

*Studies in Defence  
Procurement*



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Edited by  
Ugurhan G. Berkok

School of Policy Studies, Queen's University  
Kingston, Ontario, Canada  
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## *The Claxton Papers*

The Queen's University Defence Management Studies Program, established with the support of the Canadian Department of National Defence (DND), is intended to engage the interest and support of scholars, members of the Canadian Armed Forces, public servants, and participants in the defence industry in the examination and teaching of the management of national defence policy and the Canadian Armed Forces. The program has been carefully designed to focus on the development of theories, concepts, and skills required to manage and make decisions within the Canadian defence establishment.

The Chair of the Defence Management Studies Program is located within the School of Policy Studies and is built on Queen's University's strengths in the fields of public policy and administration, strategic studies, management, and law. Among other aspects, the program offers an integrated package of teaching, research, and conferences, all of which are designed to build expertise in the field and to contribute to wider debates within the defence community. An important part of this initiative is to build strong links to DND, the Canadian Armed Forces, industry, other universities, and non-governmental organizations, in Canada and in other countries.

This series of studies, reports, and opinions on defence management in Canada is named for Brooke Claxton, Minister of National Defence from 1946 to 1954. Brooke Claxton was the first post-Second World War defence minister and was largely responsible for founding the structure, procedures, and strategies that built Canada's modern armed forces. As defence minister, Claxton unified the separate service ministries into the Department of National Defence; revamped the *National Defence Act*; established the office of Chairman, Chiefs of Staff Committee, the first step toward a single Chief of Defence Staff; organized the Defence Research Board; and led defence policy through the great defence rebuilding program

of the 1950s, the Korean War, the formation of NATO, and the deployment of forces overseas in peacetime. Claxton was unique in Canadian defence politics: he was active, inventive, competent, and wise.

This study grew from the continuing research relationship between the Defence Management Studies Program and the Institute for Defence Resources Management at The Royal Military College of Canada. We take different approaches toward understanding the intricacies of defence policy and policy outcomes and combine them to produce, we hope, a wider and useful perspective on issues. In particular, the Defence Management Studies Program at Queen's looks at policy and outcomes as matters of government and public administration. At the Institute for Defence Resources Management, on the other hand, the agenda is aimed at developing from economic "principles and concepts" a theoretical base for discussion and further research. It is a rich association that we encourage and shall expand in future works.

The authors thank Marilyn Banting, Mark Howes, and Valerie Jarus for their continued, accomplished efforts to change the work of "mere scholars" into an attractive, readable product. We all thank Lois Jordan for her unflagging good spirits and willing support to the Chair of the Defence Management Studies Program and for her particular efforts to see that the conference organized around this research and this work actually came to fruition.

The Chair acknowledges and gives thanks for support to the conference and this *Claxton Paper* to the Department of National Defence, the School of Policy Studies at Queen's University, and The Royal Military College of Canada.

*Douglas L. Bland  
Chair, Defence Management Studies Program  
School of Policy Studies, Queen's University  
Kingston, Canada, May 2006*

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## CHAPTER ONE

# *Defence Procurement Lessons from Canada, Australia, United Kingdom and Spain*

*Ugurhan G. Berkok*

## INTRODUCTION

This *Claxton Paper* collects the three presentations in the “Comparative Views on the Economics of Defence Acquisition” session of the conference, “Defence Acquisition: Building Canada’s Future Military Forces.” The conference was co-sponsored by the Defence Management Studies Program at the School of Policy Studies of Queen’s University and by the Institute for Defence Resources Management (IDRM) at the Royal Military College of Canada. The paper also includes the discussion following the presentations.

Small and medium-sized countries’ defence procurement exhibits specificities. First, beyond the spectrum of strategic requirements, scale limitations restrict the spectrum of capabilities for such countries. Second, capital budgets are squeezed, due to a large defence administration overhead. Third, small procurement quantities reduce the bargaining power in international markets. Finally, such countries’ procurement policies are constrained by the limited scope of their defence industrial base (DIB). All three papers in this volume comment on these relevant aspects of defence procurement and demonstrate their country experiences.

The first paper, by **Stefan Markowski and Peter Hall** (University of New South Wales at the Australian Defence Academy), is an extensive review of the Australian procurement experience over the past three decades

split into four phases. The first phase started with general protectionism in the 1960s and 1970s and culminated with the Australian Industry Participation Program (AIPP) in 1970 and was characterized by an offsets-based intervention with multiple objectives. The procurement policy was aimed at transferring technology and developing the Australian defence industrial base (ADIB) wider and deeper. This phase continued until the early 1980s, and was called the “buy-local” strategy period. It was consistent with the popular import-substitution policies of the times. Not so unexpectedly, they “benefited inefficient producers, deterred exports and penalized local buyers.” Cost premia incurred by defence procurement were, accordingly, quite high.

The second phase began with a switch, in the early 1980s, to “best value for money, with direct and indirect offsets” in all sectors, defence or not. The subsequent reviews, in 1986 and 1988, refined the offsets program, and clarified the local content rules, making the associated cost premia transparent. However, either technologies were obsolete by the time they were transferred or too difficult to absorb into existing industrial capabilities, or given defence demand, were insufficient to sustain the developed capabilities.

The third phase, characterized by the “best value for money, with local content targets strategy,” started with the 1992 *Price Review of Defence Policy for Industry* when the offsets program set up in 1988 was abandoned in favour of more focused local content rules applied through contracting. Clearly identified and strategically important sectors were to be supported. Local content reached 55 percent of capital equipment acquisitions. New procurement rules, introduced in 1996–97, following the 1996 Defence Efficiency Review and formalized with the 1998 *Defence Industry Strategic Policy Statement*, outgrew local content rules and required industrial and regional benefits similar to those obtained in Canada a decade earlier. Although it is alleged that cost premia incurred in this period were acceptably low, the phase came to an end with the White Paper *Defence 2000* where the desirability of a competitive and specifically-targeted ADIB was revealed.

The fourth and current phase, which might be called the “eclectic procurement strategy” period with a strong “buy multinational” component, seems to be one of re-evaluation of past policies, a sharpening of the distinction between “must haves” and “nice to haves.” The former includes combat system software and support, data management and sig-

nal processing, C3I systems, system integration and repair, and maintenance and upgrades of major weapons and platforms. Two directions for future attention emerged from re-evaluation: first, an incrementalism in existing high-technology industrial capabilities; and second, the increased use of off-the-shelf acquisitions (or, in other words, a lowering of the cost-premium threshold associated with ADIB abilities). Although, four sectors (maritime, aerospace, land and weapons, electronic systems) were deemed worthy of strategic support, such a target proved too ambitious and elusive. Amongst the sectors, the approach to shipbuilding seemed particularly, and understandably, specific. Identifying the lack of Australian demand, which would sustain all existing shipyards, the strategic plan favoured a consolidation through a single prime contractor that would rationalize the work by allocating the subcontracts efficiently. This way, the industrial capacity would be preserved and, hopefully, the government would prevent capture of monopoly rents by the prime contractor. The current policy debate seems to reflect some confusion. Whereas an increase in off-the-shelf acquisitions appears in order and pump-priming of new and untested suppliers has been ruled out, the sectoral support plan arguably reflects a capture.

Two current relatively recent developments yield insights into the current Australian procurement debate. The first is the Australian participation in the Joint Strike Fighter project. The other is the deepening of the bi-national ANZAC shipbuilding cooperation with an additional future potential cooperation with Malaysia.

Australian defence has thus experimented with a whole spectrum of procurement strategies in its support of ADIB. The two fundamental differences between Canadian and Australian procurement experiences both derive from their geopolitics. Canada's geographic proximity to the United States as well as its traditional military alliance seem to have stimulated, first through the production-sharing arrangements and, later, by a continuing opportunity for CDIB to access the US defence market, a small and specialized but competitive defence industrial base. This industry has received and continues to receive support, but nowhere close to the levels enjoyed in Australia. The other difference is the strategic pressure on Australia to have a larger spectrum of forces imposed by its geographic location whereas Canada is largely free of direct conventional security threats. Such a strategic difference spills over to a more focused procurement policy and little defence industrial base policy in Canada.

## SMART MANAGEMENT OF SMART WEAPONS

The second presentation, by **Ron Matthews** (Vincent Centre for Defence Management, Royal Military College of Science – Cranfield University), focuses on defence acquisitions in a new strategic world, with particular emphasis on the United Kingdom. The paper discusses the potential technological rift between the UK and its allies. Interoperability may, due to this rift, be jeopardized in future coalition operations because of allies' potential inability to adopt high-technology weapons systems with fully networked enabled capacity. The search for affordability of these new weapons systems, in the presence of cost escalation combined with constricted defence budgets forces countries to prioritize acquisitions. However, technology multipliers embedded in higher quality RMA-type weapons systems induce what might be termed a constructive disarmament, that is, quantity loss compensated by quality gains.

Matthews underlines four debates on the post-September 11, 2001 (9/11) world security. First, "terrorists should not be allowed to dictate where the 'war' would be fought, and as a result, doctrine changed from being reactive to proactive." ISTAR (intelligence, surveillance, target, acquisition and reconnaissance) thus becomes critical. Second, the high-technology weapons systems and the network-enabled capacity proved incapable of securing "battle-space" supremacy in asymmetrical campaigns. Third, as part of the asymmetrical war, democratization or development debate may now point to the causal flow of development leading to democratization. Fourth, security is now intimately related to finding the bases of modern day fanaticism and terrorism. These debates raise serious doubts about countries' demands for high-technology weapons systems.

In fact, the five wars of globalization are identified as "illegal trading in drugs, weapons, people, money, and intellectual property." In the conditions created by such a globalization, six clusters of threats to international peace and security may be identified as: transnational organized crime; terrorism; nuclear, radiological, chemical, and biological weapons; internal violence, including civil war, state collapse and genocide; the continued possibility of interstate conflict and rivalry; and economic and social threats. These identifications simply reinforce the conclusion in the previous paragraph that RMA (Revolution in Military Affairs) or, with its new name, Transformational Warfare seem to be inadequate tools to address these security threats.

Thus, there may be a weak demand for what RMA has to offer. Moreover, its high costs and low scales of production rule out self-reliance and force international cooperation. The question arising is whether this loss of defence-industrial sovereignty matters any longer? Obviously, this question was pertinent to the UK, but not to Canada. In the 1950s, with the defence production-sharing agreements, Canada had already realized the irrelevance of the question. Matthews states that “Britain no longer seeks to maintain a national capacity for combat aircraft, and is likely to relinquish capacity in land systems over the next decade.” These developments are no surprise to the economist simply because, in the absence of, or withering of, strategic reasons for preserving a national defence industrial base, countries can not afford to ignore comparative advantages in a globalizing world. Moreover, in the same vein, we seem to have come to understand that jobs, investment, income-generation, and export potential are valued more highly than national ownership of defence undertakings.

Matthews underlines the importance of acquisitions for the UK defence budget (nearly 50 percent is allocated to equipment acquisition) and discusses the reform decade of the 1990s culminating in the Smart Acquisition concept. The important developments were the shift to a “whole life” costing approach and the corresponding all-stakeholders participation in CADMID (concept, assessment, demonstration, manufacture, in-service, and disposal) cycle evaluation of projects, the formation of the Defence Procurement Agency (DPA), the reduction of decision points and the creation of integrated project teams as a central feature of Smart Acquisition.

The worldwide foreign policy interests of the UK and its unitary state make it an unlikely example for Canada. However, in terms of its procurement policies and the defence budget allocation, the UK proves an invaluable example. First, equipment procurement making up 50 percent of the defence budget is a mind-boggling number for Canadian defence when the corresponding figure has hovered around 20 percent. Second, it would be very instructive to delve deeper into a comparison of the Canadian common procurement agency Public Works and Government Services Canada (PWGSC) and the UK’s exclusive Defence Procurement Agency (DPA).

A brief comparison of DIBs shows more similarities than differences because, whereas both are fairly competitive, CDIB is small and specialized,

yet the UK DIB is much larger (e.g., BAE Systems) but, according to Matthews, it is in the process of further rationalization.

The third paper, “Spain: a Shifting Approach to Defence Procurement and Industrial Policy” by **Jordi Molas-Gallart** (Science Policy Research Unit at the University of Sussex), analyzes the Spanish experience in defence procurement and industrial base policies. These latter policies, frozen for four decades under the Franco dictatorship, emerged in the public arena in the early 1980s with the purchase of F-18s accompanied by offsets rising by 100 percent.

This first period of Spanish procurement policies focused on offsets, with the Spanish defence industrial base (SDIB) characterized as “mainly state-owned, fragmented into many small plants, loss-making, and technologically backward.” A few large firms had emerged as industry leaders in aerospace, shipbuilding, and land armaments. The 1984 F-18s offsets agreement restricted indirect offsets and concentrated on technology transfer directly related to F-18s. The technology absorption proved very difficult with the limited capacity of the domestic industry. McDonnell-Douglas flooded the offsets management office with 7,759 small proposals, of which 1,190 were rejected. By the end of the program, defence-related offsets had amounted to only a third of the project in value, which shows a difficulty with technology absorption.

On a positive note, the Spanish electronics firm, CESELSA, which later merged with the electronics conglomerate INDRA, ended up building expertise in simulators, so much so that it now contributes to European international programs and is able to develop new systems. The 1980s witnessed the government’s push to involve domestic firms in defence research and development (R&D) programs. From the mid-1980s, Spanish defence R&D rose from negligible levels to almost 30 percent of the government total R&D expenditure in 1991. Most of this new R&D investment was placed in European collaborative projects, and mainly in the then European Fighter Aircraft.

The second period, beginning in the early 1990s, was characterized by Spain’s partnership in almost every European arms-development program. In the renegotiation of the F-18s offsets program, Spanish negotiators had absorbed the earlier lessons and insisted on direct offsets linked to the maintenance and support of the F-18 fighters. Indirect offsets were abandoned. Continuing in the same direction, the purchase of eight new Harriers and the modernization of the 12 that had been in service gave

Spain the opportunity to negotiate a joint program between the US, Italy, and Spain for the development of the new Harrier variant. Spain entered the development from the outset. Curiously, the participating Spanish firms had the right incentives to maximize both the short- and long-term benefits for Spain from this collaborative project without any government involvement.

The third period of Spanish defence procurement policies covers the transition from Spain's involvement in international arms-development programs to joint ventures with European partners and others. The first was in aerospace when DaimlerChrysler and CASA created the new firm DASA-CASA (German and Spanish, respectively) which, in 1999, joined French Aerospatiale to form the European conglomerate EADS. The second involved the land armaments manufacturer, ENSB, who produced Leopard tanks under licence with their German producer Krauss-Maffei. After various negotiations, ENSB was sold to General Dynamics (GD) in 2000 despite the running contract with Krauss-Maffei, which was guaranteed by GD to continue for another few years.

Spanish procurement and DIB policies and the internationalization of the SDIB were fairly recent. Spain may thus "be compelled to provide a stream of domestic projects to sustain specific capabilities that may already exist in other countries. The involvement of foreign partners in Spanish defence production is directly supported by the domestic market." By contrast, CDIB is small but competitive, fundamentally due to its development as a subcontracting partner to internationally highly competitive US defence industries over half a century.

One Spanish example of interest to Canada could be Spain's involvement with EADS. It would be interesting to speculate, counterfactually, what would have happened if Canada had continued in its initial participation with the European joint venture Eurofighter rather than joining the US Joint Strike Fighter project.



## CHAPTER TWO

# *Defence Procurement and Industry Development: Some Lessons from Australia*

*Stefan Markowski and Peter Hall*

## INTRODUCTION

Australia is a small open economy trading extensively in world goods and factor markets. Its size gives it little bargaining power in such markets, so for more than two decades, Australian governments have progressively dismantled tariff barriers and other impediments to trade. Traditionally, Australia has imported a significant proportion of its defence equipment, as well as defence-related intellectual property in the form of design and technical specifications. The purpose of defence procurement is, in principle, to provide the Australian Defence Force (ADF) with the weapons systems it needs, when required and at best value for the money. In practice, however, like most industrialized countries, Australia has also used defence procurement to foster industry development for national security objectives and to support broader economic goals such as innovation, technology diffusion, and new job creation.

Industry development objectives related to national security flow from Australia's policy of "self-reliance," which requires the ADF to defend the country without asking the country's allies for immediate military support. When the policy of self-reliance was first articulated 20 years ago, the domestic defence industry was seen as the fourth arm of Defence, that is, *strategically* essential for insurance reasons, to underpin the nation's security and provide it with a significant degree of autonomy. It was viewed as a producer of capital equipment (e.g., warships), spare

parts and consumables and the maintainer and repairer (especially battle-damage repairer) of most ADF weapons systems.

Since the Cold War and, in particular, since 9/11 (11 September 2001), the United States has drawn on its unique superpower status to adopt a much more interventionist policy. Australia, as a close ally, has aligned its defence policy with that of the US to include not only the core defence of the Australian continent and its maritime belt, but also participation in US-led coalition operations around the globe. Given this close relationship with the US, there is much less strategically-driven demand for *domestic industry* support as there is much less need for industrial self-reliance for reasons of national sovereignty.

The Australian Armed Forces spend over A\$8 billion (US\$5.7 billion at November 2003 exchange rates) annually on industrial goods and services (ASPI 2003a). Thus, irrespective of fourth arm national-security considerations, defence procurement as a major element in overall government procurement has the potential to play a key role in supporting overall industry development. This means there are associated broader economic implications when the Armed Forces seek *domestic* industry support for materiel supply.

Policy decisions in Australia must also take into account developments in *global* defence industry and technology. US industry dominates the world scene with its massive defence, and research and development (R&D) spending combined with a strong preference for self-sufficiency and protectionism in defence industry (Latham 2003). American defence firms increasingly dominate global defence markets; for example, the development of the Joint Strike Fighter.<sup>1</sup> While European industry could, in principle, pose a competitive challenge, Europe's defence market and R&D spending remain fragmented (James 2002). For Australia, this means increased dependence on US-made weapons systems and less opportunity for shopping around to make suppliers compete harder for the Australian defence dollar.

The growing international mobility of production inputs such as human, physical, and financial capital, offers more opportunities, but also creates problems for policymakers striving to develop a domestic defence industry. Complex new industrial facilities may be built relatively quickly by attracting foreign expertise and direct foreign investment, as demonstrated by the formation of the Australian Submarine Corporation (ASC) and the relatively short lead-time between the initial decision to build

submarines in Australia to the launching of the first Collins Class boat. However, the troubled existence of the ASC has also demonstrated that:

- the *formation* of new industry capability in a modern industrial economy is a much more complex operation than was first anticipated. This is because critical inputs (e.g., deep product and process design expertise) cannot be easily imported and in many cases can only be acquired *in situ* through learning by doing; that is, as know-how or tacit technological knowledge gained through experience; and
- the *sustainment* of such industry capabilities is difficult since, as the project nears completion, the challenge of the work declines, especially if there is no imminent prospect of follow-up work. There is then the likelihood of a rapid haemorrhage of human talent as the best team members are hired away to other jobs.

The widely-publicized history of the ASC (see McIntosh and Prescott 1999) shows the dangers of making major commitments to new industry capability in Australia when they are not underpinned by a good understanding of global defence industry trends and the long-term workings of factor markets.

Few countries have experimented as widely as Australia with different instruments to achieve defence industry policy objectives. Looking over the history of the Australian Industry Involvement program (defence-related industry policy), the Australian National Audit Office (ANAO) has argued recently that the Ministry of Defence had “set up a well structured approach to ensure that AII considerations are addressed in the procurement phases of capital equipment projects. Stakeholders in the AII program, including industry, with near-unanimity, agreed that the AII framework is an essential element in achieving reasonable outcomes in defence procurement for Australian industry and Defence” (ANAO 2003, 14). However, Defence had “no agreed outcomes or outputs to be achieved in the pursuit of either of its AII program objectives” and “in the absence of quantitative and/or qualitative performance measures for the AII program as a whole, it was not practicable for Defence to demonstrate whether, over the many years of its existence, the AII program has been making real progress, or is losing ground, in seeking to meet its objectives” (ibid.).

In this paper, we discuss the use of defence procurement to achieve strategic industry development objectives and broader economic goals. By defence procurement we mean acquiring military equipment, consumables, and associated services. We are not concerned here with *what* weapons systems to buy or *why* to acquire them. These issues must be addressed by defence capability managers as a matter of defence capability management and broadly-defined *defence policy*. Neither is the mechanics of weapons systems procurement, that is, *how* to acquire them, discussed here; that is a matter for defence-procurement policy. What interests us here is the defence industry policy, which determines *where* to purchase and *who* to buy military equipment and consumables from.

Governments may seek deliberately and actively to influence domestic industry development through defence procurement or they may not (Geroski 1990). Whether or not they seek actively to influence domestic industry development, local industry may benefit developmentally from defence-procurement orders — or it may not. We focus on Australian experience of defence industry policy to see, in practice, how the relationship between procurement and defence industry objectives has actually worked out in the case of a small country.

The structure of the paper is as follows.

- The past three decades of Australia's defence industry policy are reviewed in the second section.
- As a foundation for addressing issues mentioned above, we examine in the third section the value-adding process that delivers national security or defence (we use the terms interchangeably), using military equipment as intermediate inputs. This provides the broader context in which defence industry capability is developed and in which it operates. It also contains the forces that shape and determine such capability. It is often overlooked that demand for defence materiel is a derived demand to obtain capital goods and consumables needed to form national defence capabilities and produce, if required, the final bill for national security outputs. The discussion of the stylized defence value-chain is supported with references to how defence value chain is structured in Australia.
- In the following section, we discuss the need for government intervention in the development of defence-related industry capabilities in small economies such as Australia and the ways in which

governments may shape the development of defence-related industry capabilities.

- Next, we use the framework developed in the previous section to comment on Australia's many experiments with industry-involvement policies. Many other small, industrialized countries have faced the challenges of industry involvement in recent decades. Lessons are also drawn from the Australian experience.
- The conclusions follow.

## RECENT HISTORY OF AUSTRALIAN DEFENCE INDUSTRY POLICY

### **Offsets-based Programs**

The Australian Industry Participation Program (AIPP) was established in 1970, mainly as an offsets-based program. It aimed to provide work for and employment in Australian industry and develop new, defence-related industry capabilities by encouraging technology transfers from overseas contractors to domestic firms. Its implementation relied on the “best endeavours” of foreign contractors to identify opportunities for offsetting activities and in discharging offset obligations.

Following a major review in 1986, the Australian Industry Involvement (AII) program replaced the AIPP. AII placed obligations on foreign prime contractors to help establish sustainable, defence-related industry capabilities in Australia. Local content and offsets requirements involved direct technology transfers, training, R&D, and increased local involvement in design and development. Civil sectors of the national economy were to benefit through the subsequent diffusion of technological know-how and best industrial practice. The 1988 Australian Defence Offsets Program (ADOP) sought to sharpen the distinction between different forms of local content and offsets. Australian production was defined as direct, internationally competitive participation (with no cost premiums) by Australian industry in a defence equipment contract, and designated work was a further local content component — involving a cost premium. Defence offsets were additional to both types of local content requirements. The ADOP targeted new capabilities in defence industries to enhance Australia's ability to maintain and adapt military equipment, produce munitions and spare parts, and acquire technologies needed for the longer-term needs of the Australian Defence Force (ADF) (Hall and Markowski

1996). In 1989–90, the share of AII in defence equipment contracts was about 70 percent, with the two types of local content accounting for the bulk of it (Australia. DoD 1991, 18).

### **Local-Content Programs**

Policy experiments with local content requirements continued into the 1990s. Following the 1992 Price Review of Defence Policy for Industry, Defence decided to reduce its reliance on less focused mechanisms such as offsets in support of AII. The latter were downgraded as a delivery mechanism to be used in defence procurement and described as a measure of last resort, only to be applied in relation to high-priority capability requirements. The ADOP was abolished and replaced by more focused and specific provisions within contracts (Hall and Markowski 1996). By the mid-1990s, all government procurement above A\$10 million had the policy-driven aim of maximizing opportunities for Australian and New Zealand (ANZ) industry development and all defence acquisitions valued at A\$5 million or more were subject to local content and industry development requirements, implemented through “normal” contracts (Markowski and Hall 2004). The new AII arrangements focused on two priority areas:

- industry capabilities that Defence regarded as *strategically important* to develop and support a particular acquisition; and
- industry capabilities that Defence regarded as *highly beneficial* to develop and support the acquisition concerned and with the potential to sustain longer-term industry development.

In 1996/97, 55 percent of capital equipment was sourced locally and 87 percent of expenditure on defence logistics was directed to local suppliers (Australia. DoD 1998, 5).

Following the 1996 Defence Efficiency Review, AII was subjected to yet another “refocusing process.” In 1996/97, the then-Junior Minister for Defence Bronwyn Bishop introduced the “Bishop Procurement Rules” for foreign companies operating in the Australian defence market. Under the rules, foreign companies operating in Australia were asked to provide evidence of significant local capital investment, employment of Australian residents, involvement in local R&D activity, support for local small and medium enterprises and independence from overseas parent companies

as demonstrated by exports from Australia (ibid.). In our view, local content requirements are implicit in the Bishop Rules and, though offsets are not mentioned explicitly, the “demonstrated independence of action from overseas parents” of Australian subsidiaries “through exports” could be interpreted as a requirement for buybacks or countertrade (Markowski and Hall 2004). The *1998 Defence Industry Strategic Policy Statement* (DISPS) formalized the Bishop Rules as a set of “Procurement Rules for Foreign Firms Operating in the Australian Defence Market.” It confirmed AII’s role as Defence’s main tool for drawing overseas contractors into developing local industry capability and assigned Defence the task of developing a culture that would foster “competitive industry as an integral component of ADF capability” (ibid., 2). Specific percentages of AII were to be set on a project-by-project basis (ANAO 2003, 70).<sup>2</sup>

In 1997, Defence released *Defence Needs of Australian Industry*, which “brought together, for the first time, comprehensive information on Defence needs from Australian industry across *all* capabilities” (Australia. DoD 2000*b*, 7). While it identified “the knowledge edge” as Defence’s highest priority in capability development, it included a 30-page list of capabilities that are described as strategically important, highly desirable, and with little indication as to which of these capabilities are strategic “must-haves,” that must be sustained in Australia, as opposed to “nice-to-have” categories, which may vary from desirable to important. Not surprisingly, the publication of the list caused some dissatisfaction and inflated industry hopes for future work. Early in 2001, Defence reviewed its industry policy framework and concluded that although policy objectives “remained sound, their implementation had been ineffective” (Australia. DoD 2002, 1).

### **Post-2000 Contradictions**

The recent White Paper, *Defence 2000: Our Future Defence Force* reaffirms government support for “sound, *competitive* (our italics) domestic industrial base as a key element of national defence effort” (Australia. DoD 2000*a*, 98). It recognizes that Defence needs “a specifically targeted set of (industry) capabilities” and that “with our national defence expenditure accounting for only 1 percent of world military expenditure, it is unrealistic to aspire to complete industrial self-sufficiency. Nor is complete self-sufficiency necessary, given our ability to access

and acquire many important technologies from overseas” (ibid., 98). Specifically targeted industry capabilities include combat system software and support, data management and signal processing, C3I systems, system integration and repair, maintenance and upgrades of major weapons and platforms (ibid., 99-100). To develop/maintain these capabilities, the government seeks to:

- “capitalise on the potential of Australian industry to offer (technologically innovative) solutions by continuing to initiate and pursue high-technology projects,” although “important parts of our technology development effort will remain based on existing designs, as were the ANZAC and Minehunter Coastal ships”; and
- “make greater use of (overseas) off-the-shelf purchases, especially where the additional capability from Australian-specific modifications does not justify the increased cost and risk. However, total reliance on the off-the-shelf purchases is neither achievable nor desirable” (ibid., 100).

The White Paper also notes that “Defence industry will not flourish within the Australian defence market alone, with its finite and uneven level of demand. Rather, sales to Defence should be the basis for capturing broader markets.” Thus, “in short, Australian defence industry needs to be *competitive on an international basis*” (our italics) (ibid., 101). To achieve that, “the Government will shape the environment in which industry makes its decisions, but *will not intervene and shape the market through subsidies and preconceived solutions* (our italics). We will not limit ourselves to purchases from Australian industry, nor pay an unduly high premium for them” (ibid.). Like the 1998 DISPS before it, the White Paper regards competition for, and in, equipment markets as the mechanism needed to deliver value for money for the ADF.

On the other hand, recent defence industry policy statements have betrayed a telling undertow of tension concerning the relationship between government and market. Competition has often been criticized in Australia as wasteful — for leading to excess capacity, high transaction costs, and *higher* (sic) prices. It has been asserted that, despite AII, domestic suppliers find it difficult to compete against imports and are reluctant to make long-term investments in capacity. In 2001, the government foreshadowed the adoption of “a strategic approach” to defence procure-

ment to address the issue of sustaining key industry capabilities and reducing the “wastefulness” of competition (Australia. DoD 2002). The previous project-by-project approach would be replaced with long-term, multi-project (sectoral) plans aimed at sustaining key defence-related industry capabilities. To achieve these strategic objectives, there is a strong preference for dealing with a small number of larger and more broadly based contractors, effectively (sectoral) industry champions. This would effectively eliminate most for-the-market competition although, arguably, some in-the-market competition may continue at (small) subcontractor levels (Markowski and Hall 2004).

At the end of 2001, the government endorsed a new strategic approach whereby “individual acquisition decisions would be strategically linked, and offered to key industry suppliers as part of a long-term, multi-project commercial arrangement ... that might involve a move away from open competition and include consideration of sole-source procurement” (Australia. DoD 2002, 2). The current policy settings have been given effect in four sectoral plans, one each for the separate environments of maritime, aerospace, land and weapons, and electronic systems (e.g., Australia. DoD 2003). These plans supersede the *2000 Defence Needs of Australian Industry* list as they identify broad industry capabilities to be sustained in-country in each of the four sectors. In principle, industry capabilities required in-country under the plans follow White Paper guidance. However, the plans remain ambiguous as to which capabilities are needed for strategic as opposed to general economic reasons. For example, *ship-building*, as opposed to maintenance/support capabilities, can hardly be regarded as a strategic imperative, although they may well be justified on economic grounds.

The first evidence of how the new approach will work is the Australian Naval Shipbuilding and Repair (NSR) Sector Plan. The first draft of the NSR Plan was made available for public consultation in September 2002. As of November 2003, it was still awaiting government approval. The imperative behind the NSR plan is the prediction that Australia’s demand for naval *shipbuilding* (as opposed to ship repair) over the next 20 years will be insufficient to sustain existing shipyards and that shipbuilding capabilities are thus at risk. To address this issue it is proposed:

- to set up a single shipbuilding entity as sole prime contractor for all major shipbuilding and repair work. The prime contractor would then

contract out a large portion of module building and sub-assembly to specialized module suppliers and system integrators;

- the single naval shipbuilder would enter a long-term alliance contract with Defence;
- the ownership of the new entity could draw on existing shipbuilders. Government would retain enough control to ensure the sustainment of critical capabilities in industry and prevent the capture of monopoly rents by the prime contractor.

The exact nature of mechanisms needed to achieve these requirements is unclear. (For a critical response to this assertion see ASPI 2002.) Other sectoral plans allow for more competition at the first-tier contractor level, but they are similar in one respect: there appears to be a strong preference for dealing with a small number of larger and more broadly based contractors.

The undertow of tension is the subject of comment in the *Defence Procurement Review 2003* (Kinnaird 2003). As the review points out, the current government is exposing industry to international market pressure to drive restructuring and raise productivity (ibid., 44). On the other hand, the recent “development of industry policy in Defence, particularly through the four specific sector plans, seems to be more ambitious and less in tune with both the White Paper and the Government’s general industry policy” (ibid.).

The specific nature of the sectoral plans is yet to be determined, but they contain elements bearing a striking family resemblance to earlier schemes. At the time of writing, AII has two principal components: local content (ANZ supplies not subject to cost premia) and strategic industry development activities (SIDA), used as an alternative to local content when opportunities for local content do not exist (ANAO 2003, 65). SIDAs comprise primary activities (e.g., R&D, exports, innovative and risky activities) and enabling activities (e.g., technology transfers, training and provision of infrastructure).<sup>3</sup> The current AII framework can be viewed as a further evolution of the earlier concepts of Australian Production and Designated Work and, although this is not formally stated, SIDAs are likely to involve cost premia for local sourcing (Markowski and Hall 2004).<sup>4</sup> In 2000/01, AII (local content and SIDAs) accounted for 57 percent of contract value for new capital equipment with 43 percent for aerospace

systems, 68 percent for electronic systems, 44 percent for land systems, and 70 percent for maritime systems (ANAO 2003, 69, Table 3).

### **JSF Collaborative Procurement**

New challenges for the AII program are now being posed by the most recent acquisition plans. These involve technologically advanced weapons systems (e.g., replacements for F-111 and F/A-18 aircraft, new air warfare destroyers, new combat systems for the Collins class submarines) identified in the (rolling) *Defence Capability Plan*, which evolved from the 2000 White Paper and contains long-term projections of new equipment acquisitions. Technological change, especially that associated with the “digital revolution” and “network-enabled” battlespace technologies, has increased uncertainty. The new acquisitions are likely to involve a leap into US-dominated product technologies and may thus trigger a major restructuring of local defence-related industries (Markowski and Hall 2004). This is already evident from Australia’s involvement, as a Level III (informed) Partner, in the Joint Strike Fighter (JSF) program, which is increasingly viewed as a template for many future Australian acquisitions. As we note elsewhere:

In principle, traditional offsets and workshare arrangements are specifically excluded from the JSF program: all sub-contractors are expected to be internationally competitive ... While the rhetoric around Australian industry participation in the project sounds like the familiar rationale for AII (ANAO 2003, 50), the reality is that participation in the JSF supply chain is likely to be limited to firms that are well established and have a track record of highly competitive supply. There appears to be little scope for pump-priming new or “untested” suppliers as was the case under AII over the past 15 years (e.g., the Australian Submarine Corporation)... While the old style AII aimed to develop *new* industry capabilities in Australia, JSF suppliers are likely to be drawn from existing successful producers. Import substitution dominated the “old-style” AII arrangements. Successful participants in the JSF component supply chain are more likely to be export-oriented (an informal but *de facto* buyback operation) (ibid., 208).

Unlike the traditional AII, the JSF-style of collaborative procurement is designed to strengthen the economic foundations of defence

acquisitions through specialization and long-term supply arrangements. It is not well suited to achieving industry *development* objectives and lower-tier contractors are most likely to be engaged on a come-as-you-are basis. Nevertheless, government facilitation will be helpful, at least to inform smaller firms about opportunities for participating in the project and the best ways of marketing their capabilities. In Australia, as in Canada, an interdepartmental JSF Industry Advisory Council has been set up to assist firms in bidding for future work.

In sum, looking at the current situation, we are inclined to argue that, in the 30-year history of defence industry policy-making in Australia, there has never been a more confusing and confused set of policies than the current bundle of industry statements, sectoral and capability plans. While the 2000 White Paper reaffirmed the government's commitment to competition and openness of the Australian economy in broader industry and public procurement policy, the sectoral plans can be interpreted as a retrograde step responding to vested industry interests. This has been captured best by the government's own inquiry into Australian defence procurement, which concludes, *inter alia*, that "It is not clear how the objectives in the sector plans will be achieved or measured.... the lack of drivers for innovation and improved competitiveness would appear to be out-of-kilter with the Government's broader approach to industry policy" (Kinnaird 2003, 45). If it wishes to play a role in shaping defence-related industry, "Defence is more likely to succeed in fostering and sustaining desired industrial capabilities in Australia if it develops and promulgates a list of clearly defined outcomes to industry (as it has in the case of the electronic sector). Industry can then evaluate the requirements and adapt accordingly" (*ibid.*).

## EQUIPMENT SOURCING IN DEFENCE VALUE-ADDING CHAIN

### **Defence Equipment Supply Chain**

The production of national security may be viewed as a value-adding chain (defence supply chain), where domestic industry upstream (the national defence industry base or NDIB) turns out intermediate inputs (equipment, consumables, and logistic support services) for the end-producer of national security — the National Defence Organization (Defence). Overseas suppliers are the other source of Defence equipment

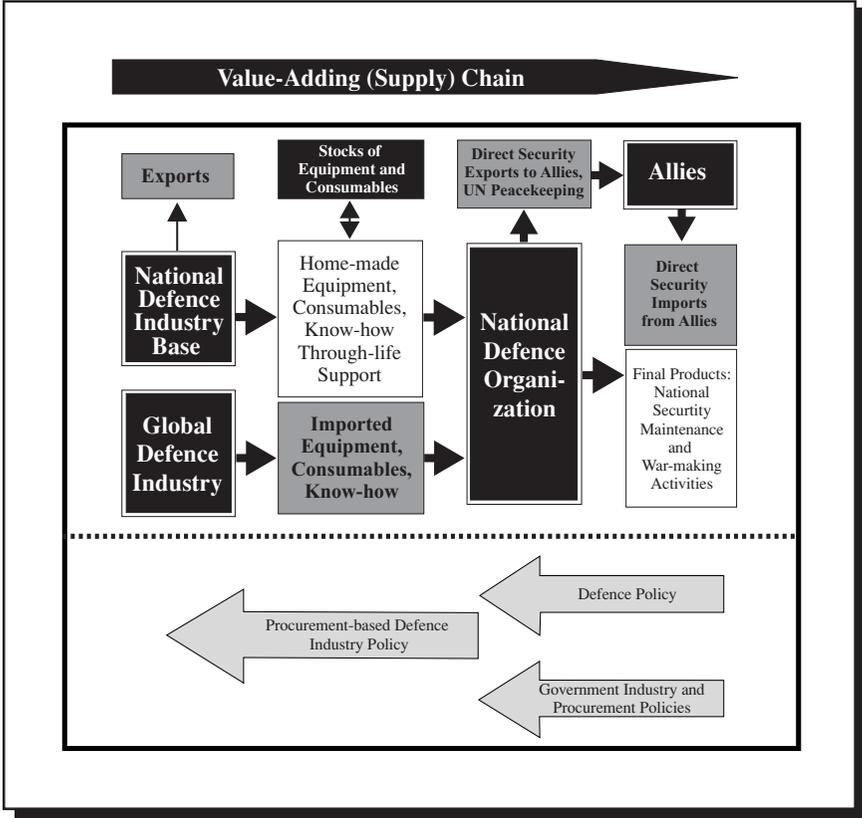
and consumables. Figure 1 depicts a stylized model of that part of the Defence value-adding chain that deals with the acquisition of equipment, consumables, and equipment-related services. Its purpose is to highlight choices that are available to governments determining the volume and scope of national security production. The figure suggests a significant number of interesting features in the defence value chain.

Much public debate about the influence of defence procurement on local industry implicitly begs the prior question of whether and when it makes sense to buy in-country in the first place. In Figure 1, arrows pointing from left to right indicate the flow of goods and services through the defence value-adding, or supply, chain. The final products of national security maintenance, war-making and peace-keeping, may be imported directly from allies or created on the basis of goods and services generated in-country or themselves imported. But this is merely a statement outlining the set of logical possibilities. It says nothing about what determines the magnitude of direct imports of security from allies as opposed to domestic provision. Neither does it say anything about why the ratio of domestically produced, NBID-sourced goods to imports from global defence industry is high or low or changing. Yet, clearly, the scope for procurement to influence domestic industry development is influenced by: (i) the extent of dependence on allies, rather than the national defence organization; (ii) the level of national defence procurement demand from local industry; and (iii) the propensity to source defence inputs overseas.<sup>5</sup>

To understand the relative magnitudes of supply flows in the defence value-adding chain for any country, we must first look at the high level military, and security-strategic, decisions which, in turn, shape demand-side requirements for defence goods. In the diagram, these are represented by an arrow labelled Defence Policy pointing from right to left. In relation to dependence on allies, defence-policy options run from total (100 percent) dependence to aspirations for complete autonomy.

Along this dimension, the greater the dependence on allies, the smaller is the opportunity for national defence-procurement demand to be used to achieve domestic industry goals. Assuming, however, some degree of aspiration for an independent defence capability, imports of inputs into the domestic defence value-adding chain might be large or small. The greater is the contribution of the NDIB, the greater, potentially, is the scope for procurement decisions to influence local industry.

**Figure 1**  
**Defence Value-Adding Chain**



Whether orders for defence goods are sourced locally or overseas depends partly on high-level defence-strategic decisions and partly on economic aspects of policy. In relation to strategy, some defence systems and their associated production systems in the supply chain may be regarded as so essential to national defence that they must be maintained in-country. This is the security or fourth-arm-of-defence argument for investing in and maintaining a local defence industry. It is a strategic decision whether to have such industry or not, though economic arguments

may be used to reflect on the alleged “inefficiency” of taking this route rather than relying on allies or on sources of foreign supply. Once the decision has been made on strategic grounds, however, the door is open — if a government wishes — to think of how investment in such industry might yield greater or smaller industry development benefits nationally, in terms of technological innovation and its diffusion, employment, and trade.

We now quarantine from the discussion those parts of defence procurement that a government believes it to be *strategically* necessary to source from domestic industry. The remaining part of procurement could, in principle, be sourced domestically or overseas. The extent to which industry-development objectives are then addressed by defence procurement will depend on the policy approach taken by the government of the day. At one extreme, a government might take a purely *laissez-faire* approach, seeking to make acquisitions by competitive tender open to potential suppliers from any location, domestic or overseas. And at the same extreme, it might make clear the functional characteristics of the system it wishes to acquire, but placing no conditions on how or where the system is produced. At the other extreme, the government might nominate its supplier without competitive tender and require that the supplier meet a wide range of conditions in the production process, especially in relation to the domestic location of production and the sourcing of its inputs. A common institutional model for achieving the same result directly would be for production to take place in government-owned factories and facilities. Between the extremes, every sort of condition might be applied in terms of the openness of competition for contracts, location of supply, ownership of inputs, and so on.

Depending on the model adopted, the prospects for achieving domestic industry development goals vary widely. In the pure *laissez-faire* model, production will take place wherever it can be achieved at best value for money. If this is entirely overseas, local industry may not be called on to be involved in the supply process at all. (Notice that we avoid saying industry may not *benefit* from the process since measures and perceptions of benefit will vary, depending on the standpoint of the observer, and may be viewed as zero from some perspectives.) On the other hand, even under a pure *laissez-faire* model there is no reason to expect all local producers to be uncompetitive across the board, and some government contracts may well finish up in domestic hands. When that happens,

whatever investment, employment, innovation and trade then occur as a result may be viewed as industry development under conditions of competitive supply, but not activity that government has had deliberately decided to prompt and promote.

If these outcomes differ from what is regarded as desirable by other arms of government or what is politically marketable, there are likely to be pressures for government to work through the defence-procurement process to influence economic variables. Commonly, there are pressures to use defence contracts to create employment and these may imply requirements to invest in domestically located plant and equipment, to order intermediate inputs from local suppliers, and to arrange training and education programs associated with procurement programs. Governments then find themselves seeking to implement any of the wide range of mechanisms available to them to promote local industry development objectives. Unless supply takes place under competitive conditions, as noted above, it is likely (if not inevitable) that costs will be higher as a result. If the supplier is a government factory or facility, higher costs might be easier to disguise, but there is substantial evidence that inefficiencies are likely to arise. Bearing in mind that we have quarantined security-related benefits for the purposes of this part of the discussion, it is then up to advocates of support for industry development objectives to demonstrate that the *economic* benefits of locally-sourced procurement outweigh the higher costs.

The two strands — security-related and economic — come together if a government chooses to ally itself with another country and then must face the issue of how and where to source inputs into the defence supply chain. One of key requirements for participation in coalition warfare with allies, in particular the US, is *interoperability* of equipment. The alliance thus predisposes national defence-procurement agencies to purchase from sources capable of producing systems that meet the interoperability constraint. In the case of the Australian Armed Forces' growing dependence on the US military systems, one might naturally expect many such sources to be located within the US itself, but there is no logical necessity for them to be found *only* in that country. Governments interested in competitive supply should be ready to invite tenders from any quarter. On the other hand, a resolute determination to promote local industry by imposing local content conditions could now come at an even higher additional

cost than those usually calculated in the premia governments have been prepared to pay in the past. If local production meant failure to achieve compatibility and interoperability, security goals would be sacrificed as well as efficient economic outcomes.

### **Organizational Framework of the Supply Chain**

It is the responsibility of the government to maintain national sovereignty (Adam Smith's first duty of the sovereign) and, in democracies, the use of violence in maintaining national sovereignty is normally a government monopoly. The formation of the necessary capabilities to use power when directed by the government is the responsibility of the National Defence Organization (NDO or Defence) which includes organizational elements such as the three services.<sup>6</sup> In Figure 1, all these organizational elements are subsumed in the NDO box.

In many countries, the procurement of equipment is delegated to a specialist organizational element within the NDO, the Defence Procurement Agency, which in the Australian case is called the Defence Materiel Organisation (DMO) and is responsible for both equipment acquisition and logistic support for it. The head of the DMO has the authority, operational responsibility, and accountability for tendering, contracting, delivering, and supporting new equipment.<sup>7</sup> At present, the DMO is also responsible for the identification of those in-country industry capabilities that are deemed essential for the production of national security. In Figure 1, the DPA is not shown as a distinct organizational element and is subsumed in the NDO box.

The NDIB produces goods and services required by Defence. It may also export some of its products. It includes business entities that are located in-country and are fully owned by residents as well as local subsidiaries of foreign companies. The NDIB comprises all those elements of in-country industry that are capable of undertaking work for the NDO, that is, it includes but is not limited to, those industry capabilities that are needed in-country for strictly strategic reasons. The NDIB is a part of the defence value-adding chain and thus it is a link in the national security value chain (see the NDIB box in Figure 1). Those elements of the NDIB that are designated by the NDO as critical to the national defence effort are sometimes referred to as the fourth arm of defence. Once Defence decides how much national security to produce in-country and how

much to import from the allies it must then decide what industry capability is needed in-country by way of support, such as, for defence strategic reasons.

Another important dimension of the defence supply chain concerns the extent of vertical integration between the arms supplier/producer and the arms buyer/user. In western democracies, government agencies such as the NDO make most final defence products but buy most of their inputs, in particular weapons systems and consumables. The government must determine, however, whether military personnel are to be largely conscripted or hired through labour markets, and whether intermediate inputs such as military equipment and consumables are to be produced in-house, by public servants in government-owned facilities, or purchased from external suppliers. Further, publicly owned industrial entities can be corporatized into quasi-independent cost centres selling their outputs to Defence. In Figure 1, The NDIB is separate from the NDO and it is assumed that the latter buys goods and services from the former.<sup>8</sup>

### **The Production of National Security**

The NDO produces defence outputs, such as combat force projection or peacekeeping operations, and uses inputs such as human resources, capital equipment, and consumables to achieve its national security objectives subject to resource constraints imposed by the government. The use of inputs other than equipment and consumables (defence materiel) is not shown in the figure. Some defence outputs may be exported in the form of Defence's contribution to coalition/alliance-based military operations, UN peacekeeping and -enforcement operations, and so on (e.g., Australia's contribution to the UN-led peacekeeping and -enforcement operations in East Timor and participation in the US-led intervention in Iraq). Similarly, a country need not produce all the national security it requires: some of it may be "imported" directly through international alliances (e.g., Australia's alliance with the US).

While there are export markets for some defence services, for example, a country may get paid for its contribution to peacekeeping operations (and some developing countries export mercenary services), alliances such as that between Australia and the US involve non-market exchange, where promises of mutual assistance are bartered on an equality of sacrifice basis.<sup>9</sup> Thus, alliances determine how much local capability is required and also, for interoperability reasons, what sort of capability. A

key national security decision is to determine how much defence is to be produced in-country and how much imported from allies.

Economists normally describe the sort of transformation of inputs into outputs that occurs within the NDO box in terms of the production function (Hildebrandt 1999). However, the defence-production function is quite different from conventional economic models of input-output transformation. This is for two reasons. First, only a very narrow range of observable defence outputs is actually produced in peacetime (e.g., functions of state, border surveillance, and deterrence). Most defence outputs are not observable; they are contingent on the occurrence of particular military emergencies, which vary from low-level threats to global war. That is, they are not produced until certain military contingencies occur. (To simplify, we distinguish between two extremes: peacetime, when a bare minimum of defence output is actually produced, and wartime when all output potential is fully utilized.) Second, defence outputs are difficult to measure even in wartime. Deterrence in peacetime is hard to identify and hence measure; but even combat-related outputs are hard to evaluate with confidence.

It is the government's responsibility to determine the range of outputs that the NDO should have the capability to produce under different threat scenarios and to provide it with sufficient financial resources and institutional support to allow it to form these capabilities, that is, to acquire human and physical assets and the associated warfighting know-how that could be deployed in response to threats to national sovereignty. "In Defence, the concept of defence capability involves more than fighting platforms ... Rather it is the combination of people, organization, equipment, systems and facilities to achieve a desired operational effect. It also encompasses the ability to prepare and maintain operations within a designated time for a specific period" (Kinnaird 2003, 2).

By determining the desirable burden of defence — the share of defence expenditure in gross domestic product (GDP) — the government determines the volume of resources that flow onto upstream providers of inputs to the NDO (e.g., the wage bill of military and civil defence personnel, equipment and consumables budgets, and so on). In Australia, the current burden of defence is about 2 percent of GDP. In 2000, about 20 percent of the total defence budget of US\$7 billion (in 1999 prices and exchange rates) was accounted for by procurement (IISS 2002; SIPRI 2002). In comparable figures, Australia's defence spending is similar in

scale to that of Canada (US\$7.5 billion) and Spain (US\$7.1 billion), but the proportion of its defence budget spent on procurement is higher (Canada 13 percent and Spain 14 percent).

### **Defence Outputs**

Since the production of defence outputs, shown as the “Final Products” box in Figure 1, is contingent on actual threats to national security, most of these outputs are not observable and measurable in peacetime. Defence outputs also involve a high degree of “publicness,” with deterrence (ability to deter threats to national security) and military intelligence as two real-life examples of a pure public good.<sup>10</sup> Due to their publicness, these outputs are not sold in the market. Thus, even when defence outputs are observed and measured, their contribution to national wealth cannot be valued directly by reference to market prices.<sup>11</sup> There are no price signals from the general public as final customer to indicate their preferences for one type of defence capability over another; such choices are made on their behalf by the government. However, in Australia, the release of the last Defence White Paper (Australia. DoD 2000*a*) was preceded by extensive public consultations and a marketing exercise to sell the government’s defence policy to the general public.

Despite these measurement and valuation difficulties, the Australian government buys outputs from Defence to achieve desired national security outcomes. A budgetary framework of outcomes and outputs was introduced in Australia in 1999 and applies to all government agencies (ASPI 2003*a*). The purpose of this quasi-transactional framework is to provide a basis for setting targets for agencies and measuring their performance and it reflects the general philosophy of engendering responsibility for resource allocation in public agencies. The government acts as an agent for the public at large in commissioning deliverables (outputs) from agency providers and paying prices for them. Agencies, such as Defence, are to be assessed in terms of “what they do” (output volume and structure) and “what they achieve” (outcomes).<sup>12</sup> However, there is little indication of what is to be achieved under outcomes other than to contribute to “the defence of Australia and its interests” (ASPI 2003*b*, 42). Also, output is a misnomer as it refers to broadly defined capability elements, for example, the “capability for major surface combatant operations” (*ibid.*, 6, Table 1.2.1.).<sup>13</sup> Similarly, output prices reflect the cost of formation and

sustainment of these capability elements rather than the value of potential deliverables to the taxpayer.

The output-outcome budgetary framework deals with the short-term provision and sustainment of capability, essentially with capabilities in being and human elements of new capability formation, that is, recruitment and training of defence personnel. Its key purpose is “to provide a basis for setting targets and measuring performance” (ibid., 7). The acquisition of new equipment, upgrades, facilities and non-military capital items comes under the capital budget.<sup>14</sup> However, substantial cash can be diverted to the capital budget from “within the price of outputs” (ASPI 2003b, 47).<sup>15</sup> In addition, the government provides an annual injection of equity (a *de facto* balancing item to achieve the target level of capital spending) and revenues from asset disposals may also be channelled to the capital budget. Under this resource-management framework, equipment (broadly defined) as an element of capability is acquired separately from other capability elements (e.g., human resources, logistic support, complementary capabilities). This fragmentation of new capability formation is one of the key problems undermining the efficient working of the procurement system (see below).

### **Defence Output Capability**

In peacetime, given the contingent nature of most defence outputs, Defence is primarily engaged in the formation of capability to deter and counter threats. The peacetime production capability of the NDO is only partly utilized as it is also tasked with the development of surge capability to increase its operational tempo (production rate) when certain contingencies materialize. In the transactional relationship between the government and Defence, output and capability outcomes provide a highly aggregate description of Defence capabilities. “In effect, the White Paper created a ‘contract’ between Defence and Government for delivery of proposed capabilities on time and on budget” (Kinnaird 2003, 1).

In the current organizational framework of Australian Defence, the responsibility for new capability formation and the sustainment of the existing military capabilities is vested in output managers, in particular the three Service Chiefs, the Commander Australian Theatre, the Deputy Secretary Strategic Policy, and the Deputy Secretary Intelligence and Security. As one of his many functions, the Vice-Chief of the ADF is

supposed to oversee the whole area of capability formation and management. However, there is no single point of accountability “to provide better integration of the capability definition and assessment process and to ensure that it maintains a joint warfare focus” (ibid., iv), and “the involvement of a number of committees in the management of the capability definition and assessment process has served to further diffuse the accountability and authority for capability decisions” (ibid., 10).

Not surprisingly, the 2003 government review tasked to examine the mechanics of defence procurement observed that most problems originate in Defence upstream of DMO:

Our review has led to the conclusion that poor project definition, analysis and planning, before tenders have been sought from industry, are one of the causes that contribute to failures, such as cost over-runs, schedule delays, and reduced capability of the delivered platforms and systems. The principal reason is that the current process of capability definition and assessment has generally lacked rigour and discipline. Often there has been an inadequate understanding of technology risks and whole-of-life costs and too great a focus on presenting specific platform solutions to government in advance of a more complete understanding of a joint approach to overcoming the identified capability gap. In short, the process has not given government a reasoned and fully investigated set of options on which to make informed investment decisions (ibid., 9-10).

Major capability enhancements must be endorsed by the government, either by the Cabinet (large projects) or the Defence Minister. This process involves a two-pass system of government approvals. At the first pass, the government should be presented with functional options to meet an identified capability gap, including the indicative schedule and life-cycle cost. The outcome of this stage is government approval for Defence to proceed to more detailed evaluation of options, including technological solutions. At the second pass, detailed options are evaluated and the government gives (or declines to give) its approval for Defence to proceed to tender for the agreed solution. The (annually updated) Defence Capability Plan provides a list of government-approved capability enhancements.<sup>16</sup>

### **Defence Inputs**

As in all other areas of production activity, demand for inputs in the production of national security is a derived or dependent demand. The formation of downstream capability to produce defence outputs drives the value chain and ultimately provides a justification for one resource allocation rather than another higher up the value chain. The military equipment used by the armed forces is analogous to the intermediate products (capital or investment goods) of civil industry and military consumables equivalent to civil industry materials. It is the armed forces that produce final defence services and derive immediate benefit from the deployment of equipment provided for them. As the focus of this paper is on industry policy, we have excluded from Figure 1 inputs such as human resources. Normally, there is considerable choice in the way different inputs may be combined to produce a particular set out of outputs. The NDO (or the government) may choose different combinations of human and non-human resources, including technological know-how embodied in people and equipment. Over the past 15 years, successive governments in Australia have favoured a labour-saving and technology-intensive input mix. Thus, the ADF is small (55 thousand uniformed personnel are employed to defend an area of about 10 percent of the globe's surface) but relatively well-equipped with modern weapons systems to produce technology-based force multipliers (e.g., using a smaller number of personnel but more lethal equipment).

The potential substitutability of inputs is often ignored by capability managers. Opportunities to substitute one type of input for another are often greater than is acknowledged, but may indeed be limited for certain types of desirable defence outputs, for example, counter-terrorist activities, peacekeeping, and nation-building operations tend to be relatively labour intensive. With the increased involvement of the ADF in such labour-intensive operations, the government has reversed the long-term trend of decreasing military personnel and approved increases, albeit small, in personnel numbers (ASPI 2003*a*). In general though, it is necessary to stress the importance of input substitutability in the context of defence value chain. For example, a limited choice of equipment may be offset by increased opportunities of substituting people for equipment. Similarly, direct imports of national security from allies reduce the need to produce it in-country, thus, reduce the demand for people and equipment.

### Weapons Systems

In this paper, we are particularly interested in one type of input into national security production — the *weapons systems*. We define a weapons system as:

a composite of equipment employed as an entity to accomplish a military mission (such as destroying enemy installations, identifying hostile aircraft, protecting advancing infantry or surveilling territory). Each weapons system provides a range of capabilities, which are of military value in and of themselves and in their interaction with other systems and resources ... considered as a product, weapons systems are *distinguished* (our italics) by the substantial technical difficulties that are involved in their conception, development and production. These difficulties reflect partly the sheer technical complexity of the systems and partly the very long periods of time involved in their planning and use cycle (Ergas 2003, 2-3).

The latter part of the statement needs to be qualified, though. First, technological complexity and associated design and production problems are a distinguishing characteristic of only those weapons systems that are very large and/or developed at the cutting edge of technological capability (e.g., B2 bombers, nuclear aircraft carriers and submarines, network-enabled battlefield management systems). The global defence industry produces a wide range of weapons systems from simple rifles to the most complex warfare equipment used in missile defence or in space warfare. The most complex weapons systems may indeed be distinguished from less complex products by the technical difficulties involved in their design, development, production, and deployment. They may also be more complex than many civil systems such as global telecommunications networks, nuclear power stations, or new towns. But the complexity of the latter should not be underestimated.<sup>17</sup>

Second, technical difficulties associated with the development of very large and complex systems on the leading edge of technological know-how are unique to large military powers, in particular the US. They certainly need not be experienced by countries such as Australia, which can import nearly all the equipment they need or produce equipment under licence. There is nothing that particularly *distinguishes* the production of ANZAC frigates, minehunters or the assembly of F/A-18s in Australia as technologically challenging. And the much publicized Collins class

problems (e.g., combat-system integration) have had more to do with the management and politics of the submarine procurement process than the technological challenges of building conventional submarines in Australia (see McIntosh and Prescott 1999).

Third, as Ergas (2003) notes, the military utility of most weapons systems depends on their performance relative to the systems used by adversaries. Competition between alternative products is more performance- than price-related. However, this is also true of many civil products, for example, high fashion or luxury sports cars. The distinguishing characteristic of weapons systems is not necessarily their technical complexity or relative performance characteristics but the contingent nature of their deployment. Like most large complex systems, civil and military, weapons systems are “experience goods,” to use another economic term. Learning from experience that comes with use is often critical to their design and system development and integration may continue well into the system’s in-service life.<sup>18</sup> However, most complex civil systems tend to be put into use upon completion. Thus, it is possible to learn from their application. By contrast, many large military systems cannot be tested in anger, as it were, unless there are military emergencies that justify their deployment. In some cases (e.g., strategic nuclear weapons), a system’s value lies in its deterrence capability and its actual battlefield effectiveness may never be known.

In this environment, military equipment buyers make their acquisition decisions under considerable uncertainty about the true productive potential (relative battlefield performance) of their acquisitions and NDOs investing in battlefield capabilities often do not know the true potential of their acquisitions until they have the opportunity to test them in warfighting conditions. Given the innovative nature of warfare with its relentless search for the enemy’s vulnerabilities, peacetime testing of many weapons systems will always be an inferior substitute for their wartime application. Further, it is only during conflicts that weapons countermeasures, developed by potential adversaries, but concealed in peacetime, are finally revealed. Thus, it is the lack of opportunities for learning through experience that distinguishes complex military systems from their civil counterparts. Arguably, *inexperience* goods may be a more applicable description of such products.

Fourth, it is difficult to determine how much value military equipment and other inputs add to defence output. In part, this is due to

uncertainties about the nature of military technology that might be applied by potential adversaries and, thus, the relative performance of different weapons systems. In part though, this is because the armed forces do not sell their services, even when they are tangible enough to measure and evaluate. This often leads military equipment to be over-engineered.<sup>19</sup> The propensity to over-engineer defence products is also a part of the broader culture that permeates defence organizations, which favour the endless additions of bells and whistles to weapons systems (gold-plating being a part of this tendency) and to customize them to meet unique user requirements. The Australianization of military equipment is one of the key reasons for cost over-runs and schedule slippages (Kinnaird 2003).

Fifth, the development and production of complex weapons systems may require long lead times, often of several years. With long delivery times and fast changing technologies, products often become technologically obsolete by the time they are delivered. To maintain technological currency and enhance the relative performance characteristics of their weapons systems, NDOs often change their requirements and technical specifications throughout the development and sometimes production phases — adding to cost and delivery slippages. Weapons systems, especially platforms, also tend to be long-lived (e.g., still operational B-52s were first deployed by the US as strategic bombers in 1955). Faced with technology-driven competition for battlefield superiority but constrained by budgets, the military often extends the life of systems to wait before they leapfrog into the next vintage of technology. Thus, new product and battlefield technologies compete not only against those available to potential adversaries, but also against potential modifications to (legacy) systems in use. The through-life modification and enhancement of military systems to retain their relative performance edge is another aspect of technological competition.

### **Global Defence Industry**

Small economies such as Australia import a large part of their defence materiel and, as an alternative to domestic procurement, the NDO may source its equipment and consumables from overseas producers (shown in Figure 1 as Global Defence Industry). The global industry is normally capable of providing substitutes for most (but not all) products made in-country.

Over the past 25 years, the global defence industry has gone through a period of intense upheaval. Well into the 1970s, most industrialized nations maintained broadly-based defence industries capable of supplying a significant proportion of their defence materiel requirements from domestic sources. The US and large military powers such as the UK or France often supported several sources of domestic supply. Disarmament in the 1990s resulted in the large-scale downsizing of defence industries with global employment declining by half and a particularly marked decline in Eastern Europe and the European Union. The largest defence firms have also changed their profile from specialized equipment manufacturers (e.g., fighter aircraft or submarine builders) to conglomerates producing a range of defence systems (e.g., Lockheed Martin, BAE Systems) or taking a broad-spectrum approach combining military and civil product lines (e.g., Boeing, EADS). The broadly-based conglomerates have become known as *system integrators*. Some of these companies (BAE Systems) originated in the upstream defence electronics sector and have integrated downstream into platform assembly, such as aircraft manufacture and shipbuilding.<sup>20</sup> With the decline in producer numbers, competition among relatively large numbers of firms has been replaced by oligopolies of only a few firms and/or monopolies (Hartley and Sandler 2003).

In general, weapons producers can be divided into two broad groups: highly diversified systems integrators who put together platform-based and/or network-enabled large, complex systems; and original equipment manufacturers, who produce smaller weapons (e.g., artillery pieces or armoured vehicles) or sub-assemblies (aero- or marine-power plants).<sup>21</sup> Larger, more complex and expensive weapons systems tend to be produced to order and the development of the necessary capabilities follows the buyer's decision to proceed with the acquisition. Smaller arms and military consumables may be produced speculatively in anticipation of domestic or export orders. These features of weapons-systems production are not unique. Large, complex, and capital-intensive civil systems in telecommunications, transport, chemical, and extractive industries are also produced to order, with designs highly tailored to particular users and applications.

With the recent consolidation of supply into a small number of system integrators, US firms now dominate particular sub-markets while

European firms dominate their home markets.<sup>22</sup> The market power of systems integrators is very considerable in their home markets and in the relevant market segments. Competition in the area of new large systems is usually limited to a small number of bidders, for example, two (Boeing and Lockheed Martin) for prime system integration for the JSF and two (BAE Systems and Thales) for the current UK aircraft carrier contract. System integrators thus exercise considerable market (monopsony) power further upstream in the supply chain. For most large contracts, prime contractors tend to contract out about 50-60 percent of the contract value. That percentage increases as the integrator gets smaller and has less scope for in-house sourcing of components.<sup>23</sup>

The market power of original equipment manufactures is generally more restricted. In part, this is because they are mostly first-tier suppliers to larger system integrators. But further, if they sell equipment directly to customers they are more likely to be exposed to international competition, since there are many sources of supply globally, and, perhaps more importantly, because there are also competing military technologies (e.g., helicopters versus land vehicles).

### **National Defence Industry Base**

Australia's defence-related industry is small and highly concentrated in shipbuilding and land systems, where Australian companies such as Tenix and ADI have operated as prime contractors, systems integrators, manufacturers, and maintainers. The aerospace component is considerably smaller and restricted largely to component manufacture. Electronics and software systems are also small, but have established a number of market niches. In the late 1990s, about a quarter of defence-procurement expenditure went to the shipbuilding sector, with another seven industries receiving between 2 and 8 percent each. The remaining 40 percent was spread widely across the economy (Hall, Thomson and Markowski 1998). Several multinational companies (Boeing, Raytheon, BAE Systems, and Thales) have established a strong presence in Australia and through these companies, the Australian NDIB is well integrated into the global defence industry.

The *Australian Defence Magazine's* (ADM) list of the top 40 defence contractors (by defence-related turnover) in Australia and New Zealand in 2002 provides a window into NDIB activity in Australia (ADM 2003).<sup>24</sup> However, a number of important companies are not listed by the

ADM. These include Lockheed Martin Australia, the local subsidiary of the world's largest defence company (but with a small footprint in Australia) and companies such as Telstra or Ericsson which, although primarily large civil businesses, have also been involved in defence-related work. The ADM survey provides detailed information on companies' current workloads and areas of interest (and/or "projects being bid").

The proclaimed "areas of interest" are, we would argue, a good description of what companies wish to market as their defence-related functional capabilities in Australia. These vary from platform assembly, in particular naval craft and land vehicles, to system integration and engineering, software development and support, project management as well as manufacture of components and the provision of through-life support.<sup>25</sup> It might be argued that it is a measure of the strength of the Australian NDIB that so many firms are confident enough to offer such a wide range of competencies.<sup>26</sup> However, in many cases, proclaiming an area of interest and a willingness to rise to the challenge should not be confused with actual ability to supply. For many firms, their defence-related technological experience, in contra-distinction to their willingness to take on new challenges, may be rather limited.

Table 1 shows the distribution of annual turnover totals for Australian firms listed in the ADM survey — where firms have made such figures available. The table shows that some 50 percent of disclosed defence-related turnover is concentrated in the four largest defence contractors, of which two (BAE Systems Australia and Raytheon Australia) are subsidiaries of large overseas companies, one is part-owned by an overseas company (ADI Limited, half-owned by the French Thales), and one, Tenix Defence, is an Australian privately-owned firm. Excluding the two garrison support and maintenance contractors (Spotless Group and Serco Sodexo), the top 15 of the ADM's top 40 defence contractors account for nearly three-quarters of the disclosed defence-related turnover. With a total disclosed turnover of \$3.8 billion in 2002, in-country defence-related spending makes Australia a middle-sized market for defence materiel.<sup>27</sup>

In 2000/01, the Australian NDIB supplied nearly 60 percent of contract value for new capital projects (ANAO 2003). There is little demand for defence exports from Australia. In 1997, the share of defence exports in all Australian exports was insignificant (BAC 2000). Imports of defence products are important, accounting for over 1 percent of all imports

**Table 1**  
**Australian Defence Contractors, ADM 2002 List**

<i>Distribution by Defence-related Turnover<sup>a</sup></i>					
<i>Turnover Size Group (\$million)</i>	<i>No. of Firms in the Group (number)</i>	<i>% of Firms (%)</i>	<i>Group Turnover (\$million)</i>	<i>Proportion of all Turnover (%)</i>	<i>Average Turnover (\$million)<sup>b</sup></i>
250 +	4	7	1,833	49	458
125 – 249.9	4	7	657	17	164
62.5 – 124.9	3	5	253	7	84
31.5 – 62.4	15	25	710	19	47
15.7 – 31.4	5	8	107	3	21
7.9 – 15.6	14	24	155	4	11
3.9 – 7.8	9	15	47	1	5
< 3.8	5	8	9	0	2
Total	59	100 <sup>b</sup>	3,771	100 <sup>b</sup>	64

Notes:

<sup>a</sup>Only firms that disclosed their defence-related turnover are included. These firms comprise nearly all Australian members of the top-40 contractors list plus a number of firms from the supplementary list.

<sup>b</sup>Rounding errors.

Source: derived from ADM (2003).

and 11 percent of defence expenditure in 1997 (*ibid.*). In comparison with Canada and Spain, Australia is more import-dependent and much less export-oriented in the production of defence materiel. Thus, the Australian NDIB is open to overseas competition but more protected than many civil sectors of the economy. It has also been less successful in winning exports than most civil sectors.

### Defence-Industry Interface

As noted earlier, until the late 1980s, Australian Defence sourced many of its equipment and logistic requirements in-house, that is, from government factories and shipyards and logistic elements of the ADF. Since then, most of these have been privatized so that defence materiel is now sourced from commercial suppliers, many of whom are local subsidiaries of large overseas companies.

Irrespective of the ownership of the productive assets (private or public), the organizational entities that operate defence production capabilities may use those capabilities more or less efficiently, depending on the degree of their exposure to actual or potential alternative sources of supply. Thus, related to, but separate from, issues of vertical integration is the contestability of transactional relations between the NDO, as the buyer of equipment, and Industry, as its supplier. Much has been written about special characteristics of the Defence-industry interface (for a recent summary, see Ergas 2003). This market-mediated interface between Defence and industry has often been described as a monopsony, with Defence as the only source of demand for the NDIB, or as bilateral monopoly, where Defence interacts strategically with large defence suppliers. For example, in its submission to the government task force on defence procurement,

Defence states that where critical capabilities are reliant on Defence as the sole or dominant buyer, Defence will shape the market on which it relies. For example, the shipbuilding and repair plan seems to be predicated on a government-facilitated monopoly outcome ... the dependency of the monopoly on Defence [i.e., *bilateral monopoly* — our emphasis] (Kinnaird 2003, 44-45).

When the market power of the buying organization (monopsony power) confronts the market power of the seller (monopoly power) it is very likely that the two parties to the market exchange will develop a strategic relationship, framed by what we refer to as bilateral monopoly. This interdependence makes:

the governance of the relation between buyer and seller [centre] on the contract between them, rather than on any scope for each to turn from the other to alternative partners in exchange (as would happen in a competitive

market). This primacy of bilateral governance, and hence of “voice” relative to “exit” as the means of controlling performance and outcomes, is made all the more important but also more difficult by (1) the need for each party to incur substantial costs that are specific to the program at issue and non-recoverable outside that program and (2) the sheer length of times for which the parties are effectively “locked in” to each other and hence for which the relationship must last (Ergas 2003, 8).

The significance of bilateral monopoly needs to be qualified, though. It is at this point that a distinction is drawn between competition for the initial supply contract (Ergas refers to this as competition for the market) and the subsequent contestability of the relationship between the supplier and the buyer (competition in the market, termed by Ergas).

The bilateral-monopoly outcome is perhaps inevitable in the case of the most complex, network-enabled weapons systems procured by the US.<sup>28</sup> However, a degree of contestability applies even to these acquisitions. As the example of JSF has shown, it is possible to have a competition for the design between two very large providers and sometimes more.<sup>29</sup> Once the winner of the competition for the system is decided and the contract awarded, that firm’s market power increases considerably (winner takes all). Subsequently, the seller and the buyer are locked into a long-term relationship where switching suppliers and thus the attendant exit cost may be prohibitive for the buyer. Nevertheless, competition *in* the market may continue at lower tiers of supply where, arguably most technological innovation occurs.<sup>30</sup> There is even more scope for competing through-life support services even if the design authority and much intellectual property stays with the prime contractor or original equipment manufacturers. As weapons systems become less complex, there is more scope for both for-the-market and in-the-market competition.

Smaller countries such as Australia may source their equipment in competitive international markets and, at the very least, secure the benefits of for-the-market competition.<sup>31</sup> Not surprisingly, Australia sources most of its weapons system designs from overseas. However, for-the-market competition for detailed system development and production tends to be restricted by government preferences for local sourcing. This simply means that domestic residence of the product supplier is added to the usual price-performance-schedule requirement, which either forces overseas

suppliers to seek Australian partners or to establish a production footprint in-country that is larger than would have occurred in the absence of local content policy. Some countries recognize this to the point of abandoning serious aspirations to have a NDIB and import most of their weapons. Other countries press on regardless, but when we look at what defence procurement achieves for local industry, we need to bear in mind the hidden costs of doing so when the application of comparative-advantage principles might suggest an alternative.<sup>32</sup>

With Australia accounting for about 1 percent of global defence spending, the market power of Australian Defence in global arms markets is very small indeed, a point recognized in the Defence White Paper 2000.<sup>33</sup> The government has increased the monopsony power of Defence in the home market through the use of protectionist local content policies (see Defence White Paper, sections 2 and 4). Insofar as local firms become dependent on home defence business, the government has cast itself in a monopsonistic role with the attendant advantage of being able to dictate the “terms of engagement” to cap-in-hand industry suppliers. On the downside, though, it has become responsible for the continuing existence in business of some defence-dependent firms. As the domestic shipbuilding experience has demonstrated, this policy-originated bilateral monopoly has locked Defence into local sources of supply and restricted its freedom to disengage from inefficient suppliers (Australia. DoD 2002; ASPI 2002). There is nothing inherent in the Australian arms market that warrants this outcome. For most goods and services, there are opportunities for substitution along the supply chain that must be rejected for the bilateral monopoly lock-in to emerge. Countries such as Australia or Canada have considerable choice in shaping the relationship between the NDO and the NDIB and should thus be able to shop around to take advantage of opportunities to achieve best value for money supply.

When the government decides, for strategic or general economic reasons, to induce import substitution, local producers of import substitutes will be vested with more market power if, as a result of import substitution, the market becomes less competitive (contestable). This may manifest itself in cost increases, or product performance degradation, or schedule slippages or some combination of all of these. Schedule slippages and quality degradation are often difficult to document, but there is plenty of evidence that higher costs resulting from import substitution result in

governments paying price premia for locally sourced defence goods.<sup>34</sup> These premia may be defended on the grounds of national security, but are often also justified on general economic grounds, that is, in terms of job creation, support for regional economic development, or preserving and stimulating “leading” economic sectors. In practice, arguments like these often, on closer analysis, turn out to have more political than economic content.<sup>35</sup> How much and what industry capability is formed in-country is thus as often determined by political considerations as by strategic or economic ones.

When defence supplies involve a high degree of innovation, the market power of the supplier may be reinforced through its superior knowledge of the specific product and process technologies used. As in many technology-intensive industries, there is growing asymmetry of knowledge between the buyer and the seller, which the seller, with its superior know-how, may use to its own commercial advantage. This problem is recognized in economic literature as moral hazard in the supply of technology-intensive products (for discussion, see Ergas 2003). However, if moral hazard threatened to significantly reduce the efficiency of the supply chain, the buyer could seek remedy in options such as: vertical integration in production (the government factory solution); the use of consulting engineers to complement in-house expertise; partnering arrangements involving the “embedding” of the buyer’s personnel in the seller’s business, and so on.

Also, if the relationship between the buyer and the seller takes the form of bilateral monopoly and, more generally, when the buyer through its preference for local content endows the producer/seller with a high degree of monopoly power, it is advantageous for the seller to invest in capabilities that increase the seller’s leverage vis-à-vis the buyer. This can be achieved through long-term partnering arrangements, although these are relatively easy to terminate. Investing in lobbying capability may also be advantageous, but this too allows the buyer to disengage at low cost. A better tactic is to capture the position of the business process coordinator (prime contractor) on the supply-side to lock-in subcontracting commitments that increase the exit cost for the buyer. Hence, developing general “system-integration” capability is likely to be advantageous, as it gives the firm more scope for positioning itself in the role of prime contractor.

By increasing its leverage, the seller may also be better placed to cope with changes in government policy and spending cycles and, in

particular, to protect their capability investments to sustain their core productive assets through cycles of temporary spending cuts. These, to use Ergas' description, reduce "the scope for spending programs to be 'locked in'" and make the government as a buyer "not fully capable of entering into credible pre-commitments" (Ergas 2003, 6).<sup>36</sup> For example, after some ups and downs, the production run of F-22 air superiority fighter is 40 percent of initial plans (Hartley and Sandler 2003). Policy or funding changes may occur anywhere and in part are dictated by circumstances beyond government control. They are not a systemic feature of the Australian defence policy but appear to be an important feature of the US cycle of annual (budgetary) appropriation acts (Kausal and Markowski 2000).

However, even when the government imposes high local content requirements there may be supply alternatives to restrict market power of protected suppliers. The choices made will have implications for domestic-capability requirements. For example, in Figure 1, Defence holds strategic inventories of commodity-type materiel (e.g., many types of munitions). Such holdings may be just as effective in reducing the market power of a sole supplier as requiring the duplication of in-country production capabilities.

In sum, the factors shaping industry capability to supply Defence are heavily influenced by the complex determinants of defence supply-chain formation and management. When the NDO elects to buy defence materiel rather than have it made in-house, it must decide whether competition between sellers is likely to provide it with better value for money. For modest defence spenders, such as Australia, there is normally a choice of overseas suppliers for most types of equipment and consumables but a very limited number of domestic suppliers. In practice, the NDO must decide whether to source its requirements from domestic or foreign suppliers. The global arms market is likely to support active competition for the delivery of supplies as well as continuing competition between suppliers and products, which, albeit at a rather high cost, would allow the NDO to replace one non-performing supplier with another. Thus, although it may be costly to switch suppliers once the delivery of supplies is underway, there is enough competition in the global arms market to make the threat of recontracting credible.<sup>37</sup>

The characteristics of defence supply chains vary from country to country. Much of the existing economic literature dealing with these issues

originated in the United States and the United Kingdom and focused on issues largely specific to these countries. However, the portability of the US and British experience is limited. Countries such as Australia, Canada, The Netherlands, Sweden, and Switzerland face more benign security environments and, thus, have more choice in shaping their national security value-chain. They can rely more on direct imports of national security from large and powerful allies and can integrate more freely into the global division of labour through imports of equipment and consumables.

### USING DEFENCE PROCUREMENT TO FOSTER INDUSTRY DEVELOPMENT

To use defence procurement to support domestic industry development, Defence must decide, given the defence budget and equipment requirements, which goods and services to source in-country and which to import. Key questions are thus what domestic industry development outcomes could be achieved through in-country defence procurement and which of these should be targeted?

There are two components of demand for domestically produced defence goods and services. First, there are products that Defence believes for its own strategic reasons must be sourced from domestic suppliers. These are strategic necessities or “domestic must-haves.” Second, there are products that Defence is equally happy — from a strategic perspective — to source domestically or abroad. In the latter case, the preference for in-country sourcing is based on socio-economic objectives.

#### **Strategic Considerations**

Strategically motivated materiel requirements extend beyond normal performance-price-schedule considerations to stipulate the in-country residence of the supplier and in-country location of key production/support capabilities. As noted earlier, this approach has the potential to vest domestic suppliers with considerable market power which they can use to increase prices and/or reduce quality of deliverables or allow their schedule to slip. This is an instance of what is referred to in the literature as “hold-up.” Thus, problems associated with the potential unreliability of overseas sources of supply in wartime, an argument frequently used to

justify strategic import substitution, must be weighed against the likelihood of domestic inefficiencies in peacetime.

As domestic sourcing for strategic reasons increases, the scope for developing related domestic industry capabilities within and beyond the NDIB also increases. On the other hand, strategically mandated local production is very likely to result in market distortions, that is, less efficient producers would be encouraged to set up shop to supply Defence. In general, when activities are diverted from international to local suppliers (import substitution), additional costs (cost premia) are likely to be incurred. These may be small, when domestic producers are reasonably internationally competitive, or potentially very large if they are not. This is particularly likely to be a problem for small economies with a modest procurement budget, such as Australia, where there are very limited opportunities for achieving scale-related cost efficiencies.

### **Economic Considerations**

The second group of products are those which Defence has no strategic reason to procure domestically. In this case, the selection of suppliers is determined by economic considerations and the extent to which industry development outcomes occur will depend on the procurement objectives that Defence sets and on the way in which efforts to achieve industry development actually turn out to be successful.

There are well-known arguments for achieving dynamic efficiencies through defence procurement. Suppliers may learn new technologies; the certainty of government contracts may encourage long-term investments in people and capital; a government-provided vote of confidence in local products may enable domestic firms to break into export markets where reputation for successful government sales is critical, and so on (Dalpe 1994, provides a comprehensive catalogue). These arguments are very similar to those for industry protection. Drawing on decades of world-wide industry experience, competitive market pressure is usually required to maximize economic benefit. Since industry protection tends to be addictive and encourages those benefiting from it to become complacent and inefficient, protection-based forms of industry assistance tend to be counter-productive in the long run.

To intervene, that is, to adopt a procurement strategy other than that needed to achieve the best value for money in sourcing military equipment

and consumables, Defence (or the government) should perform four tests that would demonstrate that:

1. The desirable industry outcome cannot be achieved anyway through “normal,” best-value-for-money procurement; that is, desirable industry capabilities would not normally be available in the absence of intervention (*desirability test*).
2. It is feasible to achieve these industry outcomes through industry-focused defence procurement (*feasibility test*).
3. The industry-focused defence procurement is superior to other forms of intervention (*efficiency test*).
4. The Defence Procurement Agency, or any other government entity entrusted with policy implementation, is the best vehicle for achieving the desirable outcome (*effectiveness test*).

### **Industry-related Procurement Strategies**

In terms of industry-related procurement strategies, Defence may operate in the dimensions of location of supply (home versus overseas) and potential impacts on local capability, trading both off against final cost and schedule. At one polar extreme, it might seek solely to achieve “best value for money” (i.e., the best price-performance-schedule combination), irrespective of the location of suppliers and without any explicit aim to promote domestic industry development. We refer to this approach as the best value for money (*laissez-faire*) strategy. As an alternative extreme, Defence may be required as a matter of general government policy to give support to specified domestic industry suppliers, or even a specific supplier. We call this approach the buy-local strategy. Value for money here is not a decisive consideration. This strategy may be applied to support: (i) the NDIB; (ii) government-specified domestic industry sectors (IT, shipping), activities (exports, R&D), or individual organizations (national airline); and (iii) domestic industry or the national economy overall.

Between these extremes, Defence procurement objectives may explicitly include domestic industry assistance, and claims on foreign inputs acquired on preferential terms through offsets schemes which, in some cases, may offer industry-development outcomes. Here, value for money will continue to be sought, but subject to additional constraints and requirements. We refer to this approach as the best value for money with import substitution strategy, as it involves demands for offsetting

local industry commitments from foreign contractors. Again, this strategy may be applied to support all or specified components of the domestic economy.

A fourth approach, international workshare and collaborative arrangements, constitutes what we refer to as the buy-multinational strategy. Such an approach aims to enhance the participation of local suppliers in the global supply chains of multinational prime contractors. It includes: (i) agreed workshare arrangements (the Eurofighter project); (ii) best endeavours industry-participation agreements (the Joint Strike Fighter project); and (iii) multinational agency-mediated industry participation (OCCAR). The discussion is summarized in the first column of Table 2.

### **Delivery Mechanisms**

In the second column of the table, we outline some of the procurement-delivery mechanisms that could be used to implement industry-related procurement strategies.

To define its procurement strategy options, Defence must determine who is eligible to supply it and how choices are to be made between different sources of supply.

*Eligibility to supply.* When the procurement strategies described above come to be implemented, an initial decision must be made defining the eligibility of potential suppliers to be selected to undertake work for Defence.

It is clear that a strategy of pure *laissez-faire*, value for money would render eligible any supplier in the world technologically and organizationally capable of undertaking the work. (Political constraints may, however, apply to firms in countries regarded as unfriendly.) The same open eligibility criteria would be applied when offsetting local industry commitments were sought from foreign contractors. The two remaining cases require more discussion.

In the case of multinational procurement, eligibility is defined by the legal and political arrangements underpinning the relevant cost-share and/or workshare or participation agreements. Normally, such agreements would constrain work to be undertaken at sites located within the geographical boundaries of the participating nations. Ambiguities might potentially arise, however, if production were located within the participating nation, but ownership was held partly or wholly in the hands of companies located elsewhere.

**Table 2**  
**Procurement Strategies, Delivery Mechanisms and Industry Development Outcomes**

<i>Industry-related Procurement Strategies</i>	<i>Procurement Delivery Mechanisms</i>	<i>Expected Domestic Industry Development Outcomes</i>
<p><b>Buy local</b> to support:</p> <p><b>National defence industry base (NDIB)</b></p> <p><b>Government-specified domestic</b></p> <ul style="list-style-type: none"> <li>• <b>industry sectors</b> (IT, shipping); or</li> <li>• <b>activities</b> (exports, R&amp;D); or</li> <li>• <b>individual organizations</b> (national airline)</li> </ul> <p><b>Domestic industry/national economy at large</b></p>	<p>domestic open tenders</p> <p>administrative selection</p>	<p>expanded/retained NDIB capabilities, including knowledge-related management and organizational capabilities</p> <p>expanded/retained national industry capability in targeted sectors/ activities/organizations, including knowledge-related, management and organizational capabilities</p> <p>capability development elsewhere in the economy from additional demand, technology transfers/spillovers, etc. job creation, foreign exchange.</p>
<p><b>Buy multinational</b> to support local industry or economy through:</p> <ul style="list-style-type: none"> <li>• <b>agreed workshare arrangements</b> (e.g., Eurofighter)</li> <li>• <b>best endeavours industry participation agreements</b> (e.g., JSF)</li> <li>• <b>multinational agency-mediated industry participation</b></li> </ul>	<p>government-to-government cost-share and workshare agreements</p> <p>government-to-government JSF-style collaborative agreements</p> <p>national participation in a multinational procurement agency (membership of OCCAR)</p>	<p>expanded/retained NDIB capabilities, including knowledge-related, management and organizational capabilities</p> <p>capability development elsewhere in the economy from additional demand, technology transfers/spillovers, etc.</p>

... continued

**Table 2  
(Continued)**

<i>Industry-related Procurement Strategies</i>	<i>Procurement Delivery Mechanisms</i>	<i>Expected Domestic Industry Development Outcomes</i>
<p><b>Best value for money with import substitutions</b> to support:</p> <p><b>National defence industry base (NDIB)</b></p> <p><b>Government-specified domestic</b></p> <ul style="list-style-type: none"> <li>• <b>industry sectors</b> (IT); or</li> <li>• <b>activities</b> (exports, R&amp;D); or</li> <li>• <b>individual organizations</b> (national airline)</li> </ul> <p><b>Domestic industry/national economy at large</b></p>	<p>open tender with domestic preference margins for internationally uncompetitive domestic suppliers (overseas firm price handicap of 20%)</p> <p>open tender with local content (value) target</p> <ul style="list-style-type: none"> <li>• best endeavours</li> <li>• mandatory (40%)</li> <li>• two envelope solicitation</li> </ul> <p>open tender with direct offset requirement for foreign primes</p> <ul style="list-style-type: none"> <li>• best endeavours</li> <li>• mandatory</li> <li>• two envelope solicitation</li> </ul> <p>open tender with indirect offset requirement for foreign primes</p> <ul style="list-style-type: none"> <li>• best endeavours</li> <li>• mandatory</li> <li>• two envelope solicitation</li> </ul>	<p>expanded/retained NDIB capabilities, including knowledge-related, management and organizational capabilities</p> <p>expanded/retained national industry capability in targeted sectors/activities/organizations, including knowledge-related, management and organizational capabilities</p> <p>capability development elsewhere in the economy from additional demand, technology transfers/spillovers, etc. job creation, foreign exchange.</p>
<p><b>Best value for money</b> (<i>laissez-faire</i>)</p>	<p>international open (possible local content preference if tie)</p>	<p>expanded/retained national industry capability in world competitive (national) industry sectors</p> <p>capability development elsewhere in the economy from additional demand, technology transfers/spillovers, etc.</p>

Source: Markowski and Hall (2003).

The same point arises in connection with buy-local strategies. The purpose of such strategies is to build and maintain essential, defence-strategic capabilities in-country or to support firms and industries for reasons to do with their perceived contributions to the economy. To support such strategies, it is a matter of simple logic to require that suppliers have production sites located within national boundaries. The appropriate procurement mechanisms could include selection among all firms, locally and internationally, that either currently have or have the potential to build such production sites. Firms eligible to become suppliers under buy-local strategies would have to own local production facilities.

*Source-selection mechanisms.* Once general criteria are established to define the eligibility of suppliers to be selected, the procurement agency may move to source selection. The method of selection may involve organizing a competition through a tendering process among potential suppliers or making an administrative decision to use a chosen supplier or suppliers. Competition may be invoked among two or more suppliers at the production stage even if no competitive tendering process was employed to select the suppliers in the first place. This is likely to be an unaffordable luxury in small economies pursuing import-substitution policies (see Sandler and Hartley 1995, 144-48).

When a pure value-for-money criterion is applied, Defence should proceed by calling for tenders from any potential supplier, at home or abroad. Other things being equal, it would make sense for a domestic supplier to be favoured in the (unlikely) event of a tie. Local world competitive suppliers within the NDIB should win all such tenders and, without any further involvement from Defence, would adjust their capabilities in whatever ways are required to meet the demands of the defence contract.

At the other extreme, Defence would purchase from nominated domestic suppliers, irrespective of their international competitiveness. In this case, Defence would play its part in underwriting the expansion of national industry capability in targeted sectors and organizations, and encouraging development elsewhere in the event of additional demand and/or technology transfers benefiting other sectors. Cost premia may often be involved in such cases.

While it is costly (both to suppliers and governments) to run competitive tenders, the general economic case for competition is that it “spurs efficiency, alters attitudes and lowers prices” (ibid., 146). From the point

of view of linking procurement to industry development, competitive tendering has the additional and crucial advantage that it allows governments to collect and evaluate information about alternative suppliers and their potential to build and maintain desired capabilities. This argument applies to all procurement strategies, though may be restricted in its application in some sorts of multinational workshare arrangements. It is an important argument because defence contracts are typically complex and choice criteria multidimensional.

In relation to industry development, information under the buy-local strategy is required, for example, on firms' capability-building potential, especially within the NDIB. Also needed is an information base sufficiently robust to allow assessments to be made of potential benefits to the rest of the economy.

Several mechanisms are available to implement value-for-money strategies where industry development goals are also at stake. First, domestic preference margins may be brought into play when assessing bids from an open competitive tender. This approach allows governments to place a handicap (say, for example, of 20 percent) on overseas firms' prices — tilting the playing field in favour of local firms that would otherwise be uncompetitive.<sup>38</sup> The challenge for governments is to determine the appropriate size of the preference margin. In principle, it should equal the additional social value generated from local industry participation and development compared with the benefits derived from buying from the most competitive overseas supplier. Information on this difference is rarely available.

Second, local content requirements may be placed on all bidders with a competitive bidding process to provide incentives for potential suppliers to find ways of enhancing their prospects of success by increasing the value of proposed local sourcing. The NDO will learn from competing bids which proposals offer the best industry-development prospects. Local content requirements (which also come under the heading of direct offsets) tend to be more diverse and are relatively easy to apply (e.g., the US buy-American policy).

Third, the use of offsets in defence procurements must also be considered. These may take the form of a demand for package enhancement from foreign suppliers (e.g., additional technology transfers), or a demand for countertrade, where the successful foreign supplier must purchase domestically produced goods and services equivalent to some pre-set

proportion of the related procurement. Offsets demands may be mandatory or informal, negotiated on a case-by-case basis by the NDO (Markowski and Hall 2004).

### **Industry Outcomes**

Finally, we consider the domestic industry-development outcomes that might be expected from defence procurement. All involve enhanced capability, desirable for strategic reasons, in the NDIB; capability enhancements valuable for economic reasons in targeted sectors and industry more generally from which Defence buys; and benefits beyond these sectors arising from technology spillovers and induced demand. (Other broader potential economic benefits may relate to government budgetary outcomes, the balance of payments and the exchange rate.) Enhanced capability may include both higher employment (if there is under-employment) and a broadening and deepening of human capital through training and on-the-job learning. Enhanced capability may also include net knowledge-gains and technology transfers that would not otherwise have occurred. Such gains may be directly associated with innovation or increase the nation's capacity to innovate.

The third column in Table 2 shows some of the expected industry-development outcomes, which the industry-focused procurement strategies aim to achieve.

## **DEFENCE PROCUREMENT AND INDUSTRY DEVELOPMENT: THE AUSTRALIAN EXPERIENCE**

In this section we seek to draw lessons from Australia's experience in using defence procurement to achieve industry development.

### **Industry-related Procurement Strategies**

Over the past three decades, Australia has used defence procurement to achieve industry outcomes within the Australian Industry Involvement program. With the exception of the "free-for-all" value-for-money strategy, Defence has tried every other procurement strategy described in the preceding part and has long endeavoured to stay close to the world's "best-practice." The Australian experience of using defence procurement to foster domestic industry development is particularly rich and, arguably, unparalleled in any other small industrial economy.

*Buy-local strategy.* Until the early 1980s, the buy-local strategy was used for certain products (e.g., shipbuilding, vehicle assembly) for strategic and general economic reasons. This was very much in keeping with the general thrust of civil industry assistance policy, which aimed to diversify the Australian economy away from primary products into manufacturing and services. The use of industry protection in the form of tariff barriers to achieve industry-development objectives was a dominant feature of civil industry policy in the 1960s and 1970s, where industry assistance was presented as a temporary measure to support “infant” manufacturing activities. However, high tariffs and other local preference schemes benefited inefficient producers, deterred exports, and penalized local buyers.

*Best value-for-money with direct and indirect offsets strategy.* Radical micro-economic reforms, which began in the early 1980s produced a major change in government procurement strategy from buy-local to best value-for-money with direct and indirect offsets, in both civil and defence-related sectors. Between 1970 and the early 1990s, this involved the use at first of “best-endeavours” and later mandatory offsets. At the time, civil and defence offsets were believed to provide an effective way of priming industry development by allowing Australian firms to acquire new technologies from foreign manufacturers in areas such as IT and aerospace (e.g., the F-18 project). It was also believed that offsets-related technology transfers would provide a stable and sustained basis for the future growth of output and exports. However, industry outcomes associated with this strategy failed to live up to promise (Australia. DoD 1994; Hall and Markowski 1996). Technologies transferred were sometimes obsolete, or too difficult to absorb, and newly developed defence industry capabilities could not be sustained without further defence work.

*Best value-for-money with local-content targets strategy.* Following the price review of defence policy for industry, Defence decided to reduce its reliance on generic mechanisms such as offsets, which were thought to lack sufficient focus on industry-development goals. Specific AII objectives were now to be achieved by more focused provisions within contracts aimed at maintaining capabilities in areas of strategic importance. By the late 1990s, procurement strategy had changed to best value-for-money with local-content targets. For example, the ANZAC ship and the

Huon Class minehunter projects aimed to achieve 60 percent local content. The achieved outcomes are said to have been 72 percent (combined Australian and New Zealand local content) for the ANZAC ship project and 68 percent for the minehunter project (Tasman Economics 2000, 2002). These relatively high local-content targets are alleged to have been achieved with no significant cost premia.

The potential effectiveness of a strategy of best value-for-money with local-content targets has come to be questioned over the past few years. Multinational primes are faced with local-content demands throughout the world, not just in Australia, and must sometimes drop efficient subcontractors from their supply networks to make room for newcomers elsewhere. Thus, even world competitive Australian subcontractors may not be able to remain in a prime contractor's supplier network unless there is a reasonable prospect of future Australian sales. Diversified companies, especially those that sell both civil and military products in Australia, are more likely to retain Australian subcontractors than specialized defence firms that face uncertain prospects of future sales in Australia.

*Buy-multinational strategy.* The ANZAC ship project provided an opportunity to experiment with the buy-multinational strategy on a best-endeavours basis. Under the ANZAC Ship Treaty, Australian and New Zealand industry was treated as a combined NDIB with local-content work subcontracted to Australian and New Zealand firms on a best-endeavours basis. In this respect, the ANZAC ship workshare has more similarities with the JSF project than the European style work- and cost-share arrangements. Following Australia's failure to enter into a similar arrangement with Malaysia for the OPC project, this strategy remains an example of a successful, albeit one-off, initiative. Australia's participation in the JSF project may be viewed as a further evolution of the buy-multinational strategy.

*Eclectic procurement strategy.* To address both supply network and demand management problems, Defence appears recently to have adopted an eclectic procurement strategy, which comprises three elements:

- the previous best value-for-money with local-content strategy — applied where there is a reasonable prospect of synergies between defence and civil work (e.g., IT, electronics);

- a buy-local with partnering arrangements and long-term demand-management strategy — supporting strategically important Australian industry where fluctuations in demand cause peaks and troughs in capacity utilization and threaten to undermine long-term capability formation. An example of this strategy is the proposed (war-) shipbuilding plan (Australia, DoD 2002); and
- buy-multinational strategy — seeking to secure Australian industry participation in long-term multinational defence projects (e.g., Australia’s participation in the JSF project).

In the absence of further evidence, the present eclectic procurement strategy is about as mature as it could be in terms of achieving an appropriate balance between the often conflicting objectives of national security and industry development. The challenge is in its application and management, and in knowing precisely why and when a particular procurement option is to be selected (Kinnaird 2003). The ultimate challenge for Defence is the ability to strike an optimal balance between stable and reasonably predictable domestic demand and resisting pressure to support elements of local industry which are not so much “strategic” as successful in lobbying for the preservation of the *status quo*.

In summary, Australia has experimented with many different approaches to defence procurement as a means of fostering industry development. Short of joining a multinational procurement agency such as OCCAR, Australian Defence has “been there, done that” to a greater extent than most other countries. In this respect, lessons drawn from the experience of other small industrialized countries are unlikely to suggest new directions that have not already been tried.

### **Procurement Delivery Mechanisms**

Similar comments can be made about procurement-delivery mechanisms. Over the past 20 years, a wide range of sourcing arrangements has been applied, from international competitive open tenders to sole-sourcing.

For the most part, competitive open tenders have been used by the former Defence Acquisition Organization and its successor the DMO. In keeping with the whole-of-government approach to procurement, competition has been seen as the best way of achieving value-for-money and deterring supplier hold-ups. To make better use of market-based delivery mechanisms, successive governments have been determined to divest

government factories and shipyards and transfer non-core logistic support services to industry under the Commercial Support Program (CSP). The CSP reflects a sophisticated methodology for the competitive tendering of defence service requirements. Over the past few years leasing and the purchase of asset services have been used to replace asset acquisition.

To enhance the efficiency of contracting, cost-plus contracts were followed by fixed-price contracts and, more recently, by incentive contracting. Progressive (evolutionary) contracting has also been added to the menu of contracting options. Collaborative rather than adversarial forms of contract management, including partnering arrangements with contractors, have been encouraged and are increasingly being used.

Local preference margins were supplemented by best-efforts offset requirements, which were replaced by mandatory offset demands. The mandatory scheme was subsequently replaced by local-content requirements set in contracts. This allowed Defence to target particular AII outcomes rather than seek broadly specified compensatory arrangements.

By the late 1990s, it was apparent that the strategy of seeking local content in contracts had been more successful than the mandatory offsets scheme. Nevertheless, it was also apparent that further development and sustainment of defence-related industry depended on the availability of domestic defence work. And industry often worried that Defence took a somewhat erratic approach to long-term new capability formation and the associated demands for new equipment. Defence-capability planning was said not to have paid enough attention to local industry's ability to sustain its production capabilities and invest in new ones. Better demand management and partnering with industry have since become a mantra of defence industry policy (Australia, DoD 1998; DoD 2002).

To improve demand management, significant efforts have been made to involve industry in Defence-capability planning. Consolidation of acquisitions and through-life logistic support within the DMO were justified in terms of cradle-to-grave management of weapons systems. Nevertheless, the DMO has frequently been criticized for poor procurement (project) management, cost overruns, schedule slippages, and product quality degradation.<sup>39</sup> At the time of writing, another government report has recommended the consolidation of defence-capability management in the main organizational structure of Defence with the DMO responsible for acquisitions (Kinnaird 2003).

Over the years, Australia has experimented with more procurement-delivery mechanisms than most other countries. By and large, Defence has been in the forefront of seeking to achieve, if not set, global standards in this area.

### **Industry-Development Outcomes**

Australia's NDIB enables it to consider a significant degree of self-reliance, an essentially strategic matter. Early in the 1990s, Defence identified several industry capabilities that were critical to ADF self-reliance: C3I, IT, surveillance, weapons platforms, weapons systems, munitions, and logistics support (Dibb 1992). There is a broad commitment to maintaining these capabilities in-country, although, as the example of ship-building shows, it is not clear which of these capabilities are really strategic in-country "must haves" and which belong to the "nice-to-have" category.<sup>40</sup> Extensive lists of specific capabilities have been published (e.g., Australia. DoD 2000*b*) but given the level of Australian procurement expenditure and poor export prospects it is difficult to judge which of the capabilities listed as strategically important can be effectively supported in-country at the cutting edge of technology. As the experience of Sweden indicates, it is difficult for a small economy to maintain a broad range of technological competencies across a wide range of air-, land-, and sea-related industry capabilities.

Broader benefits of the in-country production of weapons systems have often been claimed in Australia, but the only systematic attempt to validate this claim are the two Tasman Economics studies (2000, 2002). For example, it is argued that the ANZAC ship projects increased Australian GDP by between \$200 and \$5,000 million per year over the 15-year construction phase and created some 7,750 full-time equivalent jobs (Tasman Economics 2000). For this to be regarded as net benefit to Australia, it is necessary to assume that no cost premia are associated with the project relative to alternative imports and that, as the only alternative to in-country sourcing of the frigates, the ships would have been fully imported from overseas. Many such "what-if scenarios" can be chosen to demonstrate a much smaller value of the project to the Australian economy. The essential point, however, is this. If no cost premia are involved, it is generally advantageous to procure weapons systems in-country. This broadens the Australian manufacturing base and may result in some technological spillovers and skill transfers to other industries. While the existence

of such benefits has been claimed, and some supporting evidence has been provided by the two Tasman studies, little is known about long-term impact of in-country defence procurement on human capital formation and use elsewhere in the economy.

The experience of the Collins Class submarine project has been very important in re-focusing recent thinking on the management of defence supply-chains. System integration is increasingly the domain of multinational defence contractors such as Raytheon, Lockheed Martin or BAE Systems. Other areas of prime service provision are more open to domestic companies, although not necessarily those specializing in defence production. While a high degree of dedication is likely to continue in platform building and weapons systems manufacture, there is more room for using civil prime contractors as supply-chain managers and risk-takers in defence procurement.

Claims of the beneficial impact of defence procurement on jobs are also predicated on no cost premia being involved in local sourcing. Job creation in an industry that is capital- and knowledge-intensive is very costly and skilled labour must be competed away from other industries. There are many other industries where new jobs can be formed more cheaply. However, if some defence-related products can be produced in-country as cost effectively as overseas, it is generally advantageous to source them domestically to create jobs in Australia rather than overseas.

Export potential as noted above, is the least credible reason for supporting the in-country sourcing of defence products. Because of the mercantilist nature of the international arms trade, even world competitive suppliers in countries such as Australia stand little chance of being able to export successfully from their home base. Australia has rarely exported much in the defence-related area, despite intensive policy discussion in the past. At best, exports of design and intellectual property may be possible when products successfully developed in Australia are manufactured overseas under other countries' local-content schemes (e.g., Australian-designed decompression chambers in the US). The best prospects for achieving export gains is through government-mediated multinational procurement arrangements, and it is in this area that further efforts need to be concentrated, for example, Australian participation in the JSF project (Team Australia 2003).

## CONCLUDING COMMENTS

As noted above, Australia has experimented with a wide range of industry-oriented procurement policies. The small but quite versatile NDIB that has emerged over the past 20 years has delivered a number of weapons systems to the ADF. These have ranged from locally assembled and part-manufactured small arms and land vehicles, to part-assembly of F-18s, to “built-to-(modified)-print” frigates and minehunters and highly Australianized conventional submarines. While measures of local content at sub-assembly and component level are unsatisfactory, at least half of the delivered value appears to have been added in-country. With the exception of the Collins Class submarines, which have experienced various teething problems (McIntosh and Prescott 1999), the ADF appears to be quite satisfied with the quality of deliverables. There has been considerable dissatisfaction, though, with cost overruns and schedule slippages. These had more to do with the procurement process per se and a large part of the blame has been attributed to the DMO and its predecessors (Kinnaird 2003). To a non-economist, all this may appear to be an unqualified technological and industrial achievement, for which a succession of AII policies should take credit. As economists, we share the ANAO reservations about the AII program.

First, it is not at all clear to what extent the in-country NDIB capabilities are of strategic value. Given the difficulties associated with the measurement and valuation of defence outputs, it is difficult to assess the strategic importance of in-country production capabilities unless Defence has attributed publicly announced priorities to them. Considering the fuzziness associated with the valuation of defence inputs and outputs and the possible range of national security threats, it is possible to justify any in-country NDIB capability as a strategic necessity. However, in the real world of finite defence budgets and cost-effective import opportunities, choices must be made between what is essential to have in-country and what would be nice to have in the world free of budgetary constraints. In the public domain, Defence has never published a short list of must-have NDIB capabilities which, if necessary, it would be prepared to sustain through production subsidies of one kind or another. Instead, it has produced a long wish list of nice-to-have capabilities (Australia, DoD 2000*b*), which could not possibly be sustained in peacetime given anticipated levels of procurement spending. It is naive to argue that small domestic demands

could be compensated by exports and dual civil-defence technologies or that some magic wand of demand management can bridge the gap between grossly inflated supply expectations and actual defence requirements. Also, too little is known about cost premia associated with the strategic in-country sourcing of defence materiel. Given the difficulties of obtaining relevant benchmarking evidence, such premia are inherently difficult to calculate.

All these strategic ambiguities have created considerable dissatisfaction in industry, which has rightly argued that new investment and capacity retention decisions cannot be made unless there are unambiguous signals from Defence as to what products are to be sourced in-country for strategic and broader economic reasons. The confusion created by the unwillingness of Defence to nominate a small but sustainable stock of strategic NDIB capabilities has been further compounded by political “pork barrelling,” especially in relation to strategic directions for the shipbuilding sub-sector (see ASPI 2002). As noted earlier, attempts in the 2000 White Paper to focus NDIB capability formation in a small number of sub-sectors was largely contradicted by Defence’s (the 1960s style) sectoral plans. At the time of writing, the confusion continues and it is hard to disagree with ANAO that “it is not practicable for Defence to demonstrate whether, over the many years of its existence, the AII program has been making real progress, or is losing ground, in seeking to meet its objectives” (ANAO 2003, 14).

We agree with Kinnaird’s (2003) diagnosis that it is the lack of clear lines of authority and accountability in Defence output management that has made it difficult for Defence to focus and manage its materiel acquisitions. We would add that it is precisely for that reason that Defence has failed to identify the strategic capabilities it requires in the NDIB. At present, responsibility for AII is vested in the DMO together with the rest of procurement management. However, the identification of strategically necessary industry capabilities is a matter of upstream capability planning and management. These fourth-arm-of-Defence industry capabilities are strategic because they are complementary to the military capabilities deemed essential for Australia’s defence. Thus, they should be identified and managed by the same people who are responsible for the formation of new military capabilities within Defence. Investment in such capabilities should be highly selective and subject to strict government approval processes: they are likely to result in future subsidies either as cost premia

for in-country sourcing or “retainers” in the form of extra work directed to nominated firms, restructuring packages, and so on. The onus should be on Defence to demonstrate why a particular in-country capability is critical to the nation’s defence and what cost premia are associated with its formation and sustainment in Australia.

Second, when defence procurement is used to support in-country industry for broader economic reasons, government’s decisions should be underpinned by cost-benefit analyses performed by government agencies other than Defence. Such studies should determine sectoral (e.g., IT) or functional preferences (system integration) on the grounds of broader benefits for the Australian economy. Alternatively, local sourcing subsidies may be offered across the board in the form of cost-preference margins for local suppliers in all government procurement. All such forms of protection for in-country sourcing would have to take into account Australia’s international commitments, as has been the case with the Australia and New Zealand Closer Economic Relations Treaty (ANZCERTA). As military products procured by governments are usually exempt from international free trade agreements (the WTO Agreement on Government Procurement), there is a tendency to use defence-procurement dollars for broadly mercantilist purposes.

However, subsidized investments in defence-related industry capabilities are unlikely to provide a good return on taxpayers’ capital. As we argued earlier, small countries such as Australia can ill afford to pay import-substitution premia when they offer poor prospects of sustained future work and little scope for inter-sector technology spillovers. Some non-strategic NDIB activities, such as naval shipbuilding, should be economically viable if industry is allowed to restructure and consolidate, as it proposes to do, without political interference and bureaucratic strategic plans. If subsidies are sought on the grounds that an activity will yield broader economic benefits, the anticipated gains should be clearly identified through feasibility studies and approved by the government. Vague promises of future exports or evidence of jobs being created and new technologies diffused provide poor justification for the development of highly capital-intensive industrial capabilities that compete away scarce resources, especially highly skilled people, from other areas of the economy which offer better prospects for future economic growth and employment. In a world dominated by mercantilist sentiments, where most countries seek local content and offsets when committing resources to weapons

systems purchases, prospects for significant arms exports from Australia are negligible. That said, initiatives such as the JSF project and the increased interoperability between the ADF and the US military may create new opportunities for exports. It is easier to identify niche market opportunities and take advantage of the leverage provided by defence spending when the range of technological opportunities is more narrowly focused and specialized suppliers can compete for inclusion in global supply chains. In this respect, Australia's participation in the JSF project may help to refocus the AII program.

#### NOTES

<sup>1</sup> The following statement from a US Department of Defense official publication exemplifies the US view of its market power: "The JSF program, with its sheer size and global reach is critically important to the worldwide defense industrial base. Companies that are on the team are in a good position to retain their single source positions on the program and enhance their competitiveness — assuming schedule and cost goals are met and maintained. Those that are not JSF suppliers may see their tactical aircraft business dissipate as JSF comes to dominate the market for tactical aircraft" (US. DoD, 2003*b*,13).

<sup>2</sup> All tenderers for defence projects worth at least A\$5 million with an imported content are required to consult the Industrial Supplies Office (ISO) network to seek information on local industry capabilities to maximize opportunities for local industry participation in defence acquisitions (ANAO 2003). In tender evaluation, Defence should take into account AII plans that foster long-term partnerships between prime contractors and subcontractors. More generally, government purchasing officers for contracts of over A\$100,000 should describe in the publicly accessible Buying Australian Database the measures taken to provide Australian industry with opportunities to win contracts (*ibid.*).

<sup>3</sup> Between 1999 and 2001, local content accounted for over 80 percent of AII activities and SIDAs for the rest (ANAO 2003, 66, Table 1).

<sup>4</sup> "Industry and Defence usually deny the presence of local content (cost) premiums and the calculation of such premiums is difficult when it is not clear what is to be compared with what" (Markowski and Hall 2004, 209). Tenix, the prime contractor for ANZAC ships, advised an industry consultant that anecdotal evidence put the premium at plus/minus 5 percent while Defence had no recent estimates, but it had earlier anticipated the cost penalty for the ANZAC Ship local content to be around 3.5 percent (Tasman Economics 2000, 9-10).

For the Minehunter Coastal project, “representatives from the Department of Defence contacted in the course of this study did not indicate that the Department paid a premium” (Tasman Economics 2002, 73). As we noted elsewhere, Defence itself calculated that the cost premium paid for local industry participation in the assembly of F/A-18 aircraft in the late 1980s amounted to 29 percent of the value of the additional work required to be done in Australia (Australia. DoD 1994, Annex A, 8; Markowski and Hall 2004).

<sup>5</sup> Some countries may choose to have no defence force at all and explicitly adopt an immediate-surrender posture. The scope for a national defence-procurement policy to influence domestic industry is then, trivially, zero.

<sup>6</sup> In Australia, Defence comprises two elements: the Department of Defence and Defence Headquarters including the three services — Navy, Army, and Air Force. The three services form the Australian Defence Force (ADF).

<sup>7</sup> However, “there have been occasions where the capabilities being acquired in project managed by the DMO have been altered as a result of decisions made elsewhere in Defence. This has included changes made after contracts have been signed and without government approval, resulting in rises in the real cost of projects or significant delivery delays, or sometimes both” (Kinnaird 2003, 33-34).

<sup>8</sup> Until some 20 years ago, most western democracies maintained, in parallel with private arms manufacturing, government factories, arsenals, and shipyards to provide dependable supplies in emergencies. More recently though (in Australia in the 1990s), often for ideological rather than clearly demonstrated economic reasons, many countries have privatized their in-house production facilities and elected to purchase equipment and consumables through the market. The apparent reason for this massive privatization are production inefficiencies, which came to be regarded as inherent in public enterprise in contrast to the private sector, where high personal rewards provide strong economic incentives to deliver customer service cost-effectively. Since the massive privatization of the 1990s, the failure of private enterprise to deliver the hoped for value-for-money in the defence supply chain has also become apparent. Many privatized government factories continue to operate as designated sole-source suppliers, often as a result of the government’s preference for in-country sourcing. Thus, the change of ownership has not changed the transactional relationship between the monopoly (sole-source) supplier and the monopsony (sole) buyer of equipment. In Australia, this has been brought home by the nationalization of the Australian Submarine Corporation (McIntosh and Prescott 1999). Countries such as Switzerland and the US, whose capitalist credentials are impeccable, have

retained in public ownership many production facilities, arsenals, and R&D institutions (e.g., RUAG in Switzerland).

<sup>9</sup> It is normal though for a country to pay the allies for the supply of defence materiel and other non-human inputs. In the recent Iraq campaign, for example, Australia was asked to pay the US for the use of “smart” munitions.

<sup>10</sup> Public goods and services are those that are non-excludable and non-rival, in that domestic non-payers cannot be excluded from benefiting from their provision and, for any amount of public good/service provided, the incremental (marginal) cost of making it available for an additional person is negligible.

<sup>11</sup> In that sense, the valuation of Defence’s “outputs” in Australia should not be confused with the pricing of normal outputs of goods and services produced by trading entities. The value of defence is normally measured as the cost of inputs and not as the value that the public, the ultimate beneficiary of defence services, attaches to Defence activities. Techniques such as contingent valuation could be used to scope public preferences and produce some highly subjective estimates of the social value of defence. These are not used in national income accounting, where the value of defence outputs is measured as government outlays on defence.

<sup>12</sup> In Defence, output performance targets are set to measure the delivery of outputs in terms of: preparedness, the readiness and sustainability of various capability elements, core skills, and volumes of outputs to be delivered (e.g., ship operational availability, flying hours, numbers of personnel with certain skills). Chief of Defence Force Preparedness Directive determines capabilities available to the government in the short term (12 months).

<sup>13</sup> In 2003/04, there are six Defence capability outcomes comprising 29 outputs, for which the government pays the followings prices:

<i>Capability Outcomes (no. of outputs)</i>	<i>Prices (A\$ million)</i>
1. Defence operations (3 outputs, e.g., command of operations)	845
2. Navy capabilities (8 outputs, e.g., capability for major surface combatant operations)	4,087
3. Army capabilities (10 outputs, e.g., capability for special forces operations)	4,845
4. Air Force capabilities (5 outputs, e.g., capability for air combat)	4,004
5. Strategic policy (2 outputs, e.g., strategic and international policy, activities and engagement)	213
6. Intelligence (1 output – Intelligence)	403
<b>Total cost of capability outcomes/outputs</b>	<b>14,398</b>

An additional outcome outside this framework covers Defence superannuation payments and housing support services for current and retired defence personnel (ASPI 2003*a*, 31, Table 2.2.2.).

<sup>14</sup> The capital budget derives its goals from (the unclassified version of) the Defence Capability Plan, which is a ten-year rolling projection of major (over A\$20 million) capital investment projects in weapons systems, which are underpinned by the government's long-term, in-principle funding commitment. However, only some of these projects have received specific approval to proceed to acquisition stage. The so-called Green Book provides the rolling, five-year projection of approved and unapproved capital facility projects. Minor capital equipment (less than A\$20 million), repairable items, software, and so on are also included in the capital budget (ASPI 2003*b*).

<sup>15</sup> This is because the price of outputs is based on the accrual expenses incurred in their provision, that is, money for depreciation of equipment (non-cash expense) and net growth in liabilities (ASPI 2003*b*).

<sup>16</sup> The first public version of the plan for 2001 to 2010 was promulgated in the wake of the last defence White Paper (Australia. DoD 2000*a*). The 2001 version of the plan contains many projects that have not been rigorously assessed prior to their listing and have not been approved to proceed to procurement. The most recent update has been released, but it appears that it still suffers from the lack of transparency as to why certain capabilities are needed (e.g., main battle tanks) and their exact status in terms of government commitment to proceed and fund their acquisition.

<sup>17</sup> Civil systems of considerable complexity in Australia, such as the provision of telecommunications and transport infrastructure for the Sydney Olympic Games 2000, were completed successfully, in reasonable time, and at reasonable cost. The construction of oil and gas extraction platforms and the associated networks of pipelines, transport vessels, and trans-shipment facilities present technical problems by no means less challenging than those associated with the building of frigates or minehunters to overseas designs. Many of these civil systems must also operate in some of the most inhospitable physical environments on the planet and, thus, their ruggedness and reliability are not very different from those expected of military systems.

<sup>18</sup> On the other hand, since production and use experience are cumulative, the progressive deepening of technological know-how reduces the cost of system modification and change over time. Countries such as Australia, which embark on one-off, in-country production of small batches of complex equipment using imported technological know-how (e.g., Collins Class submarines), incur large and irretrievable (sunk) learning costs.

<sup>19</sup> Historically, there has also been a tendency to produce defence products using production processes and facilities dedicated to military production. This works against product standardization and the use of dual (military-civil) technologies and so also against the achievement of economies of scale in production.

<sup>20</sup> This is not surprising considering the cost of the integrated weapons system. Faltas (1986) estimated the warship (as a weapons system) cost breakdown to be: float 12 percent; fight 70 percent; and move 18 percent.

<sup>21</sup> Arguably, the only firms capable of producing network-enabled “systems of systems” are the largest US companies. BAE Systems, Thales, and EADS are the second division of large system integrators, together with the second division of the largest US companies, and they are gradually evolving from platform-based to broader network-centred production. Boeing and EADS are primarily civil aircraft manufacturers. In 2000, Boeing obtained 60 percent of its revenue from sales of commercial aircraft and EADS 59 percent (Hartley and Sandler 2003). Unlike their US competitors, European companies have not got access to the knowledge base, which only the US government is capable of funding at present. Smaller system integrators, such as the Italian Finmeccanica, make the third division. Smaller US firms, still large in absolute terms, appear to have significant market power to influence the US machinery of government, as evidenced by the frustration of European partners in the JSF project (see US. DoD 2003a).

<sup>22</sup> Interestingly though, the UK government has put Thales (UK) in a strong competitive position in the UK domestic market and, thus, created a duopoly of UK system integrators. The UK government chose to award the contract to BAE Systems, as the prime contractor responsible for project coordination and the management of shipbuilding while Thales (UK) was selected as the key supplier for the ship design. The latter put a lot of promotional effort into presenting the French subsidiary as the UK company. In addition, the UK MoD will manage various business risks and contingencies (Latham 2003).

<sup>23</sup> For example, at the big end of system integration, LM is expected to subcontract 55 percent of the value of JSF work during the System Design and Development phase and a further 15 percent during the production phase (US. DoD 2003a). At the other end of the spectrum, the Australian Submarine Corporation, a very small platform-based system integrator by global standards, subcontracted 80 percent of work (Ergas 2003).

<sup>24</sup> A supplementary list also includes a number of other companies, which either declined to disclose their defence-related turnover in 2002 or were too small to make the top-40 list. The available NDIB industry data (turnover,

employment) tend to be aggregated and do not always differentiate between military and civil activities. This applies to firms (IT, telecommunications) that use dual technologies so that few company resources are dedicated to defence work. Most firms in the ADM sample have disclosed their total employment data but only a small minority have revealed their defence-related employment.

<sup>25</sup> Most broadly, these functional capabilities can be summarized as:

- command, control, communications and intelligence (C3I) systems
- data capture and information management, surveillance and reconnaissance systems
- electronic warfare
- naval systems and platform integration, test, support, modification and overhaul
- land system and platform integration, test, support, modification and overhaul
- air system and platform integration, test, support, modification and overhaul
- systems engineering, modelling and simulation
- manufacturing of sub-systems (for ships and land vehicles) and components (for naval vessels, land vehicles, weapons systems and aircraft)
- explosive ordnance systems and chemicals
- electro optics
- engineering consulting, system architecture development and design
- software engineering and software support for combat/mission system software
- training and simulators
- base logistic support (including facilities maintenance, IT infrastructure, garrison support)
- business/supply chain integration (prime contracting, configuration management).

The above list is by no means comprehensive, as it is difficult to collapse a cornucopia of project, area of interest, and capability descriptions into a small number of generic categories.

<sup>26</sup> Some subsidiaries of overseas companies are marketing their areas of interest as a shopfront for the global capabilities of the parent company, offering to act as an Australian conduit for channelling the parent company's resources if and when required.

<sup>27</sup> Only the largest two Australian business entities, Tenix Defence and ADI Limited, were listed in 2000 in the SIPRI's 100 largest arms-producing companies in the OECD and developing countries, with Tenix in the 68th and ADI in the 89th position (SIPRI 2000).

<sup>28</sup> For US defence manufacturers, the domestic market is the dominant source of revenue and their export performance is largely underpinned by their sales to the US military. For example, in 2002, Lockheed Martin Corporation derived 57 percent of its revenue from sales to the US Department of Defence (LM 2003) while Boeing Corporation derived nearly 40 percent of its revenue from the same source in 2000 (Hartley and Sandler 2003). With its enormous size, the US defence market is also a magnet for leading European defence manufacturers, with companies such as BAE Systems, EADS, Thales, and Rolls Royce keen to enlarge their US footprint. This gives the US government considerable market power vis-à-vis foreign companies, which aim to sell to the US military.

<sup>29</sup> In this case, the design was in competition between the two consortia, one led by Lockheed Martin, the eventual winner, and the other by Boeing. A number of original equipment manufacturers, such as Rolls Royce, participated in both offers.

<sup>30</sup> Many JSF sub-systems are double sourced. This is in part due to project specifications, for example, two completely interchangeable engines are developed by General Electric and Pratt & Whitney and are to compete in the production phase. Lockheed Martin also double source other sub-assemblies and components, for example, the controversial award of the second-source wing production contract to Italian Alenia (US. DoD 2003a).

<sup>31</sup> The application of local-content requirements in a small economy is a necessary but not sufficient condition for the resultant interdependence between buyer and seller to take the form of bilateral monopoly. For the latter to occur, the buyer must also elect to source its requirement through the market rather than vertically integrate upstream. That is, it must have a preference for the seller to be a separate business entity operating at arm's length from the buyer rather than use a government factory model to source supplies. For example, the Swiss government applies local-content requirements to some types of military system integration and especially to through-life support for imported equipment. But it also owns RUAG, the corporatized government production and service entity. The widespread preference for sourcing supplies from the private sector assumes a reasonable degree of contestability if not active competition on the supply side. If this is lost as a result of sole-sourcing and long-term bilateral monopoly arrangements between the suppliers and the buyer, the two models of supply (government factory and private enterprise) are likely to converge.

<sup>32</sup> The evidence points to a clear lesson that local defence industry development achieved in conflict with comparative advantage will always impose a cost

(Markowski and Hall 2003). For example, studies of aerospace have shown that nations often paid substantial premia for local preference; for example, Belgium, Netherlands, Denmark, and Norway incurred a cost penalty of 34 percent for their involvement in a F-16 co-production program (Hartley 1995). To these examples may be added that of F/A-18 local industry participation in Canada, Spain and Australia. Australia's Department of Defence calculated cost premia here as 11 percent for Canada, 13 percent for Spain, and 29 percent for Australia (Australia. DoD 1994).

<sup>33</sup> The buying power of a small country NDO is likely to be limited in global arms markets, although a small buyer may still be able to strike a bargain when the seller of equipment is keen to obtain additional business.

<sup>34</sup> Defence, as the manager of the defence supply chain, must therefore recognize that investments in local industry capability imply sacrifice of opportunities to buy at lower cost in the open market. For reasonably standard types of equipment and consumables, where scale- and scope-related efficiencies (economies) result in declining average cost, "direct imports of existing equipment produced on a large-scale (e.g., US F-16 aircraft) are likely to be the least-cost solution (say index of 100), with co-production and collaboration being costlier (say, index of 130) and independence being the costliest option (say, index of 150+)" (Hartley and Sandler 2003, 376).

<sup>35</sup> Another economic rationale for paying price premia (i.e., a price for local production in excess of the world low price) might be to use them, for example, to make local defence producers undertake development and production work in-country, generating technology (knowledge) spillovers of benefit to the rest of the economy. However, the existence and value of technology spillovers to the local economy is something that has to be demonstrated empirically. In recent decades, there are many claims that much more new technological knowledge has diffused from civil IT and electronics sectors than the defence industry.

<sup>36</sup> This point has been stressed by the UK participants in the JSF project who have been concerned with "the lack of control" related to risks of participating in collaborative programs with the US. The factors that could jeopardize the affordability or viability of the JSF for the UK include: US congressional interference, reprogramming relative to other US programs, scaling back the project, and system-design changes that are not favourable to foreign collaborators needs or interests (US. DoD 2003*b*). Another concern was the potential for US Congress to institute procurement requirements that severely disadvantage international suppliers or lead to degradation of military capability.

<sup>37</sup> This threat of latent competition from global suppliers may provide enough contestability in the domestic market to dissuade sole-source suppliers from abusing their market power even after the contract is signed and Defence has already incurred significant sunk (irretrievable) costs.

<sup>38</sup> A competitive bidding process is valuable here for signalling the disparities between local and international efficiency levels, and possibly the sources of local inefficiency.

<sup>39</sup> Such criticisms have also been directed at the British Procurement Agency (and its predecessor the Procurement Executive). Similarly, the US machinery of defence procurement has long been criticized for cost overruns, gold plating of systems purchased by the military, schedule slippages, and so on.

<sup>40</sup> In shipbuilding, the largest defence sector in Australia, there has been little synergy between ship manufacture and assembly and ship repair and maintenance (ASPI 2002). Since the cost premia associated with import substitution in surface warship building in Australia have been modest or insignificant (Tasman Economics 2000, 2002), building surface warships such as patrol boats, minehunters or frigates in Australia to adapted foreign designs appears to be economically advantageous relative to outright imports of such vessels. A different picture has emerged from the Collins Class Submarine project, where significant cost premia are likely to be incurred over the next few years to bring the boats into full operational capability and to maintain their currency as advanced strategic weapons systems over time (McIntosh and Prescott 1999). At the time of writing, future prospects for this industry sub-sector are rather uncertain.

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## CHAPTER THREE

# *Smart Management of Smart Weapons*

*Ron Matthews*

### MANAGING THE REVOLUTIONS....

The defence environment has changed dramatically since the end of the Cold War. The stability of the strategic stand-off between two nuclear superpowers has given way to the uncertainty of asymmetrical warfare, and this uncertainty was heightened by the cataclysmic events of 9/11 (11 September 2001). The West's reaction to the emerging global threat of guerrilla attacks was to intensify investment in the so-called Revolution in Military Affairs (RMA), a concept recently re-labelled by the Americans as transformational warfare. Policy emphasis has begun to move away from platform-centric planning toward a fully networked enabled capability. This system-of-systems approach to warfare highlights the role of "smart" stand-off, laser-guided munitions, C4ISR systems, and armed forces that are light, mobile, rapid, flexible, and adaptable. Denial of the battle-space to the enemy also requires heavy-lift aircraft, lighter, more mobile tanks, Remote Piloted Vehicles, such as the US predator, and special forces. However, development and procurement of these new force structures and capabilities will not come cheaply.

The economic burden that transformational warfare places on the structure and value of defence budgets is significant. The pressures are two-fold. First, the RMA demands force restructuring, and invariably this must occur within the existing defence budget. Second, the contemporary RMA is impacting at a time when a conflict between superpowers is unlikely. For most countries the benign international environment will tighten the screw on defence spending so as to release government finance for the competing requirements of, for instance, health, education, and transport. Whilst Britain, France and, particularly, the United States

have recently been increasing defence expenditure this will not be sustainable in the long run. Cost escalation of high-technology weapons systems combined with pressure to reduce endemic public finance deficits will ensure that the defence community will be squeezed from both ends of the income-expenditure spectrum.

Almost inevitably, therefore, the present RMA operates under conditions of financial stringency. Thus, although the technical imperative of acquiring battle-winning weapons systems is crucial, of equal importance is the management imperative; the need to manage scarce defence resources in a cost-effective manner. The policy goal has to be “affordability,” because in its absence, transformational warfare will not be viable. What is required, then, is a parallel revolution in business affairs (RBA). Defence ministries around the globe have initiated RBA-type policies, but the UK Ministry of Defence (MoD) is probably at the helm. Its aim is clear, to maximize value-for-money (VFM). The MoD has pioneered numerous “smart management” initiatives over the last decade, and these provide a basis for identification, analysis, and reflection of the key strands of defence-related transformational management. The purpose of this paper is thus to evaluate UK MoD policy, profiling the progress achieved in improving the management of defence resources, particularly with regard to the acquisition process. However, to set this evaluation into context, it will be helpful to explain the nature of the RMA-RBA relationship, examining it against the backdrop of a radically changing security environment.

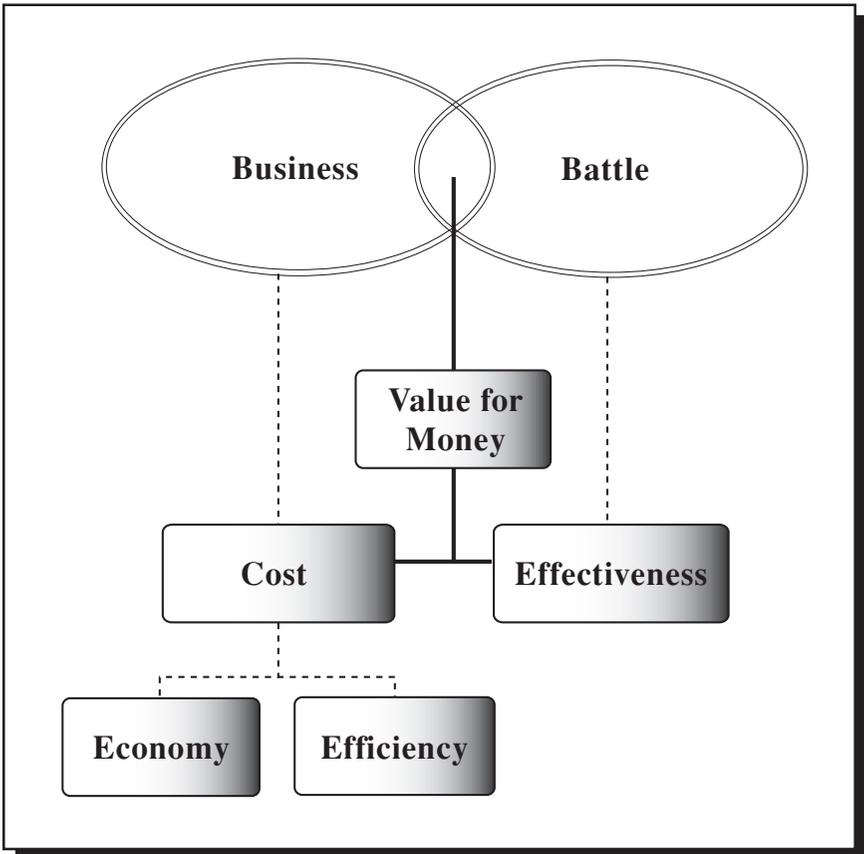
### CONCEPTUALIZING THE VFM POLICY CHALLENGE

The high and rising cost of weapons acquisition has characterized the closing decades of the twentieth and opening decade of the twenty-first century. In this regard, David Kirkpatrick argues that as far back as the end of the Second World War, the rising unit production cost of weapons systems had been rising on average by around 10 percent per annum (Kirkpatrick and Pugh 1983). Such cost escalation combined with constricted defence budgets led to what the US defence economist, Thomas Callaghan, described as “constructive disarmament” (Callaghan 1975). The negative impact of this quantitative loss may be compensated by the technology multipliers embedded in higher-quality RMA-type weapons

systems (but as the second Gulf conflict has evidenced, Apache helicopters and C130 heavy-lift aircraft are not invulnerable to relatively low-tech ground fire from insurgents). The search for affordability has thus been prioritized by the UK MoD along with other defence ministries to effect policies designed to achieve “more bang for the buck,” or alternatively, the “same bang but for less bucks.”

Figure 1 symbolizes VFM as the outcome of integrating the business and battle spaces. The progressive overlay of these two spaces reflect

**Figure 1**  
**Integrating the Business and Battle Spaces**



the commercialization of defence. In the defence context this means the pursuit of two different but interrelated goals: economy and efficiency. Policies aimed at achieving economy are concentrated in the acquisition and logistics fields, while policies aimed at promoting efficiency tend to be focused more in the fields of financial and performance management. However, both the economy and efficiency objectives share the same business goal of cost reduction.

Effectiveness is the key issue when examining the battle space, principally because it is an output, directed toward achieving battle-winning capability. A key ingredient in the mix is obviously the technological quality of the weapons systems deployed to defeat the enemy, but other factors such as morale, training, and doctrine also contribute to military effectiveness.

Linking cost and effectiveness informs operational planners as to choice and trade-off considerations impacting on decisions to develop capability. Essentially, planners evaluate alternative capability options to secure the most cost-effective way of meeting an operational requirement. The right-hand side of this relationship, effectiveness, will be measured by lethality measures and the left-hand side, cost, will be measured by aggregating both the upfront and through-life support costs of the weapons system. Thus, cost in net present value terms can be equated to the military capability it is able to purchase. Of course, trade-offs of cost against effectiveness exist, but whatever the option selected it is self-evident that the primary objective will be either to maximize output per unit of input (more bang for the buck) or minimize cost per unit of output (same bang but for less bucks). Progressive integration of the business and battle spaces highlights the fact that there are two revolutions taking place simultaneously. On the one hand, there is the RMA, focused on a panoply of considerations, such as raising the technological sophistication of modern weapons systems, doctrinal development, investment into simulation and synthetic training environments, jointery, and coalition warfare. On the other hand, there is the RBA, emphasizing economy and efficiency initiatives within the broad framework of defence-management policies. The overriding policy goal, however, is the smart management of smart weapons (Matthews 2001).

## BATTLE SPACE OR SECURITY SPACE?

Events such as the 9/11 Al-Qaeda attack on New York's twin towers, the ongoing insurgency in Iraq, and the proliferation of asymmetrical threats, have forced global defence ministries to reassess both the structure of acquisition budgets and the doctrine employed to defeat the insurgency threat. There are several important threads to this debate.

First, 9/11 represented a premeditated attack on American life and property located in the United States. In every respect it was a wake-up call for the US (and European) policymakers that homeland security was threatened. The US and Britain determined that the terrorists should not be allowed to dictate where the "war" would be fought, and as a result, doctrine changed from being reactive to proactive. The insurgents would be hunted down at source and eliminated. In support of this military posture, ISTAR (intelligence, surveillance, target, acquisition and reconnaissance) became critical. However, it was a capability that failed in the 2003 Iraq war. Contrary to the intelligence community's predictions, weapons of mass destruction have not been found. The flawed intelligence caused considerable embarrassment to the political leadership of the US and Britain, acting to undermine the pretext for the attack on Iraq and the removal of Saddam Hussein's government.

The second aspect of the growing security debate is also tied to the Iraqi conflict. Significantly, whilst the initial "shock and awe" war waged by the coalition and principally US forces against Iraq was hugely successful in achieving its military objectives, the "peace" has been something else entirely. The ensuing insurgency has proved to be nasty, prolonged and destabilizing. The US forces have largely been unprepared for the postwar asymmetrical campaign involving suicidal bombers seeking martyrdom. In particular, military training and operational kit have proved both inadequate and inappropriate. This was not the way it was supposed to be; this is not the domination of the battle space as promised by networked enabled capability and associated transformational military technologies.

A third broader security issue has regard to the policy underpinning proactive military operations, premised on democratizing and then developing the disaffected communities. The experiences of Iraq suggest that this policy may be misguided. Although enfranchisement is clearly

an important consideration, it may be a lower policy priority than creating jobs and providing food for hungry people. To effect development, aid can only ever be a short-run expediency. Of higher strategic value are economic and political engagement and the crafting of an agenda to achieve trade and development objectives that are compatible with long-term economic sustainability. The democratization-development causal flow is therefore reversed, with initial policy focus now being placed on development, leading ultimately to democratization.

Finally, policy emphasis directed toward the broader requirements of security must necessarily identify and address the bases of modern day fanaticism and terrorism. Whilst globalization pressures may have facilitated the terrorism threat, there is a growing sense that globalization may also represent a partial panacea to that threat by ensuring that disaffected societies are embraced by the new and emerging global socio-economic order. In particular, there is a growing international recognition of the plight facing the Islamic communities where:

- the heartland of the Muslim region, accounting for 30 countries and 700 million people from North Africa to Bangladesh, takes just 5 percent of global exports, down from the 14 percent in 1980;
- the global total of 57 Muslim countries receive barely as much foreign direct investment as Sweden or Singapore; and
- the Muslim world's share of the global economy has contracted by 75 percent in a generation (Gresser 2004).

However, translating the recognition of these inequities into sustainable economic development will not be immediate, and in the interim the spectrum of non-state, non-conventional threats to security will deepen and multiply. One observer, M. Naim, has translated these non-state threats into what he terms the "five wars of globalization," namely, illegal trading in drugs, weapons, people, money, and intellectual property (Layton 2004, 36). Drawing attention to the proliferation of such threats, a recent report of the United Nations High-Level Panel on Threats, Challenges and Change identified six clusters of threats to international peace and security, comprising: transnational organized crime; terrorism; nuclear, radiological, chemical, and biological weapons; internal violence, including civil war, state collapse, and genocide; the continued possibility of interstate conflict and rivalry; and economic and social threats (Annan 2004).

These security threats are far removed from the RMA, and whilst the stand-off, precision-guided weapons of the latter do represent the conduct of future war, the non-state threats of, for instance, conflict goods, often acting as the financial source for insurgency and terrorism, must also be addressed. Accordingly, operational research staffs will increasingly be obliged to use scenario analysis to influence acquisition policy in ways designed to meet lower-order threats posed by asymmetrical conflict.

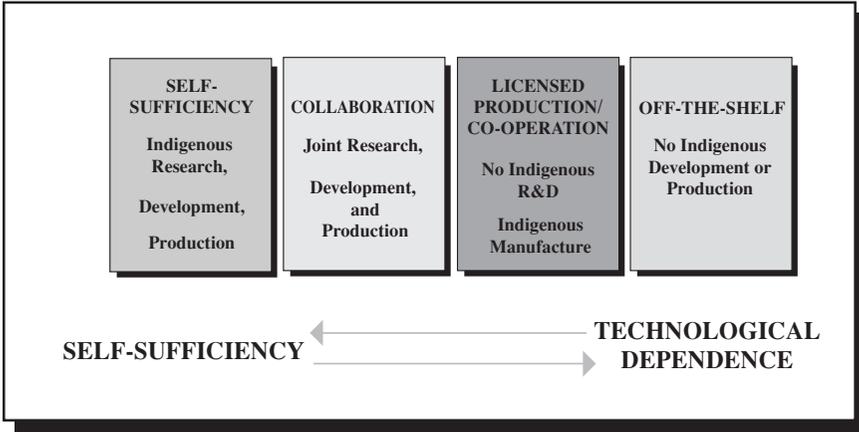
## MANAGING THE “BUSINESS” OF ACQUISITION

### **Acquisition Strategy**

Acquisition policy in the twenty-first century is a complicated and challenging endeavour. Since the end of the Cold War, the driving force has been cost reduction and affordability as a means of achieving VFM. The commercialization of defence has been accompanied by liberalization pressures impacting on the wider civil economy. As a consequence, there has been an inevitable spillover of business ethos into the defence domain, not least because commercial-off-the-shelf (COTS) technologies are increasingly to be found in RMA-type weapons systems. Liberalization, globalization, and competitiveness have become pervasive forces impacting on the global economy. The World Trade Organization (WTO), in particular, has been the engine driving the opening-up of markets and accelerating the search for ever-greater levels of competitiveness. An important component of the RMA, then, has been globalization; the attendant defence-related market pressures leading inevitably to a more focused process of defence globalization. Seizing every opportunity for cost reduction, defence companies have promoted international industrial integration policies, including the development of international supply chains, technology transfer through offsets, licensed production, and international collaboration, consortia, and strategic alliances. Figure 2 demonstrates the acquisition strategies open to policymakers at different stages in the defence-industrial process.

Countries possessing minimal defence-industrial capacity will be obliged to import weapon systems from offshore vendors. However, over time, as capacity is put into place, licensed production will deepen defence-industrial capability through local production of simple components and sub-assemblies. For some countries, such as Spain, the process

**Figure 2**  
**Procurement Strategy**



of building up relevant engineering skills and a defence-industrial infrastructure, will continue through participation in international arms-collaboration agreements (Molas-Gallart 1992). These can be distinguished from licensed production because they require R&D and not just production; in other words, cradle-to-grave development and production of the weapons system. The final stage in the defence-industrial process is the most difficult to achieve. This has regard to self-reliance, traditionally the goal of defence industrializing countries.

The contemporary policy emphasis on affordability indicates that traditional acquisition strategy is no longer relevant. The prevalence of extremely high costs and low scales of production in the development and production of complex RMA weapons systems means that increasing numbers of countries are unable to afford self-sufficiency. Thus, defence globalization is forcing a reverse process, whereby self-reliance is no longer the goal, with acquisition instead geared toward international cooperation and, increasingly, outright purchase. Collaborative projects, for example, Europe's Typhoon, and consortia ventures, such as the Joint Strike Fighter (F-35), have the twin attraction of member countries enjoying R&D costs and higher economies of scale from the unification of

markets. The lowest cost-acquisition option is arguably the global consortia model. It allows the purchase of relatively cheap off-the-shelf weapons systems from, principally, the US, eliminating the excessive opportunity costs associated with countries pursuing national acquisition strategies. However, although this model carries the benefits of a more refined international division of labour, including lower cost and enhanced product quality, the downside is the erosion of local defence-industrial sovereignty caused by increased dependence on offshore vendors. The question, however, is whether this loss of defence-industrial sovereignty any longer matters? Future (transformational) warfare is expected to be a quick and decisive exercise. It will incorporate a coalition doctrinal approach, justifying further cooperation in the development of weapons systems as self-reliance becomes less and less an affordable option.

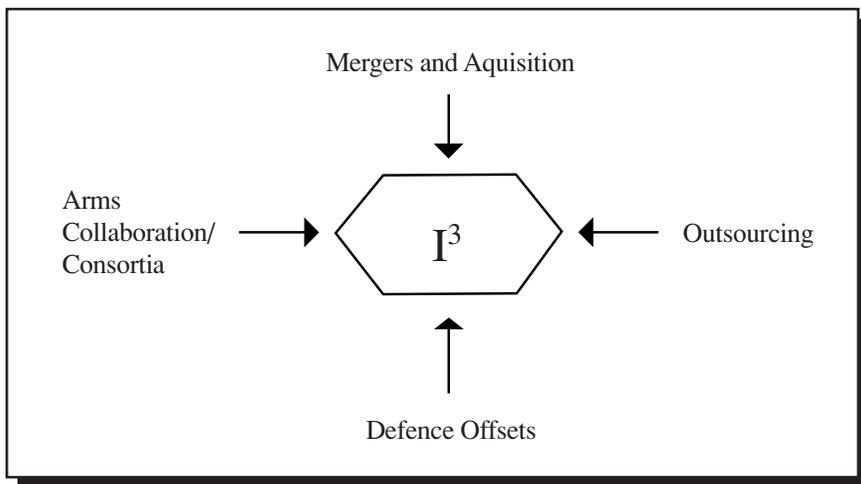
The quest for affordability means that Britain no longer seeks to maintain a national capacity for combat aircraft, and is likely to relinquish capacity in land systems over the next decade. Moreover, economic logic suggests that warship production will also likely succumb in the longer term to regional or international acquisition solutions. A complementary facet of such international industrial integration (I<sup>3</sup>) is the development of multinational defence companies. BAE Systems, for example, is a global defence business. As little as 20 percent of its turnover is now accounted for by Britain's MoD; its workforce is increasingly located overseas, and the majority of its shares are now foreign-owned. The British government's position on the dilution of the country's defence-industrial base is one of studied ambivalence. Geoff Hoon, Minister of State for Defence, aptly reflected this position when he stated in 2003 that BAE Systems is not a British company. This view was linked to Britain's changed defence-industrial policy position, highlighting the importance attached to location rather than ownership. In other words, jobs, investment, income-generation, and export potential are valued more highly than national ownership of defence undertakings. This is an explicit recognition of the globalization process reshaping the UK defence landscape. Yet, weapons are not like refrigerators. "Footloose" multinational companies are owned by global shareholders rather than by the local taxpayer. Multinational defence companies have no conception of nationhood or national security, for them profit drives location. Thus, in a fiercely competitive and increasingly borderless international economic and financial system, investment mobility in the commercial sector is acceptable. However, in

the defence context, short-term economic expediency may increase long-term strategic vulnerability.

Defence globalization is changing conventional acquisition strategy in several ways. Figure 3 offers a simplified model of the forces at work, where  $I^3$  symbolizes the inexorable process of defence globalization. Four drivers can be identified.

First, there is the ongoing consolidation of defence industry. This has been occurring at both the national and international levels. The 1992 “Last Supper” transformed the US defence-industrial structure from 17 players to four in the space of a decade.<sup>1</sup> Over recent years, moreover, BAE Systems has acquired a growing number of American defence companies. Transnational mergers and acquisitions have also become commonplace in Europe. For instance, EADS — comprising French, German, Italian, and Spanish companies — has emerged as a powerful defence-industrial force. Additionally, in the early years of the present decade, a significant US presence has evolved. US defence firms have been active in the acquisition of German, Swiss, Spanish, and British defence-related organizations, and certainly in the UK context, divisions

**Figure 3**  
**Defence Globalization Drivers**



of Lockheed Martin, Raytheon and Boeing have been established to better exploit local industrial participation opportunities.

The second globalization driver is outsourcing. This represents an overspill of developments in the commercial sector, particularly the creation of international supply-chain networks. In the past, outsourcing has occurred in the national context, but in the future, it will likely be global. In the search to maximize shareholder value, defence businesses are pursuing horizontal and vertical integration strategies. The need is market-driven: to develop a corporate presence in growing markets across the globe, to leverage highly expensive joint R&D investments, and to secure cost-reduction possibilities. Global outsourcing in the main will impact on defence company's lower-order technological activities. By contrast, the higher value-added operations will remain in-house. In this regard, it is probably no exaggeration to state that the world's leading defence-industrial companies will seek to raise their corporate profiles in research, design, development, project management, and systems integration. What little manufacturing presence remains will be focused predominantly on the production of leading-edge, high value-added technologies.

Defence offsets represent the third driver of defence globalization. Offsets have been sustained over the last two decades by the continuation of an international buyers' market. This market power provides the leverage for purchasers of major military systems to extract substantial compensatory benefits from the vendors. Historically, this has meant the transfer of not only the weapons product but also elements of its production process. Vendors have no choice but to accede to offset demands, because in a highly competitive defence market, refusal carries the risk of losing the contract. The reality of offsets is that in order to clinch deals, defence companies are obliged to establish capacity overseas, necessarily relocating work from local subcontracting tiers.

The final driver is the continued forging of both regional collaborative ventures and global defence-industrial consortia. In the past, progress in cooperative defence-industrial endeavours has been gradual and measured. In the future, by contrast, affordability pressures will mean that cooperative acquisition solutions will likely expand in importance and also become more radical. Most importantly, these solutions will go beyond offsets. This is because participating countries will partner *ab initio* in the development and production of weapons systems, whereas offsets have only ever involved licensed production of existing equipment. Yet,

this is not to state that transition to a cooperative acquisition strategy will be easy. The principal challenge in the future, as now, will be the equity of workshare. Presently, *juste retour* in the collaborative model is generally now agreed to be an inefficient mechanism for allocating work amongst partner countries. Whilst this method equitably shares work-input on the basis of output-offtake, it suffers the malady of a non-optimal international division of labour. Equally, the alternative global consortia model, requiring that workshare be based on the competitiveness of member countries' national industry has meant that the majority of work has been captured by highly efficient US and UK defence contractors, leaving minimal work for smaller country participants.

These drivers of defence globalization will have a powerful impact on the future shape of the global defence industry, but, equally, acquisition strategy will play a critical role in influencing the long-term development of domestic defence-industrial structures. The nature of these changes will impact on the breadth and, indeed, depth of defence-industrial capability, the extent of product or process specialization, and the intensity and level of engagement in regional and global weapons development and production programs. It is likely that future strategic alliances will be driven by the market. Radical acquisition solutions are probable, including the potential for tie-ups with Russia and perhaps, longer-term, with China.

### **Acquisition Management**

Strategic issues influencing acquisition strategy are important, but so too are the more tactical requirements of acquisition management. The enormous complexity and cost of developing and producing RMA-type weapons systems means that acquisition problems continue to be endemic across the global defence-industrial community. Britain's MoD has been bolder than most in implementing acquisition reform, but serious challenges remain. Equipment acquisition accounts for around 50 percent of the UK defence budget. This is not an insubstantial sum, representing over £14 billion of the 2003/04 £29 billion defence expenditure.<sup>2</sup> In the face of continuing pressure on UK defence spending, it is obvious that acquisition and logistics will be subject to further close scrutiny. The 1980's Levine proposals began the process of rooting out ineffectiveness in what was widely viewed as an antiquated, high-cost procurement system (see Schofield 1995). Contracting at that time was undertaken on a

cost-plus, cosy preferred-customer basis. It was a model that encouraged “gold-plating” and premium pricing, ultimately costing the UK taxpayer dearly. The thrust of the Levine reforms was to introduce, wherever possible, the pressures of the market. Most visibly, this was undertaken through implementation of competitive tendering.

After a series of incremental and complementary acquisition reforms throughout the 1990s, the 1998 Strategic Defence Review provided the context for the subsequent introduction of the McKinsey-inspired 1998 Smart Procurement Initiative. This set of reforms crystallized around the policy mantra: faster, cheaper, and better. Through an emphasis on team-working and the adoption of a whole-life costing approach, cost-efficiency targets were set and published. The newly formed Defence Procurement Agency (DPA) sought to achieve 10 percent cost savings across a ten-year period. Even more ambitious, the Defence Logistics Organisation (DLO) set itself the goal of achieving 20 percent savings across a five-year period. There is no doubt that savings have occurred, but there are real issues over what constitutes the cost base for calculating such savings, over the diminishing opportunities for future savings, and over the endless intellectualizing on the distinction between savings through increased efficiency and savings through simply cost-cutting.

Smart procurement quickly evolved into smart acquisition. However, irrespective of the policy name, the thrust of the reforms was always about changing culture. Smart acquisition sought to eradicate bureaucracy and delay by encouraging a commercial, innovative approach through partnership amongst all key stakeholders in the acquisition cycle. The cycle itself was reinvented as the CADMID (concept, assessment, demonstration, manufacture, in-service, and disposal) cycle. It contains only two program decision points: the Initial Gate (positioned after the concept phase) and the Main Gate (coming after the development phase). Reducing the number of decision points from four in the previous Downey acquisition cycle to the present two is expected to hasten the acquisition process (UK. Ministry of Defence, 2004, 4).<sup>3</sup> A central feature of the reform process was the creation of integrated project-management teams, incorporating representatives from MoD, the military, defence industry, and other relevant bodies. For the first time, the customer was identified. Customer one was the Director of Equipment Capability (DEC), overseeing project development from concept to manufacturing. Customer two, the Front Line Commands (Land/Sea/Air Strike), subsequently assume

project responsibility during the in-service and disposal phase. Customer two operates the equipment to achieve military effect, but will also have contributed to defining the operational requirement during earlier phases of the CADMID cycle. Additionally, DLO provides in-service support, including forward, intermediate, and rear repair facilities. Over 80 DPA and DLO IPTs have now been formed and will remain live for the duration of the weapons program. Industry participation in the IPTs now commences when the project is initiated. Smart acquisition seeks to get it right the first time, accordingly, 15 percent of project funding is targeted to be invested in the early phases of the CADMID cycle.<sup>4</sup> The aim of this upfront target investment is to ensure design robustness at an early stage of the cycle, thereby reducing both technical and financial risk later in the program. This is achieved principally by allowing opportunities for technology insertion, intended to overcome the problem of design obsolescence caused by the long concept-to-in-service cycle of defence projects. However, whilst merit-worthy as a policy goal, in practice it is challenging to achieve. Reality, of course, dictates that resources will be prioritized for the maintenance of ongoing defence programs rather than investments anticipated to yield results 10 to 20 years into the future. Examples of programs starved of upfront development expenditure are not difficult to find. For example, the troubled Astute program achieved just 0.8 percent of its £3.5 billion budget in upfront project expenditure; worse still, the equally calamitous Nimrod program took a miniscule 0.1 percent of its £3.6 billion budget for pre-Main Gate investment (Spiegel 2004a).

#### FASTER, CHEAPER, BETTER ... AND MORE EFFECTIVELY INTEGRATED

Although a major impact of the smart acquisition process has been to raise the level of debate and awareness of the challenges that policymakers face in securing greater VFM, the fact is that real and sustainable progress in achieving “faster, cheaper, and better” defence acquisition remains sporadic. A recent National Audit Office (NAO) report stated that for 2003/04 the UK’s 20 major defence projects incurred additional costs of £1.7 billion and slipped a further three months behind schedule.<sup>5</sup> This compounded the £3.1 billion extra costs and added slippage of 18 months recorded for 2002/03. Added to the previous cost overruns, the total cost of the UK’s biggest defence acquisitions, accounting for about two-thirds

of overall procurement had by 2003/04 reached £50 billion higher than initial budget estimates (NAO 2004). Aside from the continuing inability to achieve faster and cheaper acquisition, two worrying developments emerge from the NAO report. First, there now appears to be little difference between new and inherited programs. Strikingly, the NAO report argues that this split “is no longer a relevant distinction because, as analysis shows, many so-called ‘smart’ projects have failed to apply smart acquisition principles consistently” (Spiegel 2004*a*). Second, the project displaying the biggest cost increase is the F-35 Joint Strike Fighter, supposedly the latest and best example of an RMA-RBA program. An additional concern is that a number of recent high-value acquisition projects, such as the Apache and Chinook helicopter programs, have suffered from weak integration in the separate but linked lines of development. This has obliged the MoD to modify its mantra to now emphasize more effective integration in project management.<sup>6</sup>

## COSTS OF COMPETITION

Competitive tendering is an important element of Britain’s “smart” defence management model, yet there is growing concern over the nugatory costs of competition. The MoD’s policy of competitive tendering has led to cost savings of up to £1 billion per year or a collective 10 percent saving, but as with the savings attributable to smart acquisition and Lean Logistics, doubt has been expressed over the veracity of such figures (Kirkpatrick 2000, 14). Schofield, for instance, is unconvinced, arguing that neither the claims for savings nor their relationship with competition can be adequately tested (Schofield 1995, 148). Calculating the benefits of competition is even more challenging if the costs of competition are factored into the equation. The costs are several. First, the competitive tendering process often delays the decision to award a contract. The original Bowman contract, for example, is a classic case of the “illogicality” of a limited number of firms bidding against each other, precipitating the collapse of the competition through competitors joining forces to submit a unified bid. As a consequence, the MoD was obliged to stop the competition, restarting it at a later date. Moreover, delays in contract award for typically complex defence competitions are endemic in the UK. The Royal Navy’s multi-billion pound carrier competition is mired in what appears to be an unending series of contractual disputes. The

initial competition for choosing the prime contractor was protracted, with the MoD failing to pick a winner, deciding, instead, to plumb for shared prime contractor responsibility. Tensions ensued over the nature of the design, build and integration partnerships, exacerbated by the inability of stakeholders to agree contract price and carrier size. Initially, fears were raised as to whether the 60,000 ton warships were too big to access any of Britain's naval dockyards. More recently, the F-35 fighters destined to fly from the carriers were reported to be over-size and over-budget (Kemp 2004).

If competition delays do occur, then extra costs may be incurred by the MoD having to retain obsolete equipment in service beyond the planned replacement date. The competitive tendering process may also suffer from what might be termed "over-competition." This occurs when there are excessive numbers of firms engaged in the competition, causing industrial and MoD scrutiny costs to rise *pro rata* with the numbers of bidding firms. Historically, there have been as many as 15 firms bidding for UK defence contracts, though the average number of bidding firms now hovers around six (UK. Ministry of Defence 1995, xxxi). A 1990's National Audit Office (NAO) report indicates that across 13,000 competitions, the number of companies invited to tender averaged only 6.4 (NAO 1994). Arguably, however, even six bidders are excessive, leading to considerable costs of competition.

The NAO estimates that bidding costs amount to about 3 percent of contract values, yet this may be conservative as there is evidence to suggest that tendering companies in order to be compliant with bidding requirements, spend up to 5 percent of contract value to stand any chance of success in the competition (*ibid.*). The scale of these competitive costs can be shown by reference to absolute values. For instance, a detailed and compliant tender, for even a relatively simple piece of equipment such as a military vehicle, costs anywhere from £500,000 to £1 million (Matthews and Parker 1999). However, bidding costs obviously rise, *pari passu*, with increases in the complexity of a weapons system, and the Maritime Patrol Aircraft is a case in point. Its bidding and assessment costs have been quoted as exceeding £100 million, and much of this is arguably wasted expenditure (Bell 2000). Such huge competition costs are not an isolated event, and are beginning to occur with some frequency. The competition process for Britain's carriers reportedly also cost the MoD £100 million, with £30 million allocated to each of Thales and BAE

Systems for funding their respective bids and £40 million allocated for the MoD scrutiny process (Odell and Eaglesham 2003). Moreover, the bidding process is ongoing and the build-date continues to slip.

Smart acquisition often does not appear so smart. The challenges facing policymakers in achieving faster, cheaper, better, and more effectively integrated acquisitions seem unique to the defence sector, change little over time, and are common to all countries.

## CONCLUSION

This paper has sought to identify, explain, and analyze the major features of the RMA-RBA debate. It has offered a methodology for studying the current policy of integrating the business and battle spaces in the pursuit of value-for-money in the management of scarce defence resources. Cost-effectiveness has been evaluated from both the economic and strategic perspectives. This has facilitated a greater awareness of contemporary defence market conditions set against the contextual backdrop of the changing nature of security threats. The analysis has raised more questions than answers. However, two judgements can be made: defence and economics are becoming more, rather than less, entwined with the passage of time and, the RMA will heighten the need for more economic and efficient defence acquisition. This goal, however, looks to be as elusive in the future as it has been in the past.

## NOTES

<sup>1</sup> The “Last Supper” has reference to a meeting between Defence Secretary Dick Cheney and the chief executive officers of major US defence companies; the latter were told in no uncertain terms that they must consolidate to survive.

<sup>2</sup> Using the new cash requirement, a measure of defence expenditure that does not include depreciation and interest charges, UK defence expenditure in 2003/04 was £29.3 billion. See Defence Analytical Services Agency (2004).

<sup>3</sup> The original Downey procurement cycle was replaced by the McKinsey CADMID cycle.

<sup>4</sup> The October 2004 report from the Commons Public Accounts Committee states that despite an MoD policy of spending 15 percent of initial procurement costs in the assessment phase, the actual figure was only 5 percent leading to poor understanding of the military requirements and industrial risks attached to major projects. See Harrison (2004).

<sup>5</sup> See analysis of the UK National Audit Office, *Major Projects Report 2004* (Spiegel 2004b).

<sup>6</sup> Apache helicopters have been licence-built at the Westland Yeovil plant, but are being put into storage for two years because insufficient pilots have been trained to fly them (Comptroller and Auditor General 2002). Also note that a fleet of Chinook helicopters costing the RAF £250 million cannot fly because the supplier, Boeing, refuses to supply software codes to validate the avionics system and flight controls. See Harrison (2005).

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## CHAPTER FOUR

# *Spain: A Shifting Approach to Defence Procurement and Industrial Policy*

*Jordi Molas-Gallart*

### INTRODUCTION

Over the last 20 years, Spain's defence industrial and procurement policies have undergone substantial transformation. When a socialist government was elected to power in 1982, Spain was starting to emerge from a process of political transition and a deep economic crisis. General Franco had died in 1975 after almost four decades as head of state. Perhaps paradoxically, the defence industries did not play any significant role in Spanish industrial or defence policies during the dictatorship. It took a democratically elected leftist government to put in place, during the 1980s, the foundations of a defence-industrial policy.

In 1982, the Spanish Socialist Workers' Party (PSOE) was elected to power. One year before, Spain had agreed to the purchase of 84 F-18s (later to be reduced to 72) from the US firm of McDonnell Douglas. The operation would be accompanied by an offset program, which, according to statements from government officials, was to cover 100 percent of the value of the transaction. This was, by a long margin, the largest compensation program ever signed by Spain. The responsibility to negotiate and administer it fell to the newly elected socialist government.

This paper briefly traces the evolution of Spanish defence-procurement policies, particularly in relation to their foreign component: the ways in which successive administrations dealt with the need to import systems and technology for the use of the Spanish armed forces. It shows how,

from the initial focus on offsets, the preferred approaches to deal with foreign suppliers changed in an attempt to extract better conditions and adapt to shifting circumstances. All through this period, however, a main policy goal remained the pursuit of compensations from the foreign suppliers that would allow Spanish firms to upgrade their technological capabilities and thus strengthen the Spanish defence-industrial base. That the main policy approaches kept shifting while the objectives remained stable suggests that policy outcomes felt short of delivering the technological results that had initially been expected.

### THE 1980s: FOCUSING ON OFFSETS

When Spain signed the F-18 offset agreement, the Spanish defence industry was mainly state-owned, fragmented into many small plants, loss-making, and technologically backward in comparison to its European neighbours. A structure of national leaders had evolved, by which aerospace production was dominated by the aerospace firm, Construcciones Aeronáuticas, S.A. (CASA), the shipbuilder Bazán, and land-armaments manufacturer Empresa Nacional Santa Bárbara (ENSB). In this way, each of the branches was aligned with a main state-owned manufacturer.

The F-18 offset agreement was seen as a tool to develop domestic technological capabilities, particularly in the defence-related industries. The contract, signed after protracted negotiations in July 1984, limited the amount of indirect commercial offsets in the program and established a minimum level of offsets involving technology transfer and compensations directly related to the F-18 project. The offset program was to run for ten years.

Its management proved to be a difficult and labour-intensive task. Although a dedicated office was set up in Spain to administer the program (the *Gerencia de compensaciones*, Offset Management Office), its limited capabilities were soon overwhelmed with the demands of dealing with thousands of offset project applications. The procedure devised to run the project required that the Office approve the proposals submitted by McDonnell Douglas. The Office had to satisfy itself that the proposals complied with a set of minimum requirements. For instance, indirect commercial offsets had to involve a net increase in Spanish exports: they could not be substituting trade flows already in place. It was up to the Office to determine, for every commercial offset proposal, whether the operation

would represent new business for Spain as a whole, or merely substitute already existing commercial flows. In cases of technology transfer it had to assess the economic value assigned to the transaction.

McDonnell Douglas flooded the Offset Management Office with thousands of offset project proposals, many of them very small. During the ten-year life of the offset program, 7,759 proposals were submitted, out of which the Office rejected 1,190. Despite the very large number of proposals and projects, by the end of the ten-year period the program had not achieved the targets set up in the contract. Following the contractual provisions, a three-year “grace period” was negotiated. This process revealed that the Spanish negotiators had learnt from the experience and were changing their priorities when dealing with foreign sellers of advanced defence technologies.

Although the main interest of the Spanish administrators was to obtain advanced technologies and capabilities through technology transfers and defence-related offsets, by the end of the program the value of these transactions was small in comparison to the indirect commercial offsets. For instance, defence-related offsets (including direct offsets) accounted for only 28 percent of total program value. The Offset Management Office had to deal with thousands of projects and project applications, out of which only a few were substantial and even fewer involved any form of technology transfer or learning. This is not to say that the program did not have any beneficial effects; there were, in fact, cases of Spanish firms building areas of expertise which they would use on new programs and would become part of their technological portfolio. One of the best-known cases is, perhaps, the work on simulators that the Spanish electronics firm CESELSA carried out within the offset program. The firm, now merged within the Spanish electronics conglomerate INDRA, continued to work on simulators over the following years and has built a significant capacity that allows it to contribute to international programs and develop its own systems.

Yet, overall, Spanish insiders to the program felt that the very large overhead associated with the management of such a large and complex program was not in line with the marginal benefits obtained from a very large number of projects. In the future, programs would have to become more focused.

A problem that Spain had faced in the early 1980s when negotiating the F-18 deal was the limited capacity of the domestic industry to deal

with the demands of contracts directly linked to the program. Partly as a response to this lack of capability, the Spanish government started to involve domestic firms in defence research and development (R&D) programs. From the mid-1980s, Spanish defence R&D rose from negligible levels to almost 30 percent of government *total* R&D expenditure in 1991. This was part of an effort to bring the defence-industrial base up to the “European level” and to involve it in European arms development and production programs, which Spain was able now to access for the first time in history. Most of this new R&D investment was placed in European collaborative projects, and mainly in the then-European Fighter Aircraft, which by the early 1990s accounted for more than 60 percent of all Spanish defence R&D investment.

The firms that benefited most from these investments were largely the same as those that had received most of the F-18 direct offsets value: the main state-owned aerospace firm and the public and private electronics firms. Throughout the 1980s, the Spanish government saw the military demand as a source of technological development incentives in key, high-technology sectors of the economy. The tools of support, however, were shifting away from the large offset agreement that had dominated the mid-1980s.

### THE 1990s: FROM OFFSETS TO INTERNATIONAL COLLABORATION

When the time came to negotiate the three year grace period to the F-18 offset program, the Spanish defence-industrial and political landscapes bore little similarity with those of ten years earlier. Spanish firms were starting to gain some experience with international collaboration, the domestic political situation had stabilized, and Spain was now an active member of NATO and the European Union. If anything, Spain was struggling to keep up with a large number of international arms-development programs that had entered in the late 1980s and early 1990s, when almost every European arms-development program that was launched had a Spanish partner.

With the benefit of hindsight, the F-18 offset program had proved unwieldy to administer, dealing with too broad a portfolio of projects, lacking (from the Spanish point of view) a clear strategic vision, and which, ultimately, failed to deliver on its contractual commitments. The

negotiations for the grace period turned out to be tough. It was no longer left to the US firms to present proposals to be approved by the Spanish management: the composition of this last batch of offsets was to be agreed *ex ante*. The Spanish negotiators now had a clear idea of what they wanted: direct offsets linked to the maintenance and support of the F-18 fighters. In this approach, the monetary value of the transaction was less important than its content and indirect offsets were, by and large, abandoned.

Spanish arms-acquisition programs had shifted their balance in favour of international collaborative arrangements. Here the Spanish partners had an early say in the configuration of the system to be developed and could negotiate workshares and areas of activity from a stronger position than that available to just a buyer of weapons systems. Even when the only avenue open was that of a purchase (rather than a joint development) the way the operation was built changed significantly. For instance, in the early 1990s the Spanish armed forces bought eight Harriers and modernized 12 Harriers AV-8B they had in service. This time, the operation was structured as a joint program between the US, Italy, and Spain for the development of the new Harrier variant. The difference with an offset contract is stark. As a joint development program the Spanish industry was involved from the earliest stages of the project, following a division of tasks agreed to a large extent *before* the contract was signed. Theoretically such “collaborative” agreements would allow Spanish firms to interact more closely with their foreign senior partners. Even more important, there was no need for an independent agency to micro-manage the program, unlike offset programs where each project had to be approved. The main responsibility for project management shifted to the participating firms, who are naturally interested in maximizing the benefits (both short and long term) that can be derived from the collaborative program.

International collaboration was not, however, devoid of problems. During the late 1980s and 1990s, Spain entered a myriad of collaborative projects, most of them European. Many of these projects were cancelled as one or more of the participating countries were not ready to make the growing and long-term commitments that were necessary when the projects moved from the early development phases to the more costly stages of engineering and production. The rates of failure and the costs of participation were only two of the problems that international collaborative projects presented. In Spain it was also feared that the role of Spanish

firms in international projects could be marginal, addressing areas of low technological content. Through collaboration, some argued, the Spanish industry risked losing some of the capabilities that it had painfully acquired over years of protected programs and may end up as a lower-tier supplier in a bigger, integrated European defence market. International programs had to be joined with care and could not be entered at the expense of developing domestic capabilities. The solution to the maintenance and strengthening of the domestic defence-industrial base lay in foreign direct investment. The late 1990s and early 2000s bring us to the third stage of the shifting Spanish approach to international acquisition of defence systems.

#### THE 2000s: FROM PROGRAM-BASED COLLABORATION TO FOREIGN DIRECT INVESTMENT

Attracting foreign capital to Spanish defence producers had been done before, although on a modest scale. American and French companies took over minority shares in state-owned Spanish defence companies during the late 1960s and early 1970s. These operations were always linked to specific procurement programs. For instance, Northrop took a 20 percent share in the Spanish aerospace firm CASA in 1965 in an operation linked to the purchase and production under licence of 70 F-5 fighter aircraft. This type of involvement proved to be, in all cases, short lived. As the programs that spawned them were completed the interest faded and the foreign shareholders would progressively reduce their involvement.

In the late 1980s and early 1990s a slightly different type of involvement emerged, this time linked to the Spanish participation in international arms-development programs, and particularly in the European Fighter Aircraft. Spanish aerospace subcontractors lacked the technological capacity to be involved in the program subcontracts and set up joint ventures and new companies with European firms, thus creating the Spanish partners for some of the fighter subsystems.<sup>1</sup>

These operations, however, did not extend to the relatively larger Spanish primes. ENSB, Izar (previously Bazán) and CASA continued to be 100 percent state-owned. The possibility of a longer-term linkage with foreign partners to help develop the long-term technological capability of these firms was carefully being considered during the late 1990s. Foreign

partners, it was hoped, would help link Spanish manufacturers to the international defence-industrial base and provide a more stable basis on which to develop its technological capabilities. Yet, attracting foreign investors to the traditionally loss-making, state-owned military-related companies was not to be an easy task and would have to be underwritten by a portfolio of ongoing contracts assuring a minimum level of activity.

The first deal to be agreed involved the aerospace firm CASA. In June 1999, the Spanish Ministry of Industry and DaimlerChrysler Aerospace agreed a deal by which a new firm, DASA-CASA, was created and the public sector holding that had until then controlled CASA (SEPI) obtained a 12.5 percent stake in the new firm. The Spanish government had, in this way, relinquished ownership control over its most important military-related firm. A few months later, in early December 1999, DASA-CASA and Aerospatale agreed to the creation of EADS. CASA is now a junior partner in the European aerospace conglomerate.

The privatization of ENSB would always be more difficult and provides a more telling experience of the difficulties in linking procurement programs to industrial policy measures. ENSB had continually suffered losses since it was created more than three decades ago. Its dire situation reached bottom in 1995 when its losses trebled its total annual sales. The government was eager to see these results improve and had long been involved in negotiations to draw private shareholders to the firm. Initially, negotiations had taken place with the German firm Krauss-Maffei (the developers of the Leopard tank being produced under licence by ENSB for the Spanish armed forces). Eventually SEPI received three offers for the company from Krauss Maffei, General Dynamics Land Systems, and the Spanish Unión Española de Explosivos. The announcement on the sale of the whole company to General Dynamics, in the spring of 2000, came as a surprise. SEPI's CEO had hinted that a wholesale privatization was not being considered when he stated that talking about privatization did not mean that the state would sell the firm, rather it announced the entrance of private shareholders bringing technology and commercial networks.

Besides, ENSB's involvement in the licensed manufacture of Leopard tanks for the Spanish Army suggested that a German partner would have been preferred. The ten-year procurement program had been awarded in 1996, and during its negotiation the possibility of Kraus Maffei taking over Santa Bárbara had been considered. The discussions of the future of

ENSB and how the winning company would support its future were an integral part of the negotiation; yet the purchase of the tank and the sale of the company were two clearly distinct operations. Although Kraus Maffei won the first part of the contest facing the opposition of the General Dynamics offering, ENSB was sold to General Dynamics four years later. During the protracted negotiations, the government had changed, and General Dynamics offered better economic terms to the new administration. Crucially, General Dynamics committed not to close any of ENSB's surviving plants for a five-year period. Kraus Maffei, a smaller firm suffering financial constraints, opted for a tougher position aimed at streamlining ENSB into a profitable business as soon as possible. General Dynamics' willingness to make the financial effort to support the size of the loss-making firm clinched the deal. The Spanish government offered, as its part of the deal, a promise of future acquisitions that could help support ENSB.

Initially there were some doubts as to whether the Leopard contract could go ahead under the new ownership. Yet a system of "Chinese Walls" was set up separating all the work on Leopard from the rest of the company operations. The approach to achieve strict separation includes a set of detailed procedures, and is backed up by stiff penalties in favour of Kraus Maffei were these procedures not followed. This system has worked so far. Additionally, since the takeover, the new US management has introduced new administrative, monitoring, and auditing practices. Weekly reporting procedures are now in place across the company, and it is to be expected that these will result in efficiency improvements. However, the level of domestic orders that General Dynamics appears to have expected has failed to materialize, triggering some early, still private, tensions with the Spanish government.

The outcome of the process by which a procurement program was informally linked to a direct foreign investment is somehow odd. In Spain, General Dynamics is producing the tank of its main competitor in this market, Kraus Maffei. The extent to which the Spanish Leopard program will achieve its objectives, and whether the system of Chinese Walls will affect the building up of ENSB technological capabilities at a corporate level are still to be seen. There is clearly an attempt to link foreign capital to Spanish systems producers and in this way achieve a more stable basis for the domestic defence-industrial capability. Yet, the need to link this goal with specific procurement programs is likely to generate

difficulties. General Dynamics may find that the domestic Spanish defence market is not providing the opportunities it expected and tensions may emerge if, in the medium term, ENSB cannot yield a reasonable return to its new owners. As discussed above, foreign investments in Spanish defence firms in the 1960s and 1970s showed that, in the absence of a continuing stream of programs, and therefore business, the involvement of foreign partners can be a fleeting affair.

### ANY LESSONS?

In the 1990s, the Offsets Management Office changed its name to Industrial Co-operation Management Office. This change is symptomatic of the broader shift in the approach to the procurement of defence systems in international markets, and also shows that the experience gained through the management of the F-18 offset program was valuable in future negotiations. The continuity in this organization is remarkable. Today, the Office is part of the state-owned defence systems engineering firm ISDEFE, and continues to advise on international defence-industrial deals, and negotiate industrial agreements on behalf of the Ministry of Defence. Its director has remained in his post for some 20 years and the physical location of its offices (in the ground floor of an unassuming block of flats in the centre of Madrid) has also remained the same. This continuity in some of the managerial offices linked to international procurement has ensured learning based on the accumulative experience of many different projects.

Spanish policies have tried to adapt and learn from each new set of procurement programs. The response to the heavy management overhead and dispersion of large offset programs, was to increase their focus on direct offsets targeting maintenance and support and to move, whenever possible, to other forms of international acquisition. International arms-development programs are, however, costly to run and often vulnerable to changes in the political and strategic priorities of the participating countries. International mergers and acquisitions can provide a more structural link to foreign partners and integrate the domestic industries within international production networks. Yet, if the defence authorities wish to retain and improve specific technological capabilities, they may be compelled to provide a stream of domestic projects to sustain specific capabilities that may already exist in other countries. The involvement of foreign

partners in Spanish defence production is directly supported by the domestic market. Probably it is not a coincidence that the privatization effort has been accompanied by large procurement programs (Leopard for the Army; and EF-2000 for the Air Force) benefiting the privatized core defence systems manufacturers (ENSB and CASA). On top of the large financial investments that have been necessary to return these firms to the firm financial footing demanded by private investors, these procurement programs are providing a book of orders for their products.

NOTE

<sup>1</sup> Rolls Royce's 49-percent share in the newly created aero-engine components manufacturer ITP is the best-known case.

PANEL II

*Comparative Views on the Economics  
of Defence Acquisition*

*Notes on Question and Answer Period*

*By: OCdt Brendan Menzies (III) 23210 and OCdt  
Heath Robson (III) 23236*

PANEL MEMBERS

**Australia**

Dr. Stefan Markowski – School of Business, The University of New  
South Wales at the Australian Defence Force Academy

**United Kingdom**

Dr. Ron Matthews – Vincent Centre for Defence Management, Royal  
Military College of Science – Cranfield University

**Spain**

Dr. Jordi Molas-Gallart – Science Policy Research Unit, University of  
Sussex

**Canada**

Discussant – Dr. Jack Treddenick, College of International and Security  
Studies George C. Marshall European Center for Security Studies

**Chair**

Dr. Ugurhan Berkok, The Royal Military College of Canada

## Notes

Australia – highly confused, economically detrimental defence procurement initiative so that the pursuit of economic benefit is a waste of time

United Kingdom – British approach emphasizes military capability while balancing time, performance, and cost and are thus not in favour of budgeting to save cost over capability

Spain – mate defence output with increasing domestic industry in order to move from a high level of offsets to foreign investment

### *Statement – Jack Treddenick*

- Defence industry has to be preserved for meeting a national emergency (can't rely on allies completely)
- Spend defence dollars for economic benefit
- Defence spending can infuse technology growth to the overall economy
- *Must* be re-thought; let defence industry grow instead of protecting it with artificial policies
- The ability to produce kit is reliant upon an established DIB, through protection, this must be reversed
- The lag in civil development hindering defence R&D; therefore the civil industry must be supported to stimulate growth
- Economic benefit uses performance, cost time (big three) which has doubled the complexity of defence spending leading to a reduction in the initial three; therefore economic benefit should be made subservient to the real goals of defence procurement
- Decisions must be simplified in order to meet the threat over economic and regional concerns
- Defence acquisition must be commercialized versus using public bodies, including DND as ministerial motives limit decisions and slow the process
- Value = Capability (for money)

### *Statement – Senator Kenny*

- As a politician, seems to be an inordinate effort made by lobbyists during acquisition process – public relations aspect

- These aspects are common in big business in the decision-making process
- Anomalies emerge when these aspects are ignored
- The effects of the unseen aspects of business dealing

*Statement – Rick Worcroft*

- Lobbying in defence procurement is prevalent

*Statement – Jane Cochran*

- Decisions in context of democratic institutions
- Elected have direct responsibilities to link defence decisions to society; concerns outside policy framework
- Political nature of decision-making is a factor and thus a question over mandate
- What else are we getting out of this? Multipliers? Efficiency of resource allocation? Market imperfection?
- Defence economies are separate from business industry

*Question – David Franssen*

- Marketplace driving force of Industry Canada, not a competitor
- Regional development is a form of tariff
- Are we to be universally disarming? Is there a transition process?

*Answer – Stefan Markowski*

- Influence of market imperfections due to the unilateral power of the US
- Australia has option to “shop-around” or focus on local-content policy which creates market imperfection of bilateral monopoly in the domestic market
- Must have a good reason to do this – what is it?
- Critical over how these objective have been set up — what are we achieving?
- Tendency to contradict ourselves due to a lack of underlying philosophy
- Disparity between academic theory and practice
- For example, fixed exchange rate versus free trade
- The protection of legacy industries, including defence is a sunk cost – what is the real value?

- Must give industry a set series of outputs and allow it to develop the needed inputs
- Difficulties for other small nations who can't utilize the US as we can
- Despite loss, national security must be maintained as it is not a measurable asset, but it is vital

*Question – Bob Walker*

- Canadian experience with international procurement not positive — what has been the UK experience?

*Answer – Ron Matthews*

- Can't ensure success of collaborative works, can only use to try and reduce costs
- Too small in scale to assume individual production
- Must ensure compatible designs
- Historical collaboration with the continent to seek cost-effective systems
- Influence of politics; must move to integrated/harmonious relationship to avoid future wars
- EUROfighter 20-year program; need is lost while being way over budget
- May save in R&D due to split-cost, but capability is lost
- What is the degree of trade-off?
- Feasibility of developing individually; better for defence capability yet more costly
- Whole DIB in private hands

*Question – Jane Cochran*

- How effective is this? for example, EUROBUS

*Answer – Ron Matthews*

- It works well; unified approach to decision-making
- Inevitable move to transition for a European Industrial Base
- Move to most efficient supplier from “just-return” policy
- Unified procurement is the future; will have inevitable delays

*Reply by Jack Treddenick to Question from Doug Dempster*

- Essential issue is de-politicizing procurement, not bringing it into WTO or NATO
- No agreement for procurement, but there must be development (EU rationalization)
- National concerns may be subverted [he feels little hope]
- Within each country, should do their best to de-politicize – will probably never happen
- Influence of economic benefits is wrong but profound
- Industrial benefits, shared theology; markets understand better than bureaucrats
- Resources that aren't being fully employed, therefore transitions aren't beneficial
- Our trade balance is strong
- Canadian industry does not need to be sheltered, it is capable of competing
- Multiplier effect is limited (1.2), thus can't be used as a support for defence spending; due to this loss, must ensure get greatest capability
- Offsets: public feels they are getting it free – economists feel spending too much
- Conflict: developing domestic industry to support procurement

*Question – Patty O'Donnel*

- Exaggerate the importance of economic benefit, but not mutually exclusive with capability
- Infrastructure is worth investment; too focused on political distortions
- The negative aspects of politics don't outweigh the value of regional development

*Answer – Ron Matthews*

- Offsets are cost-driven there, more purchase from US (cheaper than re-developing)
- Seeking compensation based on competition, not multipliers
- Worth of offsets based on whether recipient country has the absorptive capacity to make use of it

*Question – To Stefan Markowski regarding Leopard Tanks*

*Answer – Stefan Markowski*

- When will a main battle tank be required to defend Australia? Or to be deployed?
- How can you employ them due to the distance?
- Where is the threat? Any nation able to launch an invasion of Australia (or Canada) would be wealthy enough to defeat us
- The asymmetrical threat of today will not be stopped by Leopard tanks
- Can't confuse US policy with small nations – we must be junior partners to this superpower
- Don't need kit just because others have it
- Thus, when you develop capabilities, you must define the need for it; it must be clear
- The final output must be the foundation

*Question – To all by Ernest Gillman regarding US position on military emphasis*

*Answer – Ron Matthews*

- Should be fearful the UK will become a subcontractor to the US – this is wrong, we already are
- US have scale advantage (cost-saving) and the massive DIB
- Must be linked with the US, difference becomes what level/tier contributor
- Concern over intellectual property rights
- BAE actively looking to be merged with a US prime contractor
- What are the ramifications?

*Answer – Dr. Jordi Molas-Gallart*

- Shift in the overall debate concerning this issue
- Affect of competitiveness on commercial sector (past), now, because the US has leveraged defence into domestic, it has given them the competitive advantage
- Difficult to predict the future implications
- Not addressing core fundamentals of economic justifications – the path to introduce economic thinking

- Generalizations are easy; the details are key, yet often overlooked as difficult to manage (to understand the political balance)

*Supplemental Points from OCdt Heath Robson (III) 23236 (the rest of our points were the same)*

Treddenick's main point:

Convinced that defence acquisition be taken away from politicians, DND, and its commercial culture. It should not be a public culture; he wants a department of procurement set up, and cultural change and/or revolution where value is defined as military capability. He believes economic benefits from acquisition are also futile.

*Stefan – to Jane Cochran's statement*

- Market imperfections in context of defence economics were influenced by the US because of their status as a large supplier
- A small country like Australia has choice – they can shop around
- Critical of the way objectives are set up; confusing strategic and economic objectives
- Due to the fixed exchange rates, Australia is not protecting failing industries as we are with the frigates
- Have to decide what you want as inputs and what you want from industry
- Wants to have people to hold responsible, and wants people to remember that industry demand is derived demand

*Ron Matthews*

- In the UK, the whole industrial base is in private hands
- Based on specialization and thus always procure goods from most efficient supplier
- More than just a return policy as it is in Spain
- We're moving toward a unified procurement process in Europe

*Jack Treddenick*

- Essential issue is de-politicizing procurement
- Industrial benefits from sustaining economic benefits

- Talking about economic benefits of trying to achieve fuller employment resources in Canada, but we don't have an unemployment problem so feels no benefit
- Feels our industry is one of the most robust in the world and thus does not need protection.
- Problem with offsets – in contract there is X, but “Joe public” thinks we're getting free stuff while company is saying Canadians are paying too much.

## *About the Authors*

**Ugurhan G. Berkok** is Professor at the Royal Military College, Kingston, and Queen's University. He received his PhD in Economics from Queen's University in 1989. His teaching positions have included Laval, McGill, Montreal, Quebec, Concordia and Sussex in the UK. His research interests cover public economics; health economics; and defence and security economics.

**Peter Hall** is Head of School at the University of New South Wales at ADFA in Australia. Professor Hall has an MA and MPhil from Oxford University. His research interests include economics of innovation; technology management; science, technology and industry policy; and the economics and management of defence. He has served on a working group of the Prime Minister's Science, Engineering and Innovation Council on issues relating to innovation in established businesses.

**Stefan Markowski** is Professor at the University of New South Wales at ADFA in Australia. He received his doctorate from the London School of Economics in 1974. Dr. Markowski has held several varied positions, such as in the Centre for Environmental Studies in London, School of the Environment, and the Bureau of Industry Economics in Canberra. His current interests include logistics and operations management; defence economics and management; and foreign direct investment industry studies.

**Ron Matthews** holds the Chair in Defence Economics and is the Academic Leader of the Master of Defence Administration program at the Department of Defence Management and Security Analysis, Cranfield University, UK. He has had visiting fellowships at the Institute of Defence and Strategic Studies, Nanyang Technological University, Singapore; NATO; the World Bank; and the Hoover Institute of War, Revolution

and Peace, Stanford University among others. His publications include: *Managing the Revolution in Military Affairs* (2001), *Japan's Military Renaissance?* (1993), *Defence Production in India* (1989), and *European Arms Collaboration* (1992).

**Jordi Molas-Gallart** is Research Professor at the Spanish Council for Scientific Research (CSC), and works at INGENIO, a joint research centre of CSIC and the Universitat Politècnica de València. He obtained his DPhil from the University of Sussex. He has led research projects for the European Commission; the European Parliament; the UK Department of Trade and Industry; the French Ministry of Defence; and the UK National Engineering Laboratory among others. He is the author of *Military Production and Innovation in Spain*, and his interests include defence procurement; procurement reform; and science and technology policy issues.