

# R.V. FRANKLIN

## NATIONAL FACILITY OCEANOGRAPHIC RESEARCH VESSEL

*RV FRANKLIN*

### RESEARCH SUMMARY

CRUISE FR 9/89

Sailed Hobart 1500 Saturday 15 July 1989

Arrived Hobart 1430 Monday 17 July 1989

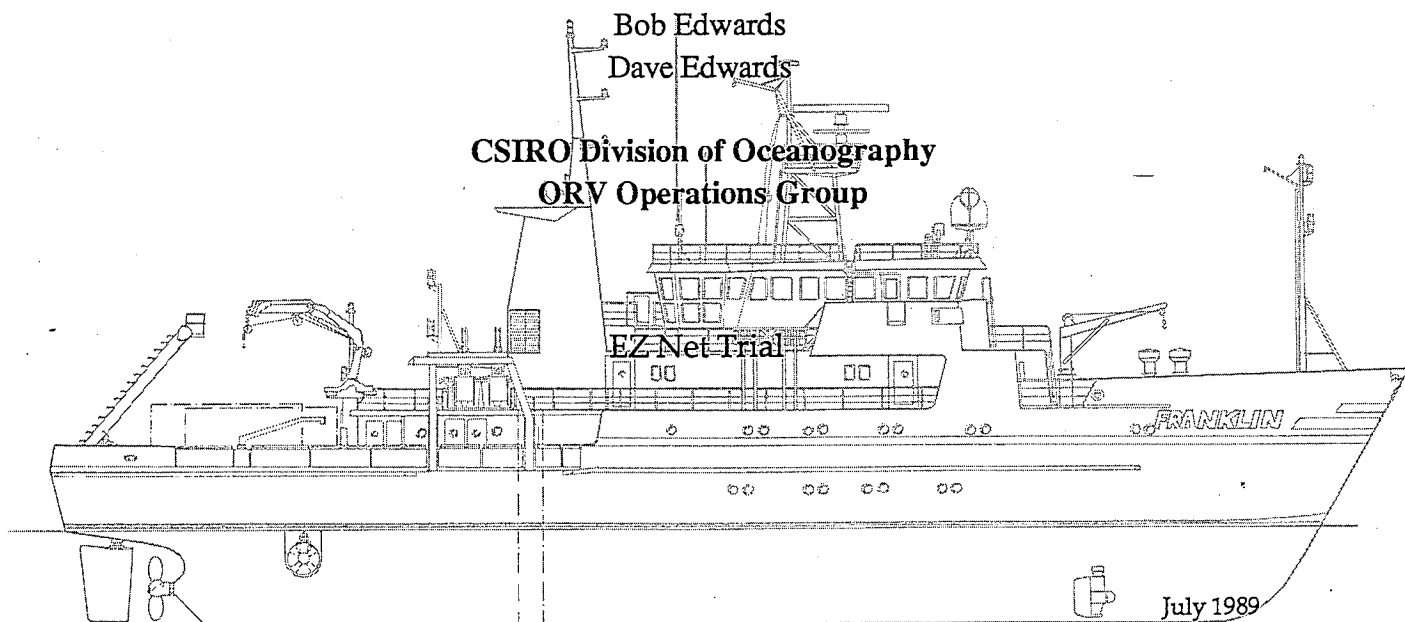
### Principal Investigators

Bob Edwards

Dave Edwards

CSIRO Division of Oceanography  
ORV Operations Group

EZ-Net Trial



July 1989

For further information contact

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R.V. FRANKLIN IS OWNED AND OPERATED BY CSIRO

***RV FRANKLIN***  
**RESEARCH SUMMARY**

**CRUISE FR 9/89**

**Itinerary**

Sailed Hobart 1500 hrs 15 July 1989  
Arrived Hobart 1430 hrs 17 July 1989

**Programs**

- EZ Net Test Cruise
- Hydrographic Survey off Maria Island

**Principal Investigators**

Bob Edwards  
Dave Edwards

**CSIRO Division of Oceanography**  
**ORV Operations Group**

**Cruise Narrative**

This short cruise was to test the development of the EZ Net System in its new configuration using in-house developed computer control and data logging. On sailing from Hobart the EZ Net was initially trialed in Storm Bay in shallow water, then in deeper water off Maria Island.

We were very lucky to have beautiful conditions during the entire cruise. On sailing we proceeded to Storm Bay where initial trials were carried out in shallow water. Late that evening we sailed to the Maria Island area arriving early next morning. Further tests were carried out in shallow water before moving to deep water. A test of the 24 bottle rosette to 2000 m followed which was completely successful. Further EZ Net trials followed until late at night and the ship then returned to Storm Bay. In the morning, more trials were carried out until the ship had to leave for Hobart.

## Results

A total of ten EZ Net deployments were made and, after some initial problems were solved, the net worked very satisfactorily. Depths samples range from near surface to 300 m with the speed being varied from 3 to 5 knots. The nets used had a mesh size of 300 microns and this restricted the speed and length of trawl since we were careful not to tear the nets due to excess speed. When the system is fitted with the 1000 micron nets, full speed and depth will be easily achieved.

It is nice to acknowledge the successful efforts of the ORV electronics section who have adapted the electronics and mechanical systems so that the EZ Net works as intended. The workshop provided an efficient 24 bottle rosette configuration.

Because of time limitations caused by the EZ net tests taking longer than anticipated, the hydrographic section was not carried out.

## Personnel

Bob Edwards	CSIRO — ORV	Chief Scientist
Phil Adams	"	
Paul Boulton	"	
Terry Byrne	"	
Sean Connolly	"	
Dave Edwards	"	
Tim Mangan	"	
Neil McQueen	"	
Bob Garret	I.N.R.E.	
Brian Griffiths	CSIRO — DF	
Simon Braine	"	
Tim Davis	"	

R.J. Edwards  
Chief Scientist  
21 July 1989

## **ELECTRONICS REPORT FR9/89**

### **EZNET TRIAL using CSIRO EZSDL ELECTRONICS and SOFTWARE**

Prior to the commencement of the cruise, the net and associated electronics was loaded on board and the remaining cabling installed. At the first trial of the system, reliable communications could not be established. This fault was traced to a crossover in the sea-cable connections. A total of ten trial deployments were carried out during the cruise.

#### **TEST A**

Two nets were fitted (posns 1 & 10). The net was towed at 2 knots and 30 meters depth. The towing bridle was in position 3 counted from the front. All 10 bars were dropped successfully. 57 net trips were detected. The net roll was shown as about 45 degrees and the pitch showed the net was towing about 20 degrees nose down. On retrieval, the net trip sensor appeared to be loose.

#### **TEST B**

The first bar was tied down to the frame, and two nets were fitted (posn 1 & 9). The towing bridle was moved to position 8. 10 bars were dropped, and 27 net trips detected. Pitch and roll readings were essentially unchanged from the previous test. Salinity readings were again suspect. During retrieval, the EZ battery reading was noted as 0. This increased to the normal value of 6 volts on deck.

#### **LAB TESTS**

During lab tests, an error in the calibration of the pitch and roll sensors was noticed. All other sensors appeared to function correctly.

#### **TEST C**

The net configuration as for Test C. Conductivity not sampled. Pitch and roll recalibrated. The net trip magnet was removed. Motor belt tightened. Light scale factor increased by 1000. Many false trips were detected on deployment, so the net was retrieved without dropping any nets.

#### **TEST D**

As for Test C. Net trip cable removed at rear of electronics case. Several SDL errors occurred. Towed at speeds up to 5 knots. No net trips detected. Pitch and roll still unacceptable. EZ battery voltage went to 0 volts when net entered water. Flow sensors appeared OK. 9 bars dropped normally, required two attempts to drop bar 10. EZ battery voltage returned to normal value of 6.1 volts on recovery.

#### **LAB MODS**

Electrical leakage currents were suspected to be cause of problem, so mods were made to the electronics to reduce the input impedance of all inputs, in an attempt to eliminate leakage interference.

## TEST I

Rubber straps on net trip tightened. Magnet fitted. First bar tied down. 8 nets fitted. Bridle position 6. Shackle still on starboard side of bridle. Drop shaft not hard against stop. SDL errors when net drops attempted. 10 net trips only recorded. Roll stable at -5 degrees. Pitch about 20 degrees, more stable at high speed. Last net closed at 5 knots. **SUCCESSFUL TOW.**

## TEST J

Replaced 1 of 2 rubber bands on net trip detector. 9 nets fitted. First bar not tied down. No shackle on bridle. Bridle in position 4. Drop shaft not hard against stop. Net trip magnet fitted. Unmodified SDL card (no low impedance mods). Towed at 3 knots. Net trip detected on deck because normal pre-deployment test procedure was carried out before rubber band was replaced. SDL errors recorded when net drop attempted. Speed 3 knots, depth 40 meters. 10 net trips only detected. Closed last net at 5 knots. Pitch was +10 degrees at 3 knots, changed to -10 degrees at 5 knots. Roll stable at about -5 degrees. May have sent 11 net drop commands. Net drop shaft appeared to have moved 11 times. **SUCCESSFUL TOW.**

## CONCLUSIONS

10 net hauls were completed in a 48 hour period. Deployment and recovery of the net was achieved without difficulties in calm weather conditions. Additional protection bars need to be fitted to the front of the net to minimise the possibility of mechanical damage to the net during deployment and recovery in rough weather. No problems were experienced with damage to the mechanical structure of the net. No nets were lost.

The new CSIRO designed electronics proved to be an enormous improvement compared to the old system, particularly in respect of the ease of removal and replacement of the electronics module on the net. The new software proved to be very robust. At no stage did communication errors or other errors cause the software to fail. All data was logged to disk without problems.

The main fault of the system was due to the presence of two unrelated errors. When these were located and rectified, the system performed as expected. The operators were able to tell at all times the status of the net. There are a few small problems remaining with the electronics (these do not affect operation of the net), and some changes will be required to the software. In particular, a preference for a graphical rather than tabular display of data during a haul was expressed by operators.

David Edwards  
18/7/1989

### **TEST E**

First bar tied down. Extra shackle on starboard side of bridle. Bridle in position 8. Net trip magnet and cable re-installed. On entry to water, salinity went funny, EZ battery went from 6.1 to 5.5 volts. Salinity went to zero when slip detector turned off. Suspected leakage currents from slip detector or EZ battery charger. All conductors in sea-cable apart from 2 required for communications disconnected to no avail. Number of SDL errors detected. When bars were dropping, salinity went to zero and recovered slowly thereafter. On recovery, 9 nets dropped, 10th not. Motor shaft appeared to have moved backwards (Bar 9 could not be reloaded).

### **TEST F**

All sensors logged except conductivity. Drop shaft not hard against stop. Bridle position 8. 8 nets loaded (posn 3 and 10). First bar tied down. Many net trips detected, most when speed increased to 4 knots. Bars appeared to drop OK, but some SDL errors. Pitch and roll appeared to be better than previous tests, particularly roll.

### **DIP TEST**

The net was briefly dipped (ropes not detached) while motor and all sensors systematically unplugged. EZ battery was monitored. Went from 6.1 to 5.5 volts on every entry to water. Electrical leakage currents suspected to be cause of problem.

### **DECK TESTS**

The electronics case was removed from the net and stood in a plastic bucket of salt water. EZ battery went from 6.1 to 5.5 volts. Leakage suspected in sensors mounted on front of pressure case. Found fault appeared when brass light meter case connected to aluminium sensor guard via seawater but not wire in air. Short between light sensor case and internal wiring located. 16k leakage between electrical ground and aluminium case traced to fault in conductivity sensor (pin 3). Light sensor repaired, conductivity sensor disconnected.

### **TEST G**

Net trip detector disconnected at rear of electronics case. SDL errors noted when motor operated in test mode on deck. Removed low impedance modification to motor card. This changed scale factor for EZ battery so reading changed from 6.1 volts to 1.1 volts. Bridle position 8. Shackle in starboard side of bridle. Drop shaft not hard against stop. First bar tied down. 8 nets loaded. Tow depth 300 meters (limited by rating of pressure sensor). Speeds 3 to 5 knots. SDL errors when bar drops attempted. No net trips detected. Roll now 1 and -5 degrees, pitch about 25 degrees nose down. Managed to drop net at 5 knots. **FIRST SUCCESSFUL TOW.**

### **TEST H**

First bar tied down. 8 nets. Shackle still in bridle. Net trip magnet removed. Net trip sensor connected. Bridle position 8. Drop shaft not hard against stop. Depth 50 meters. 3 knots for 9 nets, 5 knots for 10th net. SDL errors when net drops attempted. Pitch about 30 degrees with nets open, about 10 degrees with nets closed. Roll about -5 degrees with nets opened and closed. No net trips recorded. **SUCCESSFUL TOW.**