FP 414
A TRIUMPH OF PRAGMATISM OVER ORGANIZATIONAL BOUNDARIES

BY

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ABSTRACT

Future Projects 414 (FP414) was established as a Procurement Executive (PE) section in February 1996 following endorsement of a new Marine Engineering Development Strategy (MEDS) centred on the concept of Integrated Full Electric Propulsion (IFEP). Its task was to co-ordinate these ME developments for the next generation of Royal Navy ships. The MEDS was subsequently officially launched in June 1996 and, whilst the Electric Ship programme continues apace, FP414 has become ME206 under the Director Marine Engineering (DME) in the Ships Support Agency (SSA) just 14 months after its inception. This article describes the creation of FP414, its objectives and achievements, and how it constantly adapted, changed shape and shifted location to match the rapidly developing Electric Ship Programme remit. It describes the rationale for transfer of FP414 to the Naval Support Command and highlights the initiative whereby secondees from industry and other agencies are now integrated into the current multi-disciplined Electric Ship Programme Team.

Introduction

The concept of Integrated Full Electric Propulsion (IFEP) and its applicability to the next generation of RN ships (Future Carrier (CV(F)), Future Escort (FE) and Future Attack Submarine (FASM)) have been widely published, here[1,2] and in other publications. It is also at the core of the Royal Navy's Marine Engineering Development Strategy (MEDS), launched in 1996. The development and presentation of the strategy and the associated IFEP programme was undertaken by a Procurement Executive (PE) future projects team; initially FP412, and latterly FP414. This Electric Ship programme team transferred to the Director Marine Engineering (DME), in the Ship Support Agency of the Naval Support Command (NSC) as ME206 on the 1 April 1997. This article recounts the history and achievements of FP414, its transfer from the PE to NSC, and the promising initiative of seconding industrial engineers to a development programme. In doing so, it outlines the way ahead for the Electric Ship Programme and also illustrates how flexibility can be employed to obviate overlap and duplication between the PE and NSC in the development field.

Background

Given the high costs and risks associated with installation and integration of weapon systems, it is in both the PE and the shipbuilder's (prime contractor) interest to minimize the engineering risk of the marine engineering outfit. This can lead to the employment of propulsion and auxiliary systems that are the 'same as last but cheaper'. The outcome can be installations that might not be the most economical to operate through life but are the cheapest to buy and install and can be assured of meeting the operational requirement due to a 'minimum change' policy.

In contrast with this perceived slowing down of military marine engineering development in the 1980s, commercial marine organizations had been striving to find propulsion and transmission systems that would reduce the total cost of ownership of merchant ships. Several sectors, in particular Cruise Liners, Shuttle Tankers and Ice Breakers, had adopted full electric propulsion. Consequently, in the late 1980s the PE commenced a Full

Electric Propulsion (FEP) project, with FP412 as the Project Manager, to assess the applicability of electric propulsion to warships. The organization at that time is shown in (FIG. 1).

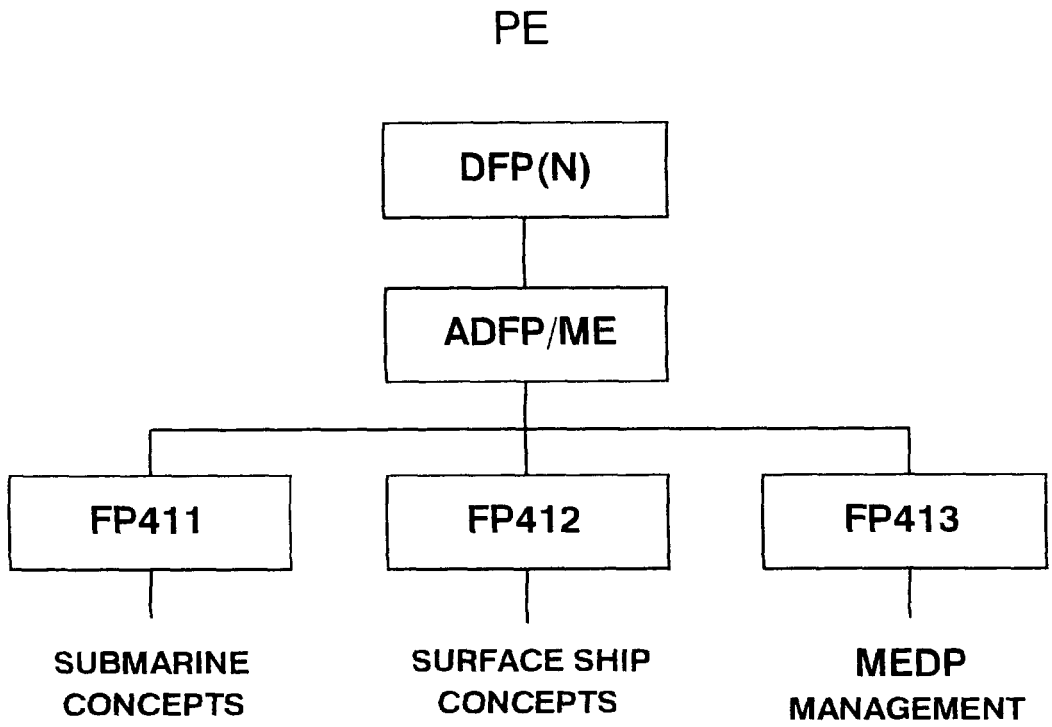

FIG. 1 — ORIGINAL FEP PROJECT ORGANIZATION

The essential conclusion of FP412's report was that a typical IFEP system was bigger and heavier than current warship systems, would cost up to 25% more, but would save up to 30% per year on fuel. In the early 1990s, in view of this outcome and in order to preclude a potential stagnation of marine engineering development, it was decided to undertake a full review to derive an ME strategy for the future. The MEDS[3] and related Electric Ship papers proposed such initiatives as:

- Single prime mover operation with battery back-up
- A DC distribution system to minimize conversion losses
- Electrification of as many auxiliaries as possible (including stabilizers and steering gear).

The final element that led to the setting up of the Electric Ship Programme was a review of the MoD's plans, projects and programmes to adopt the emerging electric propulsion technology by a Defence Scientific Advisory Council (DSAC) working party.[4] The findings of the DSAC report essentially endorsed the MEDS and the Electric Ship papers, and recommended further work to maximize the gains to be made from the adoption of IFEP.

The establishment of FP414

After discussions between the Director Future Projects (Navy) (DFP(N)), now Director Naval Architecture and Future Projects (DNA&FP), and DME, FP414 was established in Foxhill, Bath, in February 1996 adjacent to DME's power systems specialists; a PE lodger in the NSC. FP414's main objectives were to co-ordinate the development of systems and equipment in support of the Electric Ship Programme through the DME specialist sections, and to provide a marine engineering focal point for the future whole ship pro-

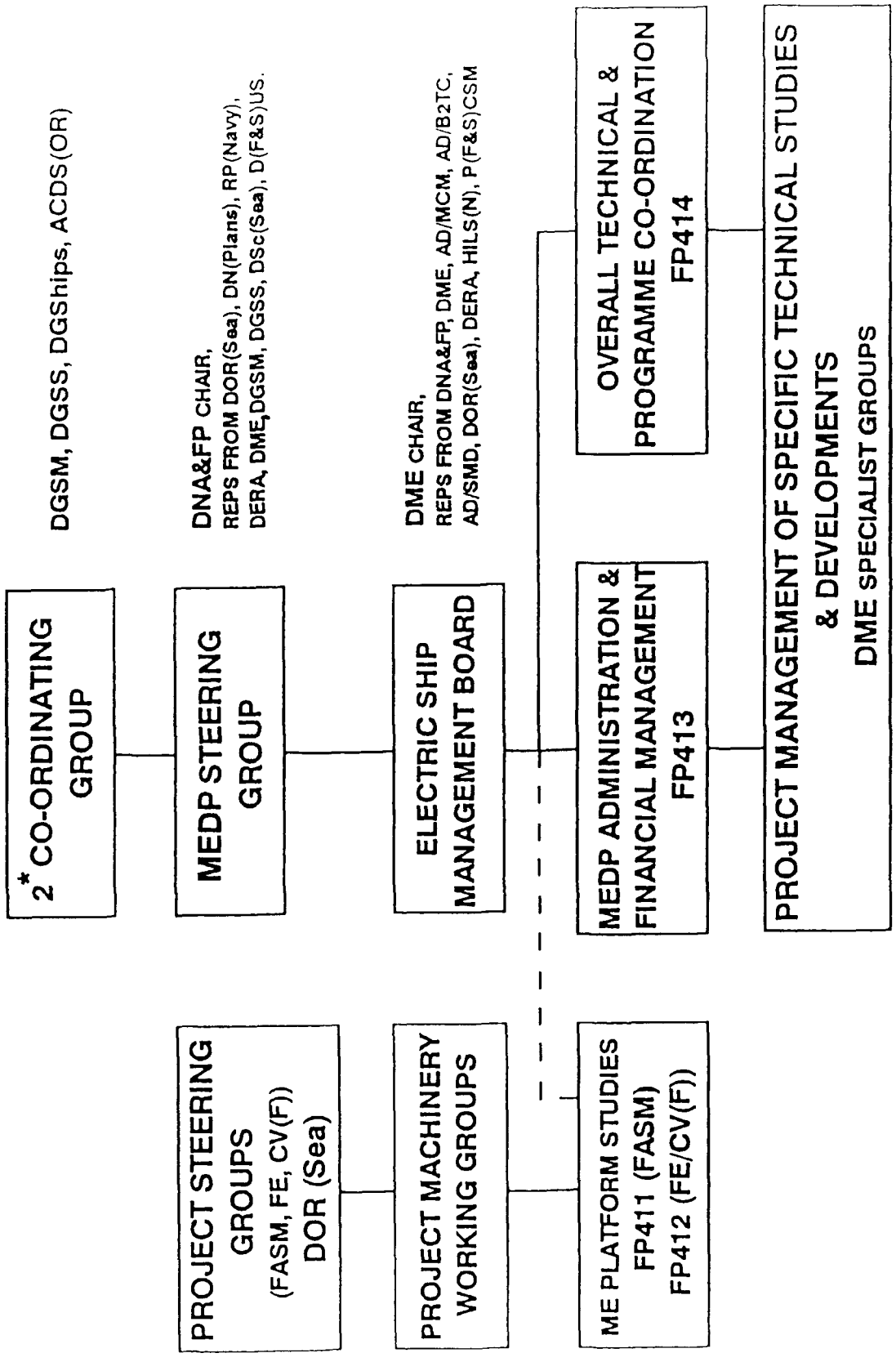

FIG. 2 — MEDS DIRECTION AND PROGRAMME OVERSIGHT

grammes through DFP(N). Overall control of the strategy direction and programme oversight was to be by a Two Star Co-ordinating Group through a Marine Engineering Development Programme (MEDP) steering committee and an Electric Ship management board (FIG. 2). The MEDP fund and its administration remained in the PE with FP413.

Reflecting the wide interests in the Electric Ship programme, FP414 was made up of naval and civilian personnel drawn from DNA&FP, DME and DERA, but with line management retained under the PE.

FP414 tasks and achievements

FP414's key objective was to develop a comprehensive programme, drawing together the various marine engineering development items and associated costings from sections who would undertake the work. The programme, issued in September 1996, integrated MEDS implementation with the latest platform project dates. A high level summary is at (FIG. 3).

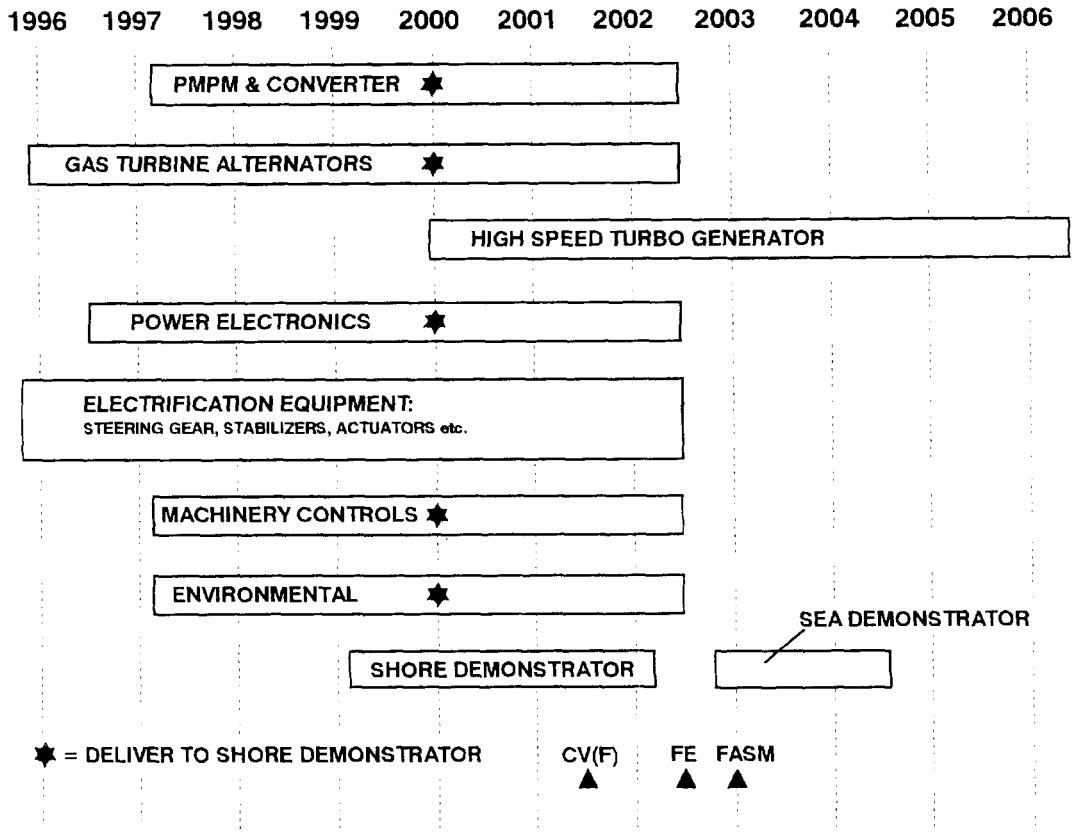

FIG. 3 — INDICATIVE ELECTRIC SHIP PROGRAMME OVERVIEW

The programme shows development of pre-production units and the subsequent integration into a shore demonstrator prior to the CV(F) Naval Staff Requirement (NSR). In order to confirm that newly developed equipment can be integrated into an installation which can be correctly controlled, accommodate power surges and motion in a seaway and achieve the Availability, Reliability, Maintainability (ARM) and manning targets in a marine environment, a sea demonstration programme is planned. The outline plan is for these IFEP demonstrations to form Phase 2 of the Trimaran demonstrator trials in collaboration with other interested nations. There is overlap between sea demonstration and equipment selection for the future platforms; however, it is expected that the shore demonstrator will have proved the major design principles and that, by concurrent engineering, it will be possible to accommodate any modifications that may result from sea trials.

Another FP414 objective was to attract support and resources to develop the IFEP concept and MEDS throughout the marine engineering fraternity. This has included some 50 presentations to industry, Service and engineering institution audiences. At the same time, relationships with other leading maritime nations (USA, France, Germany and Holland) have been forged. All are keenly interested in the IFEP concept and are at varying stages of programmes which have much in common with our own MEDS. The US and UK are already jointly testing the WR21 ICR gas turbine at Pyestock (DERA, UK) and a Memorandum of Understanding (MOU) is proposed between the UK and Netherlands to develop a 1–2 MW gas turbine alternator. The Electric Ship section continue to explore the considerable potential for further information sharing and joint development of IFEP.

The demise of FP414

By late 1996, the mixed (PE, NSC and DERA) FP414 team and its Electric Ship Programme were firmly embedded in Foxhill but still accountable to the PE, through DNA&FP and the Assistant Director Future Projects/ Marine Engineering (ADFP/ME); by then, based in Abbey Wood. It was evident that there was a need to rationalize the Electric Ship Programme and hence, when the ADFP/ME post was end-dated, it was decided to transfer FP414 formally to the NSC under DME. Considerable benefits were seen in centralizing an IFEP programme, common to all future platforms, with the lead authority for marine engineering support and development. The initiative would focus the expertise and, as long as the essential strong link between the Electric Ship Programme and the individual future platform teams in the PE was maintained, it would avoid duplication of marine engineering effort between Foxhill and Abbey Wood. However, as the Electric Ship Programme was clearly development work for future platforms, it was agreed that the PE would continue to finance the programme through the MEDP fund, although, for simplification, that fund would be administered by DME. It was also agreed that two posts would continue to be funded by the PE, but the remainder of the team would be funded by the NSC or from source for secondees (DERA and industry). Finally, 1 April 1997 signalled the end of a busy, rapidly developing 14 months existence for FP414 as it and its new arrivals became ME206.

The industrial partnership

Hot on the heels of engineering concepts from FP414, came the idea of inviting industry to get involved at this early stage in the development of the IFEP concept. The initiative would focus the broadest range of expertise upon an engineering concepts and development programme at a far earlier stage than hitherto achieved. This pooling of expertise would provide the potential to develop NSRs and an IFEP project which had benefited from both Service and industry input almost from the outset. For those companies involved, it provided an opportunity to work with the customer, to shape the concept and clearly increase the potential for their involvement in IFEP and future platform production. After some gentle persuasion, a number of companies pledged secondees to the programme to form the current multidisciplined ME 206 team (FIG. 4).

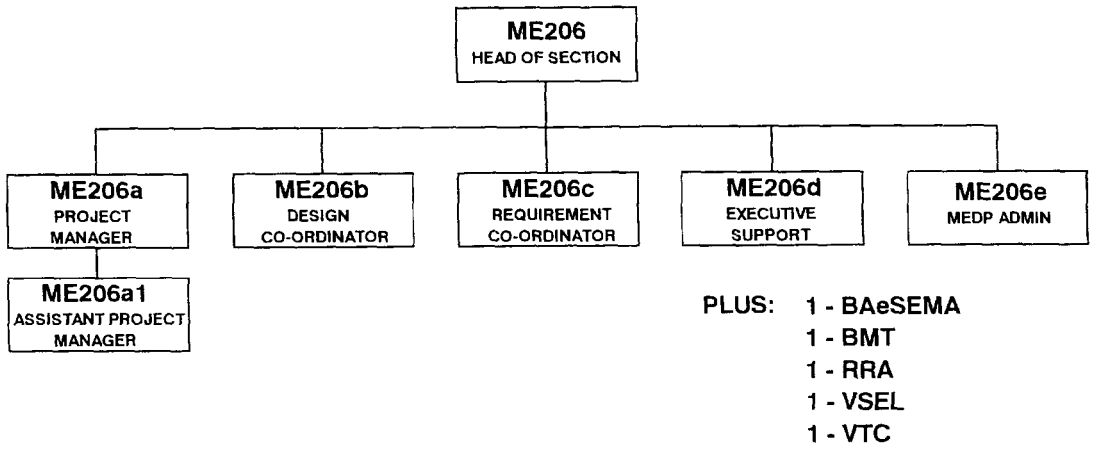

FIG. 4 — ME206 ORGANIZATION

The challenges

Despite such a strong and diverse programme team, many challenges face the Electric Ship Programme. Clearly, the over-arching aim is to develop the individual equipments and prove them in an integrated form which not only gives confidence to those formulating NSRs, but also convinces potential prime contractors that the risk in selecting IFEP for the future platforms is acceptable. Within this aim are many challenges for ME206: not least the need to obtain sufficient funding to augment the current MEDP provision; to offset this funding requirement by joint development and production with other nations and through Private Finance Initiatives; to co-ordinate the many specialist group-sponsored development work within the demanding time-scales of the overall programme; and, to make best use of the broad skills and strong commitment within the ME206 Team.

Conclusions

Few remain to be convinced of the potential which IFEP offers to the Royal Navy's future platforms in both military effectiveness and cost of ownership terms. The task of co-ordinating the development of IFEP to a point which clearly demonstrates that potential and its minimum risk sits comfortably with DME as the centre of marine engineering expertise.

FP414's short history and the route to the present ME206 Electric Ship Programme Section demonstrates how pragmatism can overcome the inevitable blur and overlap at the boundary between the PE's responsibility for platform concepts, development and procurement, and the engineering support remit of the NSC.

The moulding of ME206 into a cohesive, multi-disciplined team of MoD civilians and Service personnel, and engineers from DERA and industry has applied the broadest range of experience and expertise early in the Electric Ship Programme and is already showing considerable potential.

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