

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

1976 RESEARCH VESSEL PROGRAMME

REPORT: RV CORELLA: CRUISE 14
(Provisional: Not to be quoted without prior reference to the author)

STAFF

H R Stewardson (NIC)
P G Griffiths
W Huggins (P/t 25-30 October)
C R Hood (P/t 21-25 October)
L Cox
T Y Lee
A R Pratt (Loughborough University) (P/t 30 October-4 November)

DURATION

Left Lowestoft 1815 h 21 October
Arrived Lowestoft 0700h 4 November
All times are Greenwich Mean Time

LOCALITY

Southern Bight

AIMS

1. To obtain both qualitative and quantitative information on the performance of the mini-scanner.
2. To determine the improvement in performance when using multiplicative and tapered array techniques.
3. Optimise the range capability using circuit techniques devised at LAT.
4. To obtain records of sandwaves using the mini-scanner and Alden recorder.
5. To check out the handling problems and performance of the new U/W camera.

NARRATIVE

Having verified that harbour targets could be resolved by the mini-scanner out to 170m with engines running and mains supplied from the ships generators, CORELLA left harbour and headed south to an anchorage in Margate Roads. Work began next morning in good acoustic conditions and calm seas. The mini-scanner receiver was carefully aligned and records taken of waveforms for reference purposes later in the cruise. Transmitter frequency, power and beam pattern were measured and source level calculated. The display acuity and maximum range capability was checked using both active and passive targets. Resolution tests were performed and a number of different methods of connecting the earth return leads were tried in order to reduce interference and ghosting to a minimum.

At 1320h on 25 October the zodiac boat was used to disembark Mr Hood and bring Mr Huggins aboard. At 1515h CORELLA proceeded to an area off Margate at approximately 15°30.4'N 01°38.6'E where two wrecks were surveyed and cine records taken. The underwater camera was then tested on the hydro-wire before the ship returned to Margate Roads anchoring at 2216h. At 0703h on 26 October CORELLA proceeded to Kentish Knock and at 0954h a seabed drifter with acoustic transponding tag attached was put on the bottom with the object of tracking it with the mini-scanner. The tag was seen soon after it entered the water, but tracking, with the restricted angle of tilt and inability to track within a 30° arc on the port side, was difficult and contact was lost. The search was abandoned when CORELLA was requested to recover a drifting spar buoy. At 1301h a Granton trawl was shot with sledge and dummy camera secured inside the net at the centre of the headline. At 1502h an active target was anchored 2 metres from the bottom and records of the display taken as the ship manoeuvred round it. After doing another test of the camera on the hydro-wire CORELLA returned to Margate Roads dropping anchor at 2100h. The following day CORELLA returned to Kentish Knock. At 0944h a Granton trawl was shot with sledge and u/w camera on the headline and towed for an hour. The ship then set a course for Longsand Head where records of the sandridges were obtained with the mini-scanner in side scan mode supplying a signal to the Alden recorder. CORELLA then returned to Margate Roads and anchored at 2035h. On 28 October the range tests were repeated, the first stage units outputs were tapered, records of the beam patterns taken and performance changes checked using an active target. The wind had moved round to the NE making acoustic measurements over the side impractical so the ship weighed anchor at 0900h on 29 October and moved to calmer waters at Trinity Bay where the tapering tests continued, using both active and passive targets, and acoustic tests were made using a rig over the side. A test of the camera was also carried out. On the morning of 30 October the tapering tests were completed and at 1032h CORELLA weighed anchor and proceeded to Dover Harbour. Noise measurements were made on the way in. The ship tied up to the Eastern spur at 1113h. Later the scheduled change of staff took place. CORELLA sailed from Dover at 0714h 31 October and proceeded to Margate Roads. On the way a wreck was surveyed and after some range resolution tests work began on the multiplicative technique. The circuits required for implementing this work had been constructed during the first half of the cruise. The following morning after surveying a nearby wreck and doing some electrical testing of the scanner the multiplicative work was continued. There was some difficulty in adapting the system but at 1600h 3 November a beam pattern was obtained and records taken. CORELLA weighed anchor at 2200h and docked at Lowestoft at 0700h on 4 November.

RESULTS

Aim 1. The following results were obtained. The transmitted beam pattern contained three peaks within the 30° sector, the source level calculated for the largest peak being 121 db. The electrical power input was 6.4 kw. The maximum range at which a -21 db target could be identified was 100 metres. After the modifications in Aim 3 had been incorporated the maximum range was increased to 130 metres. The maximum range at which a long life tag could be detected (before the modifications of Aim 3 were incorporated) was 350 metres. Measurement of azimuth resolution was difficult because of the peaks in the transmitted beam pattern. The best result obtained was two - 21 db targets separated by 4 metres resolved as separate targets at 100 metres range. A tagged seabed drifter was lost because of the present restrictions on the transducer movement but sufficient evidence on polaroid and cine film was obtained using a tag on a floating rig to show the tracking potential of the mini-scanner. A cine film of a good wreck was also obtained. In general because of the smaller aperture and lack of a stabilisation platform for the mini-scanner, targets appear as lines instead of dots and wrecks and bottom details are apparent

but lack clarity. The potential and deficiencies of the present system have been demonstrated and sufficient information gathered to produce the final working equipment.

Aim 2: A number of different tapering functions were tried. The beam patterns were recorded and they agreed with those predicted from theory. The resulting reduction in side lobes may be useful in reducing breakthrough from large targets, but in general the tests using active and passive targets did not show any significant advantage in tapering the mini-scanner. The scanner did not adapt easily to the multiplicative mode. A beam pattern was obtained but the main lobe beam-width between zeros was much wider than the theory predicts. Records were taken but no firm conclusions could be drawn about the advantages of this technique.

Aim 3: The recommended circuit changes were arranged in breadboard fashion and linked to the receiver. There was a marked improvement in the display performance with reduced noise and ghosting. The test target could be identified at an additional 30 metres range. The exercise also identified parts of the system where improvement could be made.

Aim 4: Alden records of sandwaves already surveyed by the MUFF Scanner were obtained. Detailed comparison at the laboratory is required before firm conclusions can be drawn about their quality and usefulness. In general the main features were observed but the details were blurred. Little useful information could be observed on the displays.

Aim 5: The camera was operated at different depths on the hydro-wire on a number of occasions and on the headline. It was reliable and handled well. Some images of fixed targets were obtained. The camera has already demonstrated in tank tests that it is able to photograph objects in clear water. On the cruise the water was in general turbid. When the handbook is finished the camera will be ready for general use.

H R Stewardson
10 November 1976

SEEN IN DRAFT: J E W Balfour - Master
E J Bridge - Skipper

INITIALLED: AJL

DISTRIBUTION:

Basic List

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