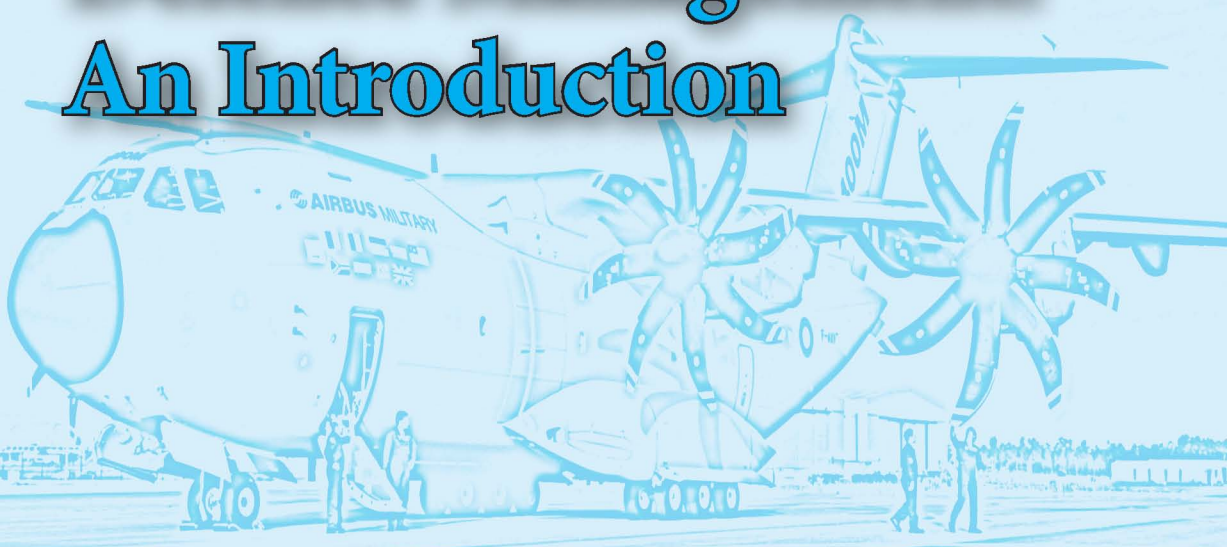
Defence Management: An Introduction



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Security and Defence Management Series no. 1

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Chapter 6

Acquisition Management

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Introduction

Acquisition is the process by which equipment and/or services sourced from external agencies are used in the building of effective military capability.[1] The external agencies are normally defence industry suppliers from whom the required equipment and/or services are procured through contractual arrangements that regulate the supply chain. 'Equipment' customarily refers to weapon systems or other warlike materiel; however, acquisition processes may also be used to obtain non-warlike materiel required by the defence establishment like office information systems or defence infrastructure. 'Services' means non-physical items that are nevertheless required in the building of military capability and may be externally sourced, for example various forms of consultancy, logistics support and training and education courses.

Although acquisition includes the activity of procurement, a term generally used to refer to the purchasing of goods and services by governments from external suppliers, it is a much broader discipline. Modern weapons systems are complex, expensive and will often remain in service for many years. Decisions made in the early phases of an acquisition project, in particular those which define what will actually be acquired, are likely to have significant downstream implications which, if they have not been anticipated and recognised in planning, may result in the overall failure of the project. Ac-

[1] Capability: "an operational outcome or effect that users of equipment need to achieve" (U.K. MoD Acquisition Management System Glossary, at www.ams.mod.uk).

quisition attempts to take account of this by adopting a whole life approach, which views the project as a single undertaking across its entire lifecycle from identification of need through to disposal. Acquisition thus involves activities for identifying the requirements for equipment and/or services to meet the needs of the user, procuring them, ensuring their support throughout their useful lifecycle and providing for their eventual disposal.

However, acquisition not only aims to provide equipment and/or services to meet user needs but also to ensure that defence budgets are wisely spent and that the equipment and/or services acquired thus represent value for money for the taxpayer. This obligation requires the acquisition manager to identify the most balanced trade-off between the performance required by the user, the cost of the project and the project timescale and thus to find acceptable solutions that address the tensions that frequently exist between these demands. In turn, this leads to a requirement for the overall acquisition process to be objective, disciplined and transparent. Furthermore, risk—the potential for unforeseen events with damaging consequences—is an unavoidable feature of the acquisition process; in fact, the complexity, expense, technological sophistication and long lifecycles of many weapon systems make acquisition one of the riskier peacetime tasks that defence establishments have to undertake and thus one of the most likely to benefit from shrewd management. Acquisition management thus involves the application of management techniques and processes with the aim of reducing project risks and helping to ensure that the right capability will be delivered when it is needed at an affordable price.

This chapter explores some of the issues involved in acquisition management. It sets acquisition management into its wider context by describing some of the processes that lead to the decision to launch a particular acquisition project, looks at the use of acquisition strategies as a means to choose how best to acquire equipment and/or services and to demonstrate these choices to stakeholders, and at acquisition cycles as a means for managing the project once launched.

Scope

While acquisition covers a wide range of disciplines and tasks, it can essentially be broken down into three broad areas of activity:

- Deciding what to acquire
- Deciding how to acquire it
- Acquiring it.

Deciding what to acquire, on the surface a simple task, is both far from trivial and key to the overall success of an acquisition project. Defence budgets, although usually among the larger components of public spending, are rarely sufficient to cover all de-

fence requirements and acquisition projects must be carefully prioritised in order to assemble an overall defence programme that is as comprehensive and as balanced as possible (and, of course, individual projects must be properly managed to ensure that they represent good value for money and an appropriate use of defence resources). Close examination of competing requirements and creative thinking about the means to address them are thus essential for successful acquisition; investment in these activities will help to reduce project risk and increase the overall chance of project success.[2]

Deciding how to acquire equipment and/or services is usually achieved through the preparation of an acquisition strategy, a formal document that records and justifies the various decisions taken. Once again, investment here will help to reduce risk and raise the chances of project success. The practice of actually acquiring the equipment and/or services, supporting them through their in-service life and eventually disposing of them is often broken down into a series of phases to make the overall task more manageable and to introduce points at which the project can be reviewed and decisions about its future taken. This is known as an acquisition cycle.

It should be noted here that these three areas of activity are interrelated and will not necessarily take place sequentially as their presentation in the form of a list suggests. As will be seen below, for example, there is much benefit in including activities aimed at identifying and clarifying what is to be acquired within the acquisition cycle itself.

Who Is Involved?

The successful conduct of the full range of activities included in the acquisition process will involve the employment of various disciplines and skills. Acquisition is usually too complex to be undertaken by single individuals, or even by groups of individuals, and the overall task will need to be shared amongst different sets of actors. There is no single right way to do this. Different defence establishments have chosen to divide up the process in different ways and among different actors. Nonetheless, there are broadly four categories of people—or stakeholders—involved.

Firstly, there are *those who decide upon the requirements* for the equipment and/or services to be acquired. Effective requirement setting does not take place in a single moment but over a period of time and study during which the requirement is gradually clarified and elaborated in greater detail. For example, an initially broad requirement for a capability to destroy a potential enemy's main battle tanks might, through exami-

[2] In this chapter, an acquisition *project* is set of activities aimed at providing equipment and/or services to meet agreed performance, cost and time targets, while the defence *programme* is the entire range of projects currently being executed or planned.

nation of the options available, be narrowed down to a requirement for a portable anti-tank missile system and eventually translated into a detailed specification describing the exact performance required. The task of implementing and managing this period of time and study—and thus defining the requirement—does not necessarily belong to a single agency, but can be transferred from one group to another as the study deepens (see 'Deciding what to acquire – establishing the requirement' below). However the task is allocated, one especially important stakeholder in this category is the user – the representative of the armed forces who is responsible for elaborating the requirement as seen by those who will eventually operate the equipment or make use of the services acquired. Clearly, the user has the expert knowledge of how military systems are employed in practice and, therefore, what sort of capability is required to prosecute a given military task. However, as will be seen, this does not necessarily make the user the best person to decide on equipment solutions to meet the capability requirement, or to manage the full acquisition process. The user community—the armed forces—will generally take the lead in the earlier stages of requirement setting but the later stages are often better handled by acquisition specialists. These form the second category of stakeholder.

Acquisition specialists will usually be responsible for managing the bulk of the acquisition project: specifying the detailed requirement, contracting with suppliers, ensuring delivery of the required equipment and/or services, managing through-life support and arranging for final disposal. Because acquisition can be very complex, many nations have found it beneficial to establish departments or agencies specifically tasked with this role and to cultivate acquisition management as a career specialisation. There are many advantages to this approach, which fosters the development and sharing of acquisition expertise on both an individual and a corporate basis, while freeing the user to concentrate on core military business. More than this, however, managing an acquisition project requires that financial responsibility—the obligation to spend public funds wisely—should be delegated to the acquisition manager and executed through the proper employment of the budget allocated to the project. This raises an important point of principle: that the user function is best separated from the financial function. This is because the user, for understandable and perfectly justifiable reasons, tends to seek out the best technical solution to a particular requirement, whereas the wider interest of the defence establishment, not to mention governments, parliaments and taxpayers, is that a balance is struck between equipping the armed forces as well as possible and the correct spending of public funds. This in turn requires that a more neutral actor—the acquisition manager—should be entrusted with selecting the best solution to resolve the tensions that sometimes exist between these two demands.

Acquisition itself involves many different sub-specialisations, such as requirements management, project management, risk management, administration, financial management, support management, quality management, safety management, reliability management, contract and legal issues and policy issues. A multidisciplinary project team, sometimes known as an Integrated Project Team (IPT) will thus often be formed under a project manager or acquisition manager to carry out an acquisition project. Most of this chapter is concerned with the role and activities of these acquisition specialists.

The third category of stakeholder is made up of *those who will oversee and scrutinise* acquisition projects, usually members of the defence establishment's senior leadership. The requirement for oversight does not arise because acquisition specialists cannot be trusted to carry out their work competently, but for wider reasons related to the overall management of defence. At the programme level, there is a need for independent oversight of the overall acquisition programme, a continual need for rebalancing that programme as priorities shift and as different projects reach different stages of maturity and a need to ensure that consistent standards are applied both within the acquisition programme and with the defence establishment's dealings with external agencies. These stakeholders also operate at the project level in delegating authority to the acquisition manager, setting project objectives and monitoring project performance. Finally, in addition to oversight and scrutiny, these stakeholders also often carry out important wider functions in enabling successful acquisition management, in particular in ensuring that project teams are provided with the right financial resources (by acting as the sponsors of the acquisition programme within the defence establishment) and the right mix of properly qualified people.

The final category of stakeholder is the *external agencies* that have the means to supply the equipment and/or services to be acquired. They will usually be private businesses but this category may also include other government agencies or other governments. The project will have a greater chance of success if the relationship between the defence establishment and these external agencies is a collaborative one, not a combative one, in which both sides recognise each others' capabilities and expectations.

Deciding What to Acquire – Establishing the Requirement

Weapon systems and other items of military equipment are hugely expensive and often very technologically complex. They take a great deal of time and effort to acquire and are likely to remain in service for many years, sometimes in a very different role from the one they were originally intended for. This is especially the case for platforms: many states continue to operate land, sea and air systems based on platforms purchased decades ago and upgraded to remain militarily useful today. The U.S. B-52

aircraft, which first entered service in 1955, and whose current generation of airframe will still be capable beyond 2040, is a striking example.[3] Few other purchasing organisations are required to handle projects on the scale and scope of those managed by defence acquisition specialists.

In addition, defence budgets are limited. It is highly unlikely that the resources available to equip a nation's armed forces will be sufficient to supply all, or even most, of the capability that would be useful in supporting the full range of its activities. This means that hard decisions need to be taken about what to include in the defence programme and what can be postponed or rejected. A related consideration is that as defence is a state funded activity, its acquisition programmes are subject to media, public and parliamentary attention; defence acquisition is visible to the outside world. This is as it should be, but it does mean that difficulties with defence projects can easily become political problems too.

For these reasons, it is not only essential that individual acquisition projects are effectively and carefully managed and that defence money is thus properly spent, but also that, as part of this process, every effort is made to ensure that sensible decisions about exactly what to acquire are made before large amounts of defence money are consumed. Mistakes made at the early stage of a project can saddle the armed forces for years with systems that are inadequate for their intended purposes or even of no use at all. They will remain idle or will require major financial outlays to put right later. It is far better to make sure from the start that what is acquired is what is required.

Where, then, does the requirement for new acquisition projects come from? Military tasks and defence planning assumptions are derived, at the strategic planning level, from defence policy and set out in general terms what the armed forces should be capable of achieving. Analysis of these will, in turn, lead to capability requirements and comparisons of these requirements with the existing capability inventory and will reveal capability shortfalls. Acquisition is the business of translating production capability and other forms of expertise available in external agencies into contributions that address these identified capability shortfalls. Capability shortfalls may thus arise for a number of reasons; among the most important:

- Policy has changed. New military tasks may be added, requiring new sets of capabilities. An example is the recent emphasis placed on expeditionary operations by NATO and European states, requiring their armed forces to be more flexible, deployable and sustainable.
- The threat has changed. New threats may arise or the character of an existing threat may change. If these threats are judged sufficiently serious to need

[3] United States Air Force, *B-52 Stratofortress Fact Sheet*, http://www.af.mil/factsheets/factsheet.asp?id=83.

to be actively countered by the preparation of military force, new sets of capabilities may also be required.

- Technology has advanced. Technological developments may create new and better ways of carrying out military tasks. (The converse of this is that technology development may make existing equipment obsolete).
- Doctrine has changed. While doctrine is defined on a state (or sometimes alliance) basis, armed forces will learn from each others' approaches to the application of military force and tend to evolve in similar directions. Doctrinal changes may also create new and better ways of carrying out military tasks, superseding old ways of doing business.

As budgetary constraints will make it impossible to address every capability shortfall that might arise—or even a small fraction of them—it is essential that they are examined calmly and logically in order that they can be properly prioritised. Defence policy and planning assumptions provide the starting points for this effort, but more often than not the guidance that such documents offer is vague and careful analysis is necessary to establish a balanced and effective defence programme. This has traditionally been done at the level of equipment types (tanks, aircraft, ships, artillery pieces) and has often led to decisions to pursue acquisition projects being taken for unsound reasons. It has frequently been assumed, for example, that an obsolete piece of equipment needs to be automatically replaced with a newer model, or that because potential enemies or allies have a particular piece of equipment then it should also be in the national inventory. These considerations may be valid but they will not always be so. Generally, assumptions of this nature constrain thinking and may lead to less than optimal decisions about what to acquire.

Recent trends towards capability-based planning have been helpful in forcing those who set requirements to think in broader terms and to consider other combinations of technical and doctrinal solutions to address shortfalls besides the immediately obvious one.[4] The principles of capability-based planning essentially oblige the requirements setter to return to basics when examining ways to address a capability shortfall. It should never be assumed that just because a particular military task has been traditionally carried out in a particular way that this is the only or the best way. The growing emphasis among western armies on peace support operations, for example, has led to

[4] Capability-based planning: "The outcome of such planning is not concrete weapons systems and manning levels, but a description of the tasks force structure units should be able to perform expressed in capability terms. Once the capability inventory is defined, the most cost-effective and efficient physical force unit options to implement these capabilities are derived." NATO Research and Technology Organisation, *Handbook on Long Term Defence Planning*, RTO-TR-069, AC/323(SAS-025)TP/41, April 2003, 4.

requirements for capabilities to enable rapid and sometimes long-range deployment. This should not automatically lead to decisions to modernise or expand the transport aircraft fleet, as other solutions may be more suitable – leased, hired or purchased ships, for example, or leasing arrangements with commercial air freight carriers. The point is that it is essential that a hard-headed look is taken at these ways of addressing the shortfall, perhaps supported by analytical methods and tools, before a particular equipment solution is arrived at; not least because traditional ways of doing business may be prohibitively expensive and the failure to consider creative and imaginative solutions to addressing a capability shortfall may result in it receiving a lower priority in the defence programme.

Many of these considerations are more properly considered under the headings of defence planning or force development, rather than acquisition, and the details of their implementation are thus beyond the scope of this chapter. Nonetheless, as discussed above, requirement setting is a process of gradual refinement which, at some point, should be turned over to the acquisition manager. States have adopted different solutions as to when this handover of responsibility should occur, which will in turn depend on the roles assigned by law or custom to the agencies involved. In general, though, detailed technical expertise exists to lesser and lesser degrees in the modern defence establishment and, where complex projects are concerned, there is often merit in seeking expertise from external agencies in the requirements' setting process itself, for example through the use of consultants. In recognition of this, many nations form acquisition teams—as the defence establishment's specialists in obtaining services from external agencies—at an earlier stage in the process and include a phase of 'project definition' as part of the acquisition cycle.

Whether or not this is the case, two further considerations are worth noting here. The first consideration is simply that there is great benefit in involving the acquisition manager as early as possible in the overall requirements setting process, both a source of advice as to what it is possible to acquire from the market and the options for doing so, and also in order that he or she should have as good an understanding as possible of the requirement as seen by the user.

The second consideration, which is related to the question of when the requirement setting process is handed from the user community to the acquisition team, is that it is important that the acquisition team should not be unnecessarily constrained in the exercise of its financial responsibilities by any requirements set by the user. The acquisition manager will be responsible for achieving the best possible deal from external agencies which, in most cases, will involve examining competing options to supply the equipment and/or services and examining possible trade-offs between performance, cost and project timescale. If the requirement is too specific, the full range of possible solutions may not be allowable and the acquisition manager will be forced to rule out

solutions which ought to be acceptable. Some common sense is needed in judging which requirements should or should not be allowed to constrain the acquisition manager but it is helpful to introduce in this context the distinction between user requirements and technical requirements. In simple terms, the former define what is properly of interest to the end user—they define what is to be done—while the latter define how a particular effect is to be achieved. Technical requirements will eventually be necessary for establishing and managing contracts with external agencies as they specify in detail what is to be delivered and thus provide the criteria for acceptance of the project deliverables. But if they are adopted at too early a stage, they will drive the acquisition project towards a particular technical solution. Other feasible and perhaps more effective solutions will have been discarded without consideration and the acquisition manager will not be able to say, with any honesty, that best value for money has been achieved. The definition of technical requirements should thus be left to a later stage in the project and should be the responsibility of the acquisition manager, rather than the user community.

It may be helpful to illustrate the point with an example. Suppose that the capability to protect a deployed infantry force from attacks from the air has been identified as a shortfall and that a man-portable air defence system has been selected as the best way to address this shortfall. The user requires, among other things, a certain level of confidence that aerial targets threatening the area in which the force is deployed can be destroyed. This suggests at least two user requirements: the size of the area to be protected and the level of confidence that a given set of targets will be destroyed. There may, however, be many technical solutions to this problem since different systems can be built from different combinations of equipment: radar systems with different detection ranges; missiles with various ranges and kill probabilities etc. If the user attempts to specify these technical parameters—how things are to be done—the acquisition project will be driven towards technical solutions which may not necessarily represent the best value for money.

Considerations of Performance, Cost and Timescale

The above discussion suggests that the identification of the preferred technical solution to the capability shortfall should be considered as part of the acquisition process itself and that the acquisition manager should be given sufficient freedom to investigate and evaluate the possible options for meeting the requirements established by the user. Frequently, this will mean choosing among options with very different levels of performance and great variations in cost. In addition, and especially when equipment and/or services are not being purchased ‘off the shelf’ the point at which they can be delivered into service (the project timescale) may also vary considerably.

These three factors—performance, cost and timescale—will usually be in some way dependent upon each other. It should be expected, for example, that equipment offering better performance—such as an armoured infantry fighting vehicle with a higher speed or a greater level of crew protection—is likely to be more expensive than its lower performance counterpart. But the natural temptation of defence establishments to buy the best available—and usually, therefore, the most expensive—is not necessarily the best choice; indeed, it may open the door to an acquisition disaster (for example, if equipment is procured, but there is no capability to properly support it). It will certainly absorb resources that might be put to better use elsewhere in the defence programme. Equally, the cheapest option, often the most attractive from the financial perspective, may not be the best. Other options may offer significant performance or timescale advantages for little additional investment. Instead of focusing on a single factor, the three need to be considered alongside each other in order to identify the solution that offers the best possible performance, acceptably close to the timescale required and at an acceptable cost. A certain amount of judgement is needed in this process of trading off, but the preferred solution will usually, but not always, be the cheapest of those that meets all the performance requirements.

It should be noted at this point that cost should be considered on a whole life basis. Historical experience has shown that the initial purchase price of a piece of equipment represents only a fraction of the total ownership costs and is therefore an insufficient basis for the comparison of competing options. A piece of equipment with a low purchase price, for example, may be unreliable and require greater maintenance and repair than an initially more expensive piece. Its lifecycle cost may thus be greater. A range of techniques is available for estimating lifecycle costs (or costs of ownership) and for deciding which elements should be attributed to the project.

Of the three factors, the one that the defence establishment will have greatest control over is performance. As this is likely to be a major driver of cost, it is essential that those responsible for setting requirements make an honest appraisal of what is required and that those requirements are also subject to independent scrutiny. Once again, there is natural temptation amongst those close to the project to want the best possible and to inflate (often unintentionally) the performance requirement. The wider interest of the defence establishment, however, is in seeing that enough performance is acquired to fill the capability shortfall but that this is done without consuming excessive resources that might be better used elsewhere. Performance requirements should thus be subject to close, objective questioning to confirm that they do really represent user needs. Where better performance is on offer, this will usually be at a higher price, and the requirements setter should be able to demonstrate why the additional performance is necessary. This is one of the drivers for establishing appropriate project review points at which decision makers will scrutinise the work conducted so far and

either authorise the project to continue or require a further round of study (see 'Acquiring it – acquisition cycles' below). A certain amount of judgement will be necessary here but it may also be worth considering investing in more sophisticated studies to establish requirements, for example using more formal requirement capture techniques or carrying out operational analysis. The acquisition team will need to consider whether investment at this early stage of the project can be justified on the grounds that money will be saved later due to a more realistic definition of the requirement.

Other forms of trade off may also be made between the various performance parameters of a military system and these too are likely to have an impact on cost and project timescale. For example, there may be a choice to be made between acquiring smaller numbers of more reliable equipment and larger numbers of less reliable equipment, both providing comparable levels of service. The point, once again, is that the acquisition team needs the freedom to investigate such trade offs and to decide on the optimal technical solution. They should not be limited by too closely defined specifications from the user community (or, rather, specifications defined in technical as opposed to user terms). In the example above, what the user actually requires is a certain level of equipment availability, rather than a fixed number of pieces of equipment.[5]

Finally, while this discussion has argued that acquisition specialists should be given the leading role in identifying the best technical solutions to address a capability shortfall, it should be emphasised that the acquisition team cannot be given full and unilateral jurisdiction in this area. Any performance trade-offs will need to be explained to and negotiated with the user. If there is a dispute over which factor should be given priority in selecting solutions, the issue will need to be put to higher authorities for decisions. This need not mean a confrontational relationship between users and acquisition specialists but some states have found it useful to regulate the dealings between the two communities by defining a form of customer-supplier relationship between them.

Project Affordability

What has been described so far is a steady process of study and analysis which gradually leads to firmer decisions about what should be acquired. At the highest level, defence policy will decide which tasks the armed forces should pursue, capability analysis will then examine various ways of meeting these tasks and select the most appropriate, and the user will describe broad requirements for a particular type of

[5] "The ability of an item to be in a state to perform a required function under given conditions at a given instant of time or over a given time interval, assuming that the required external resources are provided." North Atlantic Treaty Organisation, *NATO R&M Terminology Applicable to ARMPs*, ARMP-7 (Edition 1), July 2001, 2-1.

equipment and/or service. This process, repeated across the range of capability shortfalls and prioritised, will allow the construction of an overall long-term defence programme – a plan for the development of the armed forces, typically over a period of ten to twenty years, setting out the manpower and equipment solutions to address the overall capability requirements. The programme will be more concrete in its earlier years, when particular equipment solutions are likely already to have been selected, but more provisional in later years, for which the range of options has yet to be fully analysed and reduced. These considerations cannot take place without parallel considerations of the costs involved. Hand in hand with the defence programme, therefore, will be a financial plan, covering the same time period and providing cost data for each of the items in the programme. Cost data too will be more accurate for the early years of the plan and more tentative in later years.

The financial plan is necessary to be able to demonstrate that individual projects are affordable. That is, that the whole life costs of the project can be accommodated within the overall future plans for both defence expenditure and manpower. It is thus a measure of the practicality or credibility of the project as a component of the future defence programme. As such, affordability cannot be assessed by acquisition managers who see the details only of their own projects (although their inputs will provide the raw data) but by defence planners, who have visibility of the full extent of the defence programme.

Affordability is an aspect of the project that requires regular review. As projects mature, so the accuracy of estimates of their lifecycle costs will improve. At the same time, the defence programme will inevitably change, priorities within it will shift and projects will need to be justified against the new overall context. This is another reason why projects should have regular, scheduled and formal reviews, which are normally built into the acquisition cycle (see 'Acquiring it – acquisition cycles' below) and undertaken by independent scrutineers.

It should also be noted that affordability needs to be assessed at every point in the full project lifecycle. Project spend profiles are not flat with equal sums being spent in each of the years of the lifecycle. There will be expenditure peaks and troughs and, similarly, peaks and troughs in manning requirements. This process of forward financial planning requires planners to ensure that the consequences of decisions on the content of the programme are projected into the future – in other words, that the whole life costs of a project are considered alongside its initial purchase costs. The consequences of these budget variations with time need to be managed, requiring affordability assessments to consider not just whether resources are within the current budget but also that long term financial and manning aspects are addressed.

Affordability is clearly one of the key assessments to be made in the decision as to whether to launch or continue a project. But as well as being convinced that a project

is affordable, decision makers will want to be convinced that it will be well run – they will want to see an acquisition strategy that promises a good chance of project success.

Deciding How to Acquire It – Acquisition Strategies

An acquisition strategy is a description of *how* the required capability is to be acquired. It has at least three purposes. Firstly, there are many routes to acquire equipment and/or services and the requirement to produce an acquisition strategy forces the acquisition manager to consider the range of options available and to justify his or her choices – he or she will need to think deeply about the possible acquisition approaches and to weigh their advantages and disadvantages with respect to the particular capability being acquired. This discipline will lead to better confidence in the eventual choices. Secondly, an acquisition strategy provides a reference document for the duration of the project, which may be long and see several turnovers in staff. Thirdly, an acquisition strategy provides evidence to scrutineers that the project will be properly run and deserves inclusion in the defence programme. For example, that it follows any legal requirements for public procurement, that it will achieve value for money and that project risks have been reduced to an acceptable level. For these reasons, it is usual that acquisition strategies take the form of formal documents written to an agreed structure (which will also act as a checklist to ensure that the acquisition manager has addressed the full range of considerations necessary for a successful acquisition).

Acquisition strategies should be regarded as living documents. Many of their elements will evolve as the project progresses and different aspects are given different emphasis. They should thus be subject to regular review, updating and agreement. While they will differ for different project types, and while different states will divide up the overall strategy in different ways, their basic features will be common. Aside from background material to explain the project and set the strategy in its wider context, the start point is usually for the acquisition team to decide upon, describe and justify an overall acquisition option. There are many ways to acquire the equipment and/or services to address a capability shortfall and the preferred acquisition option can be arrived at by considering the problem from several viewpoints. These might include:

- *Does new equipment need to be procured?* Certain equipment types may be available for lease, rather than purchase and a calculation of lifecycle costs (and consideration of the wider issues) might suggest that leasing offers a better long-term solution to meeting the requirement. For example, many states have elected to lease fleets of commercially available vehicles for staff cars and other general peacetime transportation purposes. Where these options are not available, the purchase of new equipment and/or services

should not automatically be assumed as the only, or the best way to address the capability shortfall. Modification of existing equipment (either from the state inventory or sourced from abroad) and accepting donated equipment should be considered alongside options such as off-the-shelf purchase and new development. Generally, though, these options will only be available in a minority of cases and defence acquisition will involve the procurement of new equipment and/or services.

- *Is the equipment/service available off-the-shelf, or does it need to be developed?* Addressing a capability shortfall by developing equipment to meet the precise requirement has several advantages, most importantly that the user will get exactly what he needs (or, at least, thinks that he needs). There may also be occasions when this is the only option available – when the required technology does not exist, for example, as is often the case when cutting edge science is to be applied for military purposes. But development of military equipment is generally an expensive and risky business, and projects of this nature are available to only a few states – usually those with their own defence industries. Most states will be in the business of choosing from the various systems available on the market, either as Commercial off-the-shelf (COTS) or Military off-the-shelf (MOTS) products. Because these systems have been developed to meet the needs of the original customer, a COTS/MOTS acquisition will usually involve compromising on one's own requirement in one way or another. On the other hand, the equipment and/or services will normally have a track record of in-service use, problems will have been ironed out and there will be demonstrated levels of performance. Further, development costs will already have been accounted for making the product cheaper and the existence of a proven design will make the product available within a shorter timeframe. These advantages also make COTS/MOTS acquisition attractive to states that have traditionally developed weapon systems, especially in fields such as Information Technology, and many of these states now encourage this type of project. It is important to note, however, that even COTS/MOTS acquisitions will usually involve a small amount of limited development work, which must be accounted for in project risk assessments. Examples might include the acquisition of services, which will almost always be tailored to an individual customer's needs, and the integration work needed to ensure that systems sourced from different manufacturers will work together (for example, the sensors, shooters and command and control equipment that make up many defence systems).
- *What is the scope of the acquisition?* The acquisition strategy should also decide, in broad terms, what is to be acquired. The sensors, shooters and com-

mand and control system above, for example, could be treated as three separate acquisition projects, with the acquisition team and end user responsible for their integration into the complete system. It is more usual in current practice and consistent with best practice in systems engineering, however, to transfer responsibility for the production of the whole system to a prime contractor, who will be required to contract with sub-contractors and to deliver the equipment or services to specification, cost and time. Another aspect of the scope question is the consideration of which, if any, support elements should be included in the project. When acquiring a complex defence system, it may also be worth acquiring support elements such as spares, technical and maintenance support and a training programme (or at least a 'train the trainers' programme) as part of an overall package.

- *Are the required equipment and/or services available from more than one supplier?* Where more than one supplier is able to provide the required equipment and/or services, cost, performance and timescale comparisons of the available solutions and selection of the most suitable option will usually be best achieved by running an acquisition competition. The competition process, which involves inviting interested parties to make offers against a set of requirements, evaluating these offers and selecting a winner (see 'Competitive acquisition' below) is widely considered to be a key means of ensuring best value for money in public procurement and is thus an integral element of many states' procurement policies. Where competition is not possible, or has been ruled out, efforts should still be made to ensure that best value for money is achieved. It may be possible, for example, to encourage competition at the sub-contract level, to divide the project into phases, some of which may be competed, or to provide incentives to the contractor to keep costs down through appropriate pricing arrangements (see below). In situations where a competition is not possible, the acquisition team will, in any case, need to decide on the minimum terms it considers acceptable—in particular, price—and to be prepared to refuse a contract unless these can be met.
- *Are other states interested in a similar acquisition project?* When other states have similar requirements, it may be possible to conduct an international acquisition project. This is also likely to mean compromising one's own requirements; on the other hand, project costs are shared with other nations and economies of scale are likely to result in cheaper unit prices for the goods and/or services thus acquired.
- *Does the capability need to be acquired in one go?* Spreading the acquisition over several sequential sub-projects (evolutionary or incremental acquisition)

has advantages in reducing risk, especially for projects involving development work, and in profiling the project budget.

Taken together, these considerations will allow the acquisition team to determine an overall acquisition option, which can be justified and documented in the acquisition strategy. They might, for example, decide to lease equipment from a single supplier, or to run a competition to select the most suitable COTS solution to meet the requirement. Once this overall decision has been reached, the team will need to consider how to implement this option, once again justifying and recording their decisions in the acquisition strategy. Their considerations might include:

- Project structure: How will the project be divided over time, what is to be achieved in each phase, and where are the key decision points? This will often be done with reference to an acquisition cycle (see 'Acquiring it – acquisition cycles' below).
- Management structure: How will the project team be organised to manage the acquisition? What specific expertise will be required, and when? How, and how frequently, will the team interface with the supplier?
- Pricing: How will the supplier be paid? There are essentially two choices: paying an agreed price for the delivery of an agreed set of equipment or services (*fixed* or *firm* pricing arrangements) or covering the costs incurred by the supplier, plus an agreed amount for profit (*cost plus* pricing arrangements).[6] The former are more common today, especially for COTS/MOTS acquisitions, and have the advantages of predictability and encouraging suppliers to reduce costs. The latter might be required in projects that involve a large amount of risk and unpredictability—usually those involving substantial development efforts—which the supplier is unwilling to bear alone. Various hybrid forms of pricing, which reduce the supplier's financial risk but nonetheless provide incentives to keep costs down, may be useful in such circumstances.[7]
- Payment arrangements: When will the supplier be paid? The long duration of many acquisition projects means that suppliers will often request stage payments in advance of final project completion. In these cases, a helpful management technique is to associate payments with project milestones, such that the supplier will need to have achieved demonstrable project progress in

[6] Firm prices, once agreed, do not vary in any way. With fixed price arrangements, a basic sum is agreed but allowed to vary according to agreed formulae with variations in economic conditions, for example inflation or international exchange rates.

[7] Hybrid pricing arrangements might include, for example, fixed profit sums regardless of cost, or target costs with associated formulae for calculating profit.

order to earn a payment. These milestones and the conditions for payment will need to be identified and documented.

- Support strategy: How will equipment be supported through its in-service life? The identification of effective and integrated support solutions at an early stage of the project is a key element in calculating lifecycle costs and thus establishing that a project represents good value for money. A support strategy should consider both issues of logistics support during operational use and more routine peacetime issues such as repair and maintenance.
- Risk management: What are the main risks to the project and how will these be managed? A risk plan will identify the main risks to the product, usually by assessing the likelihood of their occurrence and their impact should they occur, and propose measures to mitigate them (see 'Risk management' below). As with the wider acquisition strategy, the requirement to develop a risk management plan forces the acquisition team to think in advance about problems that may jeopardise the project's performance, cost and timescale parameters and to propose ways to deal with them (some of these proposals, for example the inclusion of additional project phases or contract terms that seek to transfer the management of risk to the supplier, will also be reflected elsewhere in the acquisition strategy). That project risks are within acceptable bounds is likely to be a factor of key interest to project scrutineers and a major consideration in their decision as to whether or not to allow a project to advance.
- Government furnished assets: What government furnished assets are required and how will their provision be managed? While the supplier will be responsible for managing the majority of the project resources, most acquisition projects will also require resources from the defence establishment. This might be in the form, for example, of information that is necessary for the project to proceed, existing equipment that is to be integrated with the new supply, infrastructure, or range facilities for testing weapons. Collectively these are known as Government furnished assets and, since they are the responsibility of the acquisition team to provide to the supplier, deserve special management attention. On a similar theme, there may be other projects in the defence programme that will provide capability related to that of the project under consideration (for example, the acquisition of a new ship may be related to a project to upgrade harbour facilities); any links with these projects will also need to be recognised in the acquisition strategy.
- Offset: Few states have extensive domestic defence industries and must therefore acquire defence equipment and/or services from foreign suppliers.

Offset refers to transactions negotiated in parallel with the procurement contract which are intended to compensate the domestic market in some way for this need to acquire from abroad. Many states require defence suppliers to identify and implement offset arrangements as a condition of being awarded a procurement contract; the offset proposals thus need to be developed and assessed alongside the main acquisition proposals. Offset may take many forms ranging from direct participation of the acquiring state's industries in the acquisition project (for example, shared development work or licensed manufacture), through the organisation of contracts by the supplier for other equipment and services in the acquiring state's defence or other high-technology industries, to the organisation of contracts in entirely unrelated fields (indirect offset). The requirement to include offset arrangements as part of an acquisition project is usually set out in state legislation or regulations and will thus not be the acquisition team's decision. Similarly, such regulations will often specify the type of offset required (or, at least, preferred), the minimum value of the offset project(s), usually expressed as a percentage of the value of the acquisition project, and the broad criteria for assessing the offset project(s) as part of the overall assessment and selection of suppliers. Nonetheless, the acquisition strategy will need to recognise offset as a feature of the overall project and explain the details of any offset requirement and how the interface between the acquisition and offset projects will be managed.

- Miscellaneous technical considerations: A range of other, more technical considerations will also often be necessary in the acquisition strategy. These might include: the quality assurance arrangements for the project; any environmental or safety issues that need to be addressed (often these will arise from state legislation); security considerations; management measures that are necessary to ensure that the equipment and/or services have met the specified requirements (for example, a testing and acceptance strategy); and arrangements for dealing with intellectual property.

In short, the acquisition strategy should be a comprehensive document that sets out in some detail how a particular acquisition project will be executed. The defence market is very varied and constantly changing and just because a project has succeeded in the past is no guarantee that the same approach will be successful in the future, or that an approach that has succeeded in one project can be translated to a second. It is, therefore, good discipline to go back to first principles and to require that an acquisition strategy is prepared for all new projects (drawing appropriate lessons from previous projects). It is also important that acquisition strategies (and other acquisition management approaches) are prepared and followed for even the smallest pro-

jects, although clearly some common sense is required in these cases to decide on the level of detail to include.

Competitive Acquisition

The need to achieve and demonstrate best value for money in defence acquisition usually demands that possible solutions to the user requirement should be compared and a preferred solution selected from the range of equipment and/or services (or proposals for developing them) available on the market. The most efficient, honest and transparent way to make this comparison is to run an acquisition competition. Competition is widely used in public procurement and is mandated by laws or regulations in many states. However, the process is time consuming and requires some effort on the part of the acquisition team. It thus requires a certain amount of forward planning and there will be occasions when the likely benefits of competition will be outweighed by the time and effort involved (this should not simply be assumed but demonstrated in the acquisition strategy).

The start point for any competition is to communicate the requirement to potential suppliers and to request their proposals for meeting it. This is usually done by issuing a formal *invitation to tender* or *request for proposals* to prospective suppliers. The format of these documents will vary but they will typically include a specification of the requirement to be met and instructions for how the response is to be prepared (such as the required content and format, instructions for delivery and the closing date). There is no need to invite every potential supplier to make a proposal but the grounds for excluding certain suppliers must, in the interests of fairness and honesty, be made clear. Soliciting expressions of interest and applying appropriate qualification criteria, perhaps through a formal pre-competition round, are means of avoiding problems at this stage. It is also important that every supplier who is invited to make a proposal is broadly capable of meeting the requirement; in other words, the competition must be a genuine one, not simply one run for the sake of appearances and in the expectation that one particular supplier will win.

There will then follow a period of time for the tenderers to make their proposals. Again, the format will vary but the acquisition team should require that tender responses contain at least technical proposals to meet the capability shortfall, a proposed project timescale and an offer price. Other information that might be useful would include material to support the tenderer's claim to be competent to fulfil the project requirements (such as company track record and qualifications of key project personnel) and material to demonstrate that the project will be well run (such as a draft project plan, project management structure and project risk assessment). It should be noted, however, that tender preparation is a costly and time consuming business and the acquisition team should restrict its requirement for information only to those items

that will actually be used in assessing the tender and assisting in contractor selection. It is usual, at this stage, to allow tenderers to approach the acquisition team with questions to clarify the requirements set out in the invitation documents; in this case, in order to ensure that the competition is fair, it is important that the same information is given to all the tenderers. As a general rule, the acquisition team needs to be certain that it treats all potential tenderers equally.

Once the closing date has passed, the received bids can be evaluated by the acquisition team and other interested parties. Again, in the interests of fairness, this should be a reasonably formal and structured process. The acquisition team will certainly need to have decided in advance the evaluation criteria they will use and apply these in an even-handed way to all offers. Formal evaluation schemes and numerical scoring methods are useful approaches to ensure objectivity and evenhandedness. As has already been noted, the preferred solution will usually be the cheapest offer that meets all technical requirements, but there will be value for money exceptions, for example when one tender offers significant performance advantages for little extra cost.

If there is a clear winner, the acquisition team can proceed to contract. Where it is difficult to make a choice between two or more bids, a second round of tendering may be initiated among these by inviting 'best and final offers' which will be evaluated in a similar manner to the original tender. The heart of the contract will be the proposals made in the winning tender, amended as necessary through post-tender negotiation between the acquisition team and supplier (in other words, the supplier will be contractually bound to its tender proposal). Post-tender negotiations may be used to make minor changes to the proposals in the winning tender; they should not be used to allow a favoured supplier to substantially change its proposals to achieve a closer match with the requirement and thus gain an unfair advantage over other tenderers. In addition to the tender proposal, which describes how the supplier will meet the project requirement, the contract will also contain commercial terms to regulate the customer-supplier relationship. The substance of these terms will depend on the legal system used by the defence establishment; many states have developed a standard set of contract terms which are used as the basis for drawing up individual contracts.[8]

[8] For example, a useful set of standard contract clauses for defence acquisition projects, which may be adapted for national purposes, has been developed by a NATO working group: NATO Group on Acquisition Practices (AC/313), *Guidelines on Contractual Terms for Cooperative Programmes (AACP-2)*, September 1994, www.nato.int/structur/AC/313/intro.htm.

Risk Management

The use of risk management techniques within an acquisition project is a response to the recognition that events are likely to arise that would threaten its performance cost and timescale targets and that the chances of project success are improved if these (or similar) events, along with measures to handle them should they occur, can be identified in advance. The size and complexity of defence projects makes them especially prone to risk and the step-by-step acquisition approach of an acquisition cycle can be viewed as a mechanism for helping to ensure that risks have been reduced to an appropriately low level before the project is allowed to proceed to the next phase.

Risk management is the process of identifying project risks, assessing their importance and planning how they will be dealt with. Risks to defence projects can come from many sources, from both within the defence establishment (internal risk) and from suppliers or potential suppliers and other external sources (external risk). Sources of internal risk might include changes to the user requirement, shifting defence priorities threatening the project's affordability and changes in government bringing political threats to the project. Sources of external risk might include supplier financial difficulties, technological immaturity and the consequent inability to deliver to specification and exchange rate fluctuations leading to higher project costs. Identifying and cataloguing these risks is the starting point of risk management. Useful techniques to help identify the full range of project risks include drawing on past experience from similar projects, brainstorming, scenario analysis and the use of project plans as a basis for methodical analysis.

Assessing the importance of each of these risks is usually done by judging the probability that they will occur and the impact on cost, time and performance should they do so. This can be done both qualitatively (using, for example, terms such as 'high,' 'medium' and 'low') or quantitatively, through the application of a suitable numerical scoring scale. Risk is defined as the product of probability of occurrence and impact, the calculation of which allows risks to be compared against each other and prioritised; higher risks need to be given greater management attention. It is clearly easier to perform these calculations and make sense of the results using a quantitative method, which implies the need for a standardised set of definitions to assist with risk quantification (for example, impact on timescale might be scored from 1 to 5 according to a scale expressing expected delays to the project from 1 month to 12 months).

Plans for dealing with risk usually take one of four forms, the suitability of which should be assessed for each identified risk.[9] Firstly, risks might be mitigated through

[9] A useful acronym for these four forms is CAAT – Control, Avoid, Assume, Transfer. Department of Defense Defense Acquisition University, *Risk Management Guide for DoD Acquisition*, Fifth Edition (Version 2.0), June 2003, 21.

positive actions aimed at reducing either their likelihood of occurrence, or the impact should they occur. For example, if there is a risk that user requirements might change after the project has gone to contract, a study to clarify them might be inserted into the acquisition cycle. Secondly, risks may be simply removed by following other plans. For example, if there is a high risk that technology will not be sufficiently mature and the project will fail to deliver within budget and timescale limits, a solution involving a more mature technology might be chosen instead. Thirdly, risks might be accepted. This will often be the case for smaller risks, or those that are so large that other management actions would be impractical or prohibitively expensive. Finally, risks may be transferred to another party. This might be the supplier, for example a prime contract arrangement when the prime contractor accepts the risks of aspects of the project such as dealing with sub-contractors or systems integration, or a third party, usually through insurance. It should be noted, however, that transferring risk will usually involve a premium and that while the management of risk may be transferred to another party, the ultimate consequences of a risk arising—an inability to meet the user requirement within time and cost targets—will remain with the defence establishment.

The result of this process will produce a risk plan – a documented strategy which identifies possible risks, assesses their seriousness and outlines the way in which they will be handled should they arise. The risk plan should be treated as a living document, subject to update and revision as the project matures. Overall, the project's risk level should be steadily reduced as the project proceeds, although new risks will inevitably be identified as the ongoing project reveals more details about the nature of the equipment and/or services to be acquired.

Two final points should be noted. The first is that the identification and management of risk should be seen in a positive light. Problems within a project are inevitable and the earlier they are identified and plans are put in place to deal with them, the more likely it is that the project will succeed. It is important, therefore, that a culture is developed which encourages risk management, rather than one which equates project risks with project flaws.

The second point is that risk has a converse – opportunity. As well as unforeseen events with the potential to damage the project, it is possible that events may arise that will have a positive impact on the project as long as the opportunity is seized in a timely manner. Capturing the likelihood and impact of possible opportunities allows the acquisition team to decide also how these would be handled and puts the team in a strong position to capitalise on any short-lived opportunities that may arise.

Acquiring It – Acquisition Cycles

Introduction

Acquisition cycles provide a structure to manage the acquisition process from the initiation of the project through to the final disposal of project equipment or the termination of project services. They thus support a whole life or 'cradle to grave' approach. They do so by breaking down the overall lifecycle into a series of smaller stages or phases, each of which will be a more manageable piece of work than the overall project. Each phase will include certain defined acquisition processes and require certain outputs or products. Examples from the defence sector include the U.S. Defense Acquisition System[10] and the U.K. CADMID[11] cycle, but there are also many examples from the private sector and from other parts of the public sector.

An acquisition cycle is thus a management framework that attempts to guide the acquisition team through the complex processes of acquisition by capturing lessons from previous experience and established best practice in a set of formal procedures. It also enforces a discipline on the acquisition team that ensures that key issues and questions are addressed in sufficient depth to allow for project success. Further, an acquisition cycle ensures that opportunities are available throughout the project, usually at the end of each project phase, to scrutineers in senior management to review progress and take decisions as to whether a project should be allowed to proceed from one phase to the next. The overall objective of approaching acquisition in this way is simply to provide for a better chance of project success, such that capability shortfalls will be filled with the right equipment, at the right time and cost, and that risk in the acquisition process will be reduced. It should be noted, however, that defence acquisition will remain a complex business, even within the structured framework provided by an acquisition cycle; the design and employment of an acquisition cycle should be seen as a complement to, not a substitute for, skilled acquisition management.

The emphasis of acquisition cycles on the complete project lifecycle reflects the principle that the long-term implications of possible capability solutions—in particular their lifecycle costs—should be taken into account as part of the initial acquisition decision. A whole life approach also means that problems that might otherwise arise later in the project can often be avoided by early investment in the identification and mitiga-

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[10] See United States Department of Defense Directive 5000.1, *The Defense Acquisition System*, May 12, 2003 and United States Department of Defense Instruction 5000.2, *Operation of the Defense Acquisition System*, May 12, 2003.

[11] The acronym is derived from the names of the cycle's six phases: Concept; Assessment; Demonstration; Manufacture; In-service; Disposal. For further details, see the CADMID sections of the Acquisition Management System at www.ams.mod.uk.

tion of project risks. Most contemporary acquisition cycles thus pay particular attention—and devote significant resources—to the early phases of the lifecycle, when possible solutions to capability shortfalls are being evaluated. Under CADMID, for example, the U.K. sets a targets figure of up to 15% of the total procurement costs to be invested during the first two phases of the cycle, the majority of which would be expected to be spent on de-risking.[12]

The overall acquisition process may be divided in any number of ways and individual states have adopted different solutions depending on the characteristics of the acquisition projects they tend to follow. Those few states that develop military equipment, for example, are more likely to adopt acquisition cycles in which development work is treated as a separate project phase; development is a risky business requiring close management attention. Clearly there is less need for this approach in a state that tends to buy its equipment off-the-shelf when development activities will be minimal. A generic acquisition cycle, however, might be considered to include four broad areas of activity, suggesting at least four project phases: defining the equipment and/or services to be acquired, obtaining them, making use of them and disposing of them. These areas are discussed further below.

Defining the Equipment and/or Services to Be Acquired

As has already been noted, deciding what to acquire usually consists of a process of steady refinement in which the various solutions available are studied; and that at some point, responsibility for this process should be handed from the user community to the acquisition community. The point at which this takes place will vary and there is benefit in both communities being involved and working together for a period around the transition; however, it has also been argued above that it is good practice for the acquisition community to decide what equipment and/or services should be acquired according to the overall requirements set out by the user. The activities that define the equipment and/or services might include establishing the requirement for the project, examining conceptual options and choosing a solution defining the requirements for the equipment and/or services in sufficient detail to be communicated to suppliers. Decisions taken at this stage of the project will commit significant project resources; it may thus be wise to break these activities down into two or more project phases, providing review and control points for senior leadership.

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[12] U.K. MoD Investment Appraisals Board Secretariat, *Smart Approvals Guidance*, Version 9.1, June 2005, 'Main Gate' – page 1. The first two phases of the CADMID cycle are 'Concept,' in which options for addressing a capability shortfall are identified, and 'Assessment,' in which they are examined in greater detail and one selected to take forward.

The starting point for these activities is an agreed statement, which formally captures and documents the user's requirements for the equipment and/or services.[13] A range of concepts for how the required capability might be provided to meet these requirements can then be identified and preliminary studies of aspects such as how the capability can be expected to perform in operational conditions, the availability of technology and estimated project timescales and costs can be carried out. At this point, possible trade offs between these aspects can also be considered. The concepts can thus be evaluated and, if necessary, reduced to a more manageable number. At this early stage, the work is most likely to be in the form of paper studies, drawing on the technical and military judgement of the users and project team, or contractors. However, high level operational analysis and applied research and technology resources might also be used to assist with the assessment. It is important, in order to be confident that the eventual choice represents good value for money, that a wide range of possible solutions is evaluated and that creative and imaginative solutions are encouraged. It is also necessary to give parallel consideration to possible acquisition strategies, since these too will be important factors in the selection of the preferred option.

Studies of this nature, which might take place over several iterations at increasing levels of detail and sophistication, will allow the project team to narrow down the concepts that might feasibly address the shortfall and eventually lead to the selection of a single technical option.[14] This should represent the most balanced trade-off among the possible solutions. As such, it might require modifications to the original user requirement (in cases where, for example, high performance requirements suggest that the overall project will not be affordable). These will need to be negotiated and agreed with the user.

It is at this point that the requirement needs to be expressed in a more technical form as the basis for contracting with potential suppliers. Usually this will be in the form of a system specification – a clear and unambiguous statement which contains enough information, in the form of technical requirements, to allow potential suppliers to pro-

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[13] As discussed earlier, user requirements should define those things that are of interest to the end user. They will thus normally take the form of functional requirements (they will define *what* is to be done, not *how* it is to be done) each with appropriate measures (for example, how much, where, for how long); they should not drive the subsequent acquisition activity towards a particular technical solution or prevent the acquisition team from considering trade-offs.

[14] For complex and expensive projects, it might, for example, be appropriate to carry out more detailed systems modelling and analysis, applied research and technology work, or technical demonstration projects. Enough work needs to be done in enough detail in order that the acquisition team can be confident in the decisions taken and confident that risks have been reduced to manageable levels to allow the project to proceed.

pose a solution. However, just as user requirements should be written in a way that they do not drive the subsequent acquisition, so the technical requirement prepared at this stage should not constrain the potential suppliers from offering their own solutions to meeting the requirement. Technical requirements, like user requirements, should be written in terms of what is to be done, and the basis on which it will be accepted, not how it is to be done.

Returning to the example given earlier, we had established that the future users of the man-portable air defence system had identified a set of requirements, which included the size of the area to be protected and the level of confidence that a given set of targets would be destroyed. The technical requirements might define how these user requirements would be measured, the testing or other evidence that would be necessary to demonstrate that the user requirements had been met and the technical standards (for example ISO, Mil-Std) to be applied. As the term system specification suggests, requirements should be specified at the level of the overall system, not the sub-systems (such as radars, missile launchers and command and control systems). The statement of technical requirements should thus not mandate technical parameters such as radar ranges or missile kill probabilities, which would drive the potential supplier towards a particular equipment solution. There are two reasons for this. Firstly, the expertise and knowledge required to make the necessary technical trade-offs to achieve best value for money is more likely to reside with the suppliers than with the defence establishment. Secondly, if the overall system fails to perform as required, it will be very difficult to hold the supplier liable if he has been required to adopt certain technical parameters and not been allowed a free hand in the system design.

Obtaining the Equipment and/or Services

The content of this area of activity will depend on the nature of the project and the chosen acquisition strategy. It might, for example, include some or all of: development activities (the creation of new equipment and/or services to meet the system requirements); the manufacture to order of equipment or the design and creation of service programmes; the procurement of COTS or MOTS products; delivery; and acceptance testing. This area might also thus be broken down into two or more project phases if the complexity of the project suggests that a steadier approach to risk reduction would be useful or that additional management decision points would be wise.

Whatever the nature of the project, however, a key activity in this area will be the selection of the supplier. Some projects will be based around a single supplier; in many cases though, there will be a number of potential suppliers and supplier selection will be achieved through some sort of competition. The technical requirement will need to be communicated to potential suppliers, usually through the issue of an Invitation for Tender or Request for Proposals, the responses of tenderers assessed, a sup-

plier chosen and a contract concluded (see 'Competitive acquisition' above). This area of activity would conclude with the acceptance of the equipment and/or services into military service, according to criteria established in the contract.

Employment of the Equipment and/or Services

This area of activity frequently consumes the largest percentage of the overall project resources, highlighting the importance of taking account of whole life analysis—in particular, lifecycle costing—in the earlier stages of the project. During this part of the project the equipment and/or services will be employed in military service. Activities in this area that fall under the remit of acquisition management might include the consumption of services, the purchase and consumption of spares and consumables and the maintenance of equipment (which may, in whole or part, be a service under the contract), and, usually for equipment developed to meet a requirement, the demonstration of reliability as part of the project's acceptance criteria.

A further key aspect of this area of activity may be the upgrade of equipment as requirements change. Upgrade packages can effectively be considered as smaller projects in their own right and should be handled in a similar way.

Disposal of Equipment and Termination of Services

The final area of activity concerns the conclusion of the project and will involve the disposal phase of the equipment and the termination of services. Termination of services is relatively straightforward and is dealt with according to the terms established in the project contract. The disposal of physical equipment is also relatively straightforward but may involve costs (particularly as environmental concerns may require responsible disposal) or even revenue (for example from sale of equipment, the recovery of waste products for sale, or the retrieval of spares). The point, once again, is that these possibilities need to be considered in advance and built into the overall acquisition strategy.

This is also a useful time to compile an appraisal of the project and its acquisition management lessons (it is good practice to document these as the project proceeds rather than to try to write them at the project's conclusion when much time may have passed and personnel changed). A robust 'lessons learned' process will assist future projects and prevent similar mistakes being made, ensure that acquisition procedures are comprehensive and up to date and contribute to the development of best practice. Undoubtedly, for this process to be successful, it is important that the senior leadership encourages a culture of honesty in which the finger of blame is not pointed at individuals.

Conclusion

There are many ways of constructing acquisition cycles to carry out these broad areas of activity; different states will do so differently according to the nature of the projects they tend to pursue and their formal requirements for management and control. However, two more general points are perhaps worth emphasising. Firstly, much of the discussion above has focused on the earlier stages of the acquisition cycle. The point has already been made several times that decisions at the early stages of the project will have major implications downstream and that investment in ensuring that these decisions are robust will help to reduce overall project risk and lead to greater chances of project success. It is thus important that acquisition cycles include well defined and properly resourced early stages. Secondly, acquisition cycles are not valid simply for complex projects. While acquisition cycles might be abbreviated for simpler projects, the principles they lay down are valid for all projects and the discipline they require is useful for all projects.

Finally, it should be noted that different skills are required in different phases of the acquisition cycle. The earlier phases, for example, focus on identifying the right solution to a particular requirement, while later phases are more concerned with the management of effective project delivery. This suggests that the composition of the acquisition team may vary throughout the lifecycle, a fact that needs to be accounted for in planning for the project.

Project Scrutiny

One of the purposes of acquisition cycles is to allow opportunities for senior management to review the project at appropriate points and to take decisions concerning its future. The purpose of project review is not to allow senior managers to interfere unnecessarily in the day-to-day running of a project but to allow them to be confident that the overall defence programme, and individual projects, are affordable and will deliver value for money over their lifecycle. Acquisition cycles thus provide convenient break points at which senior management can be persuaded that the work required to achieve the aims of each project phase has been carried out in sufficient depth and are able to set guidance and constraints for the subsequent project phase. If high levels of risk are considered to remain in the project, scrutineers can ask for part (or even all) of the phase to be repeated, or additional work to be carried out to supplement the analysis that has been presented to it.

Scrutiny is thus a process that takes place within the defence establishment; it is a separate process from the regular project reviews that should, as an element of good management practice, take place between the acquisition team and the supplier. In order to build consensus around the need for and value of projects, they should be

scrutinised by representatives of most of the project stakeholders, which suggests the need for a senior standing committee with oversight of the entire defence programme. Composition will vary but is likely to include the defence establishment's senior financial officers, planners and senior representatives of the acquisition community and user community. In addition to monitoring project progress, this committee will also be responsible for agreeing to the launch of individual projects.

Aside from project authorisation, there are no fixed points at which scrutiny should be carried out – these will depend, amongst other things, on the acquisition cycle used, the size and complexity of the project and the maturity of the overall defence establishment. While the end of each phase of the acquisition cycle provides a natural break point, it is not necessary for every phase to terminate with formal scrutiny – a set of rules to define when this is necessary needs to be established.

Similarly, there are no fixed requirements as to what should be scrutinised; a set of procedures needs to be defined to establish these too. Certain requirements will come from the scrutineers' responsibility for the overall defence programme – for example, considerations of affordability or the continuing justification of the requirement for a project against other defence priorities. Other requirements will be more closely tied to the individual project; for example, to demonstrate that project risks have been defined and mitigation measures put in place, that the acquisition strategy represents good value for money and that project plans follow best practice. These two sets of requirements indicate that both the acquisition team and the wider defence planning community needs to be involved in the preparation of a scrutiny case.

Concluding Remarks

This chapter has explored some of the issues involved in acquisition management and some of the techniques that may be applied to ensure greater chances of project success. States have chosen to implement these techniques in a variety of ways. There are many advantages to be gained from formalising national approaches to acquisition by selecting the techniques appropriate to local circumstances and documenting them in the form of acquisition regulations or guidance manuals. This will ensure consistency of approach and make it easier to learn lessons from individual projects and to develop best practices.

The main messages of this chapter may be summarised as follows:

- Defence acquisition involves much more than procuring equipment and/or services to meet user requirements. It is a complex activity that should be treated on a whole life basis.
- It is essential that careful consideration is given as to how individual projects will be pursued.

- The management of defence projects can be eased by breaking the lifecycle into a number of discrete phases.
- Investment in the early phases of a project, in particular those activities that define what is to be acquired, will benefit its later phases.
- As acquisition involves finding best value for money solutions to requirements, it should not be constrained by over-specification of requirements.
- Project risk is inevitable, but can be planned for.

Further Reading

Two comprehensive English language reference sources are available through the internet. The U.K. Ministry of Defence's Acquisition Operating Framework[15] can be found at www.aof.mod.uk/index.htm, while the Defense Acquisition Guidebook produced by the Defense Acquisition University of the U.S. Department of Defense can be found at https://akss.dau.mil/dag/welcome.asp. Both allow menu-driven browsing of acquisition issues and include comprehensive search facilities.

[15] At the time of writing, the U.K. is developing the Acquisition Operating Framework (AOF) to replace the Acqusition Management System (AMS) and the content of the AMS is being migrated to the AOF. During this process, which is expected to take around 12 months, the content of the AMS will continue to be available at www.ams.mod.uk.