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FRV *Scotia*

Cruise 0504S

REPORT

27 March – 1 April 2004

Personnel

P Copland	(SIC)
E Armstrong	
J Hunter	
J Dunn	
M Stewart	
M Burns	
A Mair	
Annabelle Oronti	(Visitor MSc)
Anna Finnegan	(Visitor MSc)
C Stewart	27-29 March
P Fernandes	29 March – 1 April
N Collie	29 March – 1 April

Objectives (In order of priority)

1. Multi-sampler acoustic communication trials.
2. Conduct Multi-sampler net deployment
3. Trials of Multi-sampler net release system
4. Multi sampler net observations with RCTV
5. Plankton Sampler catch comparisons
6. RCTV cable hydrodynamics
7. Optical Plankton counter observations
8. EK 500 Echosounder relocation
9. Fluorometer monitoring
10. Trials of radio remote control system
11. Sea noise tests on SH80 Sonar

A full description of each objective is attached.

Equipment

PT 160 pelagic trawl with multi-sampler frame and codends.
U-Tow sampler
Aries
Dual Methot Isaac-Kidd
RCTV
Scanmar sensors

Narrative

Scotia sailed from Aberdeen at 1200 on Saturday 27 March. On passage to the Southern deeps the vessel stopped for a short time to test the plankton winch and crane prior to operations. Operations

commenced at the Southern deeps at 1500. The work schedule varied depending on the priority of the task and staff and equipment availability. A personnel change took place by small boat at Peterhead at 0900 on 30 March with Mr C Stewart leaving the vessel and Dr Fernandes and Mr Collie embarking. This transfer was carried out using *Scotia's* workboat. Three vertical dips were carried out to obtain samples of live *Calanus.* With the weather deteriorating rapidly, *Scotia* left the work area at 2100 on 31 March and entered Aberdeen harbour at 2400. Unloading commenced at 0830 on 1 April.

Progress on objectives.

1. Multi-sampler Acoustic Communication Trials

Mr Hunter was in charge of this task. Through water acoustic communications from the multi-sampling net control and monitoring unit were tested on two deployments. The vessel's existing Scanmar drop keel hydrophone was used as the receiver to pick up the sampler's data pulses. A final test of the through water link had to be cancelled when it was discovered that there was no acoustic signal from the frame on deployment. This may have been due to damage caused by a battery pack being inadvertently left on overnight. Software modifications are in hand to prevent a re-occurrence of this situation. Two-way communications with the frame were not possible, as the transducer equipment had not been completed prior to the cruise date. Data were received showing frame depth and tilt angle using this link. Observations were made on the signal strength of the frame telemetry system.

2. Conduct Multi-sampler Net Deployments

Mr C Stewart took charge of this task. Only one partial deployment was required to familiarise crew with the operation of the gear before full-scale trials took place. Operation was very simple and, apart from some difficulty in recovering the frame under the safety line at the ramp top, the frame should cause no problems in being used during acoustic survey cruises. A net mounted self-recording camera system was fitted during two hauls showing the nets opening and closing. Video footage is available of net deployment and recovery on the deck. One of the net deployments was conducted as a fishing haul. Fish seen in the netsonde were also seen on the net camera and the correlation with the cod end catches and amount of fish seen was very good.

Consideration was given to operations such as cod-end emptying and the storage of frame if PT170 were to be deployed from top net drum during future cruises. Neither operation caused the bridge or deck officers any concerns. It has been suggested that the manual handling of the frame might be reduced if the frame were to be fitted with one set of wheels. Consideration will be given to this suggestion.

It was noted at the end of the cruise that the rubber mounting blocks between the inner and outer frames were very distorted. It may be necessary to mechanically limit the lateral movement of the frame to avoid long-term damage to the system. Also consideration should be given to the lifting points on the frame and its transportation with cod-ends and extension section attached.

3. Trials of Multi-sampler Net Release System

Mr Hunter was in charge of this task. The system worked in four deployments. Some problems were encountered initially when a slight leak was discovered emanating from the drive shaft of the motor housing. This may have been due to misalignment of the drive or some slight imperfections in the "O" ring grooves. Although this problem did not re-appear it would be expedient to scrutinise the alignment of these shafts.

4. Multi-sampler net observations with RCTV

Mr Copland co-ordinated this task. The RCTV was successfully deployed alongside the PT160 net to monitor the behaviour of the net changing mechanism on two shallow hauls (50-65 m depth). Towing speeds of 4-4.5 knots were used. Output from the RCTV's SIT camera, Reson 4016 and SM2000

multibeam outputs were recorded on video and DVD. These demonstrated very clearly, from alongside the gear, how well the system performed. Observations would suggest that the net angle might be different from the 45-degree expected. Frame tilt angle information was transmitted to the vessel but a laboratory calibration will be required to establish the exact angle measured.

No mechanical modifications to net changing mechanism were required on board.

5. Plankton Sampler Catch Comparisons

Mr Dunn and Mr Mair were in charge of this task. The Dual Methot net and ARIES were each deployed eight times at similar positions on the scattering layers seen on the echo sounders. The ARIES system carried the SEABIRD CTD and the Optical Plankton Counter (OPC) system, both of which worked consistently and produced high quality data.

The U-tow system was deployed three times on 30 and 31 March in areas sampled immediately previously by ARIES and the Dual Methot net, but developed an undetermined fault and failed to collect samples in any of these tows. A further test deployment of U-tow proved inconclusive in determining the exact nature of this fault.

Samples from ARIES and the Dual Methot net were returned to the laboratory for analysis and comparison, but no useful U-tow samples were obtained.

Acoustic data from all four echo sounder frequencies were recorded in the acoustics container throughout the cruise to allow future analysis of correlation between echo-traces and plankton samples collected.

6. RCTV Cable Hydrodynamics

Mr Burns was in charge of this task. A total of 4 towing blocks were completed to demonstrate the RCTV performance with the fibre optic cable. The deepest that the RCTV could be deployed at 3.5 knots was 120 m with 550 m of cable out. This information will be passed to Mr Ferro for use in the next cruise.

7. Optical Plankton Counter Observations

Mr Collie, Mr Burns and Mr Dunn liased to complete this task. Data was collected to establish relationship between the particles seen on the OPC and the samples that were caught. Analysis of these results will be carried out in the laboratory.

8. EK 500 Echosounder Relocation

Mr Armstrong was in charge of this task. A second EK500 system was installed on a temporary basis in the Transceiver Room. The additional wiring installation to the acoustics container was commissioned to successfully test communication and control of the remote EK 500. Unfortunately some ships wiring was found to be unavailable as it could not be traced in any of the ships spaces outside the Transceiver Connection Room. As these were to be used for motion reference data and synchronisation pulses it may be necessary to provide additional wiring to this area to fully relocate the EK 500. Mr Armstrong also identified a possible fault in the I/O board of the EA 500 that prevents it from inputting serial navigational data. Mr Armstrong liased with the ships ETO throughout the exercise and a full description of the wiring installation, and problems encountered, will be provided in due course. The relocated EK 500 was run for a short time to establish if the noise interference encountered on the 200 KHz transducer was reduced. The results showed a dramatic improvement in available range from 90 m to almost 200 m.

9. Fluorometer Monitoring

Mr Collie was in charge of this task. Mr Edelsten will download data from the Zendiq system at the end of the cruise so that any data losses can be established. No calibration samples were required during this exercise.

10. Trials of Radio Remote Control System

Mr M Stewart was in charge of this task. A radio-controlled system was tested for use with hull transducer calibration adjusters. The system was proved to operate although cross talk in the motor control cables caused some spurious counts to be transmitted by the monitoring transmitter. This was due to electrical cross-talk in the cabling It is expected that using a different cable type will eliminate this problem. The system was tested over the length of the aft deck with no loss of performance.

11. Noise tests on SH80 Sonar

Mr Armstrong was in charge of this task. The SH80 sonar was operated for periods during the cruise to establish the background reverberation levels seen during various types of ships activities. Data from Ethernet telegrams were collected during this exercise for analysis in the laboratory.

12. GPS Tracker System

This is an additional task, which is not referred to in the cruise programme. The system was installed by Mr Hall prior to sailing and required no monitoring by staff during the cruise. The *Scotia* was requested to cross a specified range line to test if the system could recover from losing its communication to the cell phone system. The line was crossed on four occasions. Details of times and positions of line crossings have been supplied to Mr Hall separately.

P J Copland
6 April 2004

Seen in draft: P Ramsay, OIC *Scotia*