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# NOT SO SMART: WILL COMMERCIAL OFF THE SHELF PROCUREMENT HAVE A FUTURE UNDER THE DEFENCE INDUSTRIAL STRATEGY ANNOUNCED IN DECEMBER 2005?

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TABLE OF CONTENTS

**ABSTRACT**

Procuring commercial off-the-shelf (COTS) products from the defence industry has been a common theme in the last 20 years and it appears likely that COTS acquisition will become even more important in the future. Performance of these leading edge products has delivered many advantages to the Ministry of Defence (MOD), such as lower acquisition costs, faster delivery and the ability to take advantage of the latest progress in technology. COTS procurement, however, has also raised some difficult questions, especially with regard to risk evaluation, sustainability, obsolescence and security. This paper looks at COTS under the new Defence Industrial Strategy (DIS), weighs the pros and the cons of COTS procurement and considers its future under the new system. The paper argues that the DIS weighs against COTS procurement and summarizes that COTS products will not provide value for money in the future. The paper concludes that the UK will be committed to high levels of military research and development that will see the internationalisation of the military-industrial sector.

The UK has faced some difficult choices about the future of its defence industrial base (DIB).[1] Whether the country can afford to retain a DIB with a complete range of high technology systems across the sectors of land, sea and air is still an open question. On 15th December 2005, the Secretary of State for Defence unveiled a new blueprint to ensure the UK's Armed Forces acquires the best equipment at the right price and at the right time.

> The United Kingdom is rightly proud of its Armed Forces, and recognises the vital contribution they make to ensure our security in an uncertain world. Since the Strategic Defence Review in 1998, and through successive White Papers, the UK has been transforming the Royal Navy, Army and Royal Air Force to face the demands of the 21st Century. The Defence Industrial Strategy plans to provide for agile, flexible forces that can respond effectively to the varied challenges and opportunities we face now and in the future.[2]

The Defence Industrial Strategy (DIS) sets new challenges for both industry and the MOD and promotes a competitive and sustainable defence industry.[3] The strategy also recognizes the need for the MOD to engage with the DIB in order to retain the industrial capabilities necessary to ensure national security. Under DIS, the basic principles of military acquisition hold true; however, the strategy also demands that the future approach to procurement is built around coherence of defence spending, (specifically across research and development) and by achieving through-life considerations.[4] DIS raises a

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[1] Kieth Hartley, *Department of Politics and Economics*: *The Economics of UK Procurement Policy* [Kingston, On: Royal Military College of Canada, 2003], 8.

[2] Ministry of Defence, "Defence Industrial Strategy," *Defence White Paper* (December 2005) available from http://www.mod.uk/NR/rdonlyres/F530ED6C-F80C-4F24-8438-0B587CC4BF4D/0/def_industrial_strategy_wp_cm6697.pdf; Internet; accessed 31 January 2007.

[3] Ibid., 6.

[4] Ministry of Defence, *Defence Industrial Strategy*…, 10.

number of questions with regard to COTS procurement because lower purchase price does not necessarily imply an overall reduction in whole life costs. Therefore, a detailed appraisal is necessary in order to decide if COTS acquisition will, or will not, save money under the new industrial strategy.

The aim of this paper is to demonstrate that under DIS, COTS procurement will have less of a future in the UK, specifically with regard to major capability projects.

In order to support this hypothesis, this essay will:

a. Clarify why the unit cost of military equipment is rising rapidly and, thereby, set the scene as to why the new strategy was required.

b. Explain DIS and outline its aims and objectives together with its likely impact on the UK's DIB.

c. Show that the fundamental principles of 'Smart' procurement underscore the through-life approach of the UK's acquisition cycle.

d. Address COTS procurement and explain the advantages and disadvantages of COTS acquisition.

e. Tie-in the future of COTS procurement to the new industrial strategy and, thereby, draw the paper's conclusions.

The essay will show that when whole life costs of major projects are taken into account, COTS acquisition cannot provide value for money in the future. The paper will also explain that under DIS, the UK will be committed to high levels of military research and development, meaning a dilution of industrial competition and, as a consequence, COTS procurement becoming far less attractive.

**BACKGROUND**

To give a fresh view on COTS procurement and decide whether the advantages outweigh the disadvantages, it is first necessary to study the background of defence procurement in order to gain an understanding of why cost is a pivotal driver in military procurement.

For any nation (or alliance) to prevent its armed forces from falling into a position of inferiority relative to its competitors, it is vital for each country to equip its forces with modern and technically superior equipment. If another nation procures new ships, aircraft and advanced weapon systems, this increases the threat to its adversary and stimulates them to undertake their own improvements. Thus, a vicious circle of arms procurement is established and, with it, one of the main causes of the increased defence spending between one generation of equipment and the next.[5]

Since the end of the Second World War, defence equipment costs have risen sharply. To use an example of combat aircraft in the UK (where the unit production cost has been corrected for the effect of inflation) the price of RAF aircraft has risen

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[5] David L. Kirkpatrick, "The Rising Unit Cost of Defence Equipment – The Reasons and the Results," *Defence and Peace Economics* Vol. 6 (1995): 264.

at a compounded annual growth rate of 11.5 percent.[6] In America, the scale of unit cost increase was most dramatically expressed by Kirkpatrick, through his observation that, "in the year 2054, the entire US defence budget will purchase just one tactical aircraft."[7]

Higher unit cost for all equipment is a factor of increased research and development expenditure, higher development costs and overall production investment. A major problem is the more effective the unit, the more costly it becomes and, therefore, a balance between budget constraints and over-ambitious performance specifications is essential. The effects of advanced technologies must always be considered and taken advantage of in order to procure optimum designs while exploiting the cost versus effectiveness boundary. Most importantly, because defence spending estimates suggest large increases with time, expedient and price efficient procurement methods must be established and be fully exploited.

In the UK, the unit costs of military equipment have risen faster than the national defence budget and therefore, the inescapable conclusion is that the British Armed Forces may, some day, be unable to provide a viable force of next-generation fighting units. This position is unacceptable because few decisions are more important for the security of a nation than the selection and procurement of equipment for its Armed Forces.[8] The question that must be addressed then, is what can be done about this situation? It is tempting, but irrational, to procure second rate equipment.

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[6] David L. Kirkpatrick, *The Rising Unit Cost of Defence Equipment…,* 264.

[7] Ibid., 263.

[8] David Kirkpatrick, *Combined Operational Effectiveness and Investment Appraisal and its Role in UK Defence Procurement*, (Whitehall Paper: RUSI Whitehall Paper Series, 1996), 1.

Likewise, reducing the frequency of procuring new equipment is potentially dangerous and most likely, uneconomical. Revising force structures has not abated the swell of modern equipment demands and, to date, the British government's solution has been to rely on the tried and tested formula of reforming the defence procurement process to deal with the consequences of its commitments.[9] The result of these recent reforms has been the 'Smart procurement initiative' and the new industrial strategy.

## DEFENCE INDUSTRIAL STRATEGY

One of the primary aims of the DIS is to promote a sustainable industrial base that retains the industrial capabilities needed to ensure national security.[10] The key aspects include the transparency of the UK's future defence requirements and the expected industrial capability needed to support new equipment throughout its life. The government understands that this will bring complex technological challenges and, as the global security environment changes, so too must the size and shape of the UK Armed Forces. By acknowledging the need for change and accepting DIS, the MOD and industry have direction that mandates their cooperation, meaning they can work together and achieve military restructure.

As of 2006, the British Armed Forces have been undergoing extensive transformation which includes procurement of some substantial new projects.[11] For

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[9] Warren A. Chin, *British Weapons Acquisition Policy and the Futility of Reform* (Ashgate: Ashgate Publishing Company, 2004), 265.

[10] Ministry of Defence, *Defence Industrial Strategy*…, 6.

[11] Ibid., 6.

example, the purchase of future aircraft carriers, new Type 45 Destroyers, new armoured fighting vehicles as well as Typhoon and Joint Combat Aircraft are planned. These platforms will take many years to bring into service and they will need to last for decades. The projects place a huge importance on support and upgrade programs and it is essential that government can rely on industry to provide this. The problem is that, once industry has expanded and delivered, it will then need to transform itself into a supporting role or, alternatively, pursue other business. Fortunately for commerce, one of the pillars of the strategy is the requirement for the MOD to explain (arguably for the first time) exactly what it needs from industry. Because of the size and maturity of the UK's DIB, this visibility is critical because the last thing government wants, is an economic crisis within industry a few years after delivery.

Among the aims of DIS, are new support concepts, emphasis on through-life costs and enhancements of system engineering. DIS recognises the difficulty with security, sovereignty and international co-operation but, at the same time, it dictates balance between industry and the MOD and it directs a closer working relationship. The UK market for defence equipment and services is the second largest in the world,[12] and it is mature enough to recognise that for security reasons, certain capabilities must be kept onshore.[13] However, DIS does not seek to limit international cooperation. The white paper informs the MOD that it must recognise the fact that the UK cannot afford to maintain a total 'cradle-to-grave' industrial base

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[12] Ministry of Defence, *Defence Industrial Strategy…,* 2.

[13] Authors note – Among the primary aims of the DIS is to promote a sustainable industrial base, that retains in the UK those industrial capabilities needed to ensure national security.[13]

in all areas and it should recognise that it cannot dictate to companies which markets to target. The parallel commitment demands that industry and the MOD work together with the vision of through-life capability and within an environment that encourages trust, openness and transparency at all levels. As part of this transparency, industry should understand how procurement works and, also, how decisions are made. Moreover, industry has to adopt and accept the principle of through-life capability management. This is summarised in the MOD white paper:

> There is a general shift in defence acquisition away from the traditional pattern of designing and manufacturing successive generations of platforms - leaps of capability with major new procurements or very significant upgrade packages - towards a new paradigm centered on support, sustainability and the incremental enhancement of existing capabilities from technology insertions. The emphasis will increasingly be on through-life capability management, developing open architectures that facilitate this and maintaining - and possibly enhancing - the systems engineering competencies that underpin it.[14]

The significance of this paragraph is the emphasis of through-life management and the shift in the traditional pattern of manufacturing major capability platforms. The key here, is that if MOD and industry work together, then big companies can justify expenditure on manufacture, support and capability enhancements because it will be confident the MOD will ask for them. Logically, this will warrant more research and development investment and to support this view, the white paper goes on to state that, "it is unrealistic to assume that the majority of future defence needs could be met with COTS solutions."[15] Furthermore, DIS adds that if the MOD is to work effectively with industry, then industry can only spin in COTS technology when

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[14] Ministry of Defence, *Defence Industrial Strategy*…, 17.

[15] Ibid., 43.

it meets defence needs. Not withstanding this statement, it should also be accepted that for some capabilities, MOD and industry will not find value researching and developing all the technology insertions required to enhance all existing platforms. The question remains, in what circumstances are COTS products a good choice for the military and with what future? To answer this problem, it is necessary to understand the procurement process and then study the advantages and disadvantages of COTS products.

## SMART PROCUREMENT

Acquisition of defence capability in a faster, cheaper and better fashion requires a structured process and a detailed strategy. The 'Smart procurement initiative' was announced in 1997[16] and the basic principles of the process hold true under the new industrial strategy.[17] Four key factors pertain: operational effectiveness; whole life costs; affordability; long-term value for money and national security.[18] Principally, 'Smart procurement' embeds a culture of through-life planning and its foundations are summarised in the handbook with emphasis on understanding and managing cost.

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[16] Ministry of Defence, "The Smart Acquisition Handbook," http://www.ams.mod.uk/ams/content/handbook/site/index.htm; Internet; accessed 3 March 2007.

[17] Ministry of Defence, *Defence Industrial Strategy*…, 131.

[18] Ministry of Defence, *The Smart Acquisition Handbook…,* 31.

> Smart Acquisition includes the need to examine critically and manage the whole life costs of delivering military capability. In order to ensure that investment decisions take full account of the cost of owning as well as procuring equipment, a better understanding of the costs associated with operating, maintaining and disposal of the equipment is essential.[19]

The acquisition cycle stands at the centre of the through-life management approach, which dictates everything from a capability concept to the delivery of a military system. The process applies across defence and it is relevant to all military projects - whether it be a tank, a warships or an aircraft. The so called CADMID cycle, shown below, demonstrates a structured strategy and shows each phase pictorially, from concept to decommissioning.

**The CADMID Cycle**


Source: Ministry of Defence, *The Smart Acquisition Handbook,* 16.

Progression through each of the six stages involves executing the plan agreed in the preceding stage. In turn, the life cycle of a project such as a warship is managed by stages, and the whole project is likely to last for at least 20 years. Significantly, industry is involved from the outset and identifying the technology

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[19] Ministry of Defence, *The Smart Acquisition Handbook…,* 15.

required to meet the capability begins early in the concept phase. Unfortunately, if industry takes a COTS solution too early in the first phase, the part or item could be many years out of date by the time it is manufactured. As Dowling identifies, however, at least the 'Smart approach' has the potential for supporting COTS based developments.[20] The dilemma demands a detailed look at COTS products because it must be established whether COTS acquisition is a cost efficient method for future procurement of military capability projects.

## COMMERCIAL OFF-THE-SHELF

The term 'off the shelf' (OTS) can be applied to many things and therefore, when discussing COTS procurement, the term must be fully understood. COTS refers to products that have been developed for use in the commercial market. These products could be a common commercial item from the civil world such as a computer, a truck, an electric black box or an entire communication system. Thus, a COTS component is developed for commercial rather than military use and sold in volume to make a profit for the manufacturer. The underlying principle throughout is to exploit an item that already exists rather than developing it anew.[21] In whatever guise, COTS items are delivered to the MOD either as fully developed packages or, more likely, modified to some degree for military usage; the latter products are sometimes referred to as military off-the-shelf (MOTS).

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[20] Ted Dowling, "Defence Systems Procurement in a COTS World," *Journal of Defence Science* vol 5, no. 2 (2000): 145.

[21] Ibid., 142.

Twenty years ago, nearly all technology was custom built. From simple computers to the complex electronics in guided missiles, everything was the result of custom design.[22] In the late seventies, however, all this began to change and engineers stopped working to produce proprietary solutions because open systems were developed and software began to standardize.[23] Today, COTS products are mass produced and taking information technology (IT) as an example, cheaper memory and faster processors give electronic COTS products a huge advantage. In some cases, it will enable systems to be procured faster, cheaper and better thus achieving the central theme of the UK's procurement initiative. Such advantages will be addressed in the next chapter but, before doing so, traditional procurement versus COTS based procurement must be informed.

**COTS PROCUREMENT**

Exploiting COTS components in defence equipment can potentially save on procurement costs and timescales. Thus, COTS based solutions have sometimes become a part of acquiring military systems.[24] Over recent years, these potential advantages have led to a view that using COTS would enable systems to be procured faster, cheaper and better. Unfortunately, however, COTS products also bring with them a number of disadvantages. For example, there are several defence requirements that are unlikely to be met by COTS items. One of the risks is that specific military

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[22] William Payne, "Acquisition and Material Management: From custom built to off-the-shelf," [article on-line]; available from http://www.publicservice.co.uk/pdf/dmj/march2004/DMJ24%20William%20Payne%20ATL-AME.pdf; Internet; accessed 1 February 2007.

[23] Richard Ellis, "Military COTS-based systems – Instant solution or long-term headache?" *Journal of Defence Science* vol 5, no. 2 (2000): 151.

[24] Ibid., 151.

requirements will become much more expensive because they represent an increasingly niche market.[25] Potentially, this means the era of 'one-off' military specials, or custom build products could return. Procurement cost and functionality is very significant and it justifies a comparison of traditional procurement against COTS procurement. Table 1 details the differences in the two procurement methods and the comparison highlights who controls equipment functionality, be it the MOD or the supplier.

**Table 1 – Procurement Methods**

| Traditional | COTS - based |
|---|---|
| MoD can plan and control system development | COTS components change asynchronously and rapidly |
| MoD can define functionality | COTS supplier defines functionality to suit larger market. MoD spec may preclude use of COTS if too rigid |
| MoD can control functionality | COTS supplier may define upgrade package (eg operating system plus applications) |
| MoD can procure changes/fix problems, especially in emergency, perhaps in the field | COTS component changed if and when supplier sees market advantage; MoD not a significant customer |
| MoD can assume component will remain available (especially components that wear out) | COTS component may simply cease to be available (not just unsupported) if commercial market moves away from it |

Source: Journal of Defence Science, "Defence Systems Procurement in a COTS World."[26]

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[25] Ted Dowling, *Defence Systems Procurement in a COTS World*…, 148.

[26] Ibid., 144.

With regard to flexibility and functionality, the table clearly identifies a huge advantage of the traditional procurement over COTS acquisition. Notwithstanding this, cost has a part to play and there are advantages of COTS products that must be addressed.

**COTS ADVANTAGES**

Three principle advantages derive from using COTS products for military purposes: low initial cost; reduced acquisition times; and the fact that commercial products offer established support arrangements.[27] The first advantage, low cost, is immediately attractive for military procurement. The reason that commercial products are so much cheaper is because research and development costs have been gradually written off over time and high sales volume. Secondly, pre-developed components are often available immediately meaning a significant reduction in the time it takes to design and deliver a military system. Lastly, because the commercial sector sells to as many users as possible, COTS products benefit from established support arrangements and distribution networks. This is important and COTS products with support arrangements in place also amass a number of fringe benefits. For example, products can be delivered expediently because retail support and spare part networks already exist. Additionally, because the product has been sold to large numbers of users, any defect is likely to have been discovered and subsequently corrected. These advantages are especially important in the wider, more commercially orientated, sectors of industry. Utility support vehicles for example are sold in large numbers throughout the world and, because of competition, they benefit

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[27] Richard Ellis, *Military COTS-based systems*…, 151.

from almost constant technological updates. In today's utility vehicle market, private industry leads research and development and military truck requirements closely match commercial trucks already available in most respects. A commercial truck pulling a heavy load from London to Birmingham requires little differentiation (other than perhaps paint) to do the same job transporting a tank from Basra to Baghdad. Such commonalities allow industry to make profit from the commercial sector and consequently, offer value to defence in all three principle areas, low initial cost, less acquisition time and excellent support arrangements.

In other areas, such as the IT world a similar situation exists. In the past, military and aerospace research and funding customarily drove the cutting edge of development.[28] However, during the past 20 years, rapid advances of technology (which has seen computing power double every 18 months), has reversed the situation and the commercial sector now leads IT. Driven by massive consumer demand in the global market, electronic advances have leaped forward and have simply outpaced military developments. By taking advantage of COTS products therefore, the military should be able to exploit the commercial product, capitalize on its success and use commercial products within its own capabilities. As Ellis identifies, with COTS products the military can maintain state of the art capability, and hence maintain the most cost effective battle-winning capability.[29]

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[28] Richard Ellis, *Military COTS-based systems*…, 152.

[29] Ibid., 152.

Unfortunately however, COTS products also have their disadvantages and these must be analysed before relating COTS acquisition to the new industrial strategy.

**COTS DISADVANTAGES**

COTS procurement should not be seen as a panacea. This is because the acquisition of COTS products inevitably involves some form of compromise. Indeed, one should question whether utilization of these products is fitting the budget to the task, or the task to the budget. The main disadvantage with COTS items is that the products suffer from block obsolescence, loss of product control, safety and security issues and non-compliance with military standards.[30]

The first disadvantage, block obsolescence, highlights the difference between the military customer and the commercial market. Obsolescence is a major problem for the military consumer because of the difference in the shelf life of military equipment compared to its civilian equal. In fact, through-life management of all military equipment is diametrically opposed to the commercial market. In commercial markets, profit inevitably takes priority, and therefore, COTS products will get regularly updated. Therefore, rapid advances in COTS technology (particularly IT) are very quickly incorporated into commercial products which cannot necessarily be incorporated into military systems. The manifestation of obsolescence is that the vendor will likely drop an out-of-date item from its product range and, worse for the military, remove the support functions too. Even if a COTS product has

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[30] Richard Ellis, *Military COTS-based systems*…, 152.

longevity, the military will still suffer from a lack of product control. This is because, when demanded by the commercial market, new versions of software will likely be developed and the military user will get left with an out-of-date version that is completely unsupportable. Consequently, the defence user is faced with the extremely expensive option of re-investing in old technology in order to support the subject equipment. As technology advances and electronic components become obsolete, dealing with through-life obsolescence will undoubtedly become problematic in the future. In short, a culture change is necessary wherein managing obsolescence is more than just an afterthought.

Utilizing COTS items in defence systems also introduces some significant problems with regard to safety and security. With any COTS items, the supplier could go out of business and therefore supply risk remains throughout its life. Secondly, as the International Defence Review points out, when relying on commercial equipment it should be remembered that the same technology is available to everybody – enemies as well as friends.[31] Potentially, these two issues are huge and, unfortunately, they are not the only problems when considering COTS software. Global market forces have resulted in COTS software being developed in parts of the world that offer the cheapest labour rates.[32] As a consequence, the UK has come to rely on IT products produced by less developed countries, such as India, who will have a warfare edge that the MOD cannot control. In these cases, specific product safety standards cannot be assured and subsequently, no guarantee pertains that

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[31] Rupert Pengelley, "Commercial off-the-shelf Products – Military Panacea or Financier's Expedient?" *International Defence Review* (February 1995), 47.

[32] Ted Dowling, *Defence Systems Procurement in a COTS World*…, 147.

military secrecy is secured. Additionally, with regard to equipment safety, the military procurer will have to undertake specific safety tests on delivered products. These tests are unlikely to be cheap, especially when considering fluctuations in quality control and whole-life timescales. Even if a product was analysed and accepted, the short lifespan of COTS products can force repeated analysis in later years. Such analysis was acknowledged by Ellis: "analysis will take time, cost money and introduce delays in re-confirming the safety and security accreditation of the system."[33] As further evidence, DIS also admits that the difficulties with integrating commercial civilian products into complex military systems can often lessen the attractiveness of a COTS solution.[34]

The last disadvantage of COTS products is the significant mismatch between commercial standards and military, 'bomb proof' standards. For example, the MOD has traditionally insisted on compliance with specific standards relating to issues such as shock resistance, electromagnetic compatibility, toxicity and use in hostile environments.[35] Because of their commercial use, COTS products do not need to be built with these standards in mind. Therefore, the military user either has to accept risk or be forced to conduct its own testing procedures.

To sum up, the common thread linking block obsolescence, loss of product control and the safety and security of COTS products is the clear potential for the MOD to lose control of cost.

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[33] Richard Ellis, *Military COTS-based systems*…, 156.

[34] Ministry of Defence, *Defence Industrial Strategy*…, 43.

[35] Ted Dowling, *Defence Systems Procurement in a COTS World*…, 152.

**DISCUSSION**

After studying procurement and the advantages and disadvantages of OTS technology, COTS acquisition and its future under DIS remains a quandary.

First of all, the pros and cons of COTS procurement will likely remain the same for the immediate future. What then has changed that will affect COTS procurement? The question is difficult because of the complexity of the military acquisition process. However, the answer can be constrained within two major subjects; the difference between the working practise of Smart procurement and DIS and secondly, the topic of whole life costs and its relevance to major projects.

In the first case, working practice, there is a fundamental conflict between the two strategies. Smart procurement is designed to encourage competition, whereas DIS does not. Prior to DIS, the assessment phase of the CADMID cycle demanded that MOD put capability problems out to tender. In simple terms, the military shopped around and used competition to get the cheapest option. Invariably, a COTS solution would be attractive because, on purchase price alone, the project team would see good value. If the project was small or relatively simple, the contract would invariably go to the company that satisfied the capability and offered best price. Due to the advantages and disadvantages in COTS procurement, the experience was sometimes successful and at other times not. The issue here is not whether it worked or not, but the competition issue and the problems it caused within industry. On this subject, Chin says: “industry was not able or willing to behave merely as a supplier of

cost effective ideas and products within the market place."[36] Recognition of this situation progressively led industry away from the military customer because it was not seeing sufficient profit and some UK companies simply went out of business. The Marconi Company, founded in 1897 (which later became GEC Marconi), lost so much money it was taken over by BAE systems in 1999.[37] For these very reasons, the Blair Government stepped in and made a strong, overt, commitment to the preservation of the UK defence industrial base.[38] Thus, DIS was germinated out of the powerful combination of industrial pressure, military requirement and political expediency.

DIS reforms make the design process less risky for defence industries. This is because a new transparency exists between MOD and industry which removes the competition factor and allows the two sides to work together. The impact is risk sharing between government and industry and the benefit is a sustainable industrial base in the UK. Many examples of recent procurement projects support this. The latest example being the award of the future maritime Lynx helicopter replacement to Somerset based Augusta-Westland. Because of the combination of political, industrial and MOD involvement the example is, undoubtedly, a manifestation of DIS in practise.

The second point with regard to what has changed, or rather is changing since the new strategy was announced, is the recognition of through-life costs. One of the

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[36] Warren Chin, *British Weapons Acquisition Policy…,* 230.

[37] The Marconi Company, "History," http://en.wikipedia.org/wiki/Marconi_Company; Internet; accessed 13 April 2007.

[38] Warren Chin, *British Weapons Acquisition Policy…,* 245.

huge disadvantages of COTS is injecting a cost efficient part early in the project which results in significant expenditure in later years. The problem is that, COTS components age rapidly as technology advances and therefore, the interests of industry and the military are often opposed. Manufacturers strive for commercial advantage, while military systems are intended to have long lives.[39] For big capability projects this is the crux of the matter because maintenance, management and longevity costs have to be accounted for. In the UK, there are a number of examples to support this, and, the government has finally realised that the lifetime costs of owning and operating equipment normally exceeds the original capital costs by several times. The ground attack Tornado's in-service costs totalled nearly £6 billion excluding such items as crew and fuel.[40] These costs are huge and 'whole-life' cost of major projects must be managed by MOD if they are to support new projects in the future. This weighs against COTS procurement and all these difficulties combine and likely contribute to the following quote in the DIS white paper. "The difficulties with integrating commercial civilian products into complex military systems can often lessen the attractiveness of a COTS solution."[41] Relating this to the aim of the paper, it is useful to show an example where a specific COTS acquisition failed on a major military project.

The German government's decision not to make more use of the MIG29 fighter aircraft it inherited from the East German Airforce provides an excellent

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[39] Richard Ellis, *Military COTS-based systems*…, 158.

[40] John Bourn, *Securing Value for Money in Defence Procurement,* Whitehall Paper, (Whitehall Paper: RUSI Whitehall Paper Series 1994), 30.

[41] Ministry of Defence, *Defence Industrial Strategy*…, 43.

example. From an engines and airframe perspective, the Mig was a generation ahead of the German F4 fighter. Nevertheless, it was obviously not worth the trouble because among the main factors behind the decision not to operate the aircraft was the perceived difficulties it saw in securing a reliable flow of spare parts.[42] The example shows that if a major capability or equipment costs nothing up front, ie COTS at zero cost, then it can still prove to be bad decision if overall costs become insurmountable. In simple terms, the aircraft was simply going to cost too much in the long run and the example shows why UK should concentrate on the viability and costs of the supply chain, not just purchase price.

**CONCLUSION**

DIS was announced in December 2005 and this paper set out to question whether the process of COTS procurement has a future under the new system. A brief review shows that despite some advantages of COTS acquisition, COTS products are not the panacea they might appear to be, even though some projects, such as utility vehicles, would suggest that they are.

Analysis indicates that commercial competition in military procurement does not provide value for money and, if major new projects in UK are to survive, then they must be made affordable.

DIS provides a long term framework, giving clarity to industry about the future equipment needs of the Armed Forces. Furthermore, DIS also demands that MOD facilitates the unity of purpose essential to through-life management.

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[42] John Bourn, *Securing Value for Money in Defence Procurement* …, 44.

Two significant changes undermine COTS. Firstly, because transparency has replaced the barriers of secrecy between industry and the MOD, competition has been become less important and this weighs heavily against COTS procurement. Secondly, if COTS products are used early in the life cycle of a project, through-life management and the cradle to grave costing can easily escalate in the long term.

To take DIS to its logical conclusion, the strategy is aimed at fusing the interests of industry with the interests of the country. This means increased spending on research and development and a growth in the internationalisation of the military-industrial sector. To put this into context, over £8 billion was spent on procurement last year in the UK and £2.6 billion of this was on research and development with private industry.[43] In fact, the military-industrial sector has benefited enormously and in the last 12 months, BAE Systems has emerged as the sole British military industrial giant.[44] Backed by private equity and shareholders across international boundaries, over 50% of major UK defence contracts are now placed with BAE.[45] To show the potential value here, the Times newspaper has recently reported that US defence giants are now hunting British defence companies as takeover targets. The headlines

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[43] National Statistics, "Defence Analytical Services Agency," http://www.dasa.mod.uk/natstats/natstatsindex.html; Internet; accessed 22 March 2007.

[44] Dr Steven Schofield, "The UK Defence Industrial Strategy and Alternative Approaches," *Occasional Papers on International Security Policy,* no. 50 (March 2006) available from http://www.basicint.org/pubs/Papers/BP50.htm; Internet; accessed 22 March 2007.

[45] Dr Steven Schofield, *The UK Defence Industrial Strategy and Alternative Approaches*…, 1.

read, “Boeing and Lockheed Martin are eyeing British defence companies worth more than £5 billion in an attempt to win orders from the Ministry of Defence.”[46]

The trend is significant and the examples prove a reduction in COTS procurement and a growth within the national industrial sector. In the future, the impact will be that the UK will continue to finance military capability, and the MOD will secure the procurement of new generation fighting machines – regardless of increased spending on research and development.

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[46] TheTimes Newspaper, http://business.timesonline.co.uk/tol/business/industry_sectors/engineering/article1392929.ece Internet; accessed 22 March 2007.

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