

# MACHINERY TRIALS UNIT REORGANIZATION THE MTAU IS BORN

BY

COMMANDER D.I. BOGGUST, MSc, CEng, MIMechE, RN  
(*Director General Ships—ME202/Officer in Charge MTAU*)

## ABSTRACT

May 1989 saw the 25th anniversary of the Machinery Trials Unit, the Director of Marine Engineering's independent inspectorate and trial authority for surface warship main propulsion plant and auxiliary equipments. This article briefly outlines those first 25 years and explores in greater detail the initial decline and then sharp increase in the unit's 1990s trials load and the consequent restructuring of the unit before and after the formation of the Naval Support Command. The unit's renaming as the Machinery Trials and Assessment Unit (MTAU) within DG Ships ME202 is discussed and the flexible employment of ME202 personnel in the unit is explained. The MTAU looks forward to a very busy future.

## Introduction

Little has been published about the activities of the Machinery Trials Unit (MTU) since its inception in 1964. The most recent articles in this *Journal*<sup>1</sup> in 1982 and in the *Review of Naval Engineering*<sup>2</sup> in 1990 do, however, give a good flavour of MTU business prior to the contractorisation of the Royal Dockyards and in the immediate post Cold War period. Subsequently, as we are all aware, there has been a decline in the RN warship population and an increased emphasis on value for money and competing for quality in ship upkeep. The MTU has become the Machinery Trials and Assessment Unit (MTAU) and taken on a much wider task than ever could have been envisaged in 1964. So, what was the MTU role and how did it develop from dockyard contractorization and the end of the Cold War into that of today's MTAU?

## The situation up to 1989

Until contractorization of the Royal Dockyards in 1987, the modus operandi of the MTU had changed little from its formation in 1964. Located in AMTD Haslar from 1966, its primary responsibility remained the independent inspection and trial for acceptance of main propulsion and associated machinery in new construction surface ships for the Royal Navy and some foreign navies where ships were contracted to build in the UK. Additionally, acceptance trials were also undertaken where new design machinery had been installed. In accordance with the CLOETE report<sup>3</sup>, the Officer in Charge MTU (OIC MTU) reported direct to the Director of Marine Engineering (DME).

The advent of contracted surface ship refits at Devonport and Rosyth was, however, the seed corn of change and parallels with the acceptance process for new build ships were soon drawn, with the Superintendent Ships' role seen to be closely akin to that of the shipyard overseer. Therefore, it was no surprise that, in 1988, the requirement for MTU to conduct and witness post refit Harbour Acceptance Trials (Marine Engineering) (HAT(ME)) and Sea Acceptance Trials (SAT)(ME) was embodied into refit contracts. Various discussions followed concerning the efficacy of MTU also witnessing pre refit trials in order to ascertain machinery performance and defect status prior to upkeep but there was to be little progress in this direction until some seven years later.

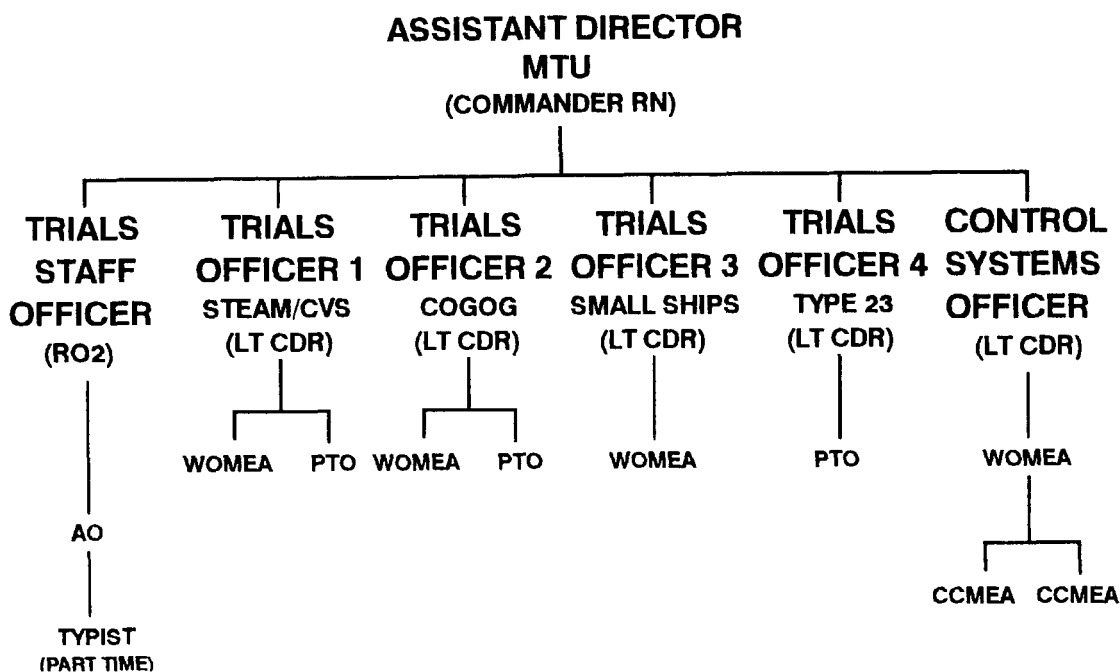


FIG. 1—THE MTU ORGANIZATION 1989

### The MTU Organization in 1989

(FIG. 1) shows the post Dockyard contractorisation MTU organization in 1989, still geared to the requirements of the Cold War era. The OIC MTU was a Commander RN of Assistant Director status whose four trials teams' responsibilities well reflected the Royal Navy of the day. The steam LEANDER class frigate was still in service in some numbers and the first of class Type 23 frigate was making its trials debut. A separate MTU Controls Systems team, formed from the 1985 amalgamation of the Machinery Controls Trials Team with MTU, also provided specialist controls trials support to, not only the older automated ships but also the HUNT class MCMVs and the new Type 23 digital Machinery Control and Surveillance (MCAS) system. This MTU organization annually undertook 1,100 man days of trials work and turned down 150 man days of work because of personnel 'stretch'. The following year, 1990, Peristroika and the reunification of Germany had already begun to exert strong pressure for change in defence strategy and with it came 'Options for Change'.

### 1990 to 1993

The earlier than planned withdrawal from service of LEANDER class frigates under 'Options for Change' and later changes under Defence Cost Studies significantly altered the MTU trials load in the 1990s. The MTU trials load requirement steadily declined from 1,250 man days in 1989 to under 1,000 man days by 1993 as overall ship numbers reduced and the composition of the surface fleet changed. The Type 22 COGAG frigate was already in service and Type 23 frigates and SRMHs were appearing in increasing numbers. 1990 to 1993 was a transitional period for the MTU.

In the early 1990's, the four trials teams and a controls system team still remained in place. However, the requirement for a separate controls team was diminishing as digital MCAS began to become the bread and butter of MTU business. Most of the Controls Team members were therefore incorporated into the Type 23 trials team to cope with the increasing numbers of

new build trials. Of necessity, the MCMV and new build SRMH trials were now shared between teams as the steam propulsion load had all but evaporated from the trials inventory.

The decline in steam propulsion and trials loading from 1991 and the consequent pressure to reduce personnel then led to a reduction of a lieutenant commander and warrant officer from the MTU complement, although a singleton controls systems post was retained. As seen from (FIG. 2), this reduced MTU was in operation by 1993, although some spare trials capacity still remained.

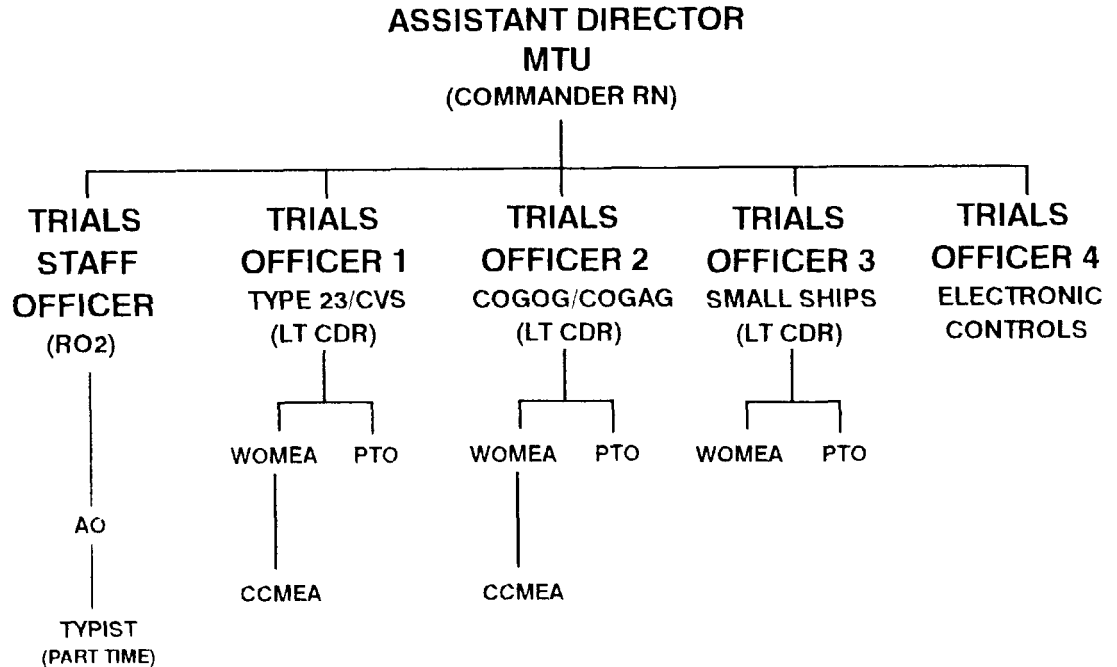


FIG. 2—1993, THE SURFACE FLOTILLA HAS SHRUNK AND SO HAS MTU

1993 also saw the Naval Support Command (NSC) concept of operations for support of the surface flotillas take firm shape and pressure build from the Defence Research Agency rationalization plans to move MTU from off the Haslar site. In accordance with the NSC concept, moves were also in place to absorb the Surface Flotilla Engineering staffs into the new DG Fleet Support (DGFS) organization in Foxhill. The force for change was irresistible.

### 1994/5 restructuring

The engineering support staffs from the surface flotilla moved to Foxhill in February 1994 and were absorbed into both the DGFS(Ships) and DGFS(Equipment Support) areas. The MTU move to Foxhill followed in September the same year and its complement was further reduced by one RN officer (the Controls Systems Team) and a PTO, with some administrative and clerical support also being lost en route. The MTU were embedded into the Engineering Support area and initially retained direct accountability to a Director, the Director of Engineering Support (Marine Engineering) DES(ME). The advantage of single site liaison between MTU and the Warship Platform and Equipment Project desks was quickly apparent and spare MTU capacity in the trials programme troughs was soon usefully employed in the resolution of systems engineering problems associated with trials work.

In the lead up to the move of the Surface Flotilla engineering staff to Foxhill, the Customer Liaison (ME) cell had been established to provide ships and ships operators with an engineering focal point for contact within DES(ME). As part of its function, this cell co-ordinated DES(ME)'s input into Continuous Material State Assessment (CMSA) and, with the arrival of MTU in Foxhill, the opportunity was taken to place the Customer Liaison Officer's, CLO(ME)'s, organisation under the OIC MTU's umbrella to form the MTAU.

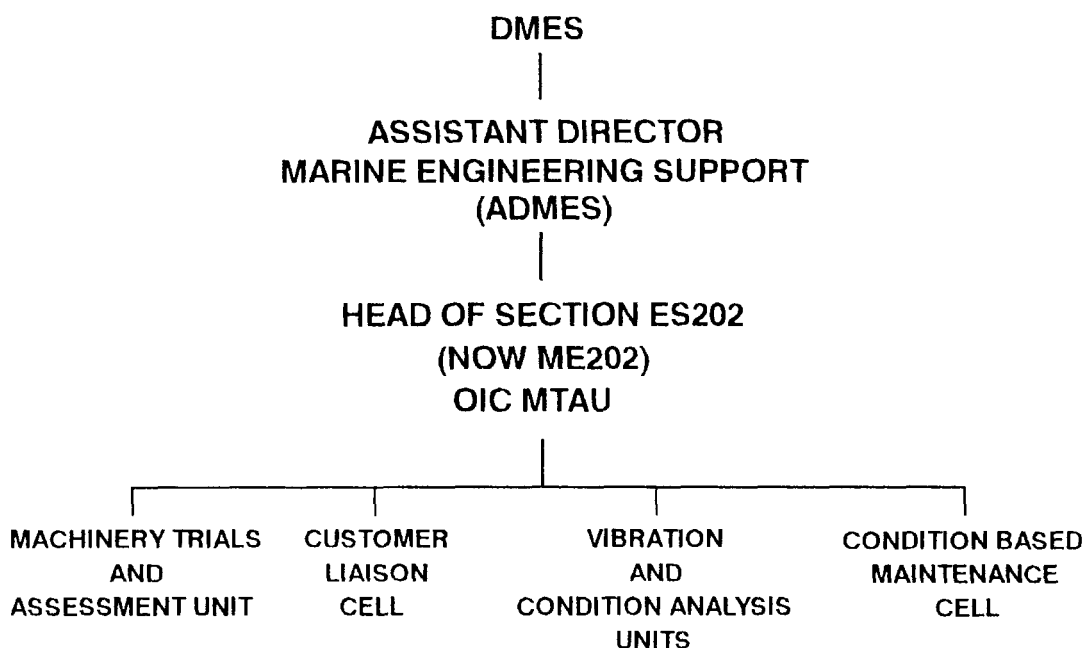


FIG. 3—THE MTAU ORGANIZATION WITHIN DES(ME), MARCH 1995

In March 1995, further restructuring followed in the DES(ME) area with the formation of the ME Support (MES) Division under ADMES. The MTAU became part of a newly created section, ES202, within this Division, the new section absorbing the Vibration and Condition Analysis units and the Condition Based Maintenance section in the process. The Commander (ME) leading MTAU became the Section Head of ES202 but retained the separate OIC MTAU title to reflect the importance attached to his independent trials status. OIC MTAU now reported to ADMES rather than direct to a Director as had been the case since 1964. The March 1995 organization of ES202 within DES(ME) is outlined in (FIG. 3) and the structure of the further reduced, streamlined MTAU in (FIG. 4). This MTAU easily coped with new ship and refit trials load in the now smaller Surface Flotilla but step changes in trials policy were already in progress.

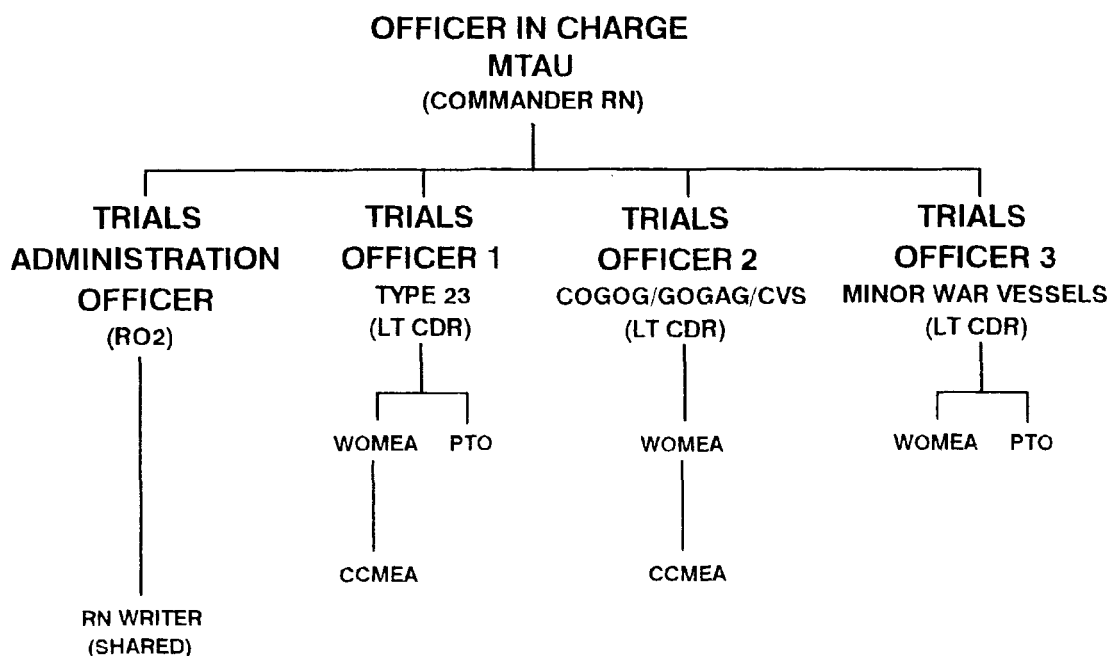


FIG. 4—THE STREAMLINED MTAU ORGANIZATION, MARCH 1995

### The NSC and proposals for change

As already stated, the early 1990's saw a decline in trials loading, a subsequent downsizing of MTAU and spare trials capacity becoming available. In this period, the intention to transfer engineering support activities from FOSF to the NSC was also perceived to require further study of some aspects of future NSC business and, in June 1993, OIC MTU was directed to review all aspects of Propulsion System Performance Trials (PPTs) for ships of the Surface Flotilla. As a result of this review a number of changes to the scope and content of trials were proposed. The main proposals were:

- (a) Refits and Docking and Essential Defects (DEDs) should be given identical levels of pre and post Upkeep Period trials.
- (b) The Survey Squadron's exception from the requirement to complete trials should be removed.
- (c) All classes of ship should have an astern trial as part of PPTs.
- (d) The Propulsion Power Statement and other documents defining operating limits for Minor War Vessels (MWVs) should be reviewed and improved.
- (e) Platform Groups should develop control system integrity checks and dynamic checks/manoeuvring trials to suit each class of ship.

These proposals, including an MTU involvement in post DED trials and the comprehensive trials coverage of MWVs and survey vessels, were accepted as necessary to meet the NSC's remit for the effective engineering support of its operator customers. However, the full refit type approach to post DED trials, with MTU conducting both HAT(ME) and SAT(ME), was considered by the main ship platform groups to be too expensive in terms of DED time and cost. It was therefore agreed that the NSC MTU involvement in post DED trials should be limited to the witnessing and assessment of a PPT during SAT(ME). The requirement for ships to conduct an MTU covered PPT on completion of Preliminary Sea Trials was eventually promulgated by signal in January 1995. The full changes to trials procedures, their applicability and content, were later promulgated by Fleet Temporary Memorandum before being incorporated into the November 1995 issue of BR 3000<sup>4</sup>.

### The effect of change on MTAU

The changes to trials requirements published in 1995 were to have a profound effect on the operation of the new born MTAU. The wider MTAU involvement in DED trials, the full inclusion of MWVs and survey vessels in the trials process and the increased volume of formal trial reporting caused a steep rise in MTAU work in the course of that year. The trials work undertaken by MTAU in 1995/6 dramatically rose from annual levels of less than 1000 man days to more than 3000 man days without increase in personnel, a remarkable tribute to the trials teams concerned. This 1995/6 step change in workload was not, however, entirely due to changes in RN trials requirements as, in that same year, successful trials were also undertaken in new construction Royal Malaysian Navy frigates (FIG. 5), Royal Navy of Oman Corvettes (FIG. 6) and Royal Saudi Navy minehunters (FIG. 7). FIGS. 5–13 illustrate the range of ships and trials work undertaken by MTAU in this most hectic of periods.

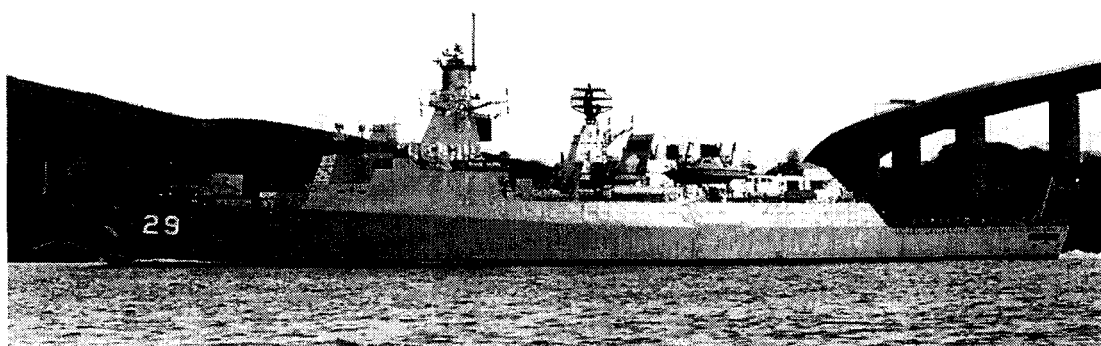


FIG. 5—ROYAL MALAYSIAN NAVY 'K.D. JEBAT'  
SHIPBUILDERS' SEA TRIALS, JANUARY 1996

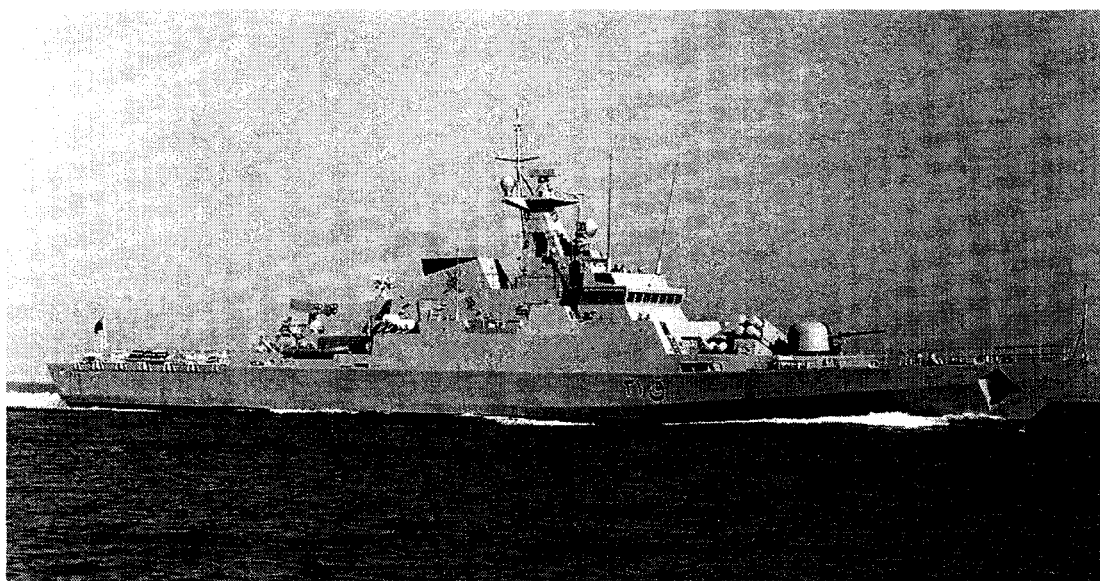
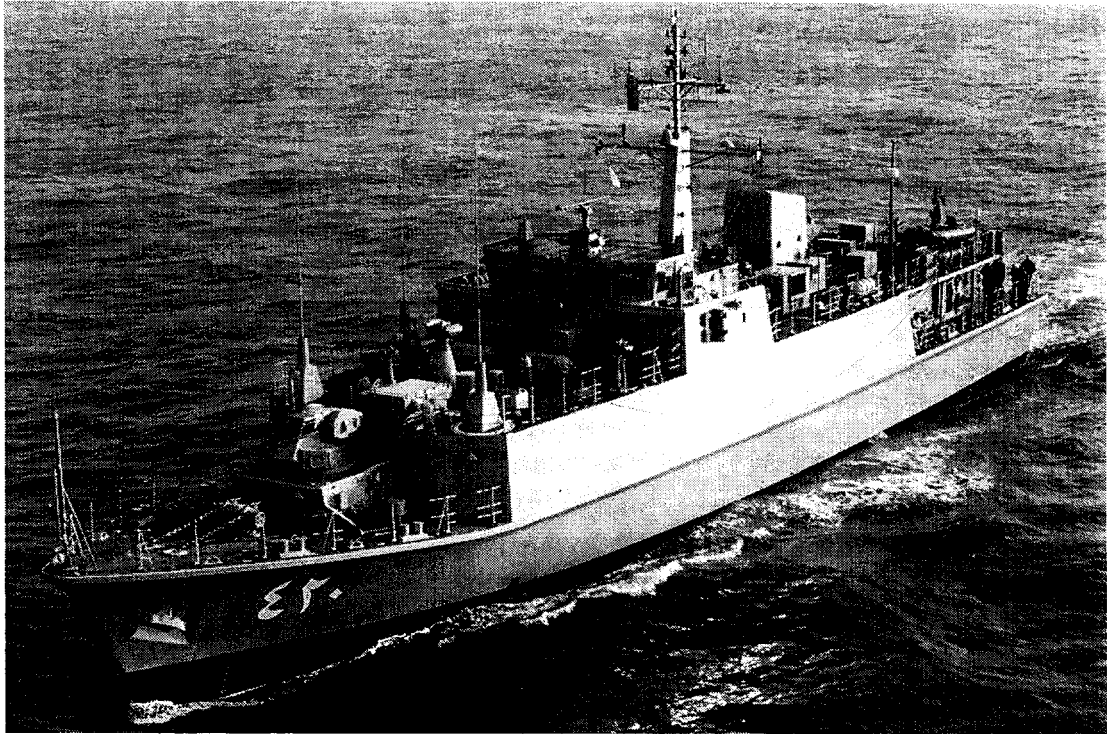


FIG. 6—ROYAL NAVY OF OMAN RNOV 'QAMIR AL-AMWAJ'  
CONTRACTOR'S SEA TRIALS, SEPTEMBER 1995  
FINAL MACHINERY TRIALS, MARCH 1996



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FIG. 7—ROYAL SAUDI NAVY HMS 'AL JAWF'  
FULL POWER TRIAL, SEPTEMBER 1995

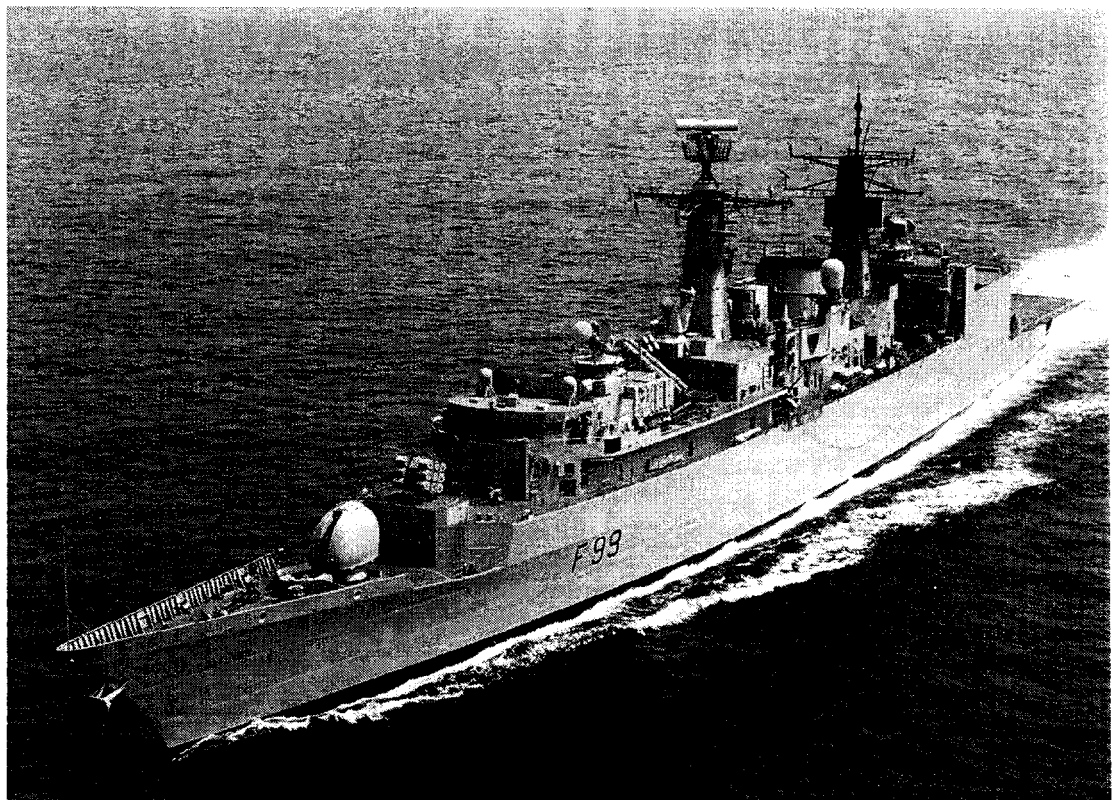


FIG. 8—HMS 'CORNWALL'—TYPE 22  
POST REFIT SAT(ME), FEBRUARY 1996



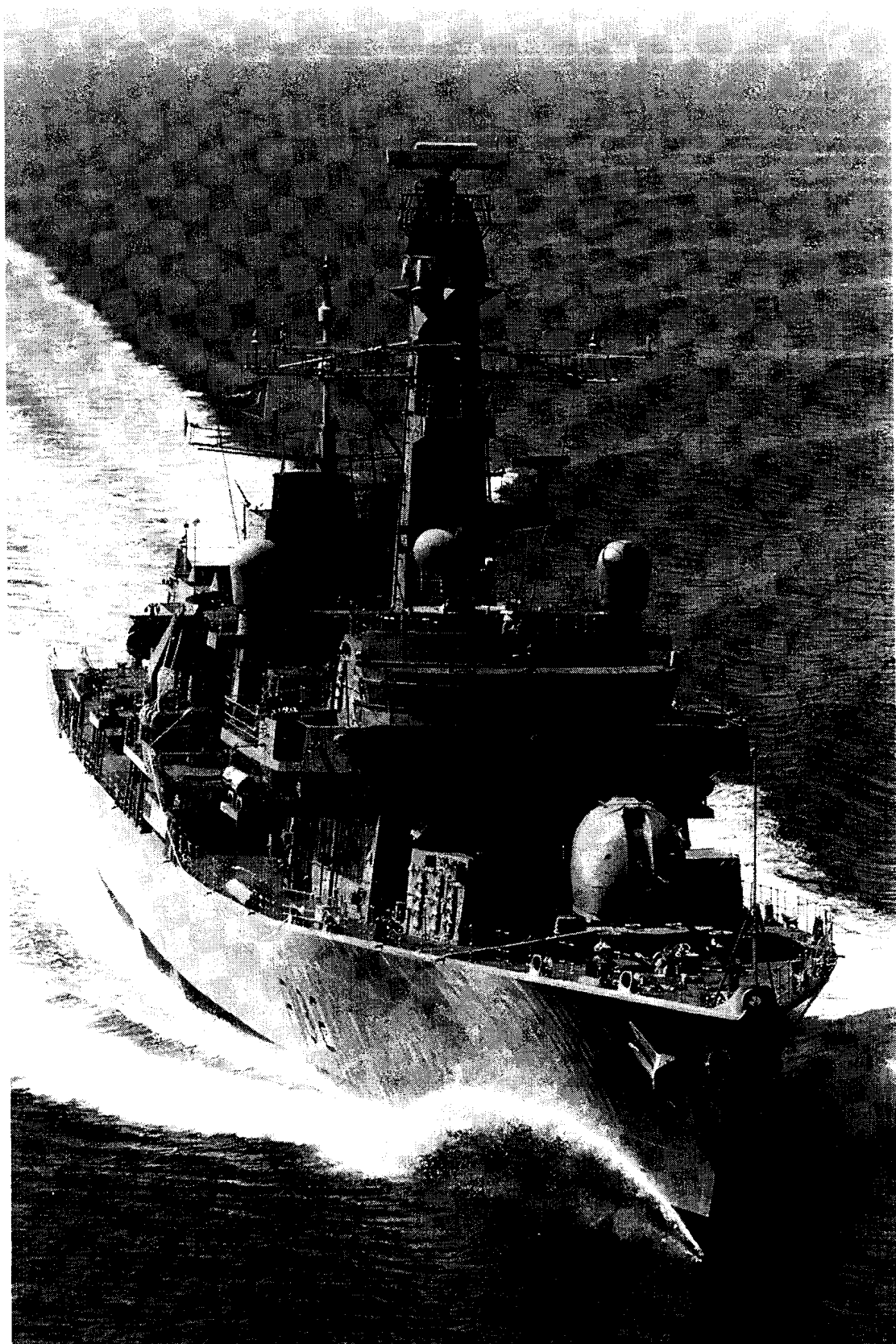


FIG. 9—HMS 'SOMERSET'—TYPE 23  
CONTRACTORS SEA TRIALS, JULY 1995





FIG. 10—HMS 'LANCASTER'—TYPE 23  
POST DED SAT(ME), JUNE 1995



FIG. 11—HMS 'NOTTINGHAM'—TYPE 42  
POST DED TRIALS, JULY 1995



FIG. 12—HMS 'BROCKLESBY'  
PRE REFIT PPA, OCTOBER 1995

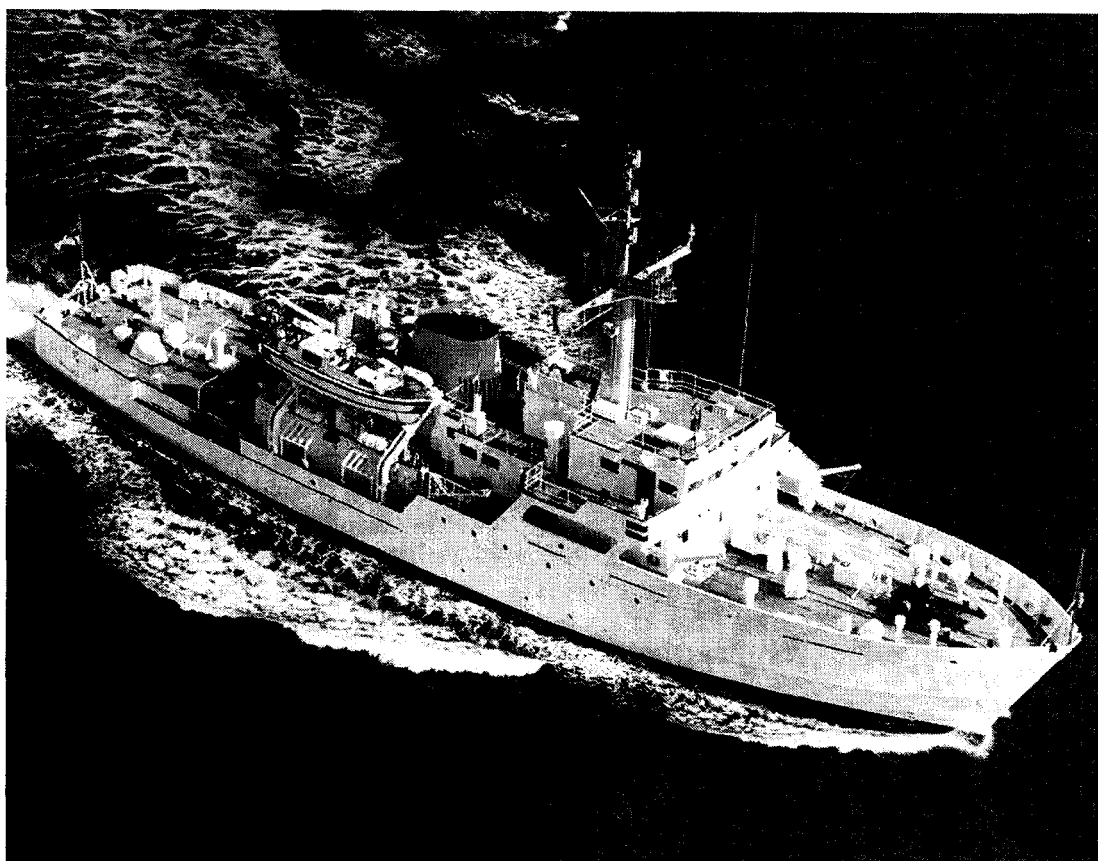


FIG. 13—HMS 'BULLDOG'  
POST DED PPT, JUNE 1995

MTAU loading projections for 1996/7 and 1997/8 are perhaps a little more representative of the underlying trend arising from the 1995 changes. Including trials in the LPH, HMS *Ocean*, and the OSV, HMS *Scott*, current load projections for these later years are now 2700 and 2300 man days respectively, with annual loads in excess of 2200 man days being predicted into the foreseeable future. The effect of the 1995 changes in trials requirements and the peak of work sustained in the year that followed is well illustrated in (FIG. 14)

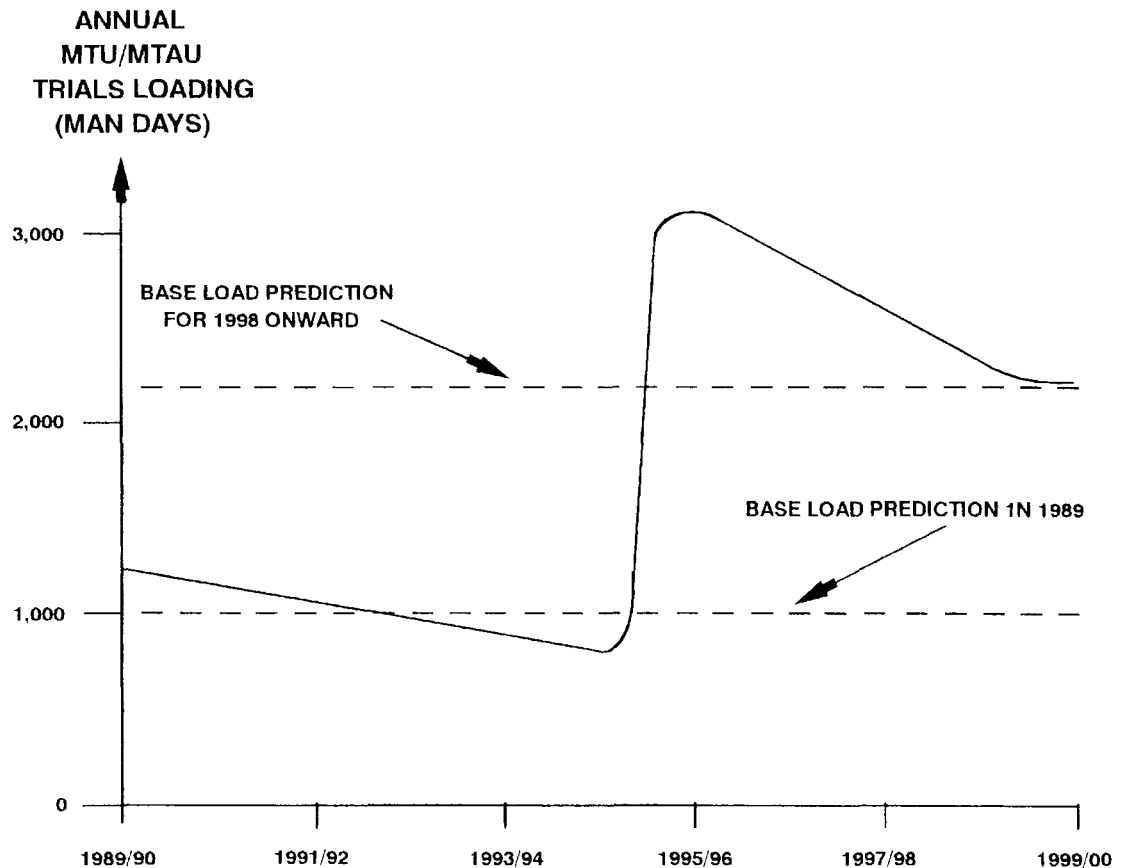


FIG. 14—THE EFFECT OF THE 1995 CHANGES IN TRIALS REQUIREMENTS POLICY ON MTAU TRIALS LOADING

The 1995/6 trials load clearly put MTAU resources under severe strain with most trials team members working very long hours and undertaking trials for extended periods, usually over weekends. Although this year was recognized as exceptional in terms of trials volume, future load projections were also still excessive, given an MTAU front line trials strength of just 10 staff split into three teams. It was now clear that, either, extra personnel were required, or, some restructuring of the trials organization/operation was needed if the current NSC, MTAU tasking level was to be maintained.

### The current task and structure

Trials tasking across all classes of RN surface warship, both pre and post Upkeep and within Fleet time, provides MTAU with a unique insight into machinery operation, Upkeep and equipment project management, general platform matters and the day to day running of ships' ME Departments. This insight may be of interest for a future article in this *Journal* but, suffice to say, the current trials task level would appear to be essential in order to sustain high levels of RN surface ship availability. Therefore, the abandonment of elements of the current task was not perceived as a solution to MTAU overload and the alternative, to increase the number of trials personnel and improve flexibility in the MTAU organization, was explored.

MTAU personnel need to be familiar with trials procedures and be able to undertake trials on a regular basis in order to maintain consistent engineering standards. They also need to be fully accountable to the OIC MTAU. To meet these requirements, the resourcing of additional trials personnel from within the overall organization of ME202 was seen as an obvious first choice.

On formation of the NSC and the move of Surface Flotilla engineering staffs to Foxhill, the speedy establishment of good customer liaison between DES(ME) sections and ship operators and other customers had been necessary. CLO(ME) established, and still maintains, this liaison function but, as ships and operators became increasingly familiar, first with the DES(ME) function and then the new DG Ships/DME organization which replaced it in late 1995, CLO(ME)'s office had begun to take on additional and increasingly diverse functions. By scaling down some of the more diverse functions, CLO(ME) became available to act as a part time Trials Officer (TO 4). To set up a complete team, which could be employed in trials peak load lopping, the former T23 trials PTO was then transferred to work full time for TO 4. This fourth team, now operating for an extended trial period, is of sufficient size to undertake many trials in minor warships and provides backup for other trials when required.

To give additional trials team flexibility, the Vibration and Condition Analysis Officer (VCAO) is now also employed within MTAU when trials loading, sickness or leave requirements dictate. Ship class lead trial responsibility is still retained by the core of three full time teams but much greater flexibility is expected of them and each team now routinely trials a wider range of ships. The more flexible MTAU organization of today, with increased trials staff at its disposal, is shown in (FIG. 15).

### Back to the future

Since its inception, the MTU, and now the MTAU, has adapted successfully to meet the ever changing requirement for machinery trials in surface warships of the Royal and Foreign and Commonwealth navies. The organization of the MTAU has therefore always been a fluid mass with its structure varying in accordance with the composition of the Surface Fleet/Flotilla and trials requirement policies.

The MTU steadily reduced in size in the early part of this decade as the post Cold War RN surface warship stock diminished. However, the formation of the NSC saw the advent of a supplier/customer relationship with operators and the inclusion of DEDs and minor warships in a much wider trials spectrum. As a consequence, in 1995, a reduced MTAU organization began to experience an unprecedented rise in trials load which has now settled to a level of over twice that of the immediate pre NSC era.

In a highly loaded environment, the structure and size of the MTAU remains under close scrutiny as the trial of dual hatted ME202 personnel progresses in an endeavour to find the most cost effective solution to increased and flexible machinery trials manning. Although the organization of the hard pressed MTAU may be fluid, its independence will always remain unchallenged. The MTAU will continue to ensure that propulsion plant and associated auxiliary equipments in surface ships operate safely and satisfactorily before their acceptance into service.

The MTAU remain faithful to the 1964 MTU motto which is perceived to be even more appropriate in today's hardened commercial environment.

### NEVER ACCEPT WITHOUT PROOF

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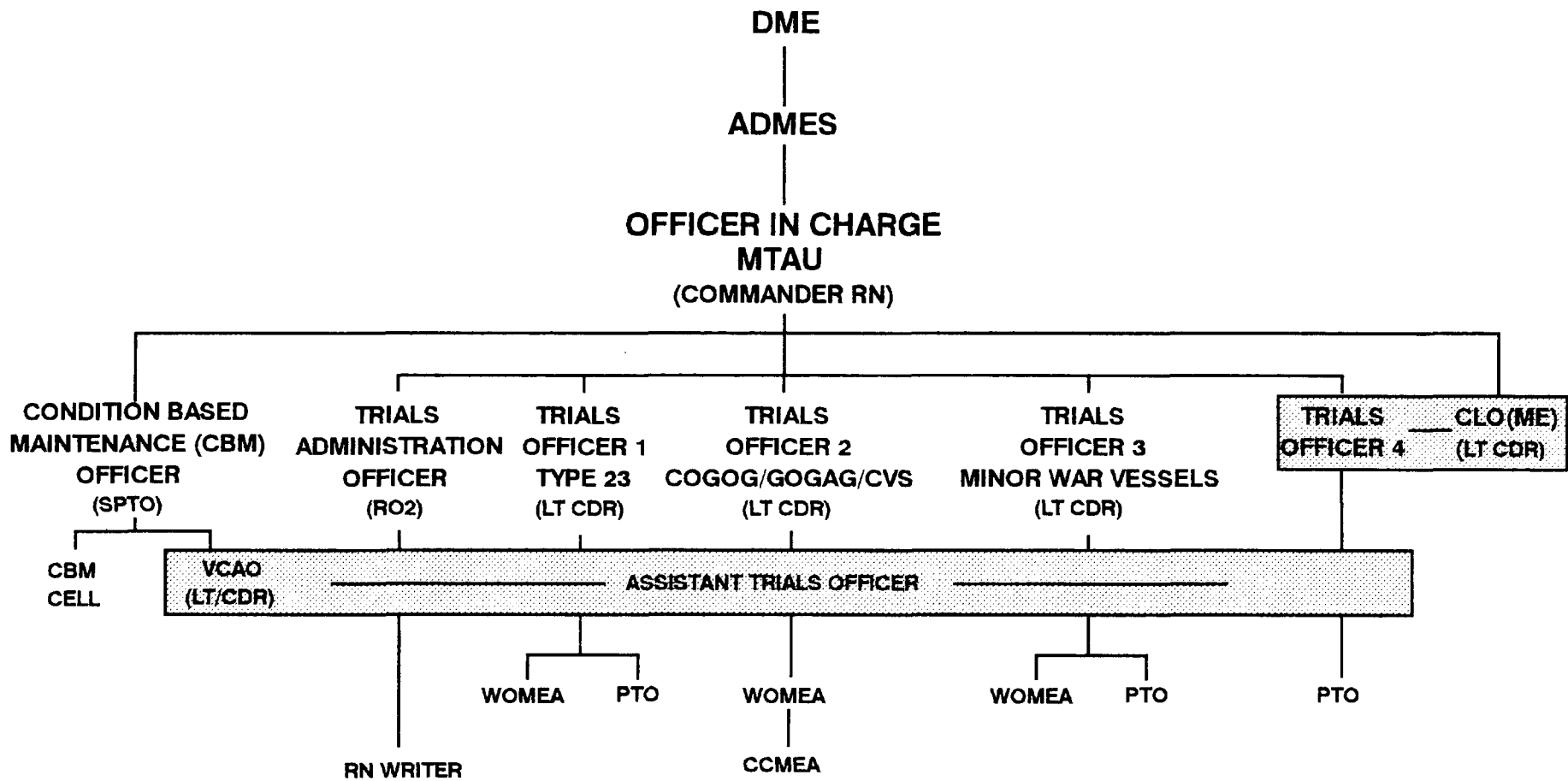


FIG. 15—THE HARD WORKED, COST EFFECTIVE FLEXIBLE ME202 MTAU ORGANIZATION OF TODAY