



WHITE PAPER: **STREAMLINING CAPABILITY DELIVERY – ‘FAST’ ACQUISITION**

Today's armed forces require the rapid delivery of not just equipment but 'Operational Capability' in order to provide the targeted effect needed to win the current battle against a rapidly evolving and adaptive enemy. The government, together with its electorate and the media require this capability to be delivered within an ever decreasing budget and to increasingly tight timeframes; they expect 'more Bangs for fewer Bucks'. The combination of these requirements present the UK Ministry of Defence (MoD) acquisition community with a highly complex challenge, creating the pressure of providing added value in a short timeframe, while at the same time reducing the risk across the time, cost and performance trinity. Adoption of a 'Systems Thinking' approach improves management of complexity, allowing the required capability delivery to be achieved through a more streamlined, agile and robust acquisition process.

WHITE PAPER:
STREAMLINING CAPABILITY DELIVERY – ‘FAST’ ACQUISITION

<i>Contents</i>	<i>Page</i>
Introduction.....	3
Aim.....	3
Background.....	3
Streamlining Capability Delivery.....	8
‘FAST’ Acquisition.....	13
Summary.....	14

INTRODUCTION

“While progress has been made, performance remains variable, partly reflecting the complexity of defence acquisition and rapidly changing operational requirements.”

(MoD MPR 2008)

The era of protracted acquisition programmes spanning years, if not decades, where time, cost and performance parameters can be allowed to slip according to circumstance, or continually changing requirements, is swiftly drawing to a close. No longer will the current economic climate, operational tempo or expectant taxpayer and serviceman¹ allow this to remain the status quo.

The significant challenge facing the UK MoD acquisition community today is that of delivering capability, not simply equipment, into the hands of the user in a swift, prudent and ‘right first time’ manner. More and more this is being undertaken via the Urgent Operational Requirement (UOR) process; designed to provide expedient capability to maintain operational tempo and provide strategic advantage direct to the front line. This process has been highly successful² in its ability to quickly get equipment into the hands of the user, but it often means that some aspects of the capability have been omitted or, at the very least, not fully considered.

The MoD currently finds itself with two acquisition systems; UOR and Equipment Programme (EP). Both have their advantages and, sadly, both have their drawbacks. As the pace of operations is unlikely to abate in the foreseeable future³ and the requirement, as well as political and public appetites, for long drawn out procurement programmes reduces, there is a strong argument for a single streamlined process for UK MoD acquisition combining the best of both current systems.

AIM

This white paper discusses the pitfalls of the current UK MoD acquisition process and proposes a way in which it might be improved to provide a more agile and flexible system, thus assisting in the delivery of urgently required operational capability (UORs) and their link to the wider core programme.

BACKGROUND

There has been much recent press attention on the vagaries of the current acquisition process, its funding and the pressing need for our troops to be provided with the hardware necessary to ensure success in the austere and hostile environments in which they operate today.

A recent study of legacy projects⁴ shows that whilst significant reform has been achieved within the UK MoD acquisition system there remain substantial shortfalls across the performance, cost and time trinity.

1. Describes both male and female service personnel.

2. HCDC Report dated 26 February 2009.

3. Much has been made of the longevity of the Afghanistan Campaign and the threat of insurgency remains high across the western world.

4. MoD Major Projects Report 2008, HC 64-1 Session 2008-2009 dated 18 December 2008.

While it will always be difficult to predict the future and mitigate every risk when dealing with longer term programmes like the Future Carrier or Joint Strike Fighter it should be reasonable to expect shorter term projects, such as UORs or Category D projects, to be consistently delivered to their expectant Performance, Cost and Time (PCT) parameters.

So why isn't this always the case, and why has £3.5bn been spent on temporary operational effect since 2003⁵ without an apparent strategic link being formed to the core Capability or Research and Development (R&D) programmes? Recent stakeholder engagement across the MoD acquisition community has identified a number of issues that may provide an answer:

- The complexity of the Acquisition Operating Framework (AOF)⁶ and its partial non-mandatory status - leading to misunderstanding and disparate levels of compliance across the community;
- A lack of process for UOR delivery - resulting in a lack of standardisation across delivery teams and thus a difficulty in providing a coherent approach to capability delivery;
- Incomplete or missing requirements - causing capability to be delivered that is 'not fit for purpose';
- Solutionising of projects before thorough stakeholder engagement has occurred - resulting in incomplete requirements and a constrained delivery process;
- Continual alteration of requirements and priorities without change management procedures to handle them - leading to a loss of project control, together with its PCT implications;
- A lack of resources - causing 'hurried' rather than 'tailored' capability delivery;
- Initiation of projects without a true understanding of the capability need - leading to costly rework downstream, or the delivery of equipment that is not truly 'fit for purpose'.

The AOF - is process getting in the way of product?

Once a capability need has been identified the AOF is used by the UK MoD to deliver the resultant system to the front line. The framework contains a system lifecycle that is split into the following phases:

- Concept;
- Assessment;
- Demonstration;
- Manufacture;
- In Service;
- Disposal.

5. Jane's Defence Weekly, April 2008.

6. Web based document - www.aof.mod.uk

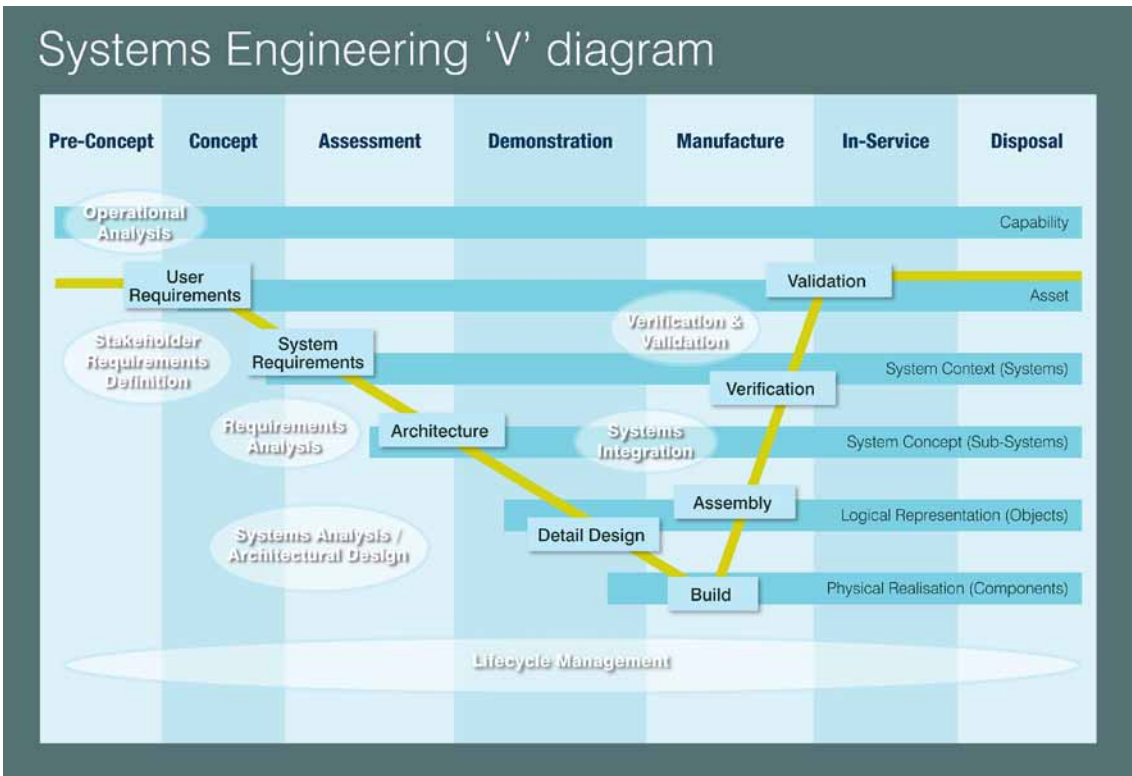


Figure 1 : the systems engineering lifecycle

The CADMID cycle was introduced in 1999, when it was devised as part of the ‘Smart Procurement’ initiative designed to deliver equipment capability within agreed performance, time and cost parameters⁷. This process is firmly based on the systems engineering lifecycle, or V model, pictured in Figure 1, which is a widely accepted method of managing complex systems designed to reduce inherent risks.

The AOF also identifies a number of underlying processes, contained within each of the lifecycle phases, which are designed to assist the delivery of the capability. Indeed the AOF is a comprehensive framework that, if followed studiously and implemented by individuals with the appropriate level of project management skill and domain knowledge, should ensure that the PCT trinity is achieved.

But is the AOF suitable for the delivery of short term projects such as the UOR? Is it agile and flexible enough to deal with the pressures of delivering capability to the front line in a matter of weeks or months, rather than years or decades? We contend that it is because of the complexities of the AOF that these projects sometimes fail to deliver on one or several points of the triangle.

Issues with the current process

As already mentioned, the AOF is not structured to provide an easily tailorable approach to rapid capability delivery - nor indeed was it originally designed to do so. Launched in April 2007, from the restructured Acquisition Management System (AMS), it was designed to provide guidelines and reference to all those within, or who regularly deal with, the acquisition community.

7. Enabling Acquisition Change, June 2006.

It should be noted that the AOF is not fully mandated. It does however contain some excellent information and processes, but is still considered somewhat cumbersome to navigate and, despite its recent rebranding, still far from user friendly.

The Defence Values for Acquisition (DVfA) contained within the AOF provide some very pertinent sound bites. One cannot help feel however that in some instances the AOF fails to follow its own advice, as highlighted in italics below:

- The best can be the enemy of the very good - *there remains a reluctance to agree to proceed with an 80% solution;*
- Time matters - *there is a need for a more iterative, rather than sequential process;*
- Think incrementally - *technology insertion should become the norm, with short term projects (UORs at present) informing the EP - this is true Through Life Management;*
- Recognise and respect the contribution made by industry - *get involvement at the earliest stage possible providing resources not available, or needed, in house;*
- Embed a through life culture - *designing UORs to ease their future incorporation into the core programme, considering all Defence Lines of Development (DLOD)⁸.*

The Defence Industrial Strategy⁹ directs the use of a ‘systems engineering approach’ for the introduction of high technology systems, however pressures to deliver often negate its use, preferring to forgo the time and cost needed to ‘scope’ and ‘bound’ the problem to determine the true effect required, and often opting to start by writing a requirements document without truly considering its impact across all lines of development.

One of the biggest impacts on project time and cost budgets occurs when requirements are changed or added to downstream. This often happens because either not all stakeholders were consulted during the initial phases, or the desired effect of a capability was not truly understood at the outset. Other omissions having substantial impact are those of failing to consider the implications across all DLODs and failing to identify relevant and suitably accountable individuals who are empowered to move the project forward in a pragmatic manner.

It is generally accepted within mainstream acquisition that 15% of a project’s cost should be spent upfront to ‘scope’ the problem¹⁰. This wisdom is however seldom adhered to, with as little as 5% to 10% actually being committed during the Concept phase¹¹. This ‘Conspiracy of Optimism’, or lack of commitment to investigate the true extent of the project, will inevitably lead to its risks, stakeholders and requirements not being fully identified and thus problems will be stored up to appear downstream when their resolution becomes more complex, time-consuming and costly.

8. The DLODs are: Training, Equipment, Personnel, Infrastructure, Doctrine and Concepts, Organisation, Information, Logistics, (Interoperability).

9. DIS White Paper dated December 2005.

10. Enabling Acquisition Change, June 2006.

11. MoD Major Projects Report 2008, HC 64-1 Session 2008-2009 dated 18 December 2008.

The common argument with UOR projects is that this is not applicable, and that funding is not required to be spent on conceptual thinking when buying 'off the shelf'. It is suggested that this argument is deeply flawed as no matter what equipment is needed it must be turned into a capability before it can be used effectively by the serviceman on the ground. In other words the wider impact of the system needs to be considered across all DLoDs and through life; no matter how short this is proposed to be.

Thus, with the focus of a significant percentage of the acquisition community now being centred on the delivery of rapid capability via UORs, and the tight constraints being placed on resources across the organisation, we contend it is time to consider a leaner and more flexible framework for the realisation of operational capability. A framework that delivers not only what is required when it is required but also attends to the longer term needs of our armed forces.

STREAMLINING CAPABILITY DELIVERY

It is hard to think of any military capability being delivered today that should not be considered as a complex system. Even providing a set of body armour involves consideration of human factors, the threat, the environment, its interaction with a weapon, etc. Therefore it is vital to ensure that all elements of a system are considered in order that successful capability can be delivered. At the same time the challenge is to ensure that this work is not only completed quickly, but that all stakeholder viewpoints are considered and that its introduction and sustainment through life are sufficiently planned and resourced.

Streamlining capability delivery, while maintaining the PCT trinity, is not a challenge to be taken lightly! However, we suggest it can be achieved if approached using a Systems Engineering¹² methodology combined with five supporting pillars of activity, namely:

- **Concurrency** - Maximising time available by conducting concurrent activity in an iterative manner. This parallel activity helps to achieve stakeholder engagement, manage the requirements capture process, and ensures project assurance activity.
- **Consultation** - Ensuring clarity of understanding between all stakeholders. The correct management of appropriately empowered stakeholders increases the probability of obtaining timely decisions across, and between, all lines of development.
- **Comprehensive Approach** - Consideration of Through Life Capability Management (TLCM) issues and that all risks are identified and suitably mitigated against. With UORs this may mean getting the 80% solution in service as rapidly as possible, but at the same time ensuring that the system is suitably robust and planned for to enable insertion of the additional 20% downstream in subsequent epochs.
- **Competency** - Having stakeholders available with the appropriate level of systems engineering, project management and domain knowledge to enable successful capability delivery.
- **Cataloguing** - Compiling and maintaining the appropriate documentary evidence required to satisfy all stakeholders (User, industry, assurers, etc.). This does not mean that ‘shelf ware’ is produced, but that a tailored approach is taken to identify the essential documents for the specific project.

This combined approach enables the right solution to be obtained without compromising accelerated delivery, budgets or end performance.

12. An interdisciplinary approach and means to enable the realisation of successful systems. Achieved by focussing on defining, managing and synthesising highly complex engineering systems that must interact with other systems. Its scope includes operations, performance, test, manufacture, cost and schedule, risk, training and support. INCOSE.

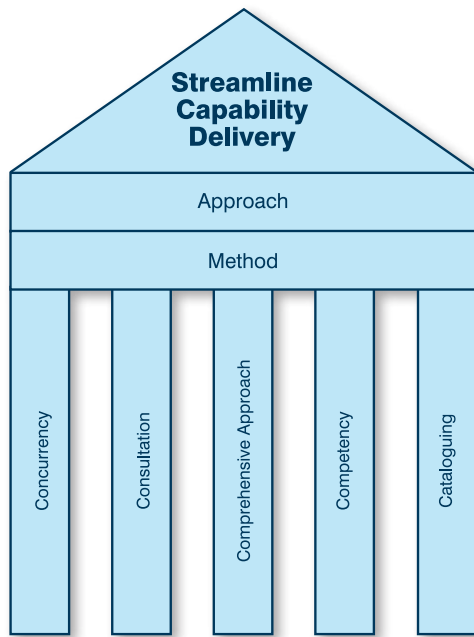


Figure 2 : the streamlined capability development model

A systems approach

Figure 2 depicts the Streamlining Capability Delivery model. The art of delivering operationally effective capability is centred on the ability to combine the approach (a process), the method (systems engineering tools and techniques), and the skill sets identified within the 5 Cs (supporting activity). This manner of comprehensive thinking ensures that all areas of the project are considered upfront, risks are identified and planned for, issues are resolved, and assumptions are realistic and justified. This holistic, or systems, approach enables a more agile and flexible approach to capability delivery.

The approach

Figure 3 proposes a streamlined process which forms part of the ‘systems’ approach described above. The first step of any acquisition process should be to confirm the capability need. This sounds simple as usually the UOR process is ‘kicked off’ by the User compiling and submitting an Urgent Statement of User Requirement (USUR). The USUR should be accompanied by a description of how, where, when and by whom this capability is to be used i.e. a Concept of Employment (CONEMP) or a Use Case. However these documents may well be written around an existing equipment, the ‘I want that one’ approach, and may not be phrased in true capability terms. There is nothing wrong with this per se, and indeed the equipment identified should be logged as a start point option, but it is imperative that the true ‘end effect’ required is defined in order to confirm that the final identified solution is suitable across all DLoDs. This not only saves time by having a reference to which the developed requirement can be compared, but it also encourages ‘buy in’ from the customer who sees his viewpoint being listened to. In order to ensure the true end effect is correctly defined it is necessary to start the concurrent activity and consultation processes outlined above.

At the heart of any complex system should be a functional model describing what it contains (equipment, people, communications, etc.), where its boundary is (what it does and does not have influence on), and what interactions it has with the outside world (integration with the wider environment). Once agreed by all stakeholders as an accurate and complete representation of the system the model is then used to identify key risks and to help to decompose requirements. This construct is referred to as the Enterprise Architecture.

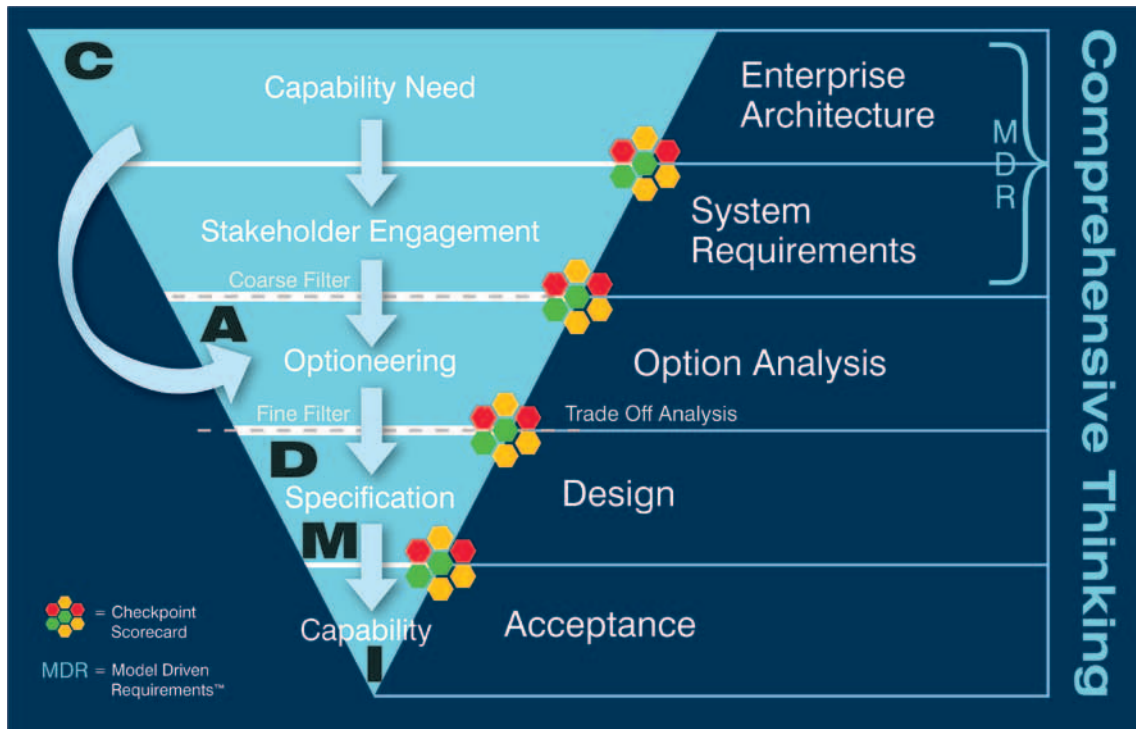


Figure 3 : the five step road map to capability delivery

Once the architecture has been sufficiently defined (recall the earlier reference to the 80% solution) then the system requirements can start to be decomposed into a format that can be used to assess available options evaluating their suitability for further development. Often these options are in the form of Commercial or Military Off The Shelf (COTS / MOTS) solutions, however it may be necessary to utilise the requirements to obtain a bespoke capability from industry. In either case the requirements should be sufficiently robust to enable rapid delivery and integration, thinking through life and across all DLoDs.

Once a preferred option has been down selected via this coarse filter exercise, the process of optioneering can begin; assessing the art of the possible and conducting trade off studies against the requirement until a final design specification is achieved.

At each stage of the process a checkpoint scorecard is used to identify the readiness level of each DLoD, ensuring interoperability issues are identified and maintaining a comprehensive approach to delivery. Concurrently, decisions, change requests, assumptions and risks are catalogued to maintain control of the project and provide an evidence trail for future use i.e. when bringing the system into the core programme.

The final stage is to monitor the design solution, along with its associated DLoDs, to accept the capability into service utilising stakeholders with the relevant competencies to prove compliance against the requirement.

The added value of a streamlining process

As shown in Figure 3, the streamlining capability delivery approach maps onto the CADMID cycle yet it is more agile and flexible than the AOF because it can be easily tailored to a specific project need.

Concurrent activity within the streamlined process minimises the cost and effort involved in managing the project. Robust requirements, obtained from the modelling process, also help to reduce the cost of design, testing and integration activities.

Identifying the most appropriate stakeholders, and ensuring that they are suitably empowered, increases confidence across the community that the capability will be delivered ‘right first time’. Also, ensuring all lines of development are considered through life, and are suitably documented, enables future activity to be conducted with a sound evidence base. This activity could therefore enable smooth transition of UOR projects into the core programme, having already conducted a significant amount of the assurance activity throughout the life of the original project.

Method

The five step roadmap described above details the streamline process, but this alone is not sufficient without the appropriate skills and experience needed to ensure successful capability delivery.

As described earlier the Systems Engineering V diagram, pictured in Figure 1, forms the basis of the CADMID cycle upon which the AOF is securely grounded. If the AOF itself is to be streamlined for UOR delivery then it follows that the methodology, or technique, on which it is based should be further analysed.

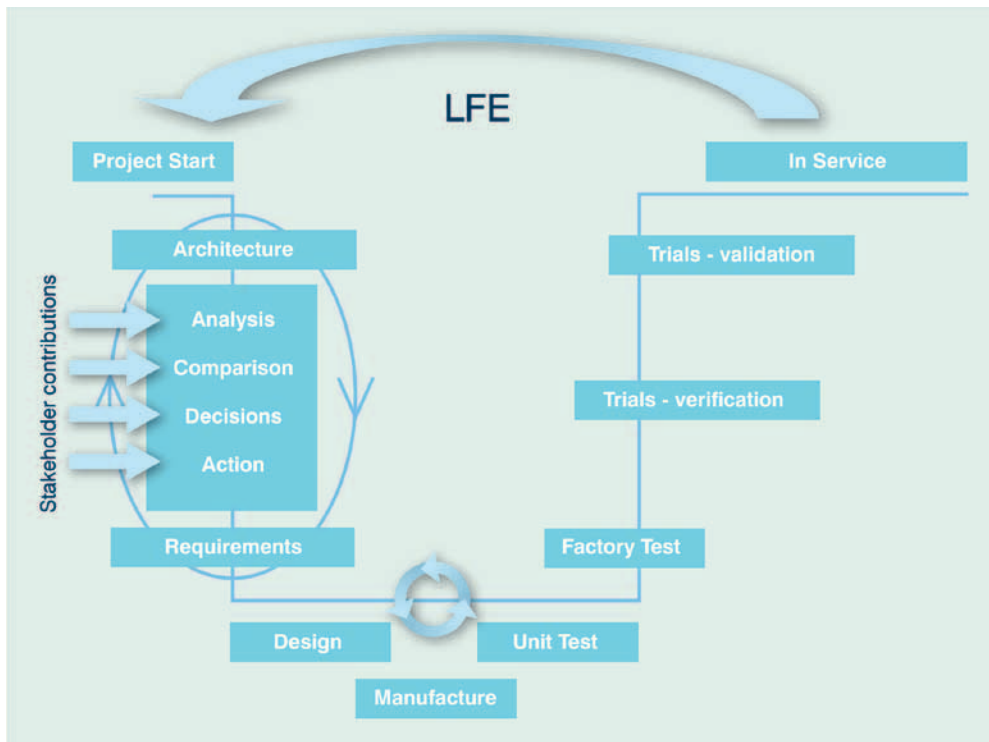


Figure 4 : the systems engineering ‘O’ diagram

Figure 4 shows a modified version of the V diagram; now termed the ‘O’ diagram. The left hand of the V has been ‘straightened’ to show a more rapid progression through the requirement specification process when utilising the streamline roadmap in Figure 3. This occurs by the utilisation of the concurrency and consultancy activities to produce an agreed architecture and robust requirements to which industry can Design, Manufacture/Modify, and Test. This is in contrast to the original V model in which a ‘waterfall’ approach is taken from the User Requirement, through the System Requirement and then on to the Architecture design in a sequential, and therefore more time-consuming, procedure.

The continual review process in the design, manufacture and test phases ensures issues are identified early and resolved with stakeholder input. Once the system has been delivered from industry, its acceptance is made easier by the presence of robust and testable requirements against which it can be assessed. A highly important factor with this approach is the feedback loop forming the completed ‘O’. This enables feedback on the fielded capability’s performance to be provided to inform the equipment programme and for subsequent planning of modifications to enable uplift from the originally delivered 80% capability.

‘FAST’ ACQUISITION

The combination of the five step road map approach, the five supporting pillars of activity, and the ‘O’ diagram methodology could provide the UK MoD acquisition community with the ability to deliver capability to the front line in a ‘FAST’ manner (Flexible, Agile, Streamlined and Through Life).

Figure 5 ties all of these elements together. It shows the delivery of the capability in epochs, each progressing the capability via feedback received from the previous delivery, and demonstrates how this approach can be used to inform both the capability and technology management plans.

Although this approach is aimed at the rapid, tailored and agile delivery of urgently required capability (e.g. UORs) it can also be used to inform the main equipment programme. As most of the technology development, and a majority of the current acquisition effort and funding, is being directed towards UORs is it not right that this should be fully capitalised on to inform and develop the longer term core programme? At present these two activities seem to be mostly de-coupled, although it could be argued that this is a function that the newly formed Programme Boards should be taking responsibility for.

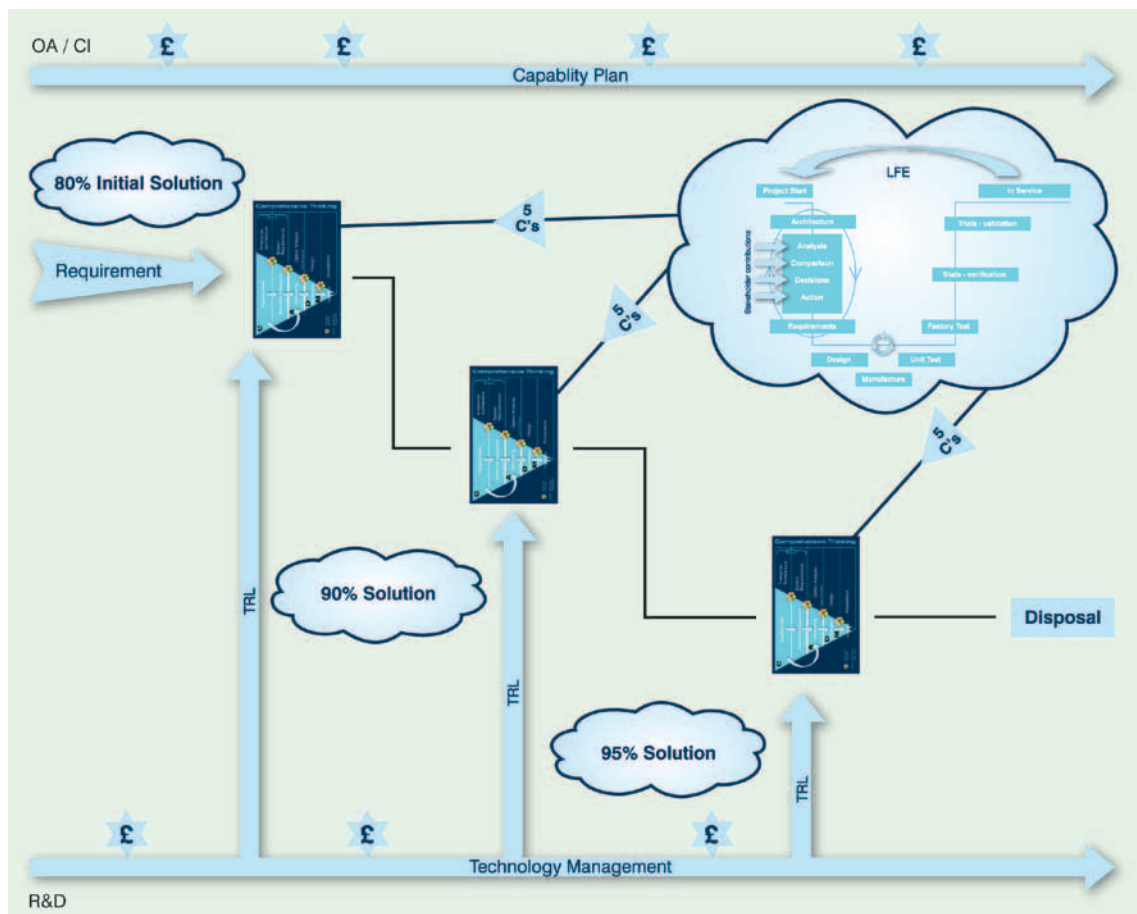


Figure 5 : the streamlined capability delivery approach

SUMMARY

This paper has discussed the ‘pitfalls’ of the current UK MoD acquisition process and has highlighted areas in which it is proposed that it can be improved to deliver greater effect, within the delivery of a capability, via a more rapid, agile and streamlined approach.

The AOF is seen to be an extremely useful and in-depth process, but not one that is believed to add significant value to the UOR programme, mainly due to its complex and sequential nature. The ‘FAST’ acquisition capability delivery model outlined in this paper provides the UK MoD acquisition community with a more streamlined, robust and holistic approach enabling the delivery of capability to rapidly enhance operational effect and helping to achieve the holy PCT trinity.



ABOUT THE PUBLISHER

BMT Group

BMT is an international design, engineering and risk management consultancy, working principally in the defence, energy and environment, marine risk and insurance, maritime transport and ports and logistics sectors.

BMT invests significantly in research. Its customers are served through a network of international subsidiary companies. The assets are held in beneficial ownership for its staff.

Website - www.bmt.org

Systems Engineering at BMT Defence Services

The capability of the defence environment is maintained through the interaction and collaboration of a complex series of systems. Success depends on performing the right activities at the right time in a simple, effective and cost-effective manner.

BMT Defence Services understands this completely and so we bring a structured and unbiased view to this complex world.

With systems engineering we understand that no two systems have the same set of objectives and so we combine innovation with our in-depth knowledge. This gives our customer confidence in our ability to deliver and maintain affordable, safe and capable systems.

When designing and maintaining capable Combat Systems, our unique whole-platform, whole-life perspective makes sure that our designs continue to work in harmony with platform and operational needs through life.

We develop, supply and support Information Systems that are tailor-made to our customer's requirement. Our awareness of our customer's procedures, organisation and information management needs helps us ensure our systems are both affordable and effective whilst complementing and enhancing their processes.

Website - www.bmtsystemsengineering.co.uk or www.bmtdsl.co.uk

Contact: Mark Stanton, Head of Systems - mstanton@bmtdsl.co.uk

Paper written by Stuart Olden.



COPYRIGHTS AND ACKNOWLEDGEMENTS

© BMT Defence Services Limited 2009. All trade and service marks are the property of their respective owners.

Diagrams and Ridgback image are the property of BMT Defence Services and should not be reproduced without prior permission. Mastiff image © Crown Copyright/MOD (Photograph supplied from www.photos.mod.uk and reproduced with the permission of the Controller of Her Majesty's Stationery Office).



“Where will our knowledge take you?”