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AFFORDABLE FUTURE MARITIME SURFACE PLATFORMS - A CAPABILITY SPONSOR'S PERSPECTIVE

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ABSTRACT

Affordability appears in many guises and affects all major decisions on future maritime surface platforms throughout their life cycle. The MoD is addressing this affordability pressure on many fronts from policy, programme organisation, platform and support solution design, and procurement strategy. This paper examines these four areas from a Capability Sponsor's perspective, explaining how they have been impacted by initiatives ranging from the Defence Industrial Strategy to Through Life Capability Management. It uses the current Future Surface Combatant (FSC) programme to demonstrate the increasingly complex view of the escalating affordability challenge in platform acquisition.

INTRODUCTION

"The future maritime surface platform will be agile, versatile and adaptable to changing capabilities, able to deploy and remain on task throughout the world. It will be interoperable in order to maximise the opportunities of the Joint environment and able to host and exploit unmanned vehicles (UXVs). It will be survivable to a level coherent with demands across the Fleet and optimally manned, capitalising on automation to take the man out of harms way and reduce cost of ownership. The ship's habitability will maintain the physical and mental wellbeing of future generations to achieve sustained effectiveness in the performance of their tasks. The equipment and systems will be usable and supportable, taking a holistic view of training and ease of use and upgrade, coherent with existing and expected future equipment across the Fleet – driving the best value for money through the life of the platform, using energy efficiently and effectively, compliant with safety and environmental legislation."

The above is a MoD's Capability Planning Group vision of the platform aspects of a future naval vessel that provide the effect of a ship by it just being there; in MoD capability terms this is called "presence". A ship's ability to deploy and stay there, ready to deliver a desired effect, rests upon a number of platform systems – the "ship" in warship. These features are collectively referred to as the maritime platform characteristics of a ship (as opposed to a combat capability delivered through its weapons and sensors) and a central feature of them is the drive to achieve the best value for money throughout the life of platform. Matching the cost of the vessel and its platform characteristics to the available funding is a significant part of the affordability question.

The maritime platform characteristics are often referred to as the “ilities” and are shown in Fig1.

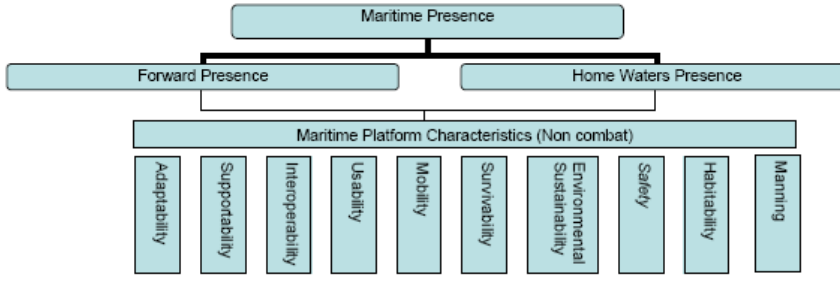

FIG.1 – MARITIME PLATFORM CHARACTERISTICS

Affordability is another “ility” that threads through all of the characteristics. It is a pre-requisite, an outcome, a driver, a restriction and is present right through the whole capability’s life cycle, from initial planning to delivery into service and disposal. Maritime platform affordability is quantified in many ways in the MoD and appears in many guises, from unit purchase costs (UPC), development costs and onto through and whole life costs. It is not just the platform but the associated lines of development such as training, manning and infrastructure that attract costs; these too have to be affordable both when introducing a ship into service and throughout its life. What constitutes affordability is complex, but always important; the platform being and remaining affordable is a main driver in the behaviour surrounding those making the significant decisions.

Affordability pressure is being tackled in the MoD on a number of fronts. It is a rising consideration in policy formulation and a significant influence in how the acquisition programme is organised to deliver capability. Similarly, affordability remains a key driver in platform design and support throughout life. These aspects come together in procurement, the commercial conversation between the purchaser and supplier, where affordability comes into sharpest focus. This paper will examine how the MoD is dealing with the complex question via each of these perspectives:

Policy – the wider framework, boundaries and higher level intent that set the conditions for platform acquisition

Programme – how the acquisition community organises itself to deliver policy

Platform – how the platform is designed and supported through its life cycle

Procurement - the commercial arrangement between customer and supplier in the whole life acquisition of the platform

DISCUSSION

Policy

Over the past 5 years, the MoD has extended the reach of its capability policy guidance, most notably with the issue of its first Defence Industrial Strategy (DIS)

in December 2005. This strategy heralded the formal elevation of industrial considerations up the policy tree and moved industrial implications from a consequence or procurement reality to a direct factor in deciding the future shape of the Royal Navy's Fleet. In the maritime surface sector, embodiment of this guidance in the strategy has been centred on sustained future affordability of complex surface platforms, including frigates and destroyers, and this is discussed in more detail in the procurement section of this paper.

The DIS outlined those elements of industrial capacity that it wished to be retained as key sovereign capability. If these capabilities could not be sustained by the open market, then the MoD intended to intervene to retain the capability onshore. In committing to this support, the MoD looked for benefit and performance incentive long term partnering agreements that would sustain these capabilities on the most affordable basis. Thus, partnering arrangements have been established where UK procurement orders can no longer sustain separate industrial teams to compete and deliver best value. The real implications of the introduction of this new approach are only gradually being felt as the sector adjusts to the impact.

The connection between capability delivery policy and industrial strategy has been firmly made in the UK maritime surface sector. It has shaped the environment and conditions under which affordability is to be achieved in the future. Much policy will be examined, and may change, in the forthcoming strategic defence review, but the outcome will set the requirement in the highest terms and robust incentives to deliver the benefits will be key to its success.

Programme Organisation

The acquisition organisation is changing with the embedding of the MoD "Through Life Capability Management" (TLCM) initiative. This change programme has more comprehensively defined the customer as the MoD Unified Customer (MUC) with representation from five aspects: The Sponsor, the User (front line command), the Material Supplier (Defence Equipment and Support), the Organisation representative (Navy Resource and Plans) and the Science and Research community. Unification of the customer has driven the planning end of the spectrum, but, as the plan becomes reality, the customer changes shape once again and responsibility passes to the Programme Board. The platform capability is now viewed from the following perspectives, called the defence lines of development (DLODs):

T – Training

E – Equipment

P – Personnel

I – Infrastructure

D – Doctrine

O – Organisation

I – Information

L – Logistics

Each of these areas has its own set of affordability considerations and business operating environments. The introduction of a new platform class is likely to have a significant impact on individual DLOD costs. Bringing together these multiple considerations early in the acquisition process, centred on a platform capability, generates the opportunity for optimising the whole life cost on a more broadly defined and integrated platform basis. For example, the FSC may be made technically more complex so that the manning numbers required to operate the platform are lowered. This might increase the equipment unit purchase cost with a higher level of sophistication attracting greater through life maintenance and training costs. However when considering a broader definition of affordability, these cost increases have to be balanced against what might be the larger reduction in whole life manning cost. Resolution of these sorts of tensions may lead to sub-optimal decisions when viewed by one line of development, but the Programme Board is in a position to consider overall affordability and has the opportunity to optimise all costs on a wider and longer term basis to optimise capability delivery.

In programme organisational terms, the affordability view has widened and deepened to a more complex and through life finance approach. Increasingly, major decisions now recognise their full, rather than just their equipment costs. However, costing some DLODs and the difficulty of moving money between them remains an ongoing challenge.

Platform

Affordability constraints are familiar considerations in the design and support aspects of the platform, with many well recognised balances having to be struck. The scope of what might be included in the balancing act is once again changing. For example, the FSC programme (Fig 2) is essentially a platform "heavy" programme with an incremental approach to the combat systems. Much of the combat equipment will already be in service in existing frigates and the intention is to "cross deck", with appropriate capability refresh, to the new build hulls. This approach decouples two major capital investments, the ship and the combat system, decreasing risk and increasing affordability at the time of build for the ship itself. This spreading of risks and costs increases the affordability of the host platform, resulting in a smoother financial profile.

FIG.2 - ILLUSTRATIVE FUTURE SURFACE COMBATANT

Platform and combat system decoupling increases reliance on the flexibility (the ability to operationally reconfigure) and adaptability (the capability to upgrade and update) built into the platform. Once again, the FSC is attempting to address both these qualities, with features such as the mission bay concept for flexible tasking (the same operational area for sonar equipment that may also become a disaster relief bay and facilitate boat operations) and an adaptable approach to the platform systems. Flexibility leads to wider platform utility and, because it is essentially a

build choice, the associated costs are relatively accurate to assess. However, during the design stages, adaptability is a much harder feature to justify in terms of value for money. Delivering an adaptable platform should improve its ability to keep pace with changing capability needs and would enhance the MoD's return on capital investment through life. Nevertheless, adaptability often amounts to adding capacity margin to ship's systems and builds in what might be perceived as additional cost, often making it a favourite savings target. Some of these adaptability features are well understood, such as stability and growth margins. Others, however, such as cooling margin, are becoming increasingly difficult to determine as weapons and sensors demand on the ship may be subject to radical technical change during a platform's life. Collecting credible evidence to support the best long term affordability decisions is a significant challenge. Flexibility and adaptability are essential qualities of a modern warship, but both strain against affordability as they increase the ambition of the design and pressurise the UPC.

The FSC programme is not only interconnected with existing combat capabilities, it has strengthened its relationship with future platform capabilities. FSC has taken an inter-class approach with the intention to be a family of ships from the Task Group anti-submarine war fighting C1 variant, through to the more general purpose C2 frigate and onto the smaller patrol sized C3 vessel. This strong family connection drives at the highest level the benefits of commonality, smaller equipment ranges and economies of scale, all easing the unit purchase costs and alleviating overall support cost pressure. The C3 vessel is also an example of a fresh look at delivering capability more affordably by combining the hydrographical and mine hunting roles into a single platform, thereby gaining greater utility from the expensive capital investment of a new build ship. These relationships should all help ease affordability pressures through life.

A popular accusation is that bespoke military features are significant cost drivers in naval vessel procurement. These unique features are often favourite targets for cuts as they are seen as "gold plating" and stand out when compared to commercial sector practices. The FSC programme has worked to understand the cost of some of these features early in the design process. A favourite example is survivability, and this characteristic is often accused of driving in additional cost and denying selection of cheaper equipment by limiting the supply base through specification of difficult military requirements. A recent study has shown that survivability features add about 9-10% to the UPC. More significantly, it is the penalty of trying to "back fit" survivability features that can cause significant cost growth. If designed in from the start, therefore, this premium is probably good value for money for a warship that will be placed in harm's way. The same examination has also led the ship builder to review its equipment shock protection sub-contracting practice. They are now looking into offering a shock protected environment by protected rafts etc. to equipment suppliers. This would open up the number of compliant suppliers as the individual procurement specification is now much less "navalised".

Innovation offers the opportunity for increasing affordability of a platform as well as its capability. Driving innovation into the early design, at acceptable levels of risk, is essential if future platforms are to remain affordable. In the FSC, this is an area where programme organisation and platform design innovation has come together to tackle affordability through formation of a design partnership. The MoD led Naval Design Partnership (NDP) has been established from a "rainbow

of industries" for concept platform designs and has ensured access to ideas in the wider industrial base. Similarly the builder is moving production engineering earlier up the procurement process and has started to influence design choices, reducing platform build costs. This greater fidelity in the concept design, coupled with the partnering approach, has enabled establishment of a robust joint cost model. The shared higher confidence modelling has improved examination of the cost drivers at a stage where change is cheapest to effect. This has enabled the project team to press down on costs and allowed cost capability trading to have a greater impact on affordability.

Redefining the project boundaries opens up the affordability debate, but the supporting cost evidence needs to be made available to inform decision making. A wider more interconnected view of platform design and support is being implemented in the FSC programme; yet, this challenges traditional views of characteristics such as flexibility, adaptability and survivability. Revising the procurement approach through incremental acquisition and partnering methods should help deal with these wider boundaries and ease cost pressures

Procurement

The 2005 DIS identified the need to retain UK sovereignty in the maritime sector for complex surface warship build. The establishment of a joint venture of 2 main shipbuilders into one company, BVT (now BAES Surface Ships Limited), followed announcement of the DIS. Moving forwards, as part of implementation of this strategy, in July 2009 the MoD signed a Terms of Business Agreement (ToBA) with BVT. This agreement has set the stage for the next 15 years of UK surface warship building at the prime or Tier One level. The agreement has moved ship building away from "boom and bust" to a performance and benefit led economy with a stabilised workload and a retained minimum industrial capacity in return for benefits to the MoD customer.

The benefits from this agreement flow from the initial consolidation of the original build companies, called the integration phase, followed by their combined improvement, the transformation phase, and in the longer term right-sizing. The integration phase removed duplication from the constituent companies, with the subsequent transformation phase looking at improved processes with initiatives such as the product orientated approach. The agreement effectively moves the MoD to more of a programme rather than project style approach to complex warship building, where stabilised overheads underpin successive builds rather than starting afresh with each project. The "sea change" that this agreement has ushered into the maritime sector has just started gathering pace and its full effects have yet to be felt.

The stability in the relationship has initiated a renewed spirit of working together and has opened up possibilities to decrease costs and enhance value for money over the next 15 years. Improved performance from BAES SSL is enshrined in the agreement by it undertaking to become an upper quartile performing ship builder and these ToBA benefits should help increase the affordability of complex platforms through the design and build phases of its life cycle.

The ToBA has also more closely tied the ship builder to the supporter. For the first time, the Type 45 Destroyer builder and main supporter are the same

company. Over time it is expected that, given effective commercial incentives, the bringing forward of support considerations into build will drive in affordability in both terms of unit purchase and support costs.

Parallel to the long term partnering agreement with a BAES SSL, a ToBA is in negotiation with Babcock Marine (BM), who followed a similar pattern of commercial consolidation with the joining of the 2 submarine support companies of Devonport Management Limited and Babcock. However, whilst primarily submarine focussed, a proportion of this agreement covers deep maintenance of surface warships.

Another significant commercial agreement is the Surface Ship Support Alliance (SSSA), which is a MoD and Industry collective approach to warship support. The Alliance owes its birth to previously competed upkeeps, where the market was looking increasingly unsustainable in the longer term. This project, which is just finishing its pilot phase and is about to enter its second phase, will operate on a "best for enterprise" allocation basis for support, and will smooth the load of large maintenance packages across the dockyard facilities. The ability to work together to balance workload and draw the best from the support infrastructure and workforce assets through the SSSA offers a real opportunity to gain the best value for money and increase the affordability of support across the maritime sector.

There is more to do on the procurement front and other opportunities are opening up through the DE&S led Maritime Change Programme, such as a more continuous approach to platform maintenance by combining what was previous called fleet time with upkeep or deep maintenance. Also rapidly gaining pace is the look across both the submarine and surface classes to share common range equipments and best practice. Fundamentally, the main business agreements have established the industrial landscape for the coming decade. They require different and more sophisticated behaviours from the acquisition community to improve affordability of future vessels, whilst continuing to gain the best from the industrial base.

CONCLUSIONS

Affordability lies at the centre of decision making on the size and shape of the future fleet. Its definition is becoming increasingly sophisticated and reflects a widening view of surface platform capability. Cost information needs to keep pace with this increasing level of complexity to support a more comprehensive and flexible financial approach to future platform capability decisions. The acquisition organisation and its processes must continue to adapt to exploit recent progress in the DIS led change in surface maritime sector procurement strategy. This new industrial landscape offers real opportunities that must be firmly grasped to keep the future fleet affordable.

ACKNOWLEDGEMENTS

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References

1. Defence Industrial Strategy, Defence White Paper, December 2005.

The views expressed are those of the authors and do not necessarily represent those of the UK Ministry of Defence or HM Government.