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CRUISE REPORT

FRS "CLUPEA"

25 FEBRUARY - 16 MARCH 1974

## Staff:

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## Preparatory Towed Underwater Vehicle Mock-up Trials

## OBJECTIVES:

1. To carry out a series of handling trials to prove the completed handling system using a reduced number of staff.
2. To carry out an extensive series of emergency recoveries with the vehicle floating or submerged.
3. To investigate the problems of using a hand held location system during emergency operations.
4. To try and carry out the handling operation without using a rubber boat.
5. To evaluate the limiting sea state for handling.

## GENERAL:

The fitting out of the ship at Buckie went very smoothly and the ship was ready to sail very late on 25 February. "Clupea" sailed midday on 26 after carrying out harbour trials. Apart from a burst hydraulic pipe in the first week and a broken lifting wire on the last day the cruise went very well. The weather was fairly good in the Moray Firth area although some steaming was required to keep a lee shore.

Results

After numerous trials of the system it was found that it was practical to carry out the complete handling system with a reduced staff consisting of 1. Deck manager 2 Winchman 3 Gantry operator 4. Boatman 5. Surface swimmer. This has the effect of reducing the scientific staff commitment in the TUV operation to 3 persons plus 1 backup diver and two occupants of the vehicle giving an overall staff requirement of six persons. Reducing the surface swimmers to one man made little difference to the speed and efficiency of the operation.

On completion of these trials a deck ladder was fitted at the stern and a further series of trials were carried out, with the rubber boat in a standby condition on board "Clupea", where the surface swimmer used the ladder for access to and from the mock-up vehicle. This system worked very smoothly and efficiently which suggests that it would be possible to work with a five

man team but with insufficient allowance for an emergency situation.

The surface emergency recovery (simulating a broken cable and the mock-up vehicle surfaced) was found to be fairly straightforward. A possible improvement is for the towing rope to be attached by the rubber boat crew and then the rest of the recovery left to "Clupea" (the small boat keeping a reasonable distance away). It became clear that a radio link was necessary between "Clupea" and the rubber boat for full coordination.

A total of nine recoveries were made with the vehicle sunk on the bottom and this exercise was found to be acceptable even when carried out in simulated conditions of darkness. The simulated night dives were achieved by inserting red filters in the divers face masks and the divers then had to rely completely on the acoustic location device. The most difficult part of this operation was not to locate the vehicle and attach the marker line, but to determine when the heavy lifting rope had been lowered to the vehicle.

As the mock-up could not sink in deep water, exercises were carried out where a 56 lb weight was recovered from 16 fathoms. This required "Clupea" to roughly locate the position where the weight was lost and then the divers to carry out a surface acoustic search from the rubber boat followed by a seabed search and location by the divers.

Regarding the sea state for the operation of the vehicle it would seem that the worst conditions for launch would be about sea state  $3/4$  although if required it would be possible to recover the vehicle in sea state  $4/5$ . The possibility of damping the swing of the gantry will have to be looked into; an improved damping system might allow for working in more severe conditions.

On the last day one of the lifting wires parted during the recovery. The reasons for failure were probably a combination of damaged cable and high loading. To improve this situation it is intended to replace the wire with a stronger one and reduce length to decrease the problems of overlay. The wire will also be changed at approximately thirty cycle intervals and a check of its condition will be made during each operation. In addition to these improvements an audible warning device will be fitted in the wire system to indicate overload.

In general the cruise was most useful and now ensures that the basic equipment for handling the Towed Underwater Vehicle is suitable.

G CAMERON

2 December 1974