment report in JR87 and JR92 with the following change: To control the deployment of the releases, a rope was put around the chain, and was used to lower the releases in a slow and controlled manner until all the tension is on the weights. This is an improvement and should be used in future deployment.

Mooring warnings:

The laminated multi language mooring warnings handouts were passed to the SG fishery officer on the 15th of January at KEP. He got 25 laminated copies in English, Russian, Spanish and Japanese.

Malfunction of WCP 004 and WCP 005:

Again, both WCP have not gathered any data over the last deployment. There was a file on instrument 005 (shallow mooring), but it was only 8 bytes long. Initially communications could not be established between the PC and the WCP. This only proved possible with the external power supply. The check of the battery pack showed that the –12V battery was down to –9V and the main +12V was down to +1.9V, this time the clock battery was fine with +2.9V. When the 004 WCP was opened we discovered that one of the Lithium cells had blown up, the gases from which have corroded the electronics beyond repair. Further check revealed that this was NOT due to a short or something similar of the battery cell or the battery pack, it looks like that it has come from the way the electronics drain the batteries. We are not aware what has caused the battery blow up and how this could happen!! The check of the battery pack of WCP 004 showed that the –12V battery was down to –2.5V (that is the pack with the blown cell) and the main +12V was down to +2V, here again the clock battery was fine with +2.8V.
With having one instrument completely destroyed by itself and the other one not working at all, it must be said that both instruments appear to have been never fit for purpose. Further action should be taken.


WcpLink Version 1.1.2 (Build 020724) (c) ASL Environmental Sciences Inc. 1998-2002 all rights reserved
Number of Internal Files
1
Get the File Directory from the Unit (shift F3)
Select File
001: sha1103x.000 03/11/13 02:23 Block:00016 Size:00002
Output File
Firmware
1.300
16383
Maximum number of blocks (assuming full chip set)
Uploading File
0
Upload Selected File (shift F5)
Start Block
0
Cancel (ESC)
Number of Blocks
0
Bytes Written
0
Uploading Block
0
115200
Maximum Baud Rate
Block Retries
0
Automatically adjust to the Maximum Baud Rate (shift F1)
Total Retries
0
Baud Rate
9600
Estimated.Time Left
Total Time
The units file directory contains 1 files
Panels
Utility (F1)
Deploy (F2)
Recover (F3)
Decode (F4)
Coefficients (F5)
Sensor (F6)
Date/Time (F7)
Playback (F8)
Help (F9)
About (F10)
Com Port Status
Baud Rate
9600
2004/01/13 20:55:11


3.6V

Work carried out:

WCP:
- Both instruments were not redeployed, due to malfunction

CTD:
- Data download

ADCP:
- Data download

NOVATEC beacons
- No work carried out

ARGOS beacons
- No work carried out

Releases
- No work carried out

Batteries to be ordered for March:

- 90 AA cells for Argos beacon, Novatec beacon and acoustic releases

Instrument settings (general):

CTD

shallow:
start time: 14.01.04
sample interval: 240 sec.

deep:
start time: 14.01.04
sample interval: 240 sec.

ADCP

Shallow:
Start time: 14.01.04
Duration: 160 days
Sample interval: 4 min
Pings in interval: 7

Deep:
Start time: 14.01.04
Duration: 160 days
Sample interval: 4 min

Pings in interval: 7

Cruise: JR96&103 Start date:30/12/03 Finish date:20/1/04

Name of ETS engineer: Jim Fox

Name of principle scientist (PSO): Pete Morris (JR103) and Jon Watkins (JR96)

Instrument	**Used?**	**Comments**
XBT (aft UIC)	x	Fine. Left in position for JR104 who have indicated a requirement. Cable is slightly at risk going across deck but no other path with towed maggy in the way during deployment.
Scintillation counter (prep lab)		
AutoSal (labs on upper deck) S/N 63360		
AutoSal (labs on upper deck) S/N 65763		
DWNM		
Magnetometer STCM1 (aft UIC)		Duff
Magnetometer STCM2 (aft UIC)	x	Monitor broke – replaced with STCM1 one.
ETS workshop PC	x	

GPS

DGPS Trimble 4000 DS (bridge – port side)	x	
DGPS Ashtec ADU5 (bridge – port side)	x	Occasionally the output string stops including any data after position. Power cycle solves problem. IT have made an SCS watch window for the heading which goes red when this hangs.
DGPS Ashtec Glonass GG24 (bridge – starboard side)	x	

ACOUSTIC

Instrument	Used?	Comments
ADCP (aft UIC)	x	
PES (aft UIC)	x	Did not use with BAS pinger.
EM120 (for'd UIC)	x	Working well.
Alden plotter (used with EM120)		
TOPAS (for'd UIC)	x	Delay – external has been working well to track the bottom
EPC plotter (used with TOPAS)	x	Have added laptop running EPC Autocomm software which takes in RS232 data messages (SCS) and puts time and EM120 depth on paper plot. Not accurate but better than nothing.
EK60/ EK500 (mid UIC)	x	Working well although the new software (ER60) seems to have the odd problem. Also changed the Ethernet connections. Main s/ware and processing s/ware now logs directly to jruf via samba. See end for description. Also replaced 128Mb memory with 512Mb in both APC10 machines.
HP deskjet 1 (used with EK)		
HP deskjet 2 (used with EK)		
SSU (for'd UIC)	x	EK60 problem found to be due to ribbon cable left disconnected from second relay output board – left in this state after Kjetil's visit. Working well. I've written new how to manuals covering this and the EA500. Loopback connector made and tested.
SVP S/N3298 (cage when unused)		
SVP S/N3314 (cage when unused)		
10kHz pinger		
MORS 10kHz transponder		

OCEANLOGGER

Instrument	Used?	Comments
Main logging PC hardware and software	X	Crashed once for unknown reason. Power cycled.
Barometer (back of logger rack) #V145002 (7/03)	X	
Barometer #V145003 (7/03)	X	
Barometer #Y2610005		
Barometer #W4620001		
Air humidity & temp (for'd mast) #15619015		
Air humidity & temp #15619025		
Air humidity & temp #28552023 (HT1, 7/03)	X	
Air humidity & temp #18109036 (HT2, 7/03)	X	
Thermosalinograph SBE45 (prep lab) #4524698-0016		
Thermosalinograph SBE45 # 4532920-0072 (7/03)	X	
Thermosalinograph SBE45 #4524698-0018		
Fluorometer (prep lab)	X	
TIR sensor (pyranometer) (for'd mast) #990684		
TIR sensor #32374 (TIR1, 7/03)	X	
TIR sensor #990685		
TIR sensor #011403 (TIR2, 7/03)	X	
PAR sensor (for'd mast) #990069		
PAR sensor #990070		
PAR sensor #30335 (PAR1, 7/03)	X	

PAR sensor # 010224 (PAR2, 7/03)	X	
Flow meter (prep room) #45/59462	X	
Uncontaminated seawater temp (transducer space)	x	

CTD (all kept in cage/ sci hold when not in use)

Instrument	Used?	Comments
Deck unit 1 SBE11plus S/N 11P15759-0458		
Deck unit 2 SBE11plus S/N 11P20391-0502		
Underwater unit SBE9plus #09P15759-0480 Press #67241	x	Used to replace 0541.
Underwater unit SBE9plus #09P20391-0541 Press #75429	x	Left from last cruise. Found to have two corroded connectors and possibly a blocked pressure capillary tube. Needs repair.
Underwater unit SBE9plus #09P30856-0707 Press #89973		
Carousel & pylon SBE32 #3215759-0173	x	Not sure which one used.
Carousel & pylon SBE32 #0248		
CTD swivel linkage	X	
CTD swivel S/N196115		
CTD swivel S/N196111	x	Needs underwater connectors replacing but still operational.

CTD contd – C & T & pumps – please state which primary and secondary

Temp sensor SBE3plus #03P2191		
Temp sensor SBE3plus #03P2307		
Temp sensor SBE3plus #03P2366		
Temp sensor SBE3plus #03P2679	x	Pri
Temp sensor SBE3plus #03P2705		
Temp sensor SBE3plus #03P2709		
Temp sensor SBE3plus #03P4235	x	Sec
Temp sensor SBE3plus #03P4302		
Cond sensor SBE4C #041912		
Cond sensor SBE4C #041913		
Cond sensor SBE4C #042222		
Cond sensor SBE4C #042248		
Cond sensor SBE4C #042255	x	Pri
Cond sensor SBE4C #042289		
Cond sensor SBE4C #042813	x	Sec
Cond sensor SBE4C #042875		
Pump SBE5T # 51807		
Pump SBE5T # 51813		
Pump SBE5T # 52371		
Pump SBE5T # 52395	x	Pri
Pump SBE5T # 52400	x	Sec
Pump SBE5T # 53415		

CTD contd

Instrument	Used?	Comments
Fluorometer Aquatracka MkIII #088216		
Fluorometer Aquatracka MkIII #088249		
Standards Thermometer SBE35 #3515759-0005	x	
Standards Thermometer SBE35 # 3527735-0024		
Altimeter PA200 #2130.26993		
Altimeter PA200 #2130.27001	x	
Transmissometer C-Star #CST-396DR		
Transmissometer C-Star #CST-527DR		
Oxygen sensor SBE43 #0242	x	Sec
Oxygen sensor SBE43 #0245	x	Pri
PAR sensor #7235	x	
PAR sensor #7252		

Notes on any other part of CTD e.g. faulty cables, wire drum slip ring, bottles, swivel, frame, tubing etc.		Bottle one failed to fire on one occasion; problem did not repeat. A spurious data glitch also occurred once on most channels – more so on optional sensors (pumps triggered off). Could be a power glitch at the JT1-JT7 end for some reason. Sliprings cleaned (bio winch sliprings also cleaned by deck engineer).

ETS UNSUPPORTED INSTRUMENTS BUT LOGGED

Instrument	Used?	Comments
EA500 (bridge)	x	Needs regular supervision by ETS or ITS bod if data is to be reliable. I found that the value from this is less accurate when used in passive (or active, for that matter) mode with the EM120 – possibly partly to do with differing transmit delays, and/ or power beam distribution by EM120.
Furuno sonar		
TSS HRP motion sensor (one with UIC repeater)	x	
Anemometer	x	
Gyro	x	
DopplerLog	x	
EMLog	x	
CLAM winch monitoring system	x	A few modifications made to the vi's at the deck engineer's request. See end for details.

At the end of the cruise, please make sure that:

- the XBT is left in a suitable state (store in cage if not to be used for a while – do not leave on deck or in UIC as it will get kicked around).
- the salinity sample bottles have been washed out and left with deionised water in – please check this otherwise the bottles will build up crud and have to be replaced.
- the CTD is left in a suitable state (washed (including all peripherals), deionised water washed through TC duct, empty syringes put on T duct inlets to keep dust out and stored appropriately). Be careful about freezing before next use – this will damage the C sensors (run through with used standard seawater to reduce the chance of freezing before the next use). Remove all the connector locking sleeves and wash with fresh water. Blank off all unconnected connectors. See the CTD wisdom file for more information.
- the CTD winch slip rings are cleaned if the CTD has been used – this prevents failure through accumulated dirt.
- the SVP is left in a suitable state (washed and stowed – do not leave on deck without a cover as this rusts).
- that all manuals have been returned to the designated drawers and cupboards.

Additional notes and recommendations for change / future work

EK60 software problems
ER60 software crashes if it has problems starting pinging. Evidence shows it could be due to Ethernet clashes and not being able to talk to the GPTs as well as it would like. When starting ER60 software pinging, untick the external trigger box, start and let ping for a couple then stop, tick external trigger then start. I found that if this wasn't done then the software would bum out with a comcontainer.exe error message.

If you find the GPTs aren't communicating, reboot PC and at same time reset the GPTs using the switch on the UIC bulkhead.

K9NT also put on EK60 machines to keep accurate time from time broadcasts on network.

Still get unknown noise (showing on 120&200kHz) which gets strong in shallow water. Can only deduce that whatever it is, is ship generated and needs a reflective path of the seabed to get to the EK transducers. Not another echosounder and not Emlog or DopplerLog. Weird.

EK60 ethernet connections
The APC10 machine is set to run the ER60 software and Echolog. Both write directly to jruf EK60 dataspace via Samba (setup by ITS). This means the data can be stored on tape. The Workstation 2 machine runs liveview (which is also connected to jruf to access the files logged by Echolog). Workstation 2 is directly connected to the LAN via the structured cabling using a 100Mbaud connection (to speed up liveview). The little EK60 hub in the UIC has the GPTs, the APC10 and a LAN connection. Log in to both machines as ek60, password ek60.

Recommend mini switch to replace the hub in due course.

CLAM VI mods
Bio winch Vis modified to new versions supplied by Mason. Also reduced logfile to 10Mb (approx 2-3months). Also changed 'write to disc.vi' to omit comp status since this doesn't seem to be very useful and is 'corrupting' the cable type selected value.

Deck engineer reports that the compensation status is incorrect some of the time and is probably irrelevant to our system anyway. I proposed doing away with compensation field; deck engineer will enquire of other users.

Data Management Cruise Report

Underway data was logged to the SCS. The following streams were logged.

SCS Streams for JR96

Stream Name	Start Time	End Time
Anemometer	11:49:54 30/12/2003	11:20:05 20/01/2004
BASSTCM	-- No Data --	-- No Data --
Doppler Log	11:49:54 30/12/2003	11:20:06 20/01/2004
Emlog	11:49:55 30/12/2003	11:20:05 20/01/2004
GPS-ADU	11:49:54 30/12/2003	11:20:05 20/01/2004
Glonass	11:49:55 30/12/2003	11:20:05 20/01/2004
Net-Monitor	20:15:34 08/01/2004	01:51:40 16/01/2004
OceanLogger	11:49:57 30/12/2003	11:20:02 20/01/2004
SeaSPY	17:06:24 30/12/2003	20:01:05 19/01/2004
Seatex	11:49:54 30/12/2003	11:20:06 20/01/2004
Simrad-ea500	15:23:55 30/12/2003	10:12:54 20/01/2004
Simrad-em120	11:49:54 30/12/2003	00:07:12 20/01/2004
TSSHRP	11:49:55 30/12/2003	11:20:04 20/01/2004
Trimble	11:49:54 30/12/2003	11:20:05 20/01/2004
Truewind-spd	11:49:54 30/12/2003	11:20:05 20/01/2004
Winch	23:22:56 08/01/2004	12:42:49 16/01/2004
gyro	11:57:29 30/12/2003	11:20:57 20/01/2004
minipack	12:26:49 31/12/2003	14:45:52 18/01/2004
minipack-real	12:26:49 31/12/2003	14:45:52 18/01/2004
new_stcm	11:51:14 30/12/2003	11:20:57 20/01/2004
pmlbox	-- No Data --	-- No Data --

The EK60 was logged to the Unix machine. The Gyro and the STCM are logged using Andy Barkers' Java Data Logging system.

Any breaks in the streams were logged and documented by ITS. The SCS performed well and the data has been collected and backed up to return to Cambridge.

Migration from RVS and PSTAR has been started. Jeremy Robst has provided web services for directly accessing the SCS files. Mark Brandon has started to migrate

PSTAR routines and functionality to Mat lab. Nathan Cunningham has started to define the data model and schemas for the JCR. This work will continue and hopefully will be completed by the next cruise and will mean that the phasing out of RVS and PSTAR can start. Below is a brief project description for the web based JCR Data Logging Interface and JCR Log sheets

- ***The functionality of the RVS listit command***
  It would be useful to be able to select a time period from which a data stream can be selected, displayed and a CSV text file produced. The main reason for this is to enable the user to easily generate local data sets of transects, station events etc. Ideally, the ability to request data from any of the streams would offer the greatest flexibility to the user, but this is not a critical function.
- ***Graphing tool***
  Graph any data stream(s) from a user defined period (or current time).
- ***Template Tool***
  Setting up user-defined templates for the Data Logging, the Log sheets and the Graphing tools. This would allow the user to select any data streams and variables and save this selection to a reusable template, for example met data from the ocean logger and the anemometer and call this data set Meteorology Data. The same would work for event logs.
- ***Amend and Delete to JCR Log Sheets***
  This would allow to the log sheet creator to have administrator rights and could amend the sheet (column order, add a column, delete a column) and delete or amend records. Any user generating a new instance of the event would be allowed to amend and delete their records, but not the entire sheet or other user records.
- ***Amend and Delete functionality to other tools***
  As outlined above, based on administrator and user read, write execute privileges. The main use would be for user editing when creating a template.
- ***Save screen output as an csv file***
  This would produce an image file from the current output of SCS Interface tool being used. This would be especially useful for the graph tool to quickly analyse interesting events.

It is hope the user community will use this tools as the primary way of accessing the underway data and generate there own data set for visualisation (which in the bioscience community is predominantly in MS Excel). Along with the move to Matlab from Pstar, the old RVS system etc can gradually be fazed out as it is becoming dated and the skill base in the user community is very low or non-existent.

Future work will include heuristic cleaning the scs streams, matlab processing suite and arc marine geodatamodel.

The UOR data will discussed in a separate document.

British Antarctic Survey
NATURAL ENVIRONMENT RESEARCH COUNCIL

Information Technology Section

Cruise Report

Cruise ID	JR96 / JR103
Principal Scientist	Jon Watkins (JR96) / Peter Morris (JR103)
ITS Support	JPRO
Date	30/12/2003 – 20/01/2004

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1. Netware / PCs

There were no problems with JRNA during this cruise.

1.1. GroupWise

Groupwise suffered database corruption again, showing the body of message meant for one user to another. GWCHECK32 was run as described in the JR91 cruise report.

This problem seems to be getting more frequent and brings its use as a serious email system into question again.

Several “bad messages” were generated by the Groupwise system this cruise; approximately 2/week. There was no apparent problem with these messages and they could easily be reconstructed on a Linux system.

1.2. Laptops / Netware frame types

Several laptops were configured with the Netware client but experience many failures logging on to the JCR tree, particularly in the UIC. TCP/IP connections to/from the laptops were unaffected.

Changing the frame type from “Auto Detect” to 802.3 in the IPX/SPX protocol settings in the network section of control panel resulted in connections to the tree every time.

Whilst using JetAdmin (see 1.3) to configure the HP1055CM printer a relatively large number of packets of different ethernet frame types were seen (e.g. 802.2 / SNAP). Possibly some piece of equipment is transmitting these frame types and confusing the laptops when they are auto detecting, leading to an inability to see the Netware tree.

1.3. HP1055CM Plotter

An attempt was made to configure the HP1055CM plotter Netware queue as some Swath Bathymetry data processing was done on PCs. Several versions of JetAdmin / Web JetAdmin were tried, but none was able to correctly configure the Netware queue.

It would be useful if somebody from Netware support could configure this queue and then document the process, including the version of JetAdmin used.

To print from the PCs the Unix queue (on JRUF) was used, though this requires the user to make a samba connection to JRUF first.

2. AMOS

On 07/01/2004 AMOS was upgraded to v5.3 and the database moved from the Netware server, JRNA, to a dedicated DL360 server. The new AMOS server was given a static IP address of **193.61.88.61** and named **jcr-amos-s1**. This name/ip address was DNS registered.

The new installation followed the notes written by Pete Lens – the database was installed on D:\amos\database\{live,training}.

Once the live and training databases were upgraded and Cambridge confirmed that the new system could be used the following machines were upgraded to the new version of AMOS. The old version of AMOS and the Sybase database client was removed from each machine and a new install was done using the iTSS Application installer kit, with manual configuration of the ODBC data sources.

2.1. Machines with the new AMOS client installed

JCR-ENGINE-D1
JCR-ENGCNTL-D2 (Live database only due to lack of C:\ drive space)
JCR-ELEC-D1
JCR-DECK-D1
JCR-2ENG-D1
JCR-CHENG-D1
JCR-COMBINED-D2 (Sybase client installed on D:\)
JCR-COMBINED-D1
JCR-ROFF-D1
JCR-CHOFF-D3

2.2. AMOS Automatic Import/Export facility

The scripts used in Cambridge to automatically receive/send AMOS import/exports by email and transfer them to/from the ships/bases were modified for use on remote clients and installed on the AMS server, JRLA.

The system has not been activated until DWGA/PCDL are happy, and the AMOS Task Server needs configuring on JCR-AMOS-S1.

See Appendix A for installation instructions.

2.3. TightVNC

TightVNC 1.2.9 was installed on JCR-AMOS-S1 server to provide remote management of the server as this uses compression (when used with a TightVNC client) and is thus more responsive than WinVNC. However using JCR-AMOS-S1 with TightVNC is very sluggish compared to JCR-NOAA-S1 (which also has TightVNC installed), for no obvious reason. Possibly a reboot will fix this.

3. Data Logging Systems

3.1. SCS

The SCS data logging system performed reasonably well throughout the cruise, with a couple of exceptions.

3.1.1. Loss of Magnetometer data

A potentially very serious problem was encountered which resulted in the loss of 2 days worth of data. On day 016 at approximately 2220Z the SeaSPY magnetometer was deployed. The stream on the remote SCS display PC in the UIC was monitored occasionally for the next few days to ensure reasonable values were being produced.

However on day 020 a gap was found in the seaspy RVS stream between 008 and 018 2115Z (when the SCS was rebooted after a crash – see 3.1.2). At first this was thought just to be a problem with the SCS to RVS conversion routine, however an examination of the SCS files, including the RAW SCS files showed no data logged between days 016 and 018. Checking the backup tapes for 018 and 017 also failed to show any data in the SCS files and this data has been lost.

Since the magnetometer was being used opportunistically the loss of this data isn't catastrophic, but is still very serious.

If, as seems to be the case the SCS appeared to be logging normally, but wasn't saving any data to disk this is a serious problem with the system. No other streams appear to have suffered this problem.

The SCS will have to be watched carefully in future, especially when the SeaSPY magnetometer is being used.

3.1.2. SCS Crash

The SCS server crashed at 2115Z on day 018, and was noticed at approximately 2145Z as all the streams had turned red, including streams not logged by the SCS, indicating a system failure.

The server did not respond to the mouse or keyboard and had to be power cycled. The system came back up at approximately 2200Z and logging resumed as soon as the SCS software was restarted.

The SCS has crashed in this manner before and it is probably due to a problem with Microsoft Windows. A possible solution would be to install Windows 2000 (workstation) on the server – NT Server (the current OS) is not required for operation of any of the software.

3.1.3.Send SCS Message

A new SCS message was created to transmit a combined Time, Depth and Position string over COM30: to a laptop connected to the EPC TOPAS recorder. Jim Fox (ETS) configured the laptop and recorder to print this information on the output trace automatically – see the ETS report.

Whilst this message was being created it was noticed that the SCS Message Builder "View Test Message" facility does not work correctly – the output is garbled. However the actual message transmitted is correct and can be seen if a laptop and terminal emulator is connected to the COM port.

3.1.4.TightVNC

TightVNC 1.2.9 was installed on the SCS server (JCR-NOAA-S1) as the software uses compression (when used with a TightVNC client) and provides a smoother experience for remote management compared to WinVNC. The password set is the same password which is used to enable Manager Functions in the SCS software.

3.1.5.SCS Event log

Date	***Time (GMT)***	***Event***
31/12/2003	11:17	ACQ stop/start to add minipack stream
31/12/2003	12:08	ACQ stop/start for minipack testing
31/12/2003	12:27	ACQ stop/start for minipack testing
01/01/2004	20:09	ACQ stop/start – SCS stream corruption
08/01/2004	19:48	ACQ stop/start – Netmon testing
08/01/2004	19:50	ACQ stop/start – Netmon testing
18/01/2004	21:16 – 22:00	Server crash & reboot

3.1.1.SCS -> Level C conversion

The scs2levc program used on JRUF to generate RVS data streams from the SCS was modified to handle streams like the SeaSPY where invalid data is generated whilst the instrument is initializing. It is now at version 1.4

The directory /nerc/packages/rvs/home/scs2levc was tidied up. The previous cruises XML configuration files were moved to the subdirectory old_xml.

The various versions of scs2levc (1.2, 1.3, and 1.4) were moved to subdirectories v1.2, v1.3 and v1.4 respectively and symlinks for scs2levc.pl and scs2levc added, pointing to the current version (v1.4).

To build a new scs2levc from the source files (scs2levc.c and xsinit.c) use the following commands (after creating a new directory v1.5 .... and coping all the files in v1.4)

setup v5.005_03 perl
setenv CC /usr/local/bin/gcc
make (ignore compiler warnings)

After editing scs2levc.c typing *make* again will rebuild scs2levc.

3.1.1.Minipack / Polynomial Conversion "**poly_convert.pl**"

Once the minipack software was running it was noticed that the values output are the engineering units (e.g mV from the temperature sensor) rather than the real units (e.g. °C) – even when the software is configured to output the real units.

The conversion between engineering units and real units is done by applying a polynomial conversion function to the engineering units. The documentation for the UOR contains the calibration coefficients so a program *poly_convert.pl* was written to generate the real units.

The program *poly_convert.pl* takes the name of an XML configuration file as its only argument.

The XML configuration file describes an input stream and the fields which require conversion, together with the conversion coefficients in descending order – e.g. If the coefficients in the file are represented by a_0 ... a_n in the order in which they appear in the file, then the function calculated is (where x is the input field value and f(x) the new field value)

$$f(x) = a_0 x^{n-1} + a_1 x^{n-2} + \cdots + a_{n-1} x + a_n$$

A new stream is created (in SCS format) with the converted fields. Any field not mentioned in the XML file is passed through to the output stream unchanged.

The program waits forever when it reaches the end of the input stream so can be run in real time during a cruise.

Currently the program is installed in c:\minipack with and XML configuration file that generates the stream *minipack-real* from the logged *minipack* stream.

The configuration file can describe multiple input and output streams so only one process needs to run, regardless of the number of streams that need conversion.

The software requires a Perl installation with XML::Simple. This is installed in C:\Perl and a zip file is in O:\ITS\Programming – Perl\scs_prog. To install on a new machine simply unzip to create the C:\Perl directory structure.

To run the conversion program start a DOS prompt, change directory to c:\minipack and type

c:\perl\bin\perl poly_convert.pl poly_convert.xml

To confirm that the program is running correctly check the output stream in d:\datalog\compress.

3.2. Logging Instruments

3.2.1. Ashtec ADU5 GPS

The Ashtec GPS stops outputting heading information occasionally (approximately every 10 days), whilst still outputting position information. (See JR93/94 report). Power cycling the ADU5 deck unit is necessary to get the heading information again (after a few seconds whilst the instrument reacquires the satellites).

The GPS has been configured to start with the correct settings and to output at 9600 baud after a power cycle, and the SCS settings have been changed to 9600 baud so no additional configuration should be necessary.

3.2.2. Oceanlogger

The Oceanlogger crashed a couple of times on the cruise – see the ETS report. No attempt has been made at diagnosing the problem.

3.3. EM120 Swath Bathymetry / TOPAS

No problems were encountered with the EM120 or TOPAS systems during the cruise.

3.4. EK60

3.4.1. Data logging via SAMBA

At the start of the cruise data logging setup of the EK60 was modified.

The hub connecting the APC10 and GPTs was connected to the main JCR LAN. An account **ek60** was created on JRUF, password **ek60** and a local account **ek60**, also with password **ek60** was created on the APC10 logging machine.

A **U:** drive mapping was created to **\\samba.jcross\ek60** and the software configured to log data directly to the appropriate directories on the U: drive (see Biosciences report).

Users should now log onto the APC10 machine as ek60 (instead of Simrad – the notice on the machine has been changed to this effect) and as long as the same password is kept between the local Windows account and the ek60 samba account on JRUF the drive will be mapped without prompting for a password.

At first the EK60 software crashed with communications errors when run in this configuration with the *echoview* software running on the second EK60 workstation. However when the second EK60 workstation was disconnected from the local hub and connected directly to the main lab the software run without any problems.

This suggests the crash was caused by too much ethernet traffic overloading the hub.

Once this configuration was stable, the echoview logging software was moved to the APC10 machine and also ran without problems.

Based on the success of this cruise it is recommended that all future cruises run in this configuration. It has many advantages -

1. The data is logged directly to central RAID storage which is backed up every night as part of the normal ITS backup routine. The data is thus much better protected against loss.

2. With the echoview software on the APC10 machine as well the second workstation is no longer a vital part of the system and so can be used for other tasks, such as live viewing and even email without affecting the data collection. To this end the machine has been configured as a normal networked PC – the Netware client has been installed.

   It still shouldn't be used by non BSD/Acoustics staff, but may be used by them whilst on watch.

Note Logging the EK60 data in this manner requires monitoring of the free disk space on JRUF to ensure there is always sufficient space for the EK60 data and post processing. Generally there should be no problem with this, as a ballpark figure this 3 week cruise collected approximately 22GB of EK60 data.

There should be sufficient space on JRUF for even longer cruises; should space ever become tight the earlier cruise data could be backed off to DLT/LTO to make room.

4. Unix Systems

4.1. JRUF

JRUF performed well throughout the cruise with no problems experienced. However the machine is now several years old and whilst data collection continues to starting to struggle with some of the tasks required of it.

The machine is also not rack mounted, so to optimize the space used in the computer room, JRUF should be replaced as soon as practical.

4.1.1. Matlab

Mark Brandon (Open University) brought a new version of Matlab, 6.5.1 which was installed in */nerc/packages/matlab/6.5.1* with the usual setup scripts in */nerc/packages/matlab/v6.5.1* and startup scripts */nerc/etc/rc.d/S70jr96matlab* and */nerc/jcross/startups/S70jr96matlab*.

4.1.2. Perl modules

Several additional Perl modules were installed, with the following sequence of operations. (All modules were installed in the 5.8.0 perl distribution – '*setup new perl*' was run first).

1. uncompress and untar the module file from CPAN
2. generate a makefile – *perl Makefile.PL*
3. build and test the module – *make test*
4. install the module and documentation – *make install*

The modules were installed in the order given below

Module	***CPAN filename***
TK 8.00.025	TK800.025.tar.gz
File::ReadBackwards 1.0	File-ReadBackwards-1.00.tar.gz
Math::Trig 0.02	Math-Trig-0.02.tar.gz
Tk::Graph 0.06	Tk-Graph-0.06.tar.gz
Tcl 0.72	Tcl-0.72.tar.gz
TclTk-0.72	TclTk-0.72.tar.gz
Spreadsheet::WriteExcel 0.42	Spreadsheet-WriteExcel-0.42.tar.gz
AnyData 0.08	AnyData-0.08.tar.gz

4.1.3. SCS Graphing Program

Mainly for the minipack/UOR users an SCS graphing tool (*scs_graph*) has been written. Unlike the graphing program supplied the SCS *scs_graph* can plot any 'SCS like' stream – e.g. m*inipack-real, gyro* etc. To plot these streams a *.TPL* file needs to be created in *D:\datalog\compress* on the SCS server in the same manner as the other SCS streams, describing the

To use *scs_graph* log on to an unix workstation (*jruh, jrui, neptune*), type '*setup scs*' and then '*scs_graph*'. Select the type of graph (at the moment only 'Time series plot'), then select the variables, colors, start time etc and click 'Draw'.

Multiple variables can be plotted on the same graph and multiple graphs can be launched from one instance of *scs_graph*.

4.1.4. JCR Eventlogs

The web based eventlog has been rewritten. The new software (installed in */data/web/webapps/eventlog*) is now database backed and allows users with a unix/samba account to create their own eventlogs via a web interface.

Each eventlog will automatically update columns with values from the data logging system where possible and has a separate log for comments.

The creator/owner of an eventlog can modify/delete any of the records, the user who entered a particular record can modify/delete that record only.

If modification of a record is allowed the time field becomes a hyperlink, selecting this allows modification/deletion of that record.

Logs can be downloaded at any time in CSV format, suitable for importing into a program like Excel.

4.1.5. Data Logging System Interface

The web based data logging system has been rewritten.

A new virtual host *das.jcross* (*193.61.88.248*) has been setup on JRUF and Apache and the software is installed in */data/web/webapps/das*.

This software provides easy access to the underway data logging system, both for viewing the cruise data and previous cruise data.

Cruises may be viewed on line (in real time if appropriate) and also selections of the data can be downloaded in CSV format for futher work.

Any combination of logged variables can be selected, for a given time range and the user can select how to merge streams when the times don't match.

At present the system on the JCR is quite slow, taking approximately 1 hour to download 24 hours of data. This is partially due to the age of JRUF, but is mainly due to the way the data is stored. A new data storage format is being developed which should increase the speed of access to the data.

This software will be mainly useful in BAS Cambridge, when cruise data is brought back from the JCR it can be imported into the system. Then any user can download the section of the underway data they are interested in without needing to go through their data manager, or using the RVS utilities and manually merging the streams, which is very time consuming.

5. Appendix A – Automatic AMOS Import/Export

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Section

Automatic AMOS Import/Export setup for Ships/Bases

v1.0 Jeremy Robst (jpro@bas.ac.uk) 20/01/2004

1. Introduction

Scripts have been written to automatically send and receive AMOS import/exports from the Ships/Bases to BAS Cambridge over the Antarctic Message System. This document describes the installation of these scripts on a remote AMS server.

2. Setup the AMOS Task Server [NOT COMPLETE – PCDL/DWGA]

The actual import/exports are done by the AMOS task server – the scripts send/receive emails and copy the import/exports to directories on the PC running the task server.

2.1. Give the task server a fixed (static) IP address, and make a entry in the local DNS (if there is one).

2.2. On the task server PC create a Windows user called amos. Give the user a standard password set to never expire. Also check the "user cannot change password" option.

2.3. Share the AMOS Transfer directory (e.g. *d:\amos\transfer*) with Windows file sharing. Remove read permissions for *Everyone* and give full control to the amos user. Create a file called *README.TXT* in the transfer directory. This can be an empty file – it is used be the scripts to confirm that the AMOS Transfer directory has been successfully mounted by the AMS server.

2.4. Configure the AMOS Task Server. [PCDL/DWGA]

3.Setup the Netware server

The scripts store backup copies of import/exports on the local Netware server.

3.1.Create a Netware user called amos, in a context used for permanent accounts (e.g. *amos.oc.jcr*). Give the user a standard password and remove the expiry date.

3.2.Create a directory on a suitable volume (e.g. *PCAPPS1\Amos\updates*) with two subdirectories, *imports* and *exports*. Give the amos user full control over the *updates* directory. (Netware permissions RWECMF).

4.Configure IPX networking on the AMS server

4.1.Add IPX networking to the first network connection, *eth0*

a)Log on to the AMS server as root.

b)Add the following lines to the end of */etc/sysconfig/network-scripts/ifcfg-eth0*

```
IPX=yes
IPXACTIVE_802_3=yes
IPXPRIMARY_802_3=yes
```

c)Add the following line to the end of */etc/sysconfig/network*

```
IPX=yes
```

d)Add the following line to the end of /etc/conf.modules

```
alias net-pf-4 ipx
```

4.2.Reboot, log on as root and test the IPX configuration

a)Type **ifconfig eth0** – if IPX networking is correctly configured you will see output like the following (note the bold line)

```
eth0    Link encap:Ethernet  HWaddr 00:60:08:50:98:5F
        inet addr:193.61.88.20  Bcast:193.61.88.255  Mask:255.255.255.0
        IPX/Ethernet 802.3 addr:C0AB8901:00600850985F
        UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
        RX packets:283785 errors:0 dropped:0 overruns:0 frame:0
        TX packets:62690 errors:0 dropped:0 overruns:0 carrier:0
        collisions:2677 txqueuelen:100
        Interrupt:10 Base address:0xe400
```

b)Confirm the AMS server can see the local Netware server – type **slist** and you will see output like the following

```
Known NetWare File Servers              Network   Node Address
--------------------------------------------------------------
JRNA                                    C13D580A  000000000001
```

5.Install additional Perl Modules on the AMS server

The scripts require several additional modules that are not installed by default on the Redhat 6.2 Perl installation.

5.1.Log on to the AMS server as root.

5.2.For each of the following Perl modules (in the order given)

a)Uncompress and untar the file in a temporary directory

cd /tmp
tar xzf module-name-version.tar.gz

(e.g. tar xzf Compress-Zlib-1.31.tar.gz)

b)Build the makefile using Perl's MakeMaker

cd module-name-version
perl Makefile.PL

c)Build and test the module

make test

d)Install the module in the Perl library directory

make install

Module	***Filename***
Compress::Zlib 1.31	Compress-Zlib-1.31.tar.gz
Test::Harness 2.36	Test-Harness-2.36.tar.gz
Test::Simple 0.47	Test-Simple-0.47.tar.gz
File::Spec 0.86	File-Spec-0.86.tar.gz
Archive::Zip 1.08	Archive-Zip-1.08.tar.gz
IO::Stringy 1.220	IO-stringy-1.220.tar.gz
MIME::Base64 2.21	MIME-Base64-2.21.tar.gz
MIME::Tools 5.411a	MIME-tools-5.411a.tar.gz

5.3.Install the Mail::Sender 0.08 module (Mail-Sender-0.8.08.tar.gz) in a similar fashion. Skip the *make test* line and when prompted to “Specify Defaults” enter **N.**

5.4. After installation of Mail::Sender 0.08 a minor edit to the module is needed to make it work with Redhat 6.2.

a) Edit the module and comment out lines 26 & 27

vi /usr/lib/perl5/site_perl/5.005/Mail/Sender.pm

b) At the start of lines 26 & 27 which read

use warnings;
no warnings 'uninitialized';

so they read

#use warnings;
#no warnings 'uninitialized';

6. Install and configure the scripts

6.1. Log on to the AMS server as comms.

6.2. Create the directories

/home/comms/amos
/home/comms/netware
/home/comms/amostmp

6.3. Copy the scripts into */home/comms/bin*

amos_import.pl
amos_export.pl
amos_export_filter.pl
amosw_check.pl

6.4. Set the permissions on the scripts and utility programs

chmod 4755 /home/comms/bin/amos_import.pl
chmod 755 /home/comms/bin/amos_export.pl
chmod 755 /home/comms/bin/amos_export_filter.pl
chmod 755 /home/comms/bin/amosw_check.pl

(as root)
chmod u+s /usr/bin/smbmount
chmod u+s /usr/bin/smbumount
chmod u+s /usr/bin/ncpmount
chmod u+s /usr/bin/ncpumount

6.5. Configure the scripts. At the start of each script there is a list of global variables that need to be modified to reflect the local installation.

a) amos_import.pl

```
See §2.1 – 2.4
# AMOS import/export info
my $AMOSMACHINE  = "JCR-AMOS-S1";       Task server name
my $AMOSIP       = "193.61.88.61";      Task server IP address
my $TRANSFER_DIR = "Transfer";          Task server share name
my $AMOSUSER     = "amos";              Task server username
my $AMOSPASS     = "********";          Task server password
# File to test for successful mounting
my $MOUNTCHECK   = "README.TXT";

See  §3.1 – 3.2
# Netware Server Info
my $NETWARE      = "JRNA";              Netware server name
my $VOLUME       = "PCAPPS1";           Netware volume
my $NETWARE_DIR  = "Amos/updates/imports";
my $NETWAREUSER  = "amos.oc.jcr";
my $NETWAREPASS  = "************";

See  §6.2
# Local machine info
my $AMOSMTPT     = "/home/comms/amos";
my $NETWAREMTPT  = "/home/comms/netware";
my $MIMETEMP     = "/home/comms/amostmp";

Only $EMAIL should need to be changed to the local comms manager/RO
# Address to send report to
my $EMAIL        = "jrcomms\@pcmail.jcross";
my $SUBJECT      = "Automatic AMOSW Import Report";
my $SMTPHOST     = "localhost";
my $FROMADDR     = "helpdesk\@bas.ac.uk";

None of these should need to be changed
# Executables
my $SMBMNT       = "/usr/bin/smbmount";
my $SMBUMNT      = "/usr/bin/smbumount";
my $NCPMNT       = "/usr/bin/ncpmount";
my $NCPUMNT      = "/usr/bin/ncpumount";
my $UNZIP        = "/usr/bin/unzip";
```

---

b)amos_export.pl

See §2.1 – 2.4

```
# AMOS import/export info
my $AMOSMACHINE  = "JCR-AMOS-S1";
my $AMOSIP       = "193.61.88.61";
my $TRANSFER_DIR = "Transfer";
my $AMOSUSER     = "amos";
my $AMOSPASS     = "*********";
# File to test for successful mounting
my $MOUNTCHECK   = "README.TXT";
my $BASE_CODE    = "02";                  Confirm with DWGA
my $HQ_ADDRESS   = "amos_import\@south.nerc-bas.ac.uk";
my $BASE_NAME    = "JCR";
```

See §3.1 – 3.2

```
# Netware Server Info
my $NETWARE      = "JRNA";
my $VOLUME       = "PCAPPS1";
my $NETWARE_DIR  = "Amos/updates/exports";
my $NETWAREUSER  = "amos.oc.jcr";
my $NETWAREPASS  = "********";
```

See §6.2

```
# Local machine info
my $AMOSMTPT     = "/home/comms/amos";
my $NETWAREMTPT  = "/home/comms/netware";
my $TEMPDIR      = "/home/comms/amostmp";
my $ZIPFILE      = "_export.zip";
my $SUBJECT      = "[OFFICIAL] Automatic AMOSW Export";
my $FROMADDR     = "jrcomms\@pcmail.jcross";
```

Change to local comms manager/RO email address

```
my $SMTPHOST     = "localhost";
my $SITE_CONTACT = "JCR Radio Officer";
```

Change

None of these should need to be changed

```
# Executables
my $SMBMNT       = "/usr/bin/smbmount";
my $SMBUMNT      = "/usr/bin/smbumount";
my $NCPMNT       = "/usr/bin/ncpmount";
my $NCPUMNT      = "/usr/bin/ncpumount";
my $ZIP          = "/usr/bin/zip";
```

c)amosw_check.pl

See §6.2

```
my $MIMETEMP = "/home/comms/amostmp";
```

6.6. Setup a cronjob for the amos_export.pl script

a) Using *crontab -e* when logged in as *comms* add the following lines to the start of the crontab file

```
# Automatic AMOS exports
30,0 * * * * /home/comms/bin/amos_export.pl /home/comms/bin/amos_export_filter.pl
```

b) This will run the amos_export.pl script every 30 minutes looking for an export. If one is found then it will be moved to the Netware server and emailed to Cambridge. A report will also be email to the comms manager/Radio Officer or if any errors occurred when the script was run.

6.7. Setup the status page to monitor amos imports

a) Overwrite */home/comms/public_html/admin/status.pl* with the new status.pl script.

7. Configure the incoming email account

7.1. An AMS account should have been created to receive exports from Cambridge (e.g. *JRAMOS*). If this has not been done contact the ITS Helpdesk (helpdesk@bas.ac.uk). Ask the comms manager/Radio Officer to add this account to the AMS so mail is collected.

7.2. Create an External User on the SMTP gateway of the local Netware/Groupwise system, with an id of the local amos account (e.g. *jramos*) and an alias pointing to *amos_import* on the local AMS server (e.g. *SMTP:amos_import@jrla.jcross*).

7.3. Create the *amos_import* alias on the AMS server

a) Log on to the AMS server as root and add the following lines to */etc/aliases*

```
# Automatic amos import
amos_import: |/home/comms/bin/amos_import.pl
```

b) Run the command *newaliases* to rebuild the alias database.

8. Troubleshooting

8.1. 'Manual' import from email

If an emailed import fails for some reason – see the email sent to the comms manager/Radio Officer for details – a copy of the email will be saved in */home/comms/amostmp/amos*nnnnnn. Once the problem has been rectified the email can be reprocessed by running the command (as comms)

*/home/comms/bin/amos_import.pl < /home/comms/amostmp/amos*nnnnnn

and a report as usual will be mailed to the comms manager/Radio Officer.

8.2.'Manual' export

If an export has been done and needs to be sent straight away or if there is a problem with the script it can be run manually by running the command (as comms)

/home/comms/bin/amos_export.pl

Status messages will be printed to the terminal and **not** mailed to the comms manager/Radio Officer.

Time	Event Number	Latitude	Longitude	Description Code	Scientist	Station	Comment	User
30/12/2003 18:51	1	-51.5999	-57.2875	MAG	Peter Morris			njcu
31/12/2003 11:07	2	-51.8881	-52.1332	XBT	Peter Morris			njcu
01/01/2004 14:25	3	-52.5247	-43.0298	UOR	Doug Bone	Test		njcu
01/01/2004 16:46	4	-52.8467	-42.4866	MAG	Peter Morris		Magnetometer Deployment	njcu
02/01/2004 12:37	5	-55.9908	-37.6241	UOR	Doug Bone	Test Deployment		njcu
02/01/2004 12:38	6	-55.9916	-37.6220	XBT	Peter Morris			njcu
02/01/2004 14:24	7	-56.1859	-37.2499	MAG	Peter Morris		Magnetometer Deployment	njcu
08/01/2004 08:53	8	-53.3047	-39.2495	MAG	Peter Morris		MAG brought in because UOR is being deployed	njcu
08/01/2004 08:55	9	-53.3048	-39.2549	UOR	Doug Bone	1.2N	Deploy the uor off transect due to ice	njcu
08/01/2004 14:45	10	-53.9342	-39.2790	UOR	Doug Bone	W1.1S	Lots of ice around	njcu
08/01/2004 14:55	11 and 12	-54.0331	-39.1533	UOR	Doug Bone		Deployed	njcu
08/01/2004 23:56	15	-53.7269	-39.4449	RMT	Jon Watkins			njcu
09/01/2004 03:33	16	-53.4930	-39.2505	CTD	Mark Brandon	W1.2N		njcu

Time	Event Number	Latitude	Longitude	Description Code	Scientist	Station	Comment	User
09/01/2004 05:44	17	-53.6393	-39.1911	RMT	Jon Watkins			njcu
09/01/2004 08:11	18	-53.8398	-39.1444	CTD	Mark Brandon	W1.2S		njcu
09/01/2004 15:20	19	-53.2437	-38.8388	UOR	Doug Bone	W2.2N - W2.2S		njcu
09/01/2004 22:00	20	-53.7854	-38.5834	CTD	Mark Brandon	W.2.1		njcu
09/01/2004 23:45	21	-53.7668	-38.5784	RMT	Jon Watkins			pstar
10/01/2004 03:13	22	-53.4334	-38.6946	RMT	Jon Watkins		Closed at 0346	pstar
10/01/2004 04:27	23	-53.4324	-38.6934	CTD	Mark Brandon			pstar
10/01/2004 16:49	24	-54.0169	-37.4356	CTD	Mark Brandon			pstar
11/01/2004 11:38	25	-53.9256	-38.1887	UOR	Doug Bone	W3.1S	WCB Transect 3	njcu
11/01/2004 23:20	26	-53.3644	-38.0792	CTD	Mark Brandon			pstar
12/01/2004 00:59	27	-53.3549	-38.0992	RMT	Jon watkins	station 3.2N (west core box)	out of water by 02:07	njcu
12/01/2004 05:03	28	-53.3549	-38.0992	RMT	Jon Watkins	w3.2S	out of water at 05:43	njcu
12/01/2004 06:14	29	-53.7143	-37.9661	CTD	Mark Brandon			pstar

Time	Event Number	Latitude	Longitude	Description Code	Scientist	Station	Comment	User
12/01/2004 08:26	30	-53.9250	-37.9023	UOR	Doug Bone		Start of transect 3.2 at northern end	njcu
13/01/2004 13:20	31	-53.7983	-37.9357	CTD	Mark Brandon		Over Shallow Mooring	pstar
14/01/2004 00:38	32	-53.7948	-37.9383	MOO	Peter Enderlein	shallow mooring	shallow mooring deployed	njcu
14/01/2004 05:30	33	-53.5116	-37.8493	MOO	Peter Enderlein	deep mooring	deep mooring recovered	njcu
14/01/2004 14:34	34	-53.5133	-37.8442	CTD	Mark Brandon		Over Deep Mooring	pstar
14/01/2004 15:34	35	-53.5186	-37.8250	MOO	Peter Enderlein	deep mooring	deep mooring redeployed	njcu
15/01/2004 00:00	36	-53.8181	-37.9334	RMT	Jon Watkins	Shallow mooring	out of water by 01:06	njcu
16/01/2004 01:08	37	-53.7935	-37.9005	RMT	Jon Watkins		out of water at 01:51	njcu
16/01/2004 07:00	38	-53.8911	-38.2085	UOR	Doug Bone	W3.1S	Start of repeat Transect	njcu
16/01/2004 22:20	39	-53.1568	-37.9482	MAG	Peter Morris		Commence swath transect	njcu

Time	Transect Name	Description	Latitude	Longitude	Start/End	Comment	User
02/01/2004 17:00	Swath 1	First transect in SE Swath box	-56.4165	-36.2937	Start		njcu
02/01/2004 17:48	Swath 1		-56.4167	-36.0062	End		njcu
02/01/2004 17:49	Swath 2	First transect within SE swath box	-56.4167	-36.0002	Start	Swath 1 leading into box	njcu
02/01/2004 23:24	Swath 2	End of First Swath transect in SE box	-56.4167	-34.0526	End		njcu
03/01/2004 00:04	Swath 3	Start of second swath transect in SE box	-56.3335	-34.0058	Start		njcu
03/01/2004 05:46	Swath 3	End of second swath transect in SE box	-56.3323	-36.0105	End		njcu
03/01/2004 06:12	Swath 4	Start of third swath transect in SE box	-56.2499	-35.9985	Start		njcu
03/01/2004 11:49	Swath 4	End of third swath transect in SE box	-56.2477	-33.9947	End		njcu
03/01/2004 12:20	Swath 5	Start of fourth swath transect in SE box	-56.1664	-34.0086	Start		njcu
03/01/2004 17:56	Swath 5	End of fourth swath transect in SE box	-56.1667	-36.0006	End		njcu
03/01/2004 18:26	Swath 6	Start of fifth swath transect in SE box	-56.0679	-36.0069	Start		njcu
03/01/2004 23:52	Swath 6	End of fifth swath transect in SE box	-56.0806	-34.0030	End		njcu
04/01/2004 00:28	Swath 7	Start of sixth swath transect in SE box	-55.9997	-33.9989	Start		njcu

Time	Transect Name	Description	Latitude	Longitude	Start/End	Comment	User
04/01/2004 06:08	Swath 7	End of sixth swath transect in SE box	-55.9591	-35.9988	End		njcu
04/01/2004 06:46	Swath 8	Start of seventh swath transect in SE box	-55.8461	-36.0050	Start		njcu
04/01/2004 12:21	Swath 8	End of seventh swath transect in SE box	-55.9112	-33.9981	End		njcu
04/01/2004 12:53	Swath 9	Start of eighth swath transect in SE box	-55.8313	-33.9923	Start		njcu
04/01/2004 18:35	Swath 9	End of eighth swath transect in SE box	-55.7500	-35.9980	End		njcu
04/01/2004 18:57	Swath 10	Start of nineth swath transect in SE box	-55.6914	-36.0131	Start		njcu
05/01/2004 00:52	Swath 10	End of nineth swath transect in SE box	-55.6974	-33.9715	End		njcu
05/01/2004 01:10	Swath 11	Start of tenth swath transect in SE box	-55.6548	-33.9987	Start		njcu
05/01/2004 06:38	Swath 11	End of tenth swath transect in SE box	-55.6696	-35.8695	End		njcu
05/01/2004 07:10	Swath 12	Start of eleventh swath transect in SE box	-55.6161	-35.9834	Start		njcu
05/01/2004 12:56	Swath 12	End of eleventh swath transect in SE box	-55.5949	-34.0004	End		njcu

Time	Transect Name	Description	Latitude	Longitude	Start/End	Comment	User
05/01/2004 13:18	Swath 13	Start of twelveth swath transect in SE box	-55.5446	-34.0015	Start		njcu
05/01/2004 22:37	Swath 13	End of twelveth swath transect in SE box	-55.5740	-35.9912	End		njcu
06/01/2004 15:59	14	Start of first transect in second swath box	-55.1304	-38.1968	start		krill
06/01/2004 17:55	14	end of first transect in swath box	-55.2953	-37.5829	end		krill
06/01/2004 18:26	15	Start of second transect in second swath box	-55.2210	-37.5095	Start		krill
06/01/2004 20:26	15	End of second transect in second swath box	-55.0453	-38.1144	end		krill
06/01/2004 20:53	16	start of third transect in second swath box	-54.9729	-38.0683	start		krill
06/01/2004 22:48	16	End of third transect in second swath box	-55.1557	-37.4683	end		krill
06/01/2004 23:16	17	Start of fourth transect in second swath box	-55.0952	-37.4098	start		krill
07/01/2004 01:15	17	End of fourth transect in second swath box	-54.9294	-38.0071	end		krill

Time	Transect Name	Description	Latitude	Longitude	Start/End	Comment	User
07/01/2004 01:35	18	Start of fifth transect in second swath box	-54.8938	-37.9912	start		krill
07/01/2004 04:05	18	end of fifth transect in second swath box	-55.0928	-37.4926	end		krill
07/01/2004 04:39	19	Start of sixth transect in second swath box	-55.1589	-37.5156	start		krill
07/01/2004 08:55	19	End of sixth transect in second swath box	-54.8140	-38.7423	End		krill
07/01/2004 09:13	20	Start of seventh transect in second swath box	-54.7720	-38.7211	start		krill
07/01/2004 11:16	20	End of seventh transect in second swath box	-54.9324	-38.0853	end		krill
07/01/2004 12:12	21	Start of eighth transect in second swath box	-55.0327	-38.1862	start		krill
07/01/2004 15:04	21	end of eighth transect in second swath box	-54.8818	-38.8224	end		krill
07/01/2004 17:13	22	Start of transect from second swath box to core box	-54.7644	-39.2409	start		krill
07/01/2004 21:12	22	end of transect from second swath box to core box	-54.1260	-39.5014	end		krill

Time	Transect Name	Description	Latitude	Longitude	Start/End	Comment	User
08/01/2004 09:10	23	Start of transect W1.2 at W1.2N	-54.0221	-39.1527	start		krill
08/01/2004 13:51	23	end of transect W1.2 at W1.2S	-54.0221	-39.1527	end		krill
08/01/2004 16:45	24	Start of transect W1.1 at W1.1S	-54.0317	-39.4048	start		krill
08/01/2004 21:04	24	End of transect W1.1 at W1.1N	-53.3536	-39.5979	end		krill
08/01/2004 21:28	25	transect from W1.1N to shelf break	-53.3421	-39.6284	start		krill
08/01/2004 23:32	25	transect from W1.1N to shelf break	-53.7259	-39.4912	end		krill
09/01/2004 00:51	26	Transect from shelf break to station 1.2N	-53.7311	-39.5148	start	night time transect	krill
09/01/2004 03:17	26	transect from shelf break to station W1.2N	-53.4987	-39.2626	end		krill
09/01/2004 10:00	27	start of transect W2.1 at W2.1S	-53.9827	-38.8208	start		krill
09/01/2004 14:28	27	end of transect W2.1 at W2.1N	-53.2910	-39.0359	end		krill
09/01/2004 16:17	28	start of transect W2.2 at W2.2N	-53.2522	-38.7519	start		krill
09/01/2004 20:32	28	end of transect W2.2 at W2.2S	-53.9694	-38.6227	end		krill
10/01/2004 00:00	29	station 2.2S to station 2.2N	-53.7455	-38.5949	start	slow and variable speed during night	krill

Time	Transect Name	Description	Latitude	Longitude	Start/End	Comment	User
10/01/2004 02:57	29	station 2.2S to station 2.2N	-53.4452	-38.6905	end		krill
10/01/2004 05:46	30	station 2.2N to start of W3.1N	-53.4080	-38.6913	start		krill
10/01/2004 08:13	30	station 2.2N to transect W3.1N	-53.2042	-38.4860	end		krill
10/01/2004 09:02	31	start transect from W3.1 N to off Rosita Harbour	-53.2365	-38.4372	start	core box cancelled because too rough	krill
10/01/2004 13:40	31	transect from W3.1N to Rosita	-51.5972	-54.8902	end		krill
11/01/2004 09:42	32	Off Rosita Harbour out to W3.2S	-53.9029	-37.5366	start		krill
11/01/2004 11:31	32	Off Rosita Harbour to W3.1S	-51.5964	-54.9010	end		krill
11/01/2004 11:50	33	start of W3.1 at W3.1S	-53.9263	-38.2189	start		krill
11/01/2004 13:50	33	W3.1 stopped	-53.6215	-38.3125	end	only half of W3.1 steamed before ship hove to	krill
11/01/2004 21:25	34	start of W3.1 from W3.1N	-53.2215	-38.4492	start	attempt to complete W3.1 as conditions improved	krill
11/01/2004 22:13	34	run along W3.1 stopped	-53.3248	-38.4139	end	no light and so broke off to go to station sampling	krill
12/01/2004 08:34	35	start of W3.2 at W3.2S	-53.9161	-37.9162	Start	attempt to run 3 transects during day	krill
12/01/2004 13:06	35	finish of transect W3.2 at W3.2N	-51.5525	-55.4480	end		krill

Time	Transect Name	Description	Latitude	Longitude	Start/End	Comment	User
12/01/2004 13:53	36	start of transect W4.1 at W4.1N	-51.5522	-55.4518	start		krill
12/01/2004 18:14	36	finish of transect W4.1 at W4.1S	-53.8540	-37.6679	end	some significant detours due to ice	krill
12/01/2004 18:38	37	start of transect W4.2 from W4.2S	-53.8529	-37.6074	start		krill
12/01/2004 21:54	37	stopped transect W4.2	-53.3463	-37.7483	end	weather too bad to continue	krill
13/01/2004 12:30	38	transect either side of shallow mooring	-53.7740	-37.9460	start		krill
13/01/2004 12:47	38	end of transect either side of shallow mooring	-53.8115	-37.9314	end		krill
14/01/2004 02:11	39	transect from north of mooring to south of mooring	-53.7771	-37.9470	start		krill
14/01/2004 02:29	39	end of transect from north of mooring to south of mooring	-53.8129	-37.9316	end		krill
14/01/2004 02:34	40	transect from south of mooring to north of mooring	-53.8166	-37.9314	start		krill
14/01/2004 03:02	40	transect from south of mooring to north of mooring	-53.7694	-37.9483	end		krill
14/01/2004 03:04	41	transect from shallow mooring to deep mooring	-53.7662	-37.9482	start		krill
14/01/2004 04:35	41	transect from shallow mooring to deep mooring	-51.5416	-55.5717	end		krill

Time	Transect Name	Description	Latitude	Longitude	Start/End	Comment	User
14/01/2004 16:46	42	transect from deep mooring to Bird Island	-53.5101	-37.8582	start		krill
14/01/2004 19:10	42	transect from deep mooring to Bird Island	-53.9764	-37.9896	end		krill
14/01/2004 23:05	43	Transect from Bird Island to shallow mooring	-53.9779	-37.9914	start		krill
14/01/2004 23:45	43	Transect from Bird Island to shallow mooring	-53.8385	-37.9482	end		krill
15/01/2004 01:30	44	north of shallow mooring to south of shallow mooring	-53.7325	-37.9559	start	first of a series of small scale passes over the mooring	krill
15/01/2004 02:20	44	from north to south over shallow mooring	-53.8621	-37.9197	end		krill
15/01/2004 02:21	45	from south to north over shallow mooring	-53.8600	-37.9180	start		krill
15/01/2004 03:15	45	from south to north over mooring	-53.7185	-37.9490	end		krill
15/01/2004 03:16	46	from north to south over mooring	-53.7201	-37.9484	start		krill
15/01/2004 04:10	46	from north to south over mooring	-53.8648	-37.9138	end		krill
15/01/2004 04:11	47	from south to north over mooring	-53.8646	-37.9157	start		krill
15/01/2004 05:05	47	from south to north over shallow mooring	-53.7301	-37.9555	end		krill

Time	Transect Name	Description	Latitude	Longitude	Start/End	Comment	User
15/01/2004 05:06	48	from north to south over shallow mooring	-53.7288	-37.9550	start		krill
15/01/2004 06:00	48	from north to south over mooring	-53.8654	-37.9196	end		krill
15/01/2004 06:01	49	from south to north over mooring	-53.8641	-37.9210	start		krill
15/01/2004 06:54	49	from south to north over shallow mooring	-53.7273	-37.9645	end		krill
15/01/2004 07:12	50	from shallow mooring to Cumberland Bay	-53.7729	-37.9252	start		krill
15/01/2004 11:40	50	from shallow mooring to Cumberland Bay	-54.1360	-36.4756	end		krill
15/01/2004 20:19	51	from Cumberland Bay back to shallow mooring	-54.1419	-36.4419	start		krill
16/01/2004 00:13	51	from Cumberland Bay back to shallow mooring	-53.8419	-37.7095	end		krill
16/01/2004 07:00	52	transect W3.1 starting at W3.1S	-53.9119	-38.1855	start	calm weather repeat of long transect	krill
16/01/2004 11:24	52	finish of transect W3.1 at W3.1N	-53.2206	-38.4488	end		krill
16/01/2004 12:40	53	start of transect W3.2 from W3.2N	-53.1865	-38.1464	start		krill
16/01/2004 16:53	53	finish of W3.2 at W3.2S	-53.8832	-37.9085	end		krill

Time	Transect Name	Description	Latitude	Longitude	Start/End	Comment	User
16/01/2004 17:18	54	start of transect W4.1 at W4.1S	-53.9013	-37.8235	start		krill
16/01/2004 22:14	54	finish of W4.1 at W4.1N	-53.1680	-37.9456	end	3 good quality transects in one day	krill