MINISTRY OF AGRICULTURE, FISHERIES AND FOOD
FISHERIES LABORATORY, LOWESTOFT, SUFFOLK, ENGLAND

1994 RESEARCH VESSEL PROGRAMME

REPORT: RV CORYSTES: CRUISE 2B

STAFF: J D Metcalfe (SIC)
B H Holford
B F Riches
R J Read
A A Buckley
M O Eagle

DURATION: Left Lowestoft 2100 h 11 February 1994
Docked Lowestoft 0815 h 25 February 1994
(all times GMT)

LOCALITY: Southern North Sea

AIMS:

1. To use sector scanning sonar to track migrating adult plaice equipped with long-life transponding acoustic tags. The timing of vertical movements of the fish will be related to local slack water by measuring directly the speeds and directions of tidal streams with an acoustic Doppler current profiler (ADCP).

2. To assess the telemetry tag decoder and the upgrade (Systems Engineering Ltd) of scan converter and display.

NARRATIVE:

CORYSTES sailed on the evening tide of 11 February and proceeded overnight to position 3 miles SE of Smiths Knoll.

During the morning and afternoon of 12 February 3 pressure sensing, and 2 long-life, acoustic transponding tags were tested, and the upgrade (Systems Engineering Ltd) of scan converter and display demonstrated, successfully. Fish tracking commenced at 1820 h. A spent adult female plaice (fish 1) fitted with a long-life acoustic tag (TX13) was released at 52° 41.8'N 02° 21.36'E. The fish was successfully tracked for almost 23 h until it was abandoned at 1738 h on 13 February at 52° 53.11'N 02° 21.10'E due to bad weather (easterly gale). All fish tracking on 14 and 15 February was suspended due to continuing easterly gales.

The weather moderated overnight on 15 February and fish tracking recommenced on 16 February. A running adult female plaice (fish 2), also fitted with a long-life acoustic tag (TX1) was released at 0937 h at 52° 44.28'N 02° 23.12'E and was successfully tracked for 129 h. The fish, which initially moved south on five consecutive south-going tides, was eventually abandoned at 1856 h on 21 February at 52° 19.22'N 02° 33.21'E after it had not moved for a period of about two days.

CORYSTES returned north to a position 3 miles SE of Smiths Knoll and fish tracking was recommenced at 2220 h on 21 February. A spent adult female plaice (fish 3), fitted with a long-life acoustic tag (TX12), was released at 52° 43.24'N 02° 23.24'E and tracked until 2000 h on 24 February.

During tracking there were a number of minor " lock ups" with the sector scanner remote tilt and azimuth microprocessor which required the instrument to be reset. Similar "lock ups" occurred on two or three occasions with the digital scan converter microprocessor and the *Systems Engineering* scanner display.

"Sextant" navigation and survey software, running on a PC display adjacent to the sector scanner console, was used to good effect throughout the cruise to plot the position of the ship relative to the fish being tracked as an aid to searching for lost targets. With the addition of a facility which uses data from the sector scanner to automatically display and update fish position (already in hand), this system will become a useful aid to fish tracking.

RESULTS:

1. *Telemetry tag decoder.*
This was not available for the cruise.

2. *Modified acoustic tag attachment method.*
All the fish tracked were tagged, prior to the start of the cruise, with a plastic "saddle" into which the long-life acoustic tag could be fitted. The saddle was designed to:

i. afford easy and rapid attachment of the acoustic tag using a simple cable tie and;
ii. improve the tag signal by maintaining the tag in a fixed position on the fish while keeping it clear of the sand during periods when the fish was buried on the sea bed.

These saddles worked well: tag attachment was achieved quickly and acoustic signals remained extremely clear out to >300 m, whether the fish was in mid-water or on the sea bed. During 221 h of fish tracking there were relatively few problems due to poor tag signals, and none of the tracks was terminated as a result of the fish being lost.

3. *The upgraded scan converter and display (Systems Engineering Ltd).*
The upgraded sector scanner display (*SE*) was run in parallel with the current system for the entire cruise. The *SE* system performed extremely well and, apart from occasional screen "lock ups" (above) which were easily reset, was free of faults. On the normal range B scan display (left hand side, Plate 1), the *SE* system gave clear, high definition colour displays of bottom topography, and tag signals were clearly identifiable out to a range of well over 300 m and on occasions, a signal that appeared very weak on the current display was clearly discernible on the *SE* display. Initially, bottom features such as sand ridges were not always as well defined on the expanded B scan display (right hand side, Plate 1) of the *SE* system as on that of the current one. However, this was later shown to be a function of the colour pallet used and when displayed in monocrome green, bottom features were equally clear on both the current and *SE* systems.

4. *Fish tracking.*
Three adult female plaice fitted with long-life acoustic tags were followed for periods of 23, 129 & 69 hours respectively. The long-life tags worked extremely well giving clear signals out to over 300 m aiding tracking in marginal weather conditions. Measurements of the speed and direction of the tidal streams were made with the ADCP for long periods during the mid-water excursions of the tracks of these fish, and for more limited periods when they were on the sea bed. Acoustic interference on the sonar was apparent at all times but rarely made tracking difficult and on only a few occasions did the ADCP have to be switched off in order to avoid losing the fish. The current broad band system appears to be a slight improvement in this respect over the previous narrow band instrument, although the ADCP still caused multiple triggering of acoustic tags at ranges <150 m.

J D Metcalfe
28 April 1994

SEEN IN DRAFT:
M J W (Master)
W M M (Senior Fishing Mate)

INITIALLED:

DISTRIBUTION:

Basic list +
J D Metcalfe
G P Arnold
B H Holford
B F Riches
A A Buckley
M O Eagle
Clerk, Eastern Sea Fisheries Committee

FIGURE CAPTIONS:

Plate 1. The *Systems Engineering* B scan display showing an acoustic tag signal (red rectangle) from a tracked plaice, and sand waves on the sea bed. Left hand side: normal display, area between blue markers is displayed as expanded (right hand side).

Figure 1. The ground track of plaice 2 (44 cm, Petersen tag No. EA 9556) which firstly moved across the sea bed 7.4 km to the north-east, then moved 44 .5 km south by selective tidal stream transport on five consecutive south-going tides (Fig. 2) and finally swam 8.5 km south-east across the sea bed.

Figure 2. The vertical track (7 point running mean with bottom contact preserved) of plaice 2 (fish: _____, sea bed: ----).

Figure 3. The ground track of plaice 3 (46 cm, Petersen tag No. EA 9545) which firstly moved 33.6 km to the south-south-east and then 8.5 km north-north-east. All movement was close to the sea bed (Fig 4).

Figure 4. The vertical track (as Fig. 2) of plaice 3 (fish: _____, sea bed: ----).

Fig.1

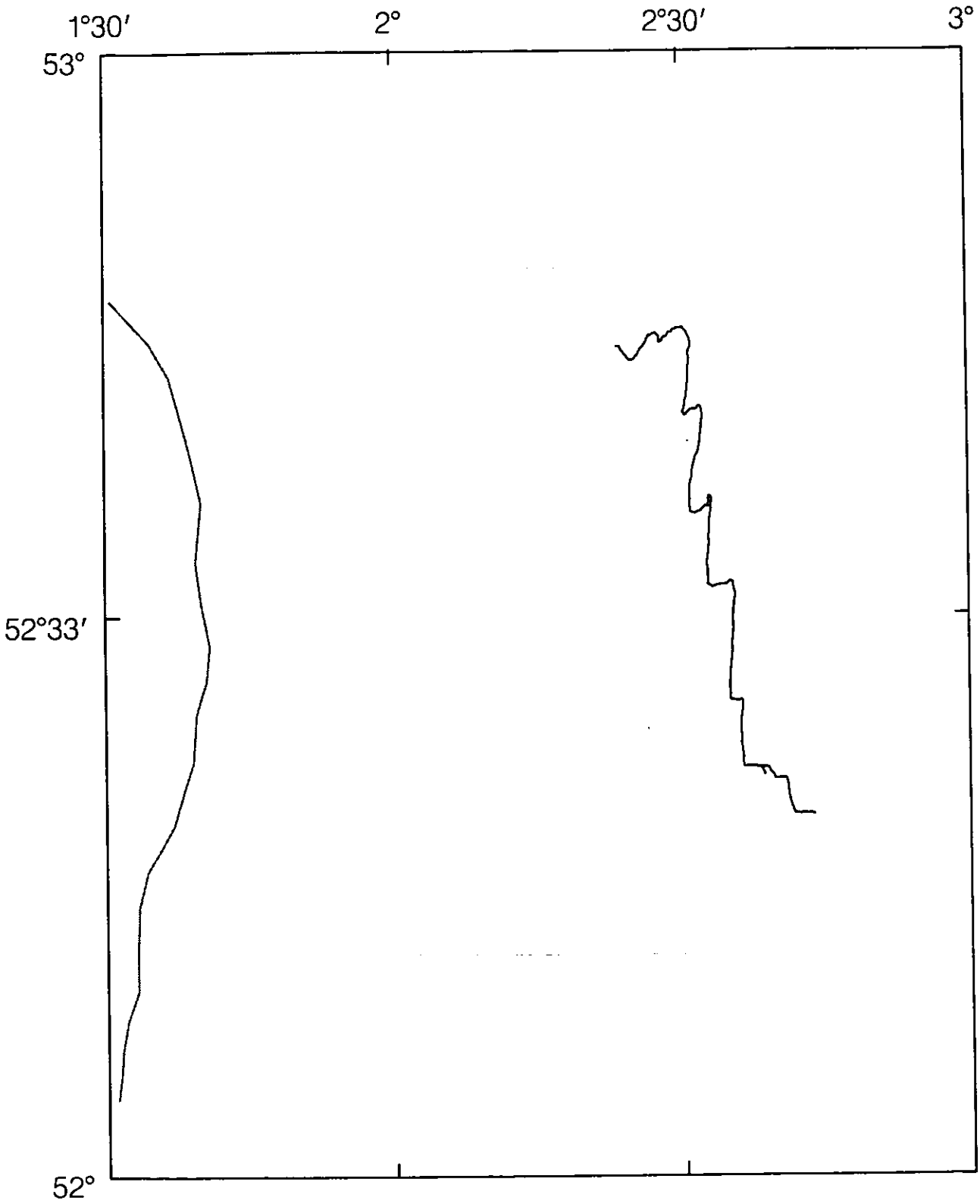


Fig. 2

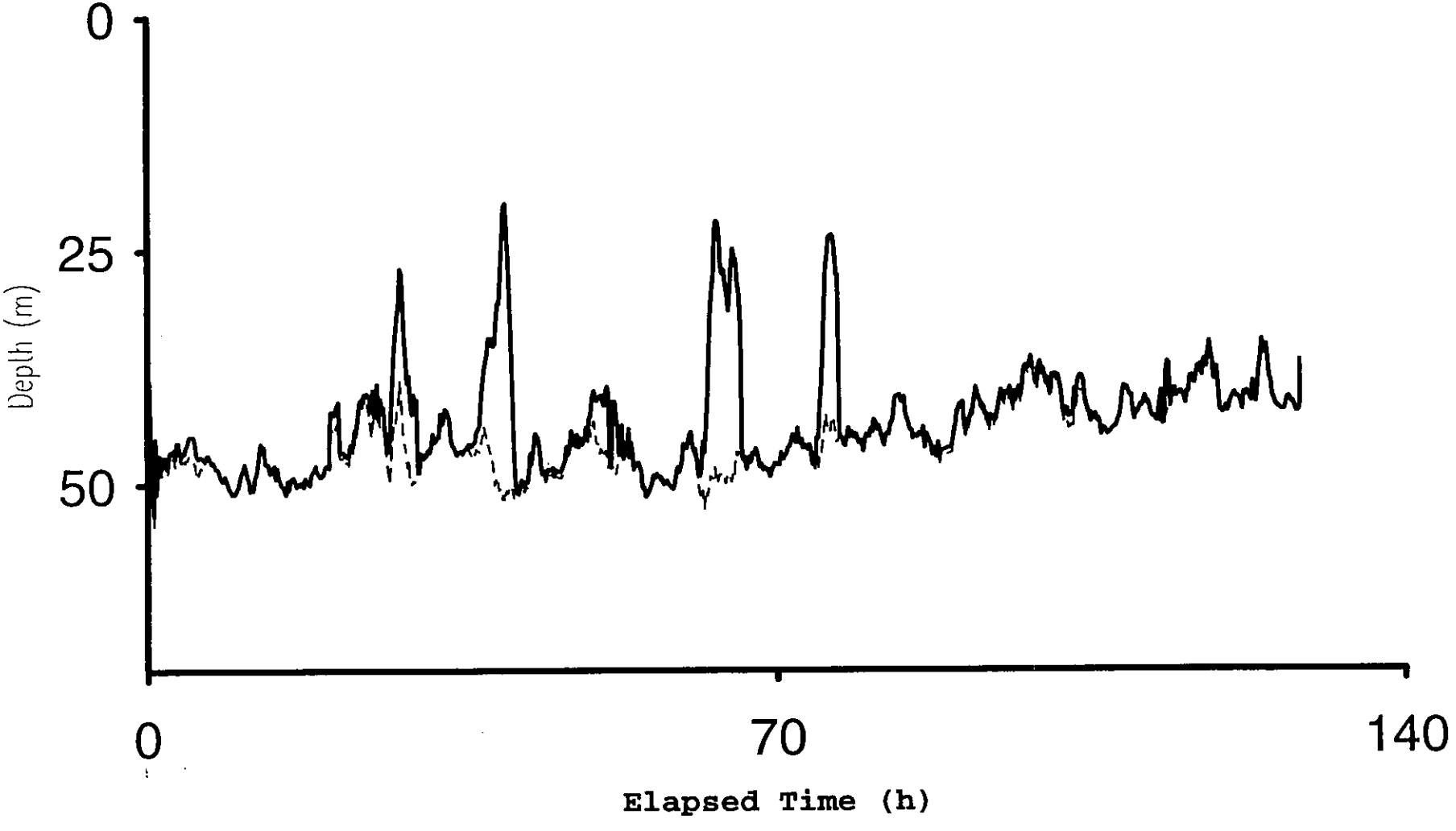


Fig. 3

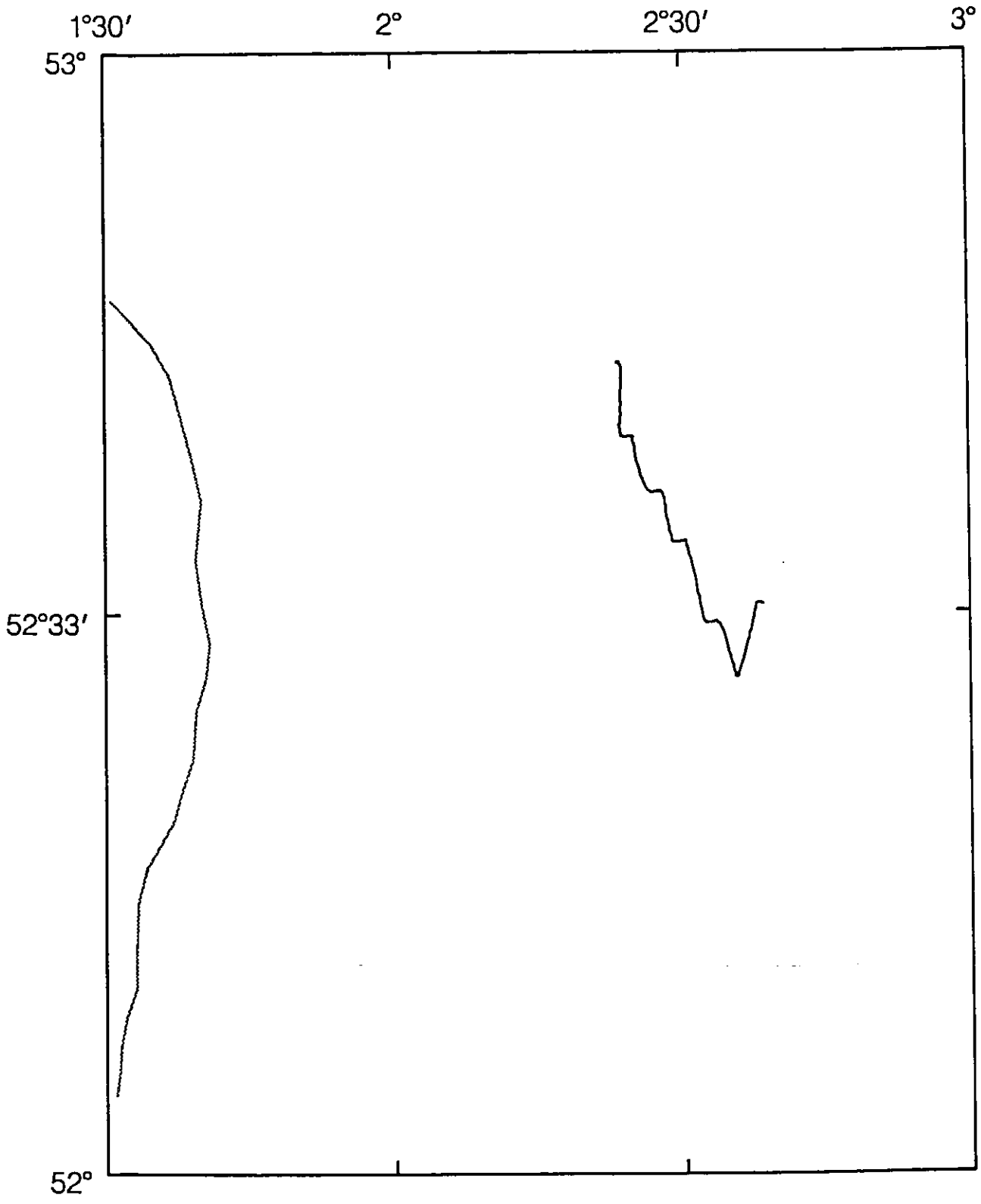


Fig. 4

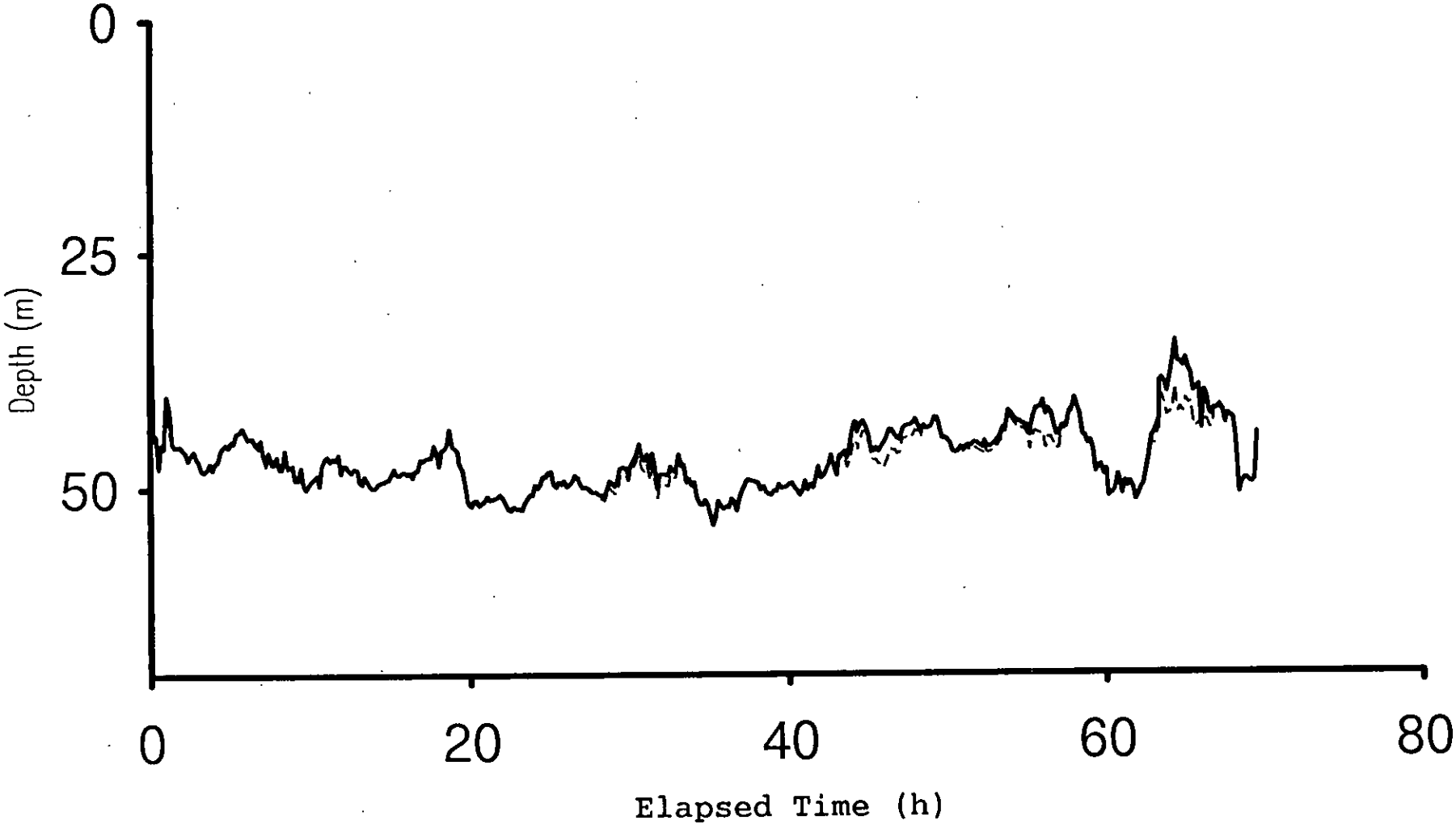
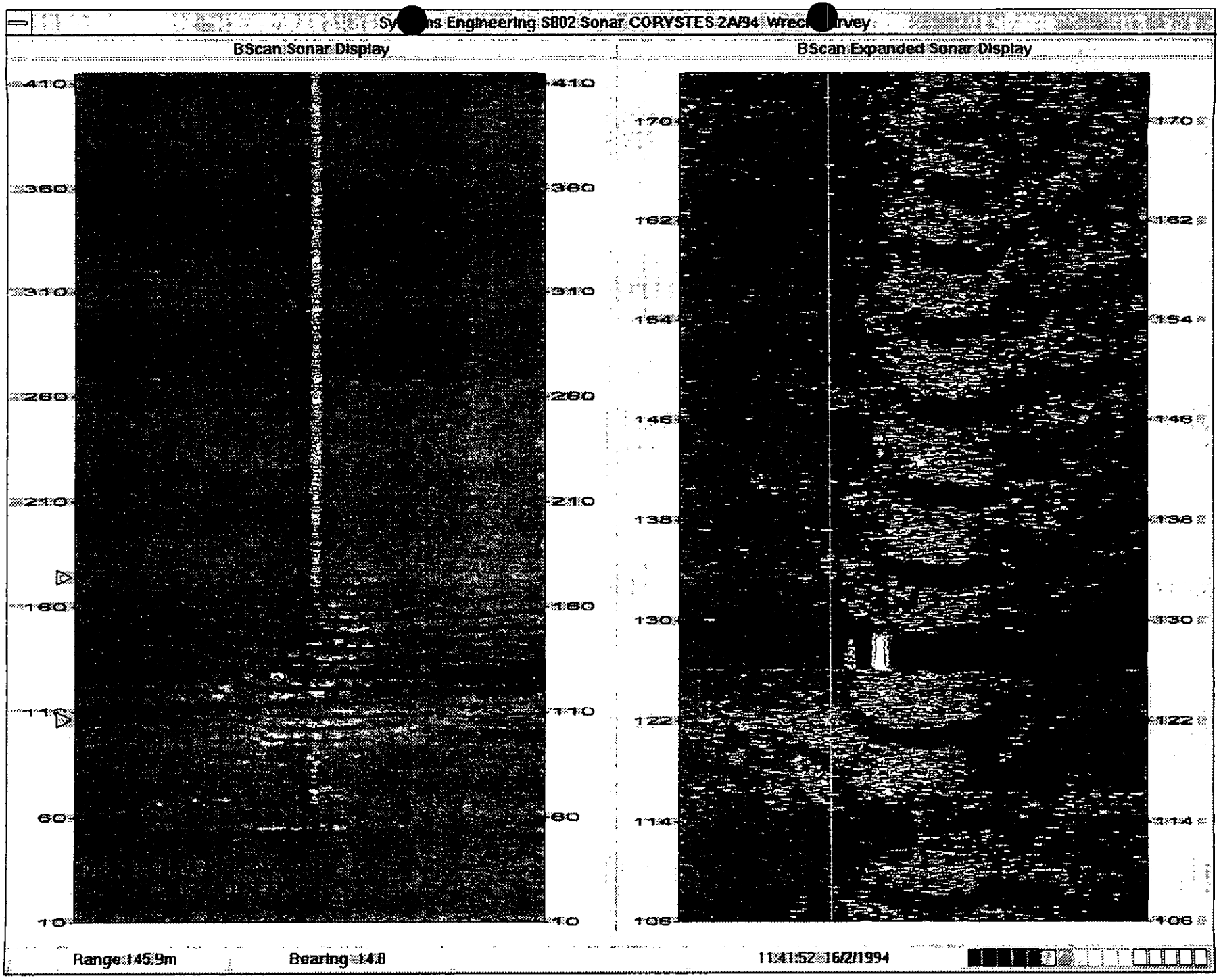


Plate 1


Sy ns Engineering SB02 Sonar CORYSTES 2A/94 Wrec rvey
BScan Sonar Display
BScan Expanded Sonar Display
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310
260
210
160
110
60
10
170
162
154
146
138
130
122
114
106
Range 145.9m
Bearing 148
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