# RV EDWARD FORBES CRUISE 9/76

11 May - 24 May 1976

# Sandwave Research in the Outer Thames Estuary and Start Bay

Cruise Report No 53 A

1976

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SCIENTIFIC PERSONNEL

| | |
|---|---|
| P M Hooper | 15 - 22 May 1976 |
| E J Moore | 15 - 22 May 1976 |
| A J Marks | 15 - 22 May 1976 |
| A Soleman | 15 - 18 May 1976 |
| J O Malcolm, D Hill, P Bowhill, R Gleason | 22 May only |

SHIP'S OFFICERS

| | |
|---|---|
| K O Avery | Master |
| S P Tilbury | 1st Officer |
| R I P Coutts | 2nd Officer |
| C J Phillips | 3rd Engineer |

OBJECTIVES

To carry out a close line bathymetric survey of the Port of London Authority trial dredged channel at Longsand Head in conjunction with a side scan sonar mosaic. The stability of the PLA HiFix chain was to be monitored using the Decca Tracer Buoy. Grab samples were to be taken in the dredged channel in predetermined positions.

To carry out a close line bathymetric survey in conjunction with a side scan sonar mosaic on the Sandettie Bank, (abandoned due to bad weather).

To evaluate the performance of HiFix 6 operating on the S Rijnmond chain.

To evaluate the performance of a single IOS (Wormley) accelerometer as a 'Heave' recorder.

To determine the presence of any sedimentary features off Totland Pier (Isle of Wight), the National Physical Laboratory rig in Christchurch Bay and Bournemouth Pier using side scan sonar.

To carry out a repeat side scan sonar survey on the Skerries Bank in Start Bay and to lift three transponder rigs and a current meter frame.

NARRATIVE

The close line bathymetric survey in the PLA dredged channel *was carried out using the hull-mounted MS36 transducers and the IOS (Taunton) MS36 recorder. The echo sounder was corrected for the speed of sound in water by taking a velocity profile from surface to seabed at 2 metre intervals, using a Plessey Sound Velocity Meter. An approximate line spacing of 14 metres was used in the dredged channel and 28 metres on the flanks of the channel. The survey lines were run at 5 knots on an orientation of 070°/250° along the length of the channel. This orientation was selected to give the best angle of cut across the crestlines of the sandwaves which are considered to be reforming in the dredged channel.

The survey was positioned using the PLA HiFix chain and a Decca Tracer Buoy was placed on Great Sunk Beacon to monitor the stability of the chain during the survey. Because of adverse sea conditions at the end of the survey it was not possible to recover the Buoy and arrangements were made with the Hydrographic Department for its recovery.

The grab sampling positions were selected to determine the grain size and distribution of the sediments infilling the dredged channel and also to sample the troughs and crests of the sandwaves forming across the channel. The samples were collected using a modified Van Veen grab.

A bottom mounted sonar with a range of up to 600 metres is under development at IOS (Wormley). In its present form this system needs to be installed on a pier or offshore structure, and with this in mind the National Physical Laboratory (NPL) rig in Christchurch Bay and the piers at Bournemouth and Totland Bay were selected. A survey of the NPL rig showed a flat featureless sandy bottom but at the eastern pier at Bournemouth small amplitude short wavelength ripples running parallel to the shore were located. These features are thought to be wave-induced and as such would provide a suitable location. It was not possible to survey in Totland Bay because of neap tides.

On arrival at Dartmouth contact was made with the IOS (Taunton) diving team who, for the previous two days, had been working to locate and buoy off the transponder rigs and the current meter frame. All the rigs, together with the frame, were successfully lifted in good condition and with the transponders operational. The added presence of the IOS Taunton launch, Sand Pebbler, was very valuable in acting as the diving tender and maintaining a good communications link between the divers and the Edward Forbes. On completion all personnel were transferred to the pilot boat and the RV Edward Forbes sailed for Barry.

* See Fig 1

INSTRUMENT PERFORMANCE

It was not possible to assess fully the operational capabilities of the HiFix 6 system because the Sandettie Bank survey was abandoned. However, the system was set up, complete with track plotter and data logger and locked in at Tongue Sand Tower. The system comprises a receiver, a D/A converter to run the peripherals and a bank of batteries with charger to provide 24 volts DC. HiFix 6 is negative earth as opposed to positive earth for HiFix and as both systems were on board this presented certain problems. Earth loops between the two systems had to be prevented, and care was taken to disconnect the HiFix signal cable and power lead from the track plotter before connecting the HiFix 6. A modification to the Maglog, which entailed substituting a SeaFix interface card for a HiFix interface card, was necessary for HiFix 6 operation. This modification was carried out by Decca Survey Ltd prior to the cruise. The system worked reasonably well particularly as it was possible to use the 350 TS track plotter and Maglog. However there are two main disadvantages compared with HiFix, namely the display and setting-in the whole lane numbers. The receiver has a seven segment filament display which has a faster response than the HiFix pattern counters and it is difficult to say 'at a glance' whether the pattern is increasing or decreasing because of the rapid fluctuations over a range of about 5/100 of a lane. The procedure for setting in the whole lane numbers is controlled by four thumbwheel switches. One thumbwheel switch to control each of the three displays and the fourth thumbwheel to select the digit required to be set in. This means that only one digit can be set in for any one operation of the lane SET switch. For each display, on its associated thumbwheel, position 1 determines the whole lane thousands, position 2 the whole lane hundreds, position 3 the whole lane tens and position 4 the whole lane units. After setting in one pattern care should be taken to zero the thumbwheel switch for that display. The procedure is more complex and confusing than HiFix and as a result locking in at Tongue Sand Tower took longer than normal. The weather that day was poor with rain squalls causing loss of lock. These conditions persisted for most of the time that the ship was in the area of good HiFix 6 cover but on moving into better weather the signal to noise ratio improved.

A single accelerometer designed by IOS(W) was mounted next to the echo sounder transducers to measure vertical accelerations and to act as a 'Heave' recorder. The output from the accelerometer was recorded on a modified solid state Shipborne Wave Recorder with a Chessell chart recorder. The full scale

deflection of the chart recorder was ± 3 metres and the paper speed used was 5cm/min. The transducers lay close to the centre line of the ship and the accelerometer should not have been badly affected by the ship rolling. The system worked well, recording swells of up to 2.5 m in amplitude with a period of about 5 secs. Time marks were derived from the Maglog coincidentally with the fix mark on the echo sounder. The mean line however was affected by variations in the ship's course and the turns at the end of the survey lines.

## SHIP PERFORMANCE

The sampling programme was stopped on 17 May because the end cover on the oil cooler for the hydraulic system developed a fracture which allowed the pump to overheat. The hydraulic system suffered a total failure while at anchor in Felixstowe and the anchor was recovered by hand. A repair was effected in Harwich but this subsequently failed while lifting the rigs in Start Bay, and only hard work on the part of C J Phillips kept the delays to a minimum. The ship handling throughout the cruise was excellent and the standard of food very good.

## ACKNOWLEDGMENTS

Thanks are due to the Captain, K O Avery, and the ship's company for a successful and happy cruise.

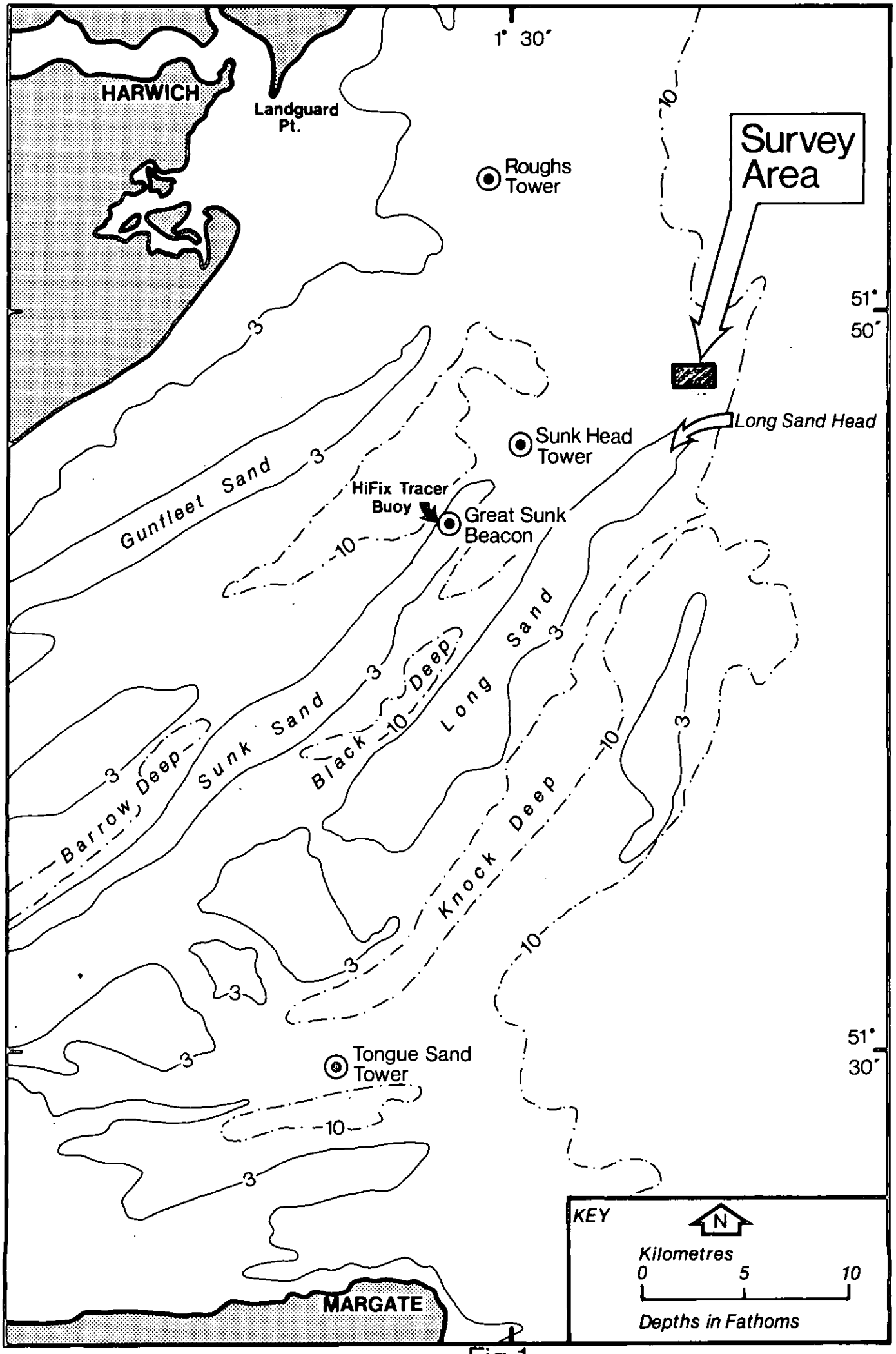
1° 30'
HARWICH
Landguard Pt.
Roughs Tower
Survey Area
51° 50'
Long Sand Head
Sunk Head Tower
HiFix Tracer Buoy
Great Sunk Beacon
Gunfleet Sand
Barrow Deep
Sunk Sand
Black Deep
Long Sand
Knock Deep
Tongue Sand Tower
51° 30'
MARGATE
KEY
N
Kilometres
0 5 10
Depths in Fathoms

Fig.1

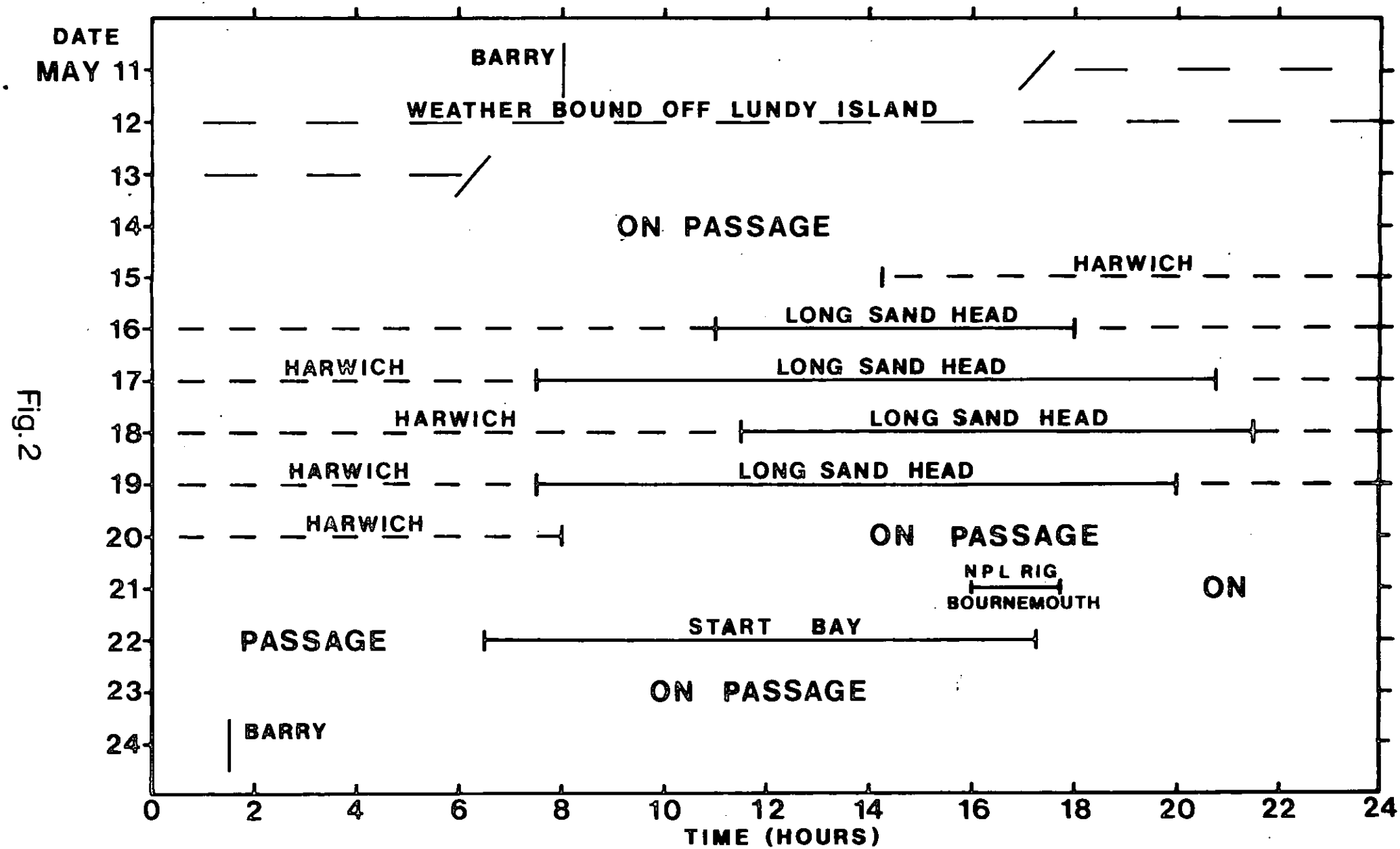


Fig.2

SYNOPSIS OF SURVEY TIMES