

# INTRODUCTION OF THE WARFARE BRANCH

## EFFECTS ON FUTURE SHIP AND EQUIPMENT DESIGN

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### ABSTRACT

The introduction of the Warfare Branch has implications for the design of future ships, submarines and systems.

### Introduction

On 4 June 1992 the Navy Board approved the establishment of a Warfare Branch which progressively would assume the roles of both the Operations and Weapon Engineering Mechanic branches. In the months following this significant decision a plethora of information has been distributed describing both the nature of the new branch and its implementation. Therefore this article will concentrate on examining the effects of the change on future ship, submarine and equipment design.

### Technological Change

The Warfare Branch is being introduced against a background of rapid technological change. During development work a number of trends were identified concerning the way in which technology may be expected to develop in the future. These trends are:

- (a) Increasing automation will remove many of the operator tasks at Ordinary Seaman and Able Seaman level. Many of the possible gains have already been achieved, by replacing missile launchers with silos for example, thereby dispensing with action loading crews. However further progress may be expected in the AIO and sensor fields.
- (b) Use of Intelligent Knowledge-Based Systems (IKBS), however sophisticated, is bound to leave a number of operator positions to be manned, but these operators will be engaged principally in judgemental tasks requiring significant operator knowledge and/or experience to undertake.
- (c) Significantly improved reliability, coupled with much more comprehensive Built In Test Equipment (BITE), is reducing the incidence of failure and allowing more rapid first line repair of simple faults.
- (d) The reduction in the use of analogue techniques has eliminated much routine maintenance of the 'check and adjust' variety.
- (e) Whilst the incidence of faults is reducing, the rapidly increasing complexity of systems means that failures are much more likely to cross system boundaries. Defects may originate in either software or hardware and distinguishing between them is often difficult. Thus the demands on the system technician and his diagnostic skills are likely to increase, unless they are offset by greater use of redundancy and self-diagnosis.

The decision to adopt a user-maintainer concept within the Warfare Branch both reacts to change which is already under way and anticipates future developments. Whilst the establishment of the Warfare Branch is expected to yield significant benefits in the short to medium term, it will only realize its full potential if technology continues to progress in the positive directions referred to above.

### **Effect on Ship, Submarine and System Design**

The ship, submarine and system designer can expect Warfare Branch Operator Mechanics to:

- (a) Possess the same or similar operator skills as their Operations Branch predecessors.
- (b) Be more technically aware than current operators and better able to understand the consequences of fault conditions.
- (c) Be able to carry out routine servicing, maintenance routines and simple fault finding and to provide support to system artificers.
- (d) Be needed in slightly fewer numbers than separate Operators and Maintainers. This aspect is discussed further below.

The Operator Mechanic will hope and expect that designers will have:

- (a) Designed a user-friendly Man Machine Interface (MMI) for both operator and maintainer functions.
- (b) Provided comprehensive BITE and BIST (Built In Self Test).
- (c) Provided documentation which is both sufficient and comprehensible.

If the foregoing seems familiar, this merely reflects the fact that the move to a user maintainer system does not change the fundamental requirements of the human links in the chain.

### **Effect on Ship and Submarine Complements**

The introduction of the Warfare Branch enables some modest reductions in complement to be achieved in the CVS, Type 22 and Type 42 Classes. It will achieve no reductions in complement in the Type 23 but, by allowing ratings to be employed more flexibly, it should ease some of the operating difficulties caused by the lean complement. The complements for the Future Frigate and LPD replacement are being developed on a Warfare Branch basis from the outset, so that any reductions have already been incorporated. There are no planned reductions in complement in submarines. However, although operator mechanics can be employed more flexibly, in no sense can one man (or woman) do two men's jobs. The principal constraints remain:

- (a) In the Action State, the need to man all positions, communications circuits, etc. and to provide sufficient resources for damage control and weapon repair.
- (b) In the Defence State the need to provide manpower to operate all key positions in two watches, whilst allowing sufficient resources for that component of maintenance which continues in Defence, such as keeping systems fully prepared for firing for example, and which cannot be done by those on watch.
- (c) In the Cruising and Harbour States, for Communications ratings the requirements of watchkeeping remain the most exacting, whereas for other sub-branches it is the maintenance load and the need for harbour duty watches and fire fighting which dictate the numbers needed.

Any overlap which may have existed between the above constraints has effectively been removed with the introduction of Warfare Branch, and so any further reductions in complement will only be achieved by more substantial

investment in enabling technology or at some penalty to capability. The costs and potential benefits of investment in equipment in order to save people can be exposed more coherently than heretofore using the principles established in the RN's Human Factors Initiative.

### **Conclusion**

The introduction of a Warfare Branch reacts to present and forthcoming technological advances and should enable the service to benefit more from such developments. However, although it is a major change, it should have only peripheral impact on ship, submarine and system design. Whilst the new operator mechanic will have some different skills to current operators, he will make very similar demands on his equipment. The user-maintainer concept allows ships to be operated and maintained with slightly fewer people than needed at present and the benefits of this are already being realized in the complementing of the Future Frigate and LPD replacement; further reductions in complement will require greater investment in enabling technology. Overall the design principles will remain the same, although the framework within which they are applied will have been altered.