

NPS-AM-09-024



EXCERPT FROM THE PROCEEDINGS

OF THE
SIXTH ANNUAL ACQUISITION
RESEARCH SYMPOSIUM

ACQUISITION CHALLENGES IN THE UNITED KINGDOM

Published: 22 April 2009

by

David M. Moore, Stuart Young and Pete Ito

**6th Annual Acquisition Research Symposium
of the Naval Postgraduate School:**

**Volume I:
Defense Acquisition in Transition**

May 13-14, 2009

Approved for public release, distribution is unlimited.

Prepared for: Naval Postgraduate School, Monterey, California 93943



ACQUISITION RESEARCH PROGRAM
GRADUATE SCHOOL OF BUSINESS & PUBLIC POLICY
NAVAL POSTGRADUATE SCHOOL

The research presented at the symposium was supported by the Acquisition Chair of the Graduate School of Business & Public Policy at the Naval Postgraduate School.

To request Defense Acquisition Research or to become a research sponsor, please contact:

NPS Acquisition Research Program
Attn: James B. Greene, RADM, USN, (Ret)
Acquisition Chair
Graduate School of Business and Public Policy
Naval Postgraduate School
555 Dyer Road, Room 332
Monterey, CA 93943-5103
Tel: (831) 656-2092
Fax: (831) 656-2253
E-mail: jbgreene@nps.edu

Copies of the Acquisition Sponsored Research Reports may be printed from our website www.acquisitionresearch.org

Conference Website:
www.researchsymposium.org



ACQUISITION RESEARCH PROGRAM
GRADUATE SCHOOL OF BUSINESS & PUBLIC POLICY
NAVAL POSTGRADUATE SCHOOL

Proceedings of the Annual Acquisition Research Program

The following article is taken as an excerpt from the proceedings of the annual Acquisition Research Program. This annual event showcases the research projects funded through the Acquisition Research Program at the Graduate School of Business and Public Policy at the Naval Postgraduate School. Featuring keynote speakers, plenary panels, multiple panel sessions, a student research poster show and social events, the Annual Acquisition Research Symposium offers a candid environment where high-ranking Department of Defense (DoD) officials, industry officials, accomplished faculty and military students are encouraged to collaborate on finding applicable solutions to the challenges facing acquisition policies and processes within the DoD today. By jointly and publicly questioning the norms of industry and academia, the resulting research benefits from myriad perspectives and collaborations which can identify better solutions and practices in acquisition, contract, financial, logistics and program management.

For further information regarding the Acquisition Research Program, electronic copies of additional research, or to learn more about becoming a sponsor, please visit our program website at:

www.acquisitionresearch.org

For further information on or to register for the next Acquisition Research Symposium during the third week of May, please visit our conference website at:

www.researchsymposium.org



THIS PAGE INTENTIONALLY LEFT BLANK



Acquisition Challenges in the United Kingdom

Presenter: Dr. David M. Moore

Director, Centre for Defence Acquisition
Cranfield University
E-mail: d.m.moore@cranfield.ac.uk
Office Phone: (44) 1793-785-659
Office Fax: (44) 1793-785-871

Authors:

Stuart Young

Lecturer, Centre for Defence Acquisition
Cranfield University
E-mail: s.young@cranfield.ac.uk
Office Phone: (44) 1793-785-051
Office Fax: (44) 1793-785-871

Pete Ito

Lecturer, Centre for Defence Acquisition
Cranfield University
E-mail: p.ito@cranfield.ac.uk
Office Phone: (44) 1793-785-843
Office Fax: (44) 1793-785-871

Abstract

The panel discussion will address four critical defence acquisition issues and programmes which illustrate the innovative approaches the United Kingdom is undertaking in this area. All four cases will echo the challenges facing the US and other countries and provide valuable "lessons learned" in a number of key areas. The first topic is the UK decision to acquire C-17 transports, which provides a good example of the benefits of capability management. The second topic is the UK implementation of a defence industrial strategy which demonstrates a concerted effort to identify those national defence capabilities that must be maintained, and those more efficiently addressed by foreign acquisition and/or cooperation. The third topic is the UK assessment of European defence cooperation, including the difficulties with such efforts and the impact of the controversial "re-evaluation" of the contract for the next generation of aerial tankers. The final topic is the UK experience with the Joint Strike Fighter program, in which the UK is the largest non-US participant, and which holds major implications on future military cooperation with the US. Ultimately, the UK experiences show the benefits of more research on international efforts to identify best practices in acquisition management.

"You never want a serious crisis to go to waste. Things that we had postponed for too long, that were long-term, are now immediate and must be dealt with. This crisis provides the opportunity for us to do things that you could not do before."

White House Chief of Staff Rahm Emanuel (Capital Journal, 2008).



Introduction

While the military procurement challenges facing the United States are enormous, it is important to bear in mind that the United Kingdom and other US friends and Allies are also confronting the task of pursuing critical acquisition programs at a time of exceptionally tight defence budgets. Although in monetary terms, the task for Washington is of greater magnitude, the decisions that are facing London and other capitals are of equal significance on a national basis. However, it is clear that the impact of Department of Defense (DoD) decisions will reverberate in defence ministries around the world, while the converse is not necessarily the case.

It remains beneficial for Allies to compare notes on valuable "lessons learned" from their individual acquisition experiences. There have been recommendations for change from domestic think-tanks and policy experts as well as from within the military. With resources dwindling, it arguably would be best to draw upon initiatives based on practice (and not just theory), and the best data to analyse would be the practice of other defence forces. If "business as usual" is no longer affordable, then it is useful to assess the practices of other defence forces to see what has worked elsewhere, provided more efficient management, and increased value for money.

There are innovative initiatives which have been undertaken by the UK in the area of defence acquisition in recent years, some of which warrant attention and consideration by other defence forces. UK participation in some of the most current key defence equipment programs provides lessons and insights that may be valuable to other states, particularly regarding the future of multinational defence programs.

Four critical areas and examples of UK defence acquisition are highlighted in this paper. First, the area of efficient capability management is examined, as demonstrated by the UK decision to acquire Boeing C-17s. Second, the example of UK defence industrial strategy is reviewed, indicating how it has moved the focus from a haphazard attempt to preserve as many jobs as possible to a serious assessment of which domestic military capabilities are essential for the nation. Third, the UK assessment of the general area of European defence cooperation practice is analysed, including commentary on the negative impact of the controversial "re-evaluation" under Congressional pressure of the US Air Force decision awarding Northrup Grumman/EADS the contract to meet future US aerial tanker requirements. Finally, the example of the UK experience with the Joint Strike Fighter program, particularly in the area of technology transfer, is assessed with a focus on implications on future multinational military cooperation led by the US.

In his outline of the eight steps needed for successfully transforming an organisation, John Kotter (1995) stresses that the first step is establishing a sense of urgency. In the UK Ministry of Defence (MOD), and probably in most defence establishments, that requirement has presumably been met. What is now important is determining what type of change is required. Assessing the experience of other defence establishments is useful in making better informed decisions, and the UK has taken innovative approaches to address acquisition challenges that warrant consideration and analysis.

Examining UK policy with an eye to possible use in the US is not a new exercise. In a recent report to Congress, the Government Accountability Office (GAO) (2008, December) review on the DoD use of performance-based logistics included an extensive examination of the UK MOD's experience with performance-based contracting. Similarly, John Schank



(2006) testified to the Senate Armed Services Committee about the RAND evaluation of the trends in the UK Naval Shipbuilding Industrial base, recommendations to the UK, and the lessons for the US industrial base.

There is no question that the UK still faces room for improvement in the area of defence acquisition, as has been emphasised by commentators like Bill Kincaid (2008). The MOD Major Projects Report from the UK National Audit Office (NAO) (2008a, p. 5) indicates that for the 20 largest MOD projects (with a combined estimated cost of £28 billion¹), the estimated total cost of the projects increased during the 12-month reporting period by £205 million, and there was an additional total slippage in the programs of 96 months. The projected total increase in costs for these 20 programs compared with the budgeted cost indicates an increase of 12%, or some £3 billion and an aggregate delay for the programs of 483 months, 36% over the anticipated timetable at the time the project was approved (NAO, 2008a, p. 5).

However, the UK MOD has made a conscious effort to pursue innovative management processes and increase flexibility. There is also a willingness to seek out outside assessments and new approaches. It is notable that the MOD has frequently commissioned RAND to provide an outside perspective on projects ranging from the Type 45 destroyer (Birkler, Schank, Arena, Smith & Lee, 2002) to the UK nuclear submarine industrial base (RAND, 2005).

In a time of scarce resources, it is arguably important for defence establishments to seek out such different perspectives and compare national policies, practices and accomplishments. The common theme which runs through the four UK examples that follow is the value of pursuing innovative and flexible approaches to defence acquisition, which can arise from analysing the best practices of other defence forces. The UK has worked hard to try and pursue such an approach and be an exemplar of innovation. Its efforts, as well as those of other defence establishments, warrant greater research to address the challenges of defence acquisition.

Air Transport

All the indications to date are that the UK decision in 2000 to obtain Boeing C-17 transports was a very sound decision, not only because it was cost-effective, but it also met the critical requirements of the UK military. The House of Commons Defence Committee (2007, July 5) assessment was that:

The leasing of four C-17 large transport aircraft, which are to be purchased when the lease ends, has greatly increased the MOD's strategic airlift capability and performed extremely well. We welcome the fact that these four aircraft will be purchased once the lease ends and that the MOD is to purchase a fifth C-17 aircraft. (paragraph 62)

In its response to the Committee report, the MOD (2007, October 12) echoed the view that the C-17 "has proved a great success on operations" (paragraph 12) and noted its announcement that it would purchase a sixth C-17 as part of its effort to enhance operational effectiveness. The acquisition of the C-17s (along with the earlier acquisition of

¹ On April 3, 2009, 1 UK pound sterling equalled 1.46 US dollars.



25 C-130Js) has more than met MOD requirements, despite their having intensified with operations in Afghanistan and Iraq. While the C-17s originally were intended to provide strategic lift capability, their operational use in those two countries has been essential to UK forces.

The benefits of the C-17 decision have been amplified by the fact that the European A400M transport, launched in 1982, has still to commence flight testing. The House of Commons Defence Committee (2009) noted that once the MOD has a better fix on the extent of the delays in the A400M, it must decide whether "abandonment would be preferable, and to take timely decisions either to procure or lease other airlift assets so that a capability gap in air transport does not develop" (p. 3). Secretary of State for Defence Hutton stated in March 2009 that the government would make a decision with regard to continuing with the A400M in the beginning of July, adding that the UK "will not be content with a gap in capability" (Hollinger & Pfeifer, 2009).

To provide some background: In 1994, the UK announced that it would replace its aging C-130K Hercules fleet. Those 50 transports had been in the Royal Air Force (RAF) inventory since the 1960s. The MOD decided on a two-part replacement program (NAO, 2008b, p. 8). The first stage was replacement of 25 C-130Ks with 25 C-130Js from Lockheed Martin, which are an updated version of the Hercules. The second stage would be participation in the A400M program which would replace the other C-130Ks. Approval for participation in the A400M was achieved in 1997.

The C-130Js came into the UK inventory in 1998 and were fully operational by 2001. As the A400M timescales became increasingly questionable, the MOD recognised that it would need to find an alternate solution to meet immediate requirements. There was concern in the UK that the purchase of the C-17s would destabilise the A400M project, which provided opportunities for British industry, particularly in the areas of wings and engines. After extensive evaluation, Secretary of State for Defence Hoon announced on 16 May 2000 the decision to lease four C-17s.

It is important to note that the C-17s have handled a wide variety of missions that would have required a diverse and much larger fleet of transports. The C-17 has been a solid contribution to the RAF fleet and has clearly met UK capability requirements. With further delays to A400M accrued and with extensive C-17 operating experience, the UK has now decided that an outright purchase of the leased aircraft is now a more cost-effective option and has expanded the fleet to reflect the operational demands.

The C-17 decision and implementation are noteworthy for a number of reasons, particularly in view of the timeframe in which the decisions were taken. At the time transport options were being considered, Smart Procurement was still relatively new. To acquire these new capabilities, Smart Procurement had been introduced with the mantra of "cheaper, faster and better." Smart Procurement adopted a more streamlined approach to acquiring equipment capability by reducing the number of approval decision points (to Initial Gate and Main Gate) aligned to the new CADMID (Concept, Assessment, Development, Manufacture, In-Service and Disposal) procurement cycle. Smart Procurement was subsequently renamed Smart Acquisition, reflecting the wider scope of activities needed to deliver effective defence equipment capability. Guidance on an incremental approach to acquiring systems was also introduced with the process being managed by Integrated Project Teams (IPTs), comprising MOD, military and industry representatives.



At this time, the IPTs were also in the early stages of viewing decisions through the optic of best commercial practice. The MOD's Defence Procurement Agency had maintained its traditional focus on requirements, rather than capabilities, and was in the early phases of moving to a concentration on the latter. Despite that fact, the transport decision centred on capability requirements, resulting in acquisition of an air transport capability greater than sought which ultimately remained within budget. It is critical to note that although a strategic airlift capability was originally required, the C-17 also had a tactical capability that has subsequently been utilised and is reflected in the UK's follow-on purchase on a further aircraft.

The UK is working assiduously to implement Through Life Capabilities Management (TLCM). One key structural component is a change in process. TLCM takes a programme approach to delivering capability, with a single Capability Manager (the Programme Manager) having responsibility for all Strategic Mobility capability through life, including C130J/K, C-17 and A400M, focusing not on specific projects or equipment, but on the capabilities that need to be delivered. The Capability Manager, supported by a wide team across all the Defence Lines of Development (Infrastructure, Personnel, Equipment, Organisation, Doctrine, Training, Logistics and Information), is now in a better position to judge the trade-offs required to provide effective capability to the front line. This step change has been supported by a huge effort to embed a change of culture in the MOD, which takes an integrated view of acquiring capability, breaking down the traditional single-service stove-pipes.

While European defence cooperation is addressed later, it is useful to briefly review UK views regarding the A400M. France and Germany have decided to stay with the A400M as they believe it is imperative to establish a European airlift capability. However, in view of continued program difficulties and delays, it is arguable that the A400M may carry too high a price for London to pay just to establish the UK's European credentials. It is also important to note that BAE Systems has divested itself of its stake in Airbus, leaving no significant UK industrial investment (though there are UK participating firms) in the A400M project.

Europe has moved forward with efforts to promote defence cooperation, including the A400M. The organisation for Joint Armament Cooperation (OCCAR) was created in 1998 to facilitate and manage European cooperative armament programs. It is noteworthy that NATO (2009) and OCCAR signed an agreement on security of information on 5 February 2009 which protects classified NATO data given to OCCAR to meet NATO requirements and conformity with NATO standardisation agreements. This is critical as NATO participates in three projects managed by OCCAR: the COBRA Target Locating Radar, the TIGER helicopter, and the A400M.

But while the OCCAR Business Plan (2008, p. 5) indicates a staff of over 200 and a budget of some four billion Euros, its efforts to tighten performance targets have not had a major impact on the programs it manages. To return to the A400M, the transport requirement was announced in 1997 by eight European nations, the decision of the Airbus A400M was made in 2000, the decision on the engine was made in 2003, OCCAR (2008, p. 11) lists the total program cost as 20.3 billion Euros—and the plane has yet to have its inaugural flight. The UK has reduced its original pledge to purchase 45 A400Ms down to 25, and there remains speculation it may be considering reducing the number even further.

The UK showed great flexibility and innovation in addressing its air transport requirements. The key "lesson learned" from the C-17 experience is that the UK made a



decision focussed on capabilities. The US, UK, Canada, Australia and New Zealand have adopted a capabilities-driven acquisition process. Whatever the shortfalls in implementation, it is worthwhile for defence establishments to seriously consider and analyse the benefits of a capabilities-driven approach. The UK's air transport decision is a good example of the results when the focus is not on equipment, but on capabilities.

Defence Industrial Strategy

The political imperative to protect domestic jobs and industries is always present and intensifies during hard times. When coupled with the legitimate concern about retaining key indigenous defence capabilities, protectionism in the defence industrial area is a powerful force. The fact that this political, economic and security priority is often at odds with the acquisition of the best military capabilities at the best price is an eternal problem. As all military forces seek to grapple with these difficult decisions, it is worth considering the approach taken by the UK in generating an innovative and extensive *Defence Industrial Strategy (DIS)* (MOD, 2005), released as a follow-on to the wider *Defence Industrial Policy* published in 2002.

The *DIS* concisely notes that the strategy carefully considers:

which industrial capabilities we need to retain in the UK to ensure that we can continue to operate our equipment in the way we choose to maintain appropriate sovereignty and thereby protect our national security. The Strategy sets these out, and explains clearly for the first time which industrial capabilities we require to be sustained onshore, noting that—as now—there are many that we can continue to seek to satisfy through open international competition. (Foreword)

The *DIS* makes a concerted effort to outline in a more transparent manner how defence procurement decisions are made. It also seeks to assist UK industry in its future planning by seeking to be more open on future UK defence acquisition plans. Perhaps most important, the *DIS* puts an emphasis on the need for a change in the relationship between government and industry as well as a change in behaviour between the two. As a structural mechanism for actually monitoring progress of implementation of the *DIS*, the National Defence Industries Council is tasked to follow the extent of progress, and the *DIS* is reviewed in every defence spending review period.

The *DIS* is comprised of three sections. Section A, the “Strategic Overview,” is extensive, and provides a thorough analysis of the key overriding factors in UK defence policy and acquisition. Section B is a “Review by Industrial Sector and Cross-cutting Capabilities.” The extensive assessment of 12 separate sectors and categories is the heart of the document, and provides an impressive detailed analysis. Section C concludes with discussion on “Implementing the Defence Industrial Strategy.”

Perhaps the most critical aspect of the *DIS* is simply the effort undertaken by the MOD to seriously analyse and put forth in a coherent structure what is a critical domestic defence industrial capability. The 145-page document is an essential first step in generating a clear national policy on this critical issue. It assesses the various parameters and aspects of UK national defence requirements, determines areas where cooperation with non-UK firms carries an acceptable risk and benefit, and candidly recognises those areas where the UK cannot maintain a domestic industrial capability at an acceptable cost. The focus on



such a detailed analysis in the *DIS* is borne out by the fact that Section B is roughly half the document.

Certainly the *DIS* and resulting UK policy seek to protect the defence industry, which the MOD has judged to be critical from threats to its viability. But there is no “buy British” backdrop to the *DIS*. To take a larger overview of UK defence acquisition policy, there is a UK willingness to enter into multinational arrangements when the need is clear. In 2006, the European Defence Agency (EDA) reported that a total of 6.66 billion Euros was spent on projects or programs involving two national defence structures, one of which is an EDA participating state. The UK was far and away the largest practitioner, with 2.58 billion Euros of such collaborative projects, well beyond the 1.63 billion Euros conducted by France (EDA, 2006a, p. 22). Of the specific subset of European collaborative procurement that year, the total spent by EDA states was 6.07 billion Euros, of which the UK comprised 2.26 billion Euros (p. 23). Just over 30% of the UK’s total equipment procurement was conducted in a collaborative program with another EU member state (p. 24).

There are key lessons from the *DIS* exercise and experience which are worth noting. One critical point is the fact that this issue received serious attention from senior MOD political and uniformed military leadership and led to the Defence Acquisition Change Programme which, in turn, introduced Through Life Capability Management and the merging of the previously separate Procurement and Support functions. A top-down process was critical to instituting a change in culture and attitudes among the MOD personnel working on acquisition. That may have been even more critical than the changes in processes and structures that were implemented.

A clear, high-level political imprimatur was essential to generating a cooperative attitude from industry, a key outcome worth serious consideration. The UK does much more outsourcing of service contracts than other European states. In 2006, the UK comprised some 10 billion Euros out of a total reported outsourcing of 14.1 billion Euros (EDA, 2006a, p. 21). The UK also has pursued partnering initiatives, a good example of which is the establishment of the Complex Weapons initiative (House of Commons Defence Committee, 2009, p. Ev102), which was part of the *DIS*. The MOD announced in 2008 that six study contracts would be undertaken by Team Complex Weapons, an industry grouping led by MBDA (UK), Thales UK, Roxel and QinetiQ, with the MOD as a partner.

The focus of the Complex Weapons initiative is on missiles and guided weapons. The MOD pledged long-term support for key programmes and technology, with industry pooling resources and streamlining personnel. The common stated goal was to move from bespoke weapons development to flexible, modular weapons design. The six assessment-phase contracts totalling £74 million were an effort to keep skills in these critical areas within the UK, and secure operational sovereignty. The effort is in its early days, and commentators (Hewson, 2008), note that a long-term source of steady funding is critical for success. But such efforts to establish a cooperative, rather than adversarial, relationship will be even more essential for defence and industry as funding becomes ever more difficult to obtain.

To cite some other examples: a Private Finance Initiative is being considered to provide the RAF with refuelling tankers for normal operations, with surplus air-transport capacity available for lease for civilian use whilst retaining a surge capacity for major operations. Similarly, the RAF is considering putting its extra capacity for pilot training to use to train pilots for commercial airlines.

The MOD has also put the goals and guidelines of the *DIS* into practice on larger acquisition programmes. The block construction of the Type 45 destroyer, the first of which was recently unveiled to great public support, is the most high-profile example. The Type 45 will provide the Royal Navy's primary anti-air warfare capability for over 30 years. And while the announced delays in the two planned Future Aircraft Carriers (CVF) tarnishes the programme, the cooperative effort with France is an indication of an effective international programme, and the work of the Carrier Alliance is a concrete example of a mutually beneficial relationship with industry.

Once again, what is perhaps most noteworthy about the *DIS* is the fact that the UK made the concerted effort to organise its priorities and extensively assess requirements, costs and opportunities regarding defence industrial capabilities. Where the decision has been made on systems that need to be produced domestically, there is an effort to establish a long-term relationship with the suppliers to ensure that capability is maintained. One example is the MOD completion of a "Foundation Contract" with BAE Systems in 2007. Such arrangements admittedly change, if not eliminate, the requirement for competition, and can effectively lock in the status quo. However, the UK decision is the result of a policy calculation of what needs to be preserved, rather than an instinctive reaction that because it is domestic, a firm must be maintained.

The UK MOD has been equally rigorous in analysing the down-side of allowing defence capabilities to be located off-shore. In a report provided by RAND (Arena et al., 2005) for the MOD on the UK's naval shipbuilding industrial base, the authors addressed the consequences of foreign procurement of naval vessels. Emphasising that its focus was on UK shipbuilding capacity, the authors noted that there were several disadvantages. In addition to the domestic economic benefit of having ships built in UK shipyards, a foreign purchase would generate a concern that the UK would not be able to acquire the latest technologies such as advanced sensors. The UK also would run the risk that it would not acquire ships that would meet its requirements or leave it open to political pressure to delay or even cancel the sale (p. 157-158).

It is noteworthy that in a subsequent study for the MOD, the RAND researchers concluded that the UK would "need to preserve and sustain several key technical skills in the maritime domain" in order to "preserve its ability to design, build, and support complex warships and submarines" (Pung, et al., 2008, p. xv). The authors focussed in particular on the need for "detailed designers and professional engineers involved in various stages of surface ship and submarine acquisition and support" (p. xv). Such considerations have clearly been taken into account in structuring and concluding various naval programmes, such as the Type 45 and the CVF.

Certainly more needs to be done. In submissions to the House of Commons Defence Committee (2009), the Defence Industries Council noted that many steps have been taken toward embedding the principles of the *DIS* into business practice. But the "overall progress has been much slower than industry would have wished" (p. 67). The Committee highlighted the concern expressed from industry that there is still insufficient transparency about MOD plans. In particular, it noted that an updated version of the *DIS* should have been published in December 2007 and has yet to be presented. The Committee criticised the failure to publish the updated document, adding that it considers that "its continuing absence increases the risk that the UK Defence Industrial Base will not be able to meet the future requirements of our Armed Forces" (p. 76).



Unfortunately, since Lord Drayson, who as Minister (Defence Equipment and Support) was the main driving force behind the *DIS*, resigned in early 2008, the momentum behind the *DIS* has decreased. Political and economic uncertainty has increased the pressure for a Strategic Defence Review in the UK, and it appears unlikely that the next edition of the *DIS* will be published in the near future. There is also concern about whether it is possible to generate a follow-on *DIS* programme that is affordable. As noted above, industry now perceives a lack of commitment by the MOD to a sustainable industrial strategy and this impression has been reinforced by an ongoing lack of transparency in the MOD's planning activities, despite promises to the contrary.

The UK approach in the area of a defence industrial strategy is innovative and extensive. Like any other country, the UK is concerned about the possibility of being held hostage to foreign sources of key military equipment. It is also cognisant of the political pressure to protect "British jobs for British workers." However, to summarise the "lesson learned" in this example, the value of the *DIS* is that it provides a more stable framework in which to conduct the policy discussion and reach the programmatic decision. Defence establishments that do not undertake such a study are more vulnerable to wide-ranging, ad hoc debates which focus on the latest set of unemployment figures, rather than strategic military considerations.

European Defence Cooperation

Political factors and job preservation are particularly relevant with regard to consideration of European defence cooperation, the third area in which UK experience and policy provide a number of noteworthy points about the utilisation of flexible, innovative approaches. First, as indicated by UK acquisition decisions and endorsed in the *DIS*, the UK is interested in pursuing worthwhile multinational projects. This is driven by the focus on capabilities. It is accentuated by the prospects with regard to overall defence spending and the need to focus on continuing operations, resulting in an even bleaker picture on available acquisition funding.

However, the second point is that there are limits to UK support for European initiatives. The A400M delays and the difficulties which plagued the Typhoon/Eurofighter have diminished UK enthusiasm for such efforts. Certainly the UK will be open to hearing the case for European projects, and if they are well thought-out and in line with the *DIS*, will be willing to pursue such projects. The agreement with France on the CVF is an indication that the UK continues to be ready to conclude arrangements if the programmes meet policy goals and the numbers add up. On the other hand, the UK Type 45 destroyer programme resulted from a decision to withdraw from a European programme when work-share arrangements and misalignment of requirements did not satisfy the UK. Indeed, the Type 45 programme arose because the UK was not satisfied with two European attempts to establish a joint destroyer programme: the NFR-90 and the Horizon CNGF.

It is clear the UK will be closely monitoring the track record on European military programmes and will want to see if such efforts will become more efficient at delivering capabilities, rather than just parcelling out jobs and funding. It would appear that European states and trans-European organisations are taking steps in the right direction. The question is whether they are large enough steps. Many European actions continue to be merely restatements of lofty goals, without concrete action. This is exemplified by the November 10, 2008, declaration of intent among 12 European countries to establish a European Air Transport Fleet. This project, taken within the EDA, recognises the importance of a



European airlift capability, but does nothing to move the generation of concrete capabilities forward. Citing another example, there are constructive initiatives undertaken by the EDA and individual states to promote European defence cooperation. The "Guide to the EDA's new European Defence Equipment Market" notes that the EDA's "Electronic Bulletin Board" provides an opportunity for European firms to bid for defence contracts in virtually all other EU member states, and is a small step toward generating a Europe-wide defence equipment market (EDA, p. 3).

The question remains whether increased opportunities to bid will actually generate greater willingness for national governments to give contracts to firms from other nations. The EDA generated an Intergovernmental Regime in Defence Procurement, which operates within Article 296 of the EC Treaty and is aimed at enhancing international competition for public procurement. Similarly, the associated Code of Conduct is also aimed at promoting more equal treatment of suppliers, promoting transparency. However, the EDA itself makes clear that all these steps can only offer an improved approach for changing the way Europeans handle defence acquisition, and "It now falls to national governments and industry to take full advantage of it" (p. 8).

As a result, it would appear that the public and political sentiment in the UK would be to acquire the last generation of US equipment, rather than the next generation of European capabilities. For example, if the clock could be rolled-back, there arguably would be general support for acquisition of destroyers with the Aegis system rather than initiating the Type 45 destroyer project. There are other reasons for preferring acquisition from the US: national security policy, the desire to be on the cutting edge of military technology, history, etc. The numbers are clearly in favour of military cooperation with the US. The US spends twice as much on defence as Europe combined, outspends Europe six to one in defence R&D, and, most critically, targets 35% of its defence spending on investment compared to 20% in Europe. (EDA, 2006b, para 67). For all of these reasons, there is arguably a strong sentiment that cooperative efforts centred on the US may be the optimal way to achieve future military capabilities, especially at the high end of the scale. While each European state will make its own preferences known in its policy decisions, it would seem from the UK perspective that many, if not most, European countries would agree on the need to work with the US.

However, only one state can prevent the US from assuming that essential role in military development and acquisition programs: the US. That is arguably the generally accepted UK view. And from a UK vantage point, it may well be the general European perception. While the JSF, which has a particular significance for the UK, will be addressed later, it is important at this point to address the ramifications of the action by the US Congress in 2008 to overturn the DoD decision to award the aerial tanker contract to the Northrup-Grumman/EADS proposal for the KC-30 tanker. Simply put, this decision has damaged the European desire to work with the US in the area of defence acquisition.

To provide a short history: EADS had made no secret of its desire to enter the US market, and the DoD requirement to find a new aerial tanker to replace the KC-45 provided a unique opportunity which EADS ardently pursued. Boeing was the only obvious source for the new tanker, and there were no viable competitors. Indeed, Congress itself recognised and made clear its views on the importance of ensuring there was a competition. EADS then made extra efforts to acquire the political support it would need. It partnered with Northrup-Grumman on the tanker proposal, emphasised the KC-30 would be an American tanker, and



proposed to maximise US domestic content by having the Airbus A330 airframe produced in the US.

The Air Force decision of February 29, 2008, to award the contract to the Northrup-Grumman/EADS consortium could well have marked a critical juncture in the promotion of multinational defence acquisition. From the UK perspective, the stereotypes of the way the US and Europe view each other with regard to defence acquisition carries a great deal of truth. The US believes it has the best military technology and Europe is pursuing protectionist policies which focus on jobs and money rather than military capabilities. In an "objective" competition, Europe would buy US equipment and get more value for money. For Europeans, there is a policy concern about becoming reliant on US military equipment and a political focus on European jobs. European defence industry believes it has the technology and capability to contribute to a modern military program. But as the prognosis for European defence spending is bleak, it wants an opportunity to enter the US market, since that is where the money can be found. In this respect, BAE System's approach has been to re-invent itself as a global company with wholly owned US subsidiaries who are able to market themselves in the USA as US companies under the BAE Systems, Inc., banner.

The decision in favour of Northrup-Grumman/EADS was quickly met with a protest by Boeing, loudly supported by members of Congress, and was subsequently sustained by the Government Accountability Office [GAO] (2008b) in its June 18, 2008, decision. The GAO cited seven reasons for sustaining the Boeing protest, all of which focussed on shortcomings in the Air Force selection process, and recommended the competition be conducted again.

It might be fair to state that the GAO decision has not been widely read by Europeans and that they only know that the GAO is an arm of the Congress. More important, the perception is that procedural flaws only became material when a "foreign" consortium won the competition. Such a perception can have an impact on defence industrial cooperation. First, it casts doubt on the US willingness to engage in an "objective" competition assessing cost and capabilities. Second, it validates the views of some that even if European firms partner with US defence contractors, they will still not be able to enter the US market. Third, the Congressional impetus for the re-opening the decision provides validation for those who argue that the US also will act to preserve its sovereign military capabilities as well as American jobs, so there is no reason for Europe to bow to US criticism on this count.

Finally, the re-opening of the decision damages the goal of promoting competition, emphasised by Congress itself. There was no competitor to Boeing for the next generation of tankers, and it was Congress which pressed for a competition. A situation with no competing US firms may become increasingly common in the future, and in a situation in which there are few bidders, they have power due to the threat to not participate in the bidding process (Franck, Lewis & Udis, 2008, September 30, p. 36). In view of the outcome of the tanker decision, European firms will be reluctant to pursue the time and expense of trying to provide a competitive bid which it will not be allowed to win.

The history of the aerial tanker decision has damaged the European perception of the opportunities to cooperate with US firms and enter the US market. It has also strengthened the case for European defence cooperation, particularly in areas where programs cannot be funded by individual defence budgets. As stated previously, the UK believes that there are many reasons to support cooperative military programs centred on



the US as the optimal path for increasingly expensive investments in defence programs. Discussion of UK support for such efforts leads to the program which currently has the greatest impact on views of US-led development projects: the JSF program.

Joint Strike Fighter

The fourth and final example which is valuable to analyse is the JSF, the largest multinational development program in history and a prime example of the UK commitment to pursuing innovative approaches to defence acquisition. It is a high-profile project which has numerous aspects, each of which could justify an entire discussion. There is, however, one key aspect which needs to be highlighted, particularly in a US forum: the impact of US technology transfer rules on future multinational military development programs.

This is not simply the litany of long-standing complaints about US technology transfer rules and the International Trafficking in Arms Regulations (ITAR). The high-profile US-UK dispute over JSF source codes, which needed to be resolved at the level of President and Prime Minister, is merely the most notable case of the difficulties faced by US partners in such endeavours. Simply put, the application of US technology transfer rules as exemplified in the JSF damages the prospects for multinational military development programs centred on the US. If that is the perception from arguably the closest US ally, one which is committed to cooperative programs with the US whenever possible, that is an indication of the seriousness of the threat posed by US regulations and practice to the future of US-led programs.

It is important to begin with a short history of the program to indicate why the JSF is such a significant commitment (if not a gamble) by the UK. In the 1990s, the US Navy, Marine Corps and Air Force were working on a next-generation strike aircraft. In 1996, the JSF project was announced by the US. At about the same time, the British Royal Navy was also looking at new Future Carrier Borne Aircraft capability for its CVF programme. The US and UK combined efforts in this area. The requirements of the US services drove the program, but the UK focus was on an attack aircraft with advanced Short Takeoff and Vertical Landing (STOVL) capabilities so that it could operate from forward battlefields as well as from aircraft carriers. The UK preference for the JSF was confirmed in a 2001 MOU with the US. In 2002, the UK selected the STOVL variant to meet its future requirements, with a positive review of the JSF program and the STOVL design completed in 2005 (NAO, 2008b, p. 45).

It was important that as an indication of US support for this endeavour, the Office of the Secretary of Defence sent down instructions that the JSF program should emphasise international participation, and there was a consensus that the UK would participate in the program (Franck, Lewis & Udis, 2008, January 29). The US and UK engaged in extensive, detailed exchanges on the nature of the program and the UK role, compiled in the US-UK Engineering and Manufacturing Development Framework MOU. Comprised of agreements, letters and other supporting material, it provides the details of the US-UK relationship on JSF.

While decisions on specific numbers of fighters to be purchased were not required at the outset, the Royal Navy and Air Force were looking at the purchase of some 150 STOVL fighters to replace the Harriers. The UK participation began at the outset of the program, and the UK is the only "Level 1" partner contributing some \$2 billion to the system design and development phase (Bolkcom, 2009). That designation means that the UK has



significant access to most aspects of the program as well as the ability to influence requirements and design solutions. And the UK will not have to pay the non-recurring R&D cost recoupment charge that normally accompanies the purchase of US military equipment and will receive a share of the levies on sales to third parties.

However, the UK commitment to the JSF is not primarily based on programmatic considerations such as cost savings, but on a key national security determination. The UK made a policy decision on the need to retain an aircraft carrier capability, and the requirement for carrier-based fighters derived from that critical decision. The recent announcement by the Defence Minister of a postponement of the aircraft carrier production schedule by another two years due to constraints on the defence budget is obviously critical for that specific programme. The delays mean that the two carriers now have projected in-service dates of 2015/16 and 2016/17. However, that decision on the carriers is separate from the discussions on the JSF fighters that will operate on those carriers.

There is no doubt that the UK has made a significant wager in tying itself to the JSF program, for if there are major problems with the fighter, the UK will need to generate a "Plan B" to avoid having its aircraft carriers merely serving as floating platforms. If the STOVL version of the JSF does not emerge, the UK would be faced with the challenge of re-designing ships so that, for example, they would have new catapults. As of April 2007, the UK plan had been to bring in a total of 138 JSF fighters, with the bulk of the acquisition to begin starting in calendar year 2012 (Joint Strike Fighter Program Office, 2007). The MOD is already in the process of working through modelling and simulation to optimise the safety and operability of the new aircraft carriers and the JSF when the fighters arrive (Scott, 2009).

The delays and cost increases associated with the Eurofighter program were a factor in the UK consideration of participation in the JSF. In the aftermath of the Eurofighter experience, the fact that the JSF was structured so that the most competitive firms would win contracts was appealing to the UK, and in line with the goal of pursuing more efficient acquisition programs. And the fact that the US was providing the overwhelming amount of funding for a program with cutting-edge military technology was significant to all the participating states, including the UK.

Adding to the list of factors pressing the UK to participate in JSF, the Defence Industrial Strategy places great emphasis on the need for the UK to remain interoperable with Allies, particularly the US. It is also noteworthy that British industrial participation amplifies the UK focus on the JSF project. BAE Systems is the largest non-American participant in the JSF and has hoped for around £14 billion in development and production contracts (McGhie & Gee, 2006). Such a high level of BAE participation is to be expected, as it does the majority of its business in the US and is one of the largest suppliers to DoD. It is also noteworthy that BAE participation in the JSF was viewed in the UK as a seal of approval on the British ability to participate in cutting-edge military projects. Trade and Industry Secretary Patricia Hewitt said that BAE participation "proves that British companies can compete with the best in the world for the big contracts" ("Jet contract," 2001). And there are potentially significant economic benefits. A Congressional Research Service (2009, p. 17) study notes that the DoD conducted a 2003 assessment which determined that partner nations could potentially earn between \$5 and \$40 of revenue for every \$1 invested in JSF program contracts.



As the technology transfer issue came to dominate the discussions on the JSF, it is also important to note the backdrop for US-UK military cooperation. Franck, Lewis & Udis (2008, January 29) note that it is estimated that 99.8% of licenses for UK-US transactions are approved, which accounts for some 8,500 items with a value of \$14 billion, indicating that the routine operation of bilateral defence cooperation and technology transfer proceeds without friction. Moreover, the extent of UK-US defence industrial interconnection has increased substantially. Aside from BAE, UK firms have acquired 50 aerospace and defence firms in the US since 2001, which constitutes some three-quarters of all foreign investment in the US defence sector (p. 20-21). Major American defence contractors are established in the UK or have acquired operations or set up a presence in the UK.

With this backdrop of increasing cooperation, the specific problems that arose regarding access to JSF source codes generated doubts in the UK regarding US-led military cooperative efforts that could have been avoided. Initially, commentary on the JSF was full of praise as a model for future multinational defence cooperation. That turned to criticism of the JSF as an example of why such efforts may not pass an all-encompassing cost-benefit analysis.

It is a key operational requirements as well as a matter of sovereignty for the UK to be able to have the information needed to integrate, upgrade, operate and sustain the JSF as required. As a practical matter, the UK cannot buy into a system which requires a US maintenance team to take care of any problems that may arise or to arrange for required modifications. The House of Commons Defence Committee (2005) reported that:

It is vital that the UK gets all the information and access to technology it requires from the U.S. to have 'Sovereign Capability'—the ability to maintain the Joint Strike Fighter aircraft and undertake future upgrades independently. The UK must receive adequate assurances that it will get all the information and access to technology it requires before the programme is too far advanced. If these assurances are not given, it is questionable whether the UK should continue its involvement in the programme. (p. 3)

The Committee (2005, p. 29) emphasised that the UK could not accept a situation in which it could not operate the JSF independently of the US and pressed the Defence Minister to act to ensure the UK would have operational independence. It noted its expectation that the MOD would set a deadline by which the assurances on sovereign capability would be obtained from the US. In December 2006, as the source code issue was heating up, the Committee warned that an assurance from the US was needed by the end of the year that it would provide the UK with all the requested technical information. In the absence of such an agreement by the end of 2006, the committee called on the government to develop a “plan B” to obtain alternative aircraft (“MPs warn,” 2006).

From the UK perspective, the history of the political discussions to resolve the source code issue is not the best advertisement for multinational programs. Indeed, the fact that such issues never seemed to be fully resolved added to the frustration with US policy and practice. The technology transfer dispute had already been addressed in 2004, when Secretary of State for Defence Hoon wrote to Secretary of Defense Rumsfeld on the issue and referred to the fact that the US had signed an outline agreement on defence technology cooperation in 2002 (O'Connell, 2004). It is noteworthy that PM Blair believed he had reached an agreement with President Bush in May 2006, but, however, the dispute lingered on unresolved until the end of the year (Baldwin, 2006). Indeed, in the Defence



Authorization Act for Fiscal Year 2007, Congress, aware of UK concerns over this issue, advised the Secretary of Defence to share technology consistent with the national security interests of the US and UK (Bolkcom, 2009, p. 18).

The importance of technology transfer in cooperative arrangements with the US was already set out in the *DIS*, where the significance of the US defence market and US defence spending was acknowledged. The *DIS* observation on the technology transfer point warrants a full recitation:

To meet our own sovereign needs, it is important that we continue to have the autonomous capability to operate, support and where necessary adapt the equipment that we procure. Appropriate technology transfer is therefore of crucial importance. This is so for any cooperative project, but in practice difficulties have arisen particularly with the U.S., whose technology disclosure policy we have found less adapted to the needs of cooperative procurement than those of our partners in Europe. To reiterate, this is not about gaining competitive advantage for UK industry; it is about being confident that the equipment we buy meets the capability requirements against which it is procured and can be modified effectively to meet emerging requirements through life. We fully recognise the need to ensure that intellectual property is protected, and that appropriate measures are put in place to ensure this; security is a key issue for us, just as it is for the USA. But a certain degree of technology transfer is required if we are to be able to fully cooperate with the USA (or any other partner) on our equipment programmes. What we are striving towards is an agreed framework which facilitates this whilst ensuring that our mutual security needs are met. (MOD, 2005, December, p. 45)

Difficulties with US practice arise even when it is not the most sensitive technology. One Lockheed-Martin employee noted that the restrictions on technology transfer have been “far more cumbersome and impenetrable than originally envisioned” and that it is necessary to ask for Washington’s approval of “even unclassified information exchanges” (Metz, 2005, p. KN3-7). Such requirements make it difficult for partners to participate, and generates a large administrative burden on the team members, who face the requirement that “all information is releasable under penalty of jail terms—not a conducive atmosphere for co-engineering a product” (p. KN3-7).

It is worth noting that the report of the Inspector General (IG) of the Department of Defense (2008) on security controls regarding JSF classified technology assessed seven applications from Northrup Grumman and BAE systems for detailed review. In addition, the IG’s office evaluated security reports on BAE Systems facilities. While the assessment from the IG’s office was a frank statement that JSF advanced technology “may have been compromised by unauthorized access at facilities and in computers at BAE Systems” (p. ii), the specific criticism was that DoD did not always use sufficient controls to evaluate potential unauthorised access to such technology (p. i). Indeed, the specific recommendation with regard to BAE Systems is that the Defence Security Service (DSS) could have bolstered its efforts by collecting, analysing and retaining security audit reports completed by BAE Systems, a point on which the Director of DSS concurred. The other recommendations involved the actions of DSS.

Now that the source code issue has been resolved, the JSF is once again a low-profile project. The House of Commons Defence Committee (2009) simply noted that the MOD has assessed that the JSF program is “progressing well” and the Committee would



monitor the progress of the program (p. 47). Secretary of State for Defence Hutton announced in March 2009 that the UK would purchase three F-35B operational test aircraft, indicating the UK commitment to the Operational Test and Evaluation phase of the JSF (JSF, 2009).

Unfortunately, that does not erase the contentious history. If the JSF is an example of the future of multinational military cooperative programs, the source code dispute has clouded the picture. In late 2006, with the issue of source codes at its most contentious, an unnamed UK MOD official was quoted as stating, "If we can't trust the Americans to provide this, then you would have to ask what else we should be doing with them in defence terms" (Baldwin, 2006).

It is unfortunate that the US-UK Defence Trade Cooperation Treaty, signed in 2007, is still on hold. In September 2008, the Senate Foreign Relations Committee deferred a decision on ratification of the defence trade treaties with the UK and Australia until 2009 due to "too many unresolved questions" about both treaties (Wagstaff-Smith, 2009). The goal of the treaty, to cut red tape in the bilateral exchange of defence goods services and information, would have been a productive step forward.

On the other hand, such complaints about US policy are long-standing, and it is not clear how heavily they will weigh on the decisions of other nations to work with the US on military projects. As Franck, Lewis and Udis (2008, January 29) point out, "very few national military establishments can generate sufficient orders to sustain a weapons source of efficient size in any category" (p. 17). And with the rapid growth of military technology (and the concomitant growth of costs) the essential nature of the US in any development program will clearly increase.

However, the US should consider whether it can afford to be indifferent to the willingness of other nations to participate in, and carry some of the costs of, such defence programs. Spreading the burden of large development costs would presumably be appealing to the DoD. Increasing costs also have ramifications with regard to the production phase of future programs. It is an open question whether DoD contracts alone would be sufficient to sustain US military contractors.

The Congressional Research Service has noted that while the US aviation industry is positioned to compete in the growing global market for civil aircraft, "the extent to which such economic conditions may preserve an adequate US defence industrial base for the development and production of combat aircraft is debatable, however, given the significant differences between civilian and military aircraft requirements and technologies" (Bolkcom, 2009, p. 17). Even US firms and the DoD may need to focus more on overseas sales to sustain programs. And if the US wishes to generate significant sales to other nations, then it is important that such equipment address the fundamental issues of operational requirements and sovereignty which have been critical to the UK in the JSF.

If the JSF experience is an indication of wider structural problems, it suggests that multinational military development programs may be too difficult to be politically or economically feasible. Technology transfer issues may generate too much friction. Difficult decisions on the awarding of contracts may be too hard to overcome. Increased costs may not be sufficient to counter-balance political and programmatic challenges. The extent of the obstacles to multinational projects should be more thoroughly researched and analysed.



If these problems are indeed too difficult to overcome to allow for efficient multinational development programs, then perhaps the better option might be for multinational acquisition programs. In such arrangements, there would be fewer states participating in development and more states signing up for purchase of the equipment. This could reduce the impact of some of the more contentious issues while increasing interoperability. However, there would still be significant difficulties, especially political problems, and technology transfer problems would only be reduced, but not eliminated. Once again, it would be important to more thoroughly research and analyse the potential benefits of greater multinational acquisition programs. If the structure of such arrangements allows for more efficiency in development and production, and addresses the concerns of individual military establishments, it might be a more cost-effective option.

Conclusion

To return to a central theme of this paper, it appears to the UK that scarcer resources and increasingly expensive military projects make it imperative to look closely at innovative approaches to defence acquisition. While new theories should be welcomed and encouraged, it is far less speculative to study the concrete "lessons learned" from the practice of other defence establishments. The goal of examining these four critical areas of UK defence acquisition was not to indicate that the UK has a formula or solution. Instead, it was to highlight new approaches to new challenges and the results of some innovative practices.

The C-17 decision indicates the benefits that can be obtained by focussing on capabilities. The UK Defence Industrial Strategy shows the value of a serious assessment of which domestic military capabilities are essential. The UK view of European defence cooperation theory and practice provides a sobering assessment of its shortcomings. And the UK experience with the JSF indicates the extent of the difficulties generated by US technology transfer and export control policies to promoting military development programs led by the US.

The expectation is that commentators will have other views on these UK examples. From the UK perspective, that is the point: close scrutiny and analysis of practice in other nations is an important exercise for any defence force, particularly in these financially challenging times. It would be valuable to intensify research on the comparative policies and practices of various defence establishments. And it would be instructive to bear in mind the approach taken by the defence industry: increasingly ignoring national boundaries, and working to ensure that they can operate and transfer expertise across boundaries.

At a time when defence budgets are under pressure and the use of the word "crisis" may not be an overstatement, it is important for military establishments to reassess how they are conducting defence acquisition and to consider new and innovative ways of doing business. In short, there is no more appropriate time to intensively research and analyse the "lessons learned" from the wide range of national defence acquisition experiences.



List of References

- Arena, M., Pung, H., Cook, C., Marquis, J., Riposo, J. & Lee, G. (2005). *The United Kingdom's naval shipbuilding industrial base—The next fifteen years*. Santa Monica, California: RAND, pp. 157-158. Retrieved December 2, 2008, from <http://www.rand.org>
- Baldwin, T. (2006, December 11). Secret codes clash may sink £140 billion fighter deal. *The Times*. Retrieved December 2, 2008, from <http://www.timesonline.co.uk>
- Jet contract 'to create 8,500 jobs.' (2001, October 26). *BBC News*. Retrieved December 2, 2008, from <http://news.bbc.co.uk>
- MPs warn over US fighter jet deal. (2006, December 8). *BBC News*. Retrieved December 2, 2008, from <http://news.bbc.co.uk/>
- Birkler, J., Schank, J., Arena, M., Smith, G., & Lee, G. (2002). *The Royal Navy's new generation type-45 destroyer: Acquisition options and implications* (MR-1486-MOD). Santa Monica, CA: RAND. Retrieved February 11, 2009, from <http://www.rand.org/>
- Bolkcom, C. (2009). *F35 Lightning II Joint Strike Fighter (JSF) program: Background, status, and issues* (7-5700 RL 30563). Washington, DC: Congressional Research Service, pp. 18-18.
- Capital Journal. (2008, November 21). In crisis, opportunity for Obama. *Wall Street Journal*. Retrieved February 16, 2009, from <http://online.wsj.com/>
- European Defence Agency. (2006a). *2006 national breakdowns of European defence expenditure*, pp. 21-24. Retrieved December 2, 2008, from <http://www.eda.europe.eu/>
- European Defence Agency. (2006b). An initial long-term vision for European defence capability and capacity needs, Para 67. Retrieved December 2, 2008 from <http://www.eda.europe.eu>.
- European Defence Agency. (2008). A guide to the EDA's new European defence equipment market, preface on Pages 3, 8. Retrieved December 2, 2008 from <http://www.eda.europe.eu>.
- Franck, C., Lewis, I., & Udis, B. (2008, September 30). *New patterns of collaboration and rivalry in the U.S. and European defense and aerospace industries* (NPS-AM-08-131). (p. 36). Monterey, CA: Naval Postgraduate School.
- Franck, C., Lewis, I., & Udis, B. (2008, January 29; 2008, May 20). *Echoes across the pond: Understanding EU-US defence industrial relationships* (NPS-AM-08-002). Monterey, CA: Naval Postgraduate School, pp. 17, 64, 88, 98.
- GAO. (2008, December). *Improved analysis and cost data needed to evaluate the cost-effectiveness of performance based logistics* (GAO-09-41). Washington, DC: Author.
- GAO. (2008, June 18). *Decision in matter of the Boeing company* (File: B-311344, et al.). Washington, DC: Author.
- Hewson, R. (2008, September 4). Opinion: UK faces complex questions in bid to supply critical future weapon systems. *Jane's*. Retrieved March 3, 2009, from <http://search.janes.com/>
- Hollinger, P. & Pfeifer, S. (2009, March 31). EADS reassures customers over future of A400M. *The Financial Times*. Retrieved April 2, 2009, from <http://www.ft.com>
- House of Commons Defence Committee. (2005, December 21). *Future carrier and joint combat aircraft programmes*. Second Report of Session 2005-06. HC 554, p. 3. London: The Stationary Office Limited.
- House of Commons Defence Committee. (2007, July 5). *Strategic lift*. HC 462, Para. 62. London: The Stationary Office Limited.
- House of Commons Defence Committee. (2007, October 12). *Strategic lift: Government response to the Committee's eleventh report of session 2006-2007*. HC 1025, Para. 12. London: The Stationary Office Limited.



- House of Commons Defence Committee. (2009, February 26). *Defence equipment 2009*. Third Report of Session 2008-2009. HC 107, pp. 3, 47, 67, EV 102. London: The Stationary Office Limited.
- Inspector General. US DoD. (2008, March 6). *Security controls over Joint Strike Fighter classified technology* (Report No. D-2008-058). Washington, DC: Author, p. ii.
- Joint Strike Fighter Program Office. (2007). *Annex A (April 2007 revision) estimated JSF air vehicle procurement quantities*. Retrieved December 2, 2008, from http://www.jsf.mil/downloads/down_documentation.htm
- Joint Strike Fighter Program Office. (2009, March 19). *United Kingdom announces F-35 Joint Strike Fighter purchase*. Retrieved April 3, 2009, from <http://www.jsf.mil/>.
- Kincaid, B. (2008). *Changing the dinosaur's spots—The battle to reform UK defence acquisition*. London: RUSI.
- Kotter, J. (1995, March-April). Leading change: Why transformation efforts fail. *Harvard Business Review*, 59-67.
- McGhie, T., & Gee, J. (2006, February 26). Anglo-US defence deals in jeopardy. *Financial Mail*, 1.
- Metz, P. (2005). The Joint Strike Fighter—An international enterprise. In *Flight Test—Sharing knowledge and experience* (pp. KN-3-1 -- KN3-8). Meeting Proceedings (RTO-MP-SCI-162, Paper KN3). Retrieved from <http://www.rto.nato.int/abstracts.asp/>
- MOD. (2005, December). *Defence industrial strategy* (Defence White Paper CM6697). London: Author, p. 45.
- National Audit Office. (2008a, December 18). *Ministry of Defence major projects report 2008*. HC 64-1 Session 2008-2009,.p. 5. London: Author.
- National Audit Office. (2008b, December 18). *Ministry of Defence major projects report 2008: Project summary sheets*. HC 64-II. Session 2008-2009, pp. 8, 45. London: Author.
- NATO. (2009, February 5). NATO and OCCAR sign agreement on security of information. Retrieved February 11, 2009, from <http://www.nato.int/docu/>
- OCCAR. (2008). *OCCAR business plan 2008*. Retrieved December 2, 2008, from www.occar-ea.org.
- O'Connell, D. (2004, July 25). Britain fights for larger stake in JSF. *The Times*. Retrieved December 2, 2008, from <http://business.timesonline.co.uk/>
- Pung, H., Smallman, L., Arena, M, Kallimani, J., Lee, G., Puri, S. & Schank, J. (2008) Sustaining key skills in the UK naval industry. Santa Monica, CA: RAND, p. xv. Retrieved December 2, 2008, from www.rand.org.
- RAND Corporation. (2005). The United Kingdom's nuclear submarine industrial base. (Vols. 1, 2 and 3; MG-326/1-MOD, MG-326/2-MOD and MG-326/3-MOD). Santa Monica, CA: Author. Retrieved February 11, 2009, from <http://www.rand.org/>
- Schank, J. (2006, April 6). *Trends in the United Kingdom's naval shipbuilding industrial base—Lessons for the United States*(CT-259). Testimony presented before the Senate Armed Services Committee, Subcommittee on Seapower. Santa Monica, CA: RAND. Retrieved February 11, 2009, from <http://www.rand.org/>
- Scott, R. (2009, January). Preparing for take-off: UK ramps up JSF carrier integration effort. *Jane's International Defence Review*, 44-49.
- Wagstaff-Smith, K. (2009, February 11). 'Buy America' plan raises fears for trade treaty. *Jane's Defence Weekly*, 31.



THIS PAGE INTENTIONALLY LEFT BLANK



2003 - 2009 Sponsored Research Topics

Acquisition Management

- Acquiring Combat Capability via Public-Private Partnerships (PPPs)
- BCA: Contractor vs. Organic Growth
- Defense Industry Consolidation
- EU-US Defense Industrial Relationships
- Knowledge Value Added (KVA) + Real Options (RO) Applied to Shipyard Planning Processes
- Managing Services Supply Chain
- MOSA Contracting Implications
- Portfolio Optimization via KVA + RO
- Private Military Sector
- Software Requirements for OA
- Spiral Development
- Strategy for Defense Acquisition Research
- The Software, Hardware Asset Reuse Enterprise (SHARE) repository

Contract Management

- Commodity Sourcing Strategies
- Contracting Government Procurement Functions
- Contractors in 21st Century Combat Zone
- Joint Contingency Contracting
- Model for Optimizing Contingency Contracting Planning and Execution
- Navy Contract Writing Guide
- Past Performance in Source Selection
- Strategic Contingency Contracting
- Transforming DoD Contract Closeout
- USAF Energy Savings Performance Contracts
- USAF IT Commodity Council
- USMC Contingency Contracting

Financial Management

- Acquisitions via leasing: MPS case
- Budget Scoring
- Budgeting for Capabilities-based Planning
- Capital Budgeting for DoD



- Energy Saving Contracts/DoD Mobile Assets
- Financing DoD Budget via PPPs
- Lessons from Private Sector Capital Budgeting for DoD Acquisition Budgeting Reform
- PPPs and Government Financing
- ROI of Information Warfare Systems
- Special Termination Liability in MDAPs
- Strategic Sourcing
- Transaction Cost Economics (TCE) to Improve Cost Estimates

Human Resources

- Indefinite Reenlistment
- Individual Augmentation
- Learning Management Systems
- Moral Conduct Waivers and First-tem Attrition
- Retention
- The Navy's Selective Reenlistment Bonus (SRB) Management System
- Tuition Assistance

Logistics Management

- Analysis of LAV Depot Maintenance
- Army LOG MOD
- ASDS Product Support Analysis
- Cold-chain Logistics
- Contractors Supporting Military Operations
- Diffusion/Variability on Vendor Performance Evaluation
- Evolutionary Acquisition
- Lean Six Sigma to Reduce Costs and Improve Readiness
- Naval Aviation Maintenance and Process Improvement (2)
- Optimizing CIWS Lifecycle Support (LCS)
- Outsourcing the Pearl Harbor MK-48 Intermediate Maintenance Activity
- Pallet Management System
- PBL (4)
- Privatization-NOSL/NAWCI
- RFID (6)
- Risk Analysis for Performance-based Logistics
- R-TOC Aegis Microwave Power Tubes



- Sense-and-Respond Logistics Network
- Strategic Sourcing

Program Management

- Building Collaborative Capacity
- Business Process Reengineering (BPR) for LCS Mission Module Acquisition
- Collaborative IT Tools Leveraging Competence
- Contractor vs. Organic Support
- Knowledge, Responsibilities and Decision Rights in MDAPs
- KVA Applied to Aegis and SSDS
- Managing the Service Supply Chain
- Measuring Uncertainty in Earned Value
- Organizational Modeling and Simulation
- Public-Private Partnership
- Terminating Your Own Program
- Utilizing Collaborative and Three-dimensional Imaging Technology

A complete listing and electronic copies of published research are available on our website:
www.acquisitionresearch.org



THIS PAGE INTENTIONALLY LEFT BLANK





ACQUISITION RESEARCH PROGRAM
GRADUATE SCHOOL OF BUSINESS & PUBLIC POLICY
NAVAL POSTGRADUATE SCHOOL
555 DYER ROAD, INGERSOLL HALL
MONTEREY, CALIFORNIA 93943

www.acquisitionresearch.org