

FRANKLIN

National Facility
Oceanographic Research Vessel

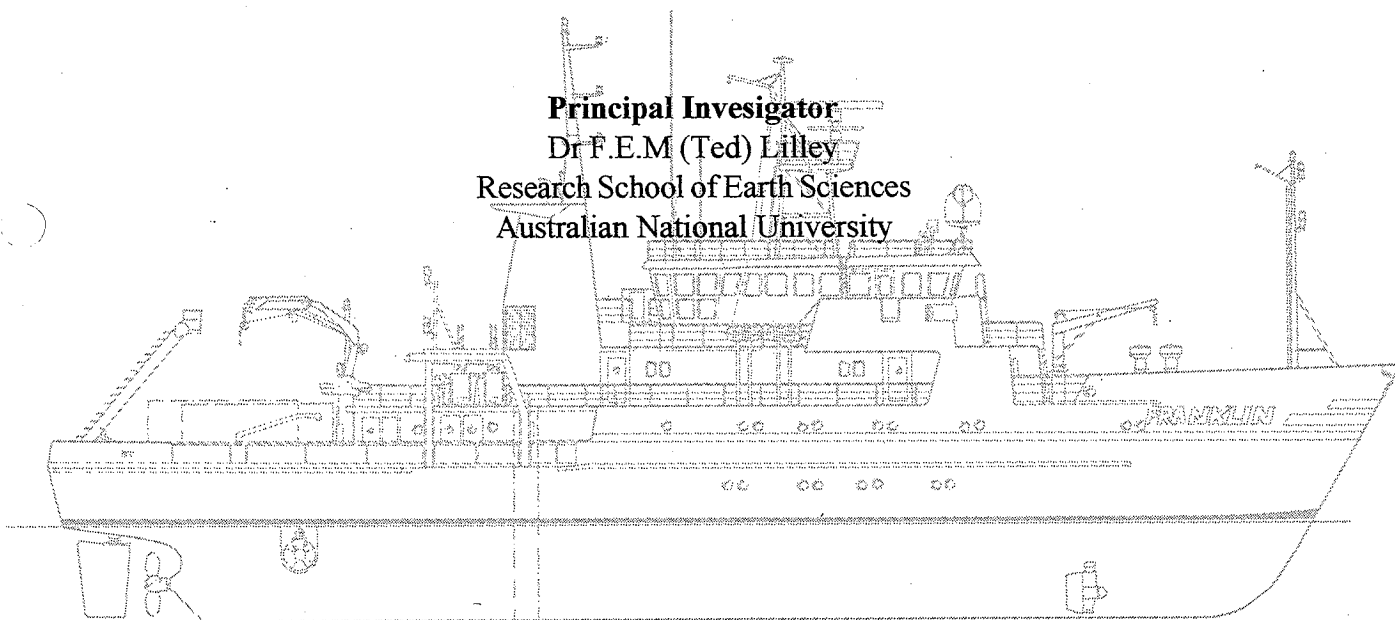
CRUISE PLAN

R/VFRANKLIN

Fr08/97

Depart:	Townsville	1000h 24 Sept 1997
Arrive	Brisbane	1000h 9 Oct 1997

Principal Investigator
Dr F.E.M (Ted) Lilley
Research School of Earth Sciences
Australian National University



For further information contact:

ORV Operations Manager
CSIRO Division of Marine Research
GPO Box 1538, Hobart, Tasmania 7001

Phone (03) 6232 5222
Fax (03) 6232 5000
Telex AA 57182



FRANKLIN is owned and operated by CSIRO

**Cruise Plan
RV Franklin
Fr08/97**

Itinerary

Depart:	Townsville, Qld, Wed 24 Sept 97	1000 hr
Harbour pick-up:	Sydney region, NSW, Sun 28 Sept 97	1600 hr
Harbour drop-off:	Sydney region, NSW, Tues 7 Oct 97	0800 hr
Arrive:	Brisbane, Qld, Thur 9 Oct 97	1000 hr

Title: Study of Oceanic Dynamo Action (SODA)

Principal Investigator

Dr F.E.M.(Ted) Lilley
Research School of Earth Sciences
Australian National University,
Canberra, A.C.T. 0200.
Phone: (06) 249 4174 or (06) 249 3406.
Fax: (06) 249 0738.
Email: Ted.Lilley@anu.edu.au

Scientific Objectives

1. Obtain a description of the motional electromagnetic induction taking place in the East Australian Current (EAC), by measuring natural magnetic and electric signals. Much of the equipment is still under development. An objective of the cruise is to test and possibly further develop the equipment under ocean conditions.
2. (Piggyback) Run a radiometer and release ionosondes to assess instrumentation for future use on merchant "ships-of-opportunity".

Cruise Objectives

The cruise, Sydney - Sydney, is of 9 days ship time, during which Franklin leaves from Sydney, and proceeds to the most suitable part of the EAC, chosen from satellite images at the time. Ideally the area of investigation will be off Bateman's Bay, in order to benefit from the proximity of the Canberra Magnetic Observatory; however, flexibility in this aspect of the cruise plan is important, right up to the time the ship leaves port, and also during the cruise itself.

The schedule given below is followed for 9 days, centred about a transect line across the EAC; the line to run directly out from the east Australian coast into the Tasman Sea, for 500 km (see Fig. 1).

Put simply, the intention is to obtain a "snapshot" of the EAC as a dynamo, in as much detail as possible.

Cruise track

See Fig. 1.

ORV Equipment

Standard:

Position (Navigation) and Depth-Sounder

Underway:

ADCP; Thermosalinograph; XBT (estimate 50 in all).

Hydrology: CTD (three CTD 12-bottle stations per day).

On Board Instrumentation:

UNIX Computer; Personal Computers.

After Deck:

Acoustic-release Deck Unit; Pinger.

Other Items:

Containerised Deck Laboratory ('Bio. Lab').

Ship's radio direction-finding apparatus to receive signals from beacons, attached to magnetometer packages, at about 156 MHz.

Special requirements:

1. Power and space in the Franklin Electronics Laboratory for the operation of acoustic navigation and recall equipment. Also in the Electronics laboratory, space for assembling magnetometer and electrometer equipment.
2. Possible use of either or both of the ship's "in-hull" 12 kHz acoustic transducers for communicating with marine magnetometer packages. It is expected that the acoustic decksets brought on board by the SODA party will be Benthos models 210-TDU and DS-7000. Knowledge of the actual make and model of each of the two Franklin in-hull 12 kHz transducers would be helpful, plus knowledge of their input impedances. Also, equipment (a signal generator and a variable load?) to allow the measurement of their input impedances while the cruise is under way may be very useful.
3. Ship's boat to effect pick-up and drop-off transfers of personnel in Sydney region.

User Equipment

Seafloor recording magnetometers and electrometers
Acoustic recall equipment (Benthos) for the seafloor instruments
Magnetometer packages for magnetometer casts, and floating magnetometers
Hand-held RDF receiver (~ 156MHz), as back-up for ship's RDF.

Time Estimates

The ship leaves Townsville at 1000 hr on Wed 24 Sept 97, and picks up the SODA party near Sydney at 1600 hr Sun 28 Sept 97.

The 9 days of the scientific part of the cruise, as described below, start from this time.

SODA Days 1 and 2 (Sept 28/29 and 29/30): Proceed from the coast directly out along the transect line, laying four seafloor recording stations, spaced regularly (170 km apart). Proceed to outer end of northern leg.

Steaming time: 800 km @ 20 km/hr = 40 hr
Deploying seafloor stations: 4 stations @ 2 hr = 8 hr
Total = 48 hr (2 days)

SODA Days 3 and 4 (Sept 30/Oct 1 and Oct 1/2): Return to the coast along the northern leg, making casts at regular intervals (every 100 km, each cast taking 3 hrs approx). Proceed to inshore end of southern leg.

Steaming time: 700 km @ 20 km/hr = 35 hr
Cast station time: 6 stations @ 3 hr = 18 hr
Total = 53 hr (2.2 days)

SODA Days 5 and 6 (Oct 2/3 and 3/4): Proceed out from coast along the southern leg (a line parallel to the transect line but offset 100 km souths from it), taking casts as for Days 4 and 5. Proceed to outer end of main transect line.

Steaming time: 600 km @ 20 km/hr = 30 hr
Cast station time: 6 stations @ 3 hr = 18 hr
Total = 48 hr (2 days)

SODA Days 7, 8 and 9 (Oct 4/5, 5/6 and 6/7): Proceed back to the coast along the main transect line, taking casts as time permits, and retrieving the seafloor instruments. Return to Sydney.

Steaming time: 700 km @ 20 km/hr = 35 hr
Retrieving seafloor stations: 4 stations @ 5 hr = 20 hr
Cast station time: as schedule permits.
Total = 55+ hr (2.3+ days)

The 9 days of SODA time end in Sydney Harbour (off Watson's Bay) at 0800 hr on Tues 7 Oct 97. The Franklin then sails for Brisbane.

Seafloor stations: It is envisaged that the seafloor stations will comprise seafloor recording magnetometers and electrometers.

Casts from Franklin into the EAC:

It is envisaged that the "casts" referred to in the above schedule will each comprise CTD measurements, and measurements of the magnetic field through the ocean column ("magnetometer casts"). While a combined cast, of CTD and magnetometer together, may be achieved by slinging the magnetometer capsule on a length of rope below the CTD package, the opportunity will first be taken to trial a "free fall" magnetometer package. This package will be released to sink by itself to a pre-set hydrostatic pressure, there to jettison a weight and so to rise again to the surface; this free-fall traverse to a certain depth and back occurring while a regular CTD cast is in progress. One purpose of the "free-fall" technique will be to achieve remoteness of the magnetometer from the magnetic effects of the ship, even when the magnetometer is near the surface. The "free-fall" magnetometer package will be released to sink from a freely-floating buoy, in which there will be a second magnetometer (again remote from the ship's magnetic effects) to monitor the magnetic signals at the seasurface. These magnetometer packages, set free from the ship, will be equipped with radio beacons and flashing lights to aid in their recovery. XBT measurements are planned at sites midway between the CTD casts.

Personnel List

SODA:

Lilley, F.E.M.(Ted).	Australian National University. Responsible for magnetometer casts at sea. Chief Scientist.
White, Antony.	Flinders University. Responsible for deployment and retrieval of the seafloor magnetometers and electrometers.
Heinson, Graham S.	Flinders University. Assist with the deployment and retrieval of the seafloor instruments, and with the magnetometer casts.
Perkins, Brenton.	Flinders University. Duties as for Heinson.
Kiss, Andrew.	Australian National University. Assist with CTD and XBT casts. Keep general scientific log of station positions and instrument activity. Liaise regarding hydrological data.
Wong, Alan.	Australian National University. Assist with CTD and XBT casts. Keep general scientific log of station positions and instrument activity. Liaise regarding hydrological data.
Student, Flinders.	Flinders University. Assist with CTD and XBT casts. Keep general scientific log of station positions and instrument activity. Liaise regarding hydrological data.
Student, ANU.	Australian National University. Assist with CTD and XBT casts. Keep general scientific log of station positions and instrument activity. Liaise regarding hydrological data.

Piggyback (radiometry)

Suber, Ken.	CSIRO Division of Marine Research. Radiometer, ionosondes.
-------------	--

ORV Support

Vaudrey, David. Cruise Manager and Computer Systems Manager.
Adams, Philip. Electronics Support.
Critchley, Gary. Hydrology Support.

At present it is planned that all SODA personnel will join and leave the ship near Sydney (with personal luggage only; equipment will be loaded and unloaded at Qld ports). Nearer the time one or more SODA personnel may arrange to join the ship in Townsville.

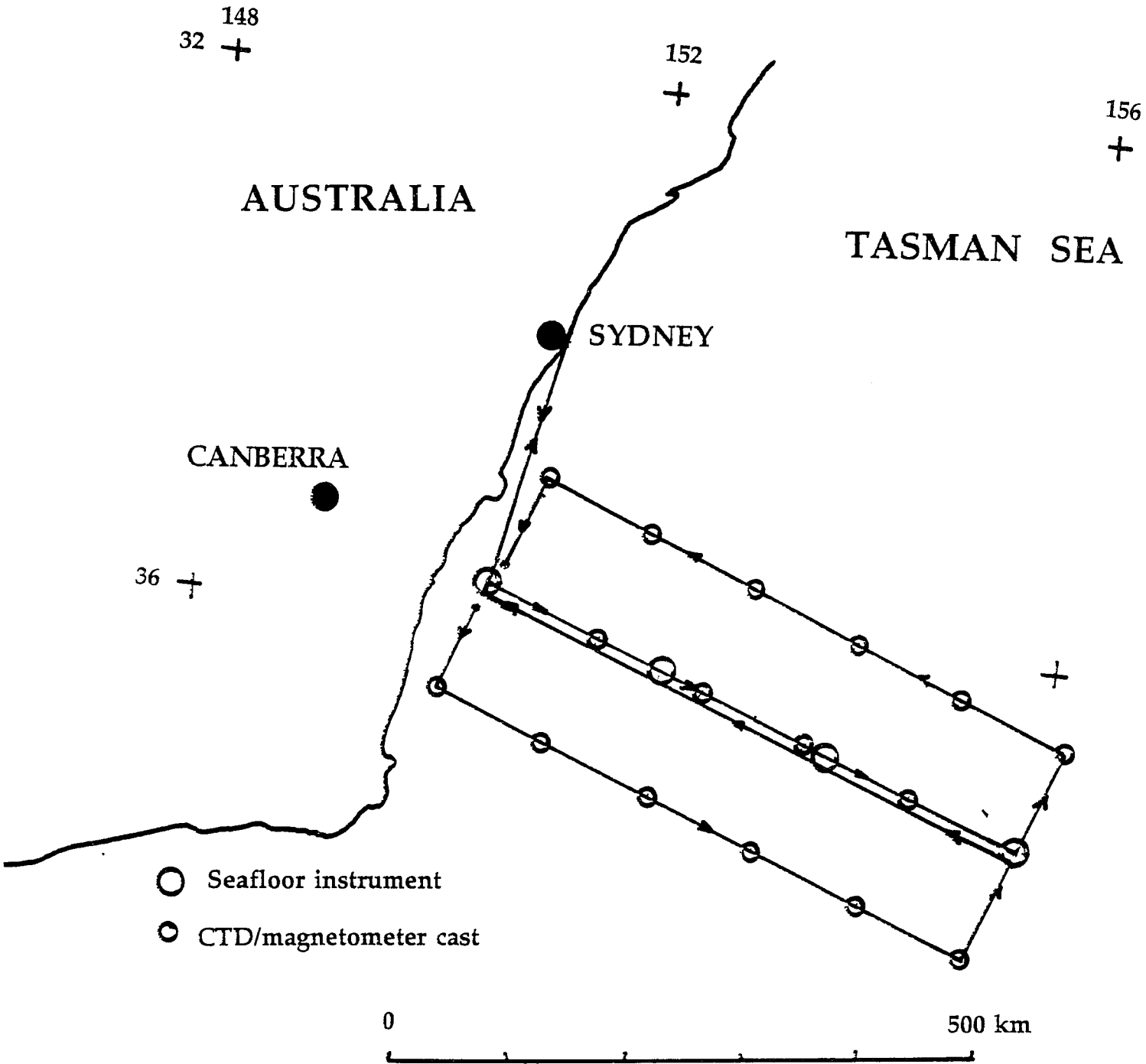
This cruise plan is in accordance with the directions of the National Facility Steering Committee for the oceanographic research vessel Franklin.



C B Fandry
CSIRO Division of Marine Research



Prof. G W Paltridge
National Facility Steering
Committee



Note: Positions of cruise tracks may need to be adjusted, up or down the coast of NSW, to accord with the state of the East Australian Current at the time of the study.

Fig. 1 Cruise track for the ORV Franklin for the proposal "Study of Oceanic Dynamo Action".