INTERNAL W/T ORGANISATION OF THE EASTERN FLEET.

In the Eastern Fleet the inter-ship W/T organisation for use by a group of ships has undergone marked changes during 1944, changes designed to solve the following problems:

(a) The rapid and certain manoeuvring of a large group of ships under air attack at night, where frequent alterations of course together are required. A secondary requirement is that the time between initiation and execution of a manoeuvring signal must be short, since snap decisions have to be made depending on the range and bearing of the most dangerous attacking aircraft.

(b) The improvement of the Air Radar reporting system.

(c) The proper use and dissemination of information derived from Surface Radar.

The organisation in use when the Fleet sailed in the New Year (1944) was as follows:-

(a) Auxiliary Wave (low power, M/F, W/T) used for manoeuvring, alarm reports and general inter-communication within the Fleet. Constant watch in all ships.

(b) Inter-F.D.O. Wave (low power, V H/F, Type 86/87, R/T) for inter-communication between F.D.O's. Also used for initial air radar reporting. Constant watch kept by cruisers and above only.

(c) Radar Reporting Wave (low power, M/F, W/T) for air radar reports. Always kept ready but not manned. Circuit opened as soon as W/T silence on H/F could be broken. Manned only by cruisers and above.

(d) Fleet R/T Wave (medium power, H/F, R/T) used to carry out a broadcast of the air situation for the benefit of all ships. Circuit ready but not manned, and only opened when permissible to break W/T silence on H/F.

There was no organisation for dealing with Surface RADAR information.

During re-organisation, the Inter F.D.O. Wave became a universal channel of communication, and its old name no longer described its functions. The name was changed to Plot Control Wave, although the frequency was not altered.

Manoeuvring: W/T on Auxiliary Wave was too slow and uncertain for manoeuvring for the following reasons:-

(a) The transmitters and receivers in use were not crystal-locked and tuning troubles were always present.

(b) The operators in the Fleet were of too low a standard to compete with the Auxiliary Wave, admittedly the most difficult form of operating.

(c) The Combined Executive Method made the transmission of a manoeuvring signal too long a process. Rapid Executive Method was too dangerous for the reasons given in (a) and (b).

Little could be achieved by attempting to improve the existing methods. A radical change was required. The American Transceiver T.B.S. was becoming available for fitting in Fleet Units, and although by Admiralty policy this set was to be fitted primarily for the Fleet R/T Wave, it was decided to fit it to replace Auxiliary Wave. R/T was used from the beginning.

The immediate results were so promising that steps were taken to equip the whole Fleet in the shortest possible time. A destroyer was sent to Cochin to meet the Escort Carrier bringing the sets from Australia and to bring them round to Trincomalee. Destroyers were then taken alongside ships of the 1st Battle Squadron for fitting. Nine destroyers were fitted by the Squadron in six days.

The following conclusions are based on about 6 months' experience with a Fleet fitted T.B.S.:-

(a) R/T on T.B.S. is preferable to W/T. It is quicker, not difficult to control, and more traffic can be handled. Coding of action signals is less necessary.

(b) Tuning is perfect. In consequence Rapid Executive Method can be used without fear even after weeks of W/T silence.

(c) R/T procedure became excellent, but the absence of Voice Production training equipment is felt.

(d) The set is reliable. At first its reliability was in doubt, but it stood up nobly to long periods at sea and to gunfire. A change of valves in the receiver was found necessary every two months. The thought of Action Damage caused concern, since this was the only apparatus on board that would work on the frequencies in use. A W/T wave is always set under action conditions, as a standby, and there is no relaxation of training for auxiliary wave operators. The fitting of a second T.B.S. in all destroyers and above should remove this fear.

Air RADAR Reporting: In the large spaces of the Indian Ocean there is little danger from using V H/F comparatively freely. All fighters in the Fleet were equipped with V H/F, and if a system could be evolved whereby all Inter F.D.O. Communications and Air RADAR Reporting could be carried out on V H/F, then the thorny question of when to relax W/T silence on H/F and M/F would disappear, and at the same time the RADAR Reporting Wave, notoriously unreliable, could be abolished. The Fleet R/T Wave, if all destroyers could be fitted Type 86 or 86 M, would also become redundant. The fitting programme was soon completed.

Before the original organisation was changed, the tendency to continue Air RADAR Reporting on Plot Control Wave as long as possible was noticeable, and, after many exercises, it was decided that, by suitable modification of the procedure, the Plot Control Wave could carry everything, except during the heaviest air attacks. The RADAR Reporting Wave and Fleet R/T Wave was abolished. The Plot Relief Wave - a second V H/F R/T wave in the Type 87 M band - was introduced, to carry Inter F.D.O. Communications should Plot Control Wave become too congested. If required, it is manned by cruisers and above by order of the controlling ship, while Air RADAR Reporting continues on the Plot Control Wave on which all ships are keeping watch. Destroyers automatically set watch on Plot Control Wave on receipt of first air RADAR report.

The modified Air RADAR Reporting Procedure is called the "Sitrep" procedure, whereby only the controlling ship talks, other ships only making reports either initially, or if their plots differ markedly from those being broadcast by the controlling ship.

Surface RADAR Reporting: A system had to be evolved which

(a) Gave the best information to all ships.

(b) Did not present the enemy with the information we had. Security was required in signals made, especially security of bearing. Distance was not so important. V H/F throughout was essential.

(c) Kept communication channels as clear as possible.

The system evolved is broadly as follows:-

(a) A controlling ship is detailed. Normally this is the Flagship, but if a ship fitted with better WS RADAR is in company, that ship may

be detailed. Again in a searching force, that ship which first gains contact is made controlling ship.

(b) The controlling ship carries out an R/T broadcast on Plot Control Wave of all hostile, unidentified and friendly plots that she is in contact with.

(c) Other ships only pass in detactions which are not already on the Surface RADAR Broadcast.

Security: A slight measure of security results from the use of V H/F, but in order to improve this further, raid numbers are included in reports between Jig and the bearing, and the whole spoken as a multi-figure number, thus:

"Jig one two one three zero one".

Ship's Internal Organisation: W/T communications separate from the plot are too slow, uncertain and too noisy. Remote Control of T.B.S., Plot Control Wave and Action Information Wave have been brought into the plot (Bridge Plot and Operations Room) in all ships.

The basis of the above W/T organisation is the use of a V H/F R/T, and a standby organisation is necessary in case V H/F becomes unuseable e.g. ships getting too far apart, congestion, etc. This is arranged for by a series of "relief" waves, which, although not normally manned, can be instantly brought into force by the Admiral. Relief waves can also be brought into use before action is joined if it is obvious that V H/F will not be satisfactory. The whole family is shown below.

Normal Wave.	Function	Relief Wave
T.B.S. Constant watch in all ships.)	(i) Alarm Reports (ii) Manoeuvring (iii) General Intercom. (iv) Distribution of Anti-Ship Gun-Fire.	Admiral's Wave (W/T)
Plot Control Wave. (Constant watch in cruisers and above; Destroyers set watch on first air RADAR report).	(i) Inter F.D.O. Communication.	Plot Relief Wave or, if H/F required, Action Information Wave.
	(ii) Air RADAR Reporting	Plot Relief Wave should air and surface attack occur simultaneously at night. If H/F, A.I. Wave.
	(iii) Surface RADAR Broadcast. (iv) Control of A.A. gunfire.	A.I. Wave

Admiral's Wave retains its normal functions - enemy reports from surface craft, intercommunication between detached forces etc - as do Reconnaissance Wave, Fire Control Waves, etc. Action Information Wave is H/F R/T Medium Power.

The Fleet normally cruises keeping only loud-speaker watch on the two v H/F waves, and it is remarkable that only on one occasion in action during the last six months has it been necessary to bring in a relief wave, and that was when groups became separated. Although the Fleet has taken part in no major affairs during that period, complicated air situations have in fact arisen and been dealt with easily. Complicated night exercises with large forces involved have been carried out with excellent results, and with the lines of communications running only at half volume.

Codes

A number of standardised codes have been introduced in order to make the handling of RADAR within the Fleet rapid and simple. These are contained in the FLEET SIGNAL BOOK, Section 4.

(a) The Alarm Signals Table: This is contained in Art.150, and is a single-letter Table which will be found useful in the initial stages of attack, and when aircraft are first detected at short range.

(b) RADAR Reporting of Aircraft: This Table is contained in Art. 148A, and gives facilities for the guardships to pass in their reports quickly and accurately, in practically self-evident form. In addition, it enables the Admiral to allocate Raid Letters, which are consecutive single or double letters, to the various RADAR reports, in order that each particular raid can be readily distinguished. In addition there are Control Signals, by means of which the Admiral can control the whole reporting apparatus, on such occasions as when it becomes obvious that one raid is being reported as separate raids from two separated ships, or when he requires emphasis to be laid on the reporting of raids in one sector over those in others, or when he wishes ships to cease passing reports on certain raids, etc.

(c) RADAR Reporting of Surface Contacts: A suitable Table for this is contained in Article 148B, and contains an Information Table, as well as a method of controlling reporting, as before. The allocation of Raid Letters is not considered necessary in this case.

(d) W/T Policy Table: This code is contained in Table 4 of Art. 158, and enables the Admiral to promulgate quickly his policy with regard to the use of W/T, abd must be noted carefully by all ships who have responsibilities for RADAR Reporting.

(e) Friendly Aircraft Indicating: A means whereby the movements of friendly aircraft can be signalled rapidly is contained in Art. 198, and needs no explanation.

(f) RADAR Policies: A means whereby the Admiral can signal his RADAR Policy is contained under ZRN.

(g) RADAR Guard Duties: The RADAR Guard Duties, types of sweep, types of detection to be reported, can all be signalled by using the Table in Art. 210, but this is not a popular Table.

(h) Fighter Direction: A standard R/T code has also been produced for Fighter Direction, and is contained in the Fighter Direction Manual.

It should be emphasised that all the above codes do not contain any security value, but are merely a form of shorthand.