



Canada First:

Leveraging Defence Procurement Through Key Industrial Capabilities

Report of the Special Adviser
to the Minister of Public Works and
Government Services

February 2013



Cover photo source: General Dynamics Land Systems – Canada and CAE Inc.

Disponible en français

Cat. No. P4-52/2013E

ISBN 978-1-100-21762-8

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Government Services

February 2013



The Honourable Rona Ambrose
Minister of Public Works and Government Services and
Minister of Status of Women
Place-du-Portage III, 18A1
11 Laurier Street
Gatineau, Quebec
K1A 0S5

Dear Minister:

I am pleased to present the enclosed report entitled “Canada First: Leveraging Military Procurement Through Key Industrial Capabilities”. This report fulfills a mandate, in my capacity as your Special Adviser, to inform the further development of the government’s defence procurement strategy. As you know, I was assisted in this effort by an expert panel of four distinguished Canadians from across the country with diverse experience relevant to this undertaking. These individuals are: Mr. Ray Castelli, Ms. Christyn Cianfarani, Major-General (ret’d.) David Fraser, and Dr. Peter Nicholson. I am grateful to have had the pleasure of working with these dedicated Canadians.

It is our hope that the information and recommendations in the report will assist you and your Cabinet colleagues with the important task of continuing to develop a strategy to maximize the leverage of Canada’s military procurements to support innovative, globally-competitive defence and security industries in Canada. The ultimate objective is to enhance the sovereign control of our nation’s security and to increase the economic return on its defence-related investments.

I wish to acknowledge the support that the Panel has received from an interdepartmental secretariat led by Mr. Christopher Baird. We thank him and those who worked with him for their dedicated efforts. We also acknowledge and thank the many other Government of Canada officials, as well as the representatives of Canada’s defence-related industries whose valuable input has informed this report.

Sincerely,

A handwritten signature in black ink, appearing to read "Tom Jenkins". The signature is fluid and cursive, with a long horizontal stroke extending to the left.

Tom Jenkins, Special Adviser

Special Adviser



Tom Jenkins

A handwritten signature in blue ink that reads "Tom Jenkins".

Panel Members



Ray Castelli

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Christyn Cianfarani

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David Fraser

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Peter Nicholson

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ACKNOWLEDGEMENTS



Secretariat

The Panel was supported in its work by a secretariat under the direction of Mr. Christopher Baird of Public Works and Government Services Canada (PWGSC). Mr. Baird was supported by Lynne Barrowman, Suzanne Cardinal, Scott Davy, Quang Duong, and David Reid. The secretariat was also supported by officials from the Department of National Defence, Industry Canada, the Department of Foreign Affairs and International Trade, the Privy Council Office and the Treasury Board Secretariat.

Additional Acknowledgements

The Panel wishes to express its appreciation to Mr Andrei Sulzenko for his considerable contribution to the preparation of this report, and to Jonathan Fortier, Veronique Nadeau and Mary Boland of PWGSC for their contribution to its layout and production.

Sincere appreciation is also expressed to the Canadian Embassy in Washington, and in particular Ms. Anya Lisowski and her team, for coordinating the Panel's consultations with a range of U.S. defence industry stakeholders. This included officials from the Office of the Under Secretary of Defense, the Offices of the Assistant Secretaries of the Air Force, Army, Navy, the Assistant Secretary of Defence for Research and Engineering, and the General Services Administration.

Lastly, the Panel also wishes to acknowledge and thank the many other governmental and non-governmental organizations whose representatives contributed time and insight that served to inform the Panel's work. A complete list of the organizations the Panel consulted is available at Annex 2.

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Terms of Reference and Process

The Minister of Public Works and Government Services appointed Mr. Tom Jenkins as a Special Adviser regarding the development by the Government of Canada of a Defence Procurement Strategy. Mr. Jenkins, in turn, identified a panel of experts to assist him in this work. Specifically, Mr. Jenkins' panel was given the following mandate:

The Government of Canada has committed to develop a Defence Procurement Strategy (DPS) that meets the operational requirements of the Canadian Forces in a timely, cost-effective manner, while maximizing related job creation, supporting Canadian manufacturing capabilities and innovation, and bolstering economic growth. The Special Adviser's mandate is to help inform the development of the DPS by:

- 1) Considering and developing criteria that would inform the selection of Key Industrial Capabilities (KICs) related to Canada's defence-related industries;*
- 2) Establishing a process to apply these criteria to identify KICs; and*
- 3) Proposing a list of individuals or organizations that the Minister could ask to conduct an assessment of Canada's defence industry capabilities using the criteria and process noted above, in order to identify and propose a list of possible KICs.*

In fulfillment of this mandate, the panel was asked to consult with a range of stakeholders

including Government of Canada officials involved with military procurement, representatives from the defence and aerospace sectors, and other individuals with business or economic expertise as required. These consultations were by invitation only and not open to the public.

The panel reviewed relevant information and reference material of the Government of Canada, of other countries, and non-government organizations, as well as the findings and recommendations of a Special Report on Procurement produced by the Expert Panel tasked with the Review of Federal Support to Research and Development as they related to government procurement, innovation and technology development, and defence industry-related matters.

The panel was also asked to consider the recommendations of the Review of Aerospace and Space Programs and Policies led by the Honourable David Emerson on behalf of the Minister of Industry. That report was published in late November 2012.

Officials of Public Works and Government Services Canada (PWGSC) provided administrative support to Mr. Jenkins' panel and coordinated with other federal government departments as required.

EXECUTIVE SUMMARY



In 2008, the Government of Canada established the Canada First Defence Strategy (CFDS) which provides stable long-term funding and a roadmap for the modernization of the Canadian Forces over a 20-year period.

The CFDS commits to a total investment of \$490 billion in personnel, equipment, readiness and infrastructure, of which \$240 billion is allocated to procurement in the latter three categories (see Exhibit 1). The government has stated that it intends to use the unique opportunity created by this exceptional investment to support the competitiveness of Canadian industry. While a significant number of CFDS procurements have occurred or are currently in progress, many others are forthcoming and represent the potential for very substantial long-term economic benefit for Canada.

The principal objective of this report is to outline an approach to maximize the overall benefit of the government's CFDS investment. This involves identifying and supporting key industrial capabilities (KICs) to enable Canada's defence-related industries to better meet the operational requirements of the Canadian Forces while generating sustainable economic growth.

Defence-related industries are unique in that governments are essentially the only customers, and have flexibility under international trade agreements to favour domestic suppliers. The production and trade of military goods and services is therefore powerfully influenced by governments, usually in ways that strongly encourage the development of the home country's defence industry. Many of the most highly industrialized countries have thus developed,

CANADA FIRST DEFENCE STRATEGY – TOTAL DEFENCE SPENDING (2008/09 – 2027/28)			
Pillar	Amount	% of Total	Remarks
Personnel	\$250B	51%	70,000 regular, 30,000 reserve
Equipment	\$60B	12%	equipment, major fleets, other capital
Infrastructure	\$40B	8%	rebuilding and maintenance
Readiness	\$140B	29%	spare parts, maintenance and training
Total Spending	\$490B	100%	

Exhibit 1 (Source: Canada First Defence Strategy)

explicitly or implicitly, strategies that promote their defence-related industries, recognizing that such innovative, dynamic industries contribute importantly both to sovereignty and to growth. In short, a nation's defence industrial capability is inextricably linked to government policies and practices. The only question is whether that linkage is strategically proactive or relatively passive. This report advocates a proactive approach.

Procurement policies and practices play the central role in the development of such an approach given that they are the principal means by which the key customer, the Government of Canada, can foster the innovative capabilities that characterize world-class defence-related industries. Evidence indicates that primarily all successful Canadian-based defence suppliers of scale—several of which also have large commercial businesses—got their start with a Department of National Defence (DND) contract. This first contract is vital, not only in refining the cost and performance characteristics of any new or improved product, but also in validating it outside of the domestic market. The return on this investment includes high-value Canadian jobs in the short term, but the far more important measure of success is the number of high-growth companies created over the long term.

The Global Context

Global defence requirements are going through a period of rapid transition from the immediate past, led by the U.S. which accounts for almost 50% of global defence spending. The U.S. is recalibrating its needs in the face of shifting defence priorities, impending budgetary reductions, and disengagement from major conflict zones. Current expectations are that its annual spending on activities that comprise the majority of the market for defence-related companies will decline by 25%

or more in the three fiscal years 2011/12 to 2014/15 (see Exhibit 2).

The expected reduction in U.S. defence spending is occurring in parallel with a review of its long-term defence posture. Based upon the Panel's consultations with government and industry representatives in Washington, the following structural shifts in U.S. defence priorities can be anticipated:

- a shift in threat to cyber and electronic warfare, combined with a shift in capability to intelligence and surveillance;
- a shift in geographic focus to the Asia-Pacific region;
- a corresponding shift in military capabilities to naval and unmanned aerial systems; and
- a shift from reliance on new platforms to upgrading and maintenance of existing platforms.

Reduced U.S. Department of Defense emphasis on expensive new platforms is causing U.S. companies to focus on specialized capabilities for existing platforms and to thereby compete more directly with Canadian firms that have existing and potential niche capabilities in the U.S. market. American prime contractors are responding to anticipated spending reductions by vertically consolidating—by acquiring smaller companies in their supply chains—and horizontally diversifying into related commercial fields, particularly IT, logistics, and maintenance, which are all areas of Canadian expertise.

This situation presents both a threat to, and an opportunity for, Canadian suppliers: the threat being less potential overall business in the U.S. and other

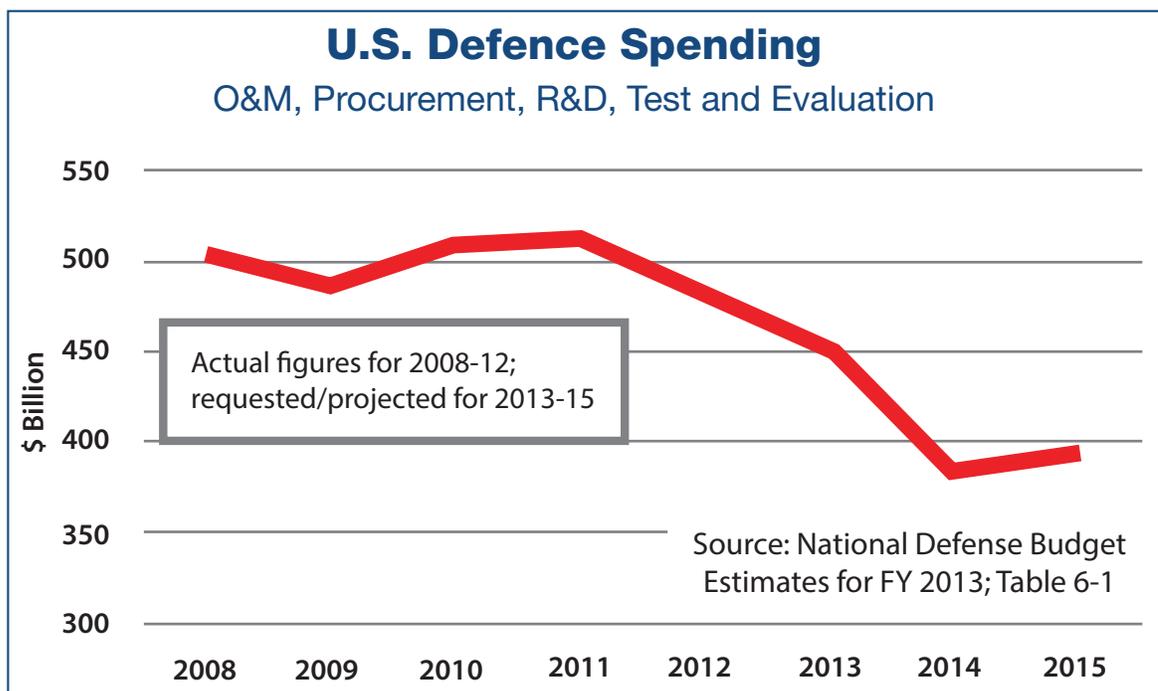


Exhibit 2 (Source: U.S. Department of Defense)

foreign markets, as primes adjust to new business realities; the opportunity being new growth opportunities in the U.S. market in specialized areas complementary to U.S. capabilities. Furthermore, there is potential for business growth in Canada's comparatively healthy defence procurement market, aided by increased government leverage in negotiating with prime contractors seeking to offset declining sales elsewhere.

In other countries, there are diverging trends. NATO allies in Europe are also challenged by changing priorities and budgetary constraints, with a forecast decrease in defence spending of almost 5% between 2009 and 2016. In contrast, Canada continues to re-equip its land, sea and air forces, with sustained expenditures on equipment and readiness not seen in sixty years. Meanwhile, emerging markets are steadily building up their defence forces, which are expected to grow overall by more than 40% from 2009 to 2016.

The Canada First Defence Strategy Opportunity

Canadian requirements are ramping up through a \$240 billion re-equipping of all three branches of the Canadian Forces projected between 2008 and 2027. The key element that drives spending on the "Readiness" pillar (spare parts, maintenance, repair, and training) is the \$60 billion allocated to "Equipment", comprising major fleets and other capital. Based on published CFDS spending estimates, approximately 20% or \$12 billion of the \$60 billion will have been allocated by the end of 2012/13. This will leave \$48 billion in planned expenditures through 2027/28. The Panel understands that decisions on procurement plans for most of that amount are scheduled to be taken over the next three years. This suggests that the unique window of opportunity to leverage defence procurement is closing rapidly.

The CFDS Readiness pillar of \$140 billion is approximately two and a half times the value of the Equipment pillar. Approximately \$24 billion of this amount has been allocated, leaving \$116 billion over the life of the CFDS through 2027/28.

Repair and maintenance activities, which are often performed through an In-Service Support (ISS) contract, are spread over the life of the acquisition and can be up to four to five times the value of the equipment acquisition over a life-cycle of 30 years or more. ISS ranges from relatively routine tasks to very sophisticated, high-value work dependent on Intellectual Property (IP) owned by the prime contractor. Access by Canadian firms to the higher end of the ISS market is therefore heavily dependent on contracting terms and conditions established at the front end of a major acquisition because they determine whether, and on what conditions, Canadian ISS providers will have access to the required IP.

Beginning in 2008, DND decided to bundle ISS and other elements, such as operational training, with a platform acquisition to achieve a “single point of accountability” (SPA) with the prime contractor. The reason for this approach is to mitigate risk in contract performance. This decision has often had the unintended consequence of inhibiting competition by preventing Canadian firms from bidding on ISS or other work and of restricting their ability to move up the value chain through developing niche solutions that contribute to these platforms.

Canada’s Defence Industrial Capabilities

Canada’s defence-related industries represent more than two thousand companies, with more than 70,000 employees and an estimated \$12.6 billion in annual revenues (2011), almost equally

split between domestic and export sales. Many of these companies are commercially-oriented, with related military capacity. Canadian defence-related industries have world-class capabilities in some areas, and a healthy presence in some export markets. However, opportunities domestically could be significantly improved, leading to greater investment and more globally-competitive industrial capabilities in Canada.

Many defence-related companies—and particularly those with specialized, innovative products—get their start with one, or a few initial customers (almost always a government) with particular needs that correspond to the firm’s product. Until a new product is proven; it is unlikely that it can be marketed outside of the domestic market. This illustrates why so many of today’s successful Canadian defence-related companies point to one or more federal government contracts as the catalysts for their subsequent growth. In fact, the Panel found no evidence of a large-scale “self-generated” Canadian defence-related company. The significant number of success stories in Canada demonstrate clearly the value of a supportive, proactive procurement strategy and the exceptional long-run economic impact that can result when government investment is well-targeted.

A main source of revenue for Canadian industry relates to the government’s long-standing Industrial and Regional Benefits (IRB) policy—often referred to generically as an “offsets” policy—that requires winners of major defence contracts to spend the equivalent of the dollar value of contracts (which are often awarded to foreign firms) in support of Canadian industry. As of 2011, total IRB obligations are approximately \$23 billion. It is anticipated that further obligations

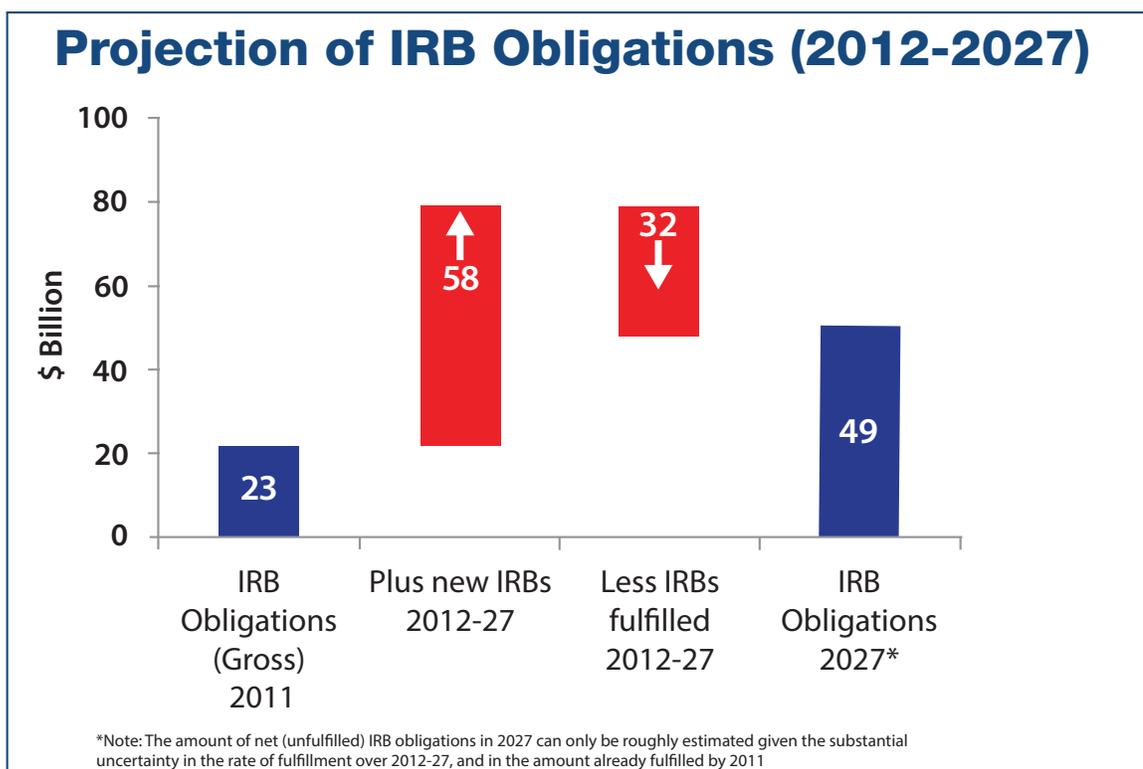


Exhibit 3 (Panel projection - See Annex 3 for projection assumptions)

of almost \$60 billion will result from CFDS procurements between 2012 and 2027 (see Exhibit 3). This amount far exceeds the scale of other government programs that support the development of defence-related industrial capabilities in Canada.

As IRB obligations accumulate, their annual average fulfillment rate could increase from about \$1.5 billion in the past to \$2 billion through 2027. This rate could potentially be higher depending upon the absorptive capacity of Canadian industry. Potential IRB-related business for Canadian firms, if effectively targeted, represents a significant opportunity to foster more innovative and globally competitive defence-related industries in this country.

Key Industrial Capabilities

The case for developing a strategy to promote Canadian defence-related industries through better leveraging of procurement goes beyond the obvious opportunity presented by the unique increase in defence spending associated with the CFDS, and with the flexibility available to the Government of Canada under international trade agreements. Even in the absence of a major increase in defence spending, it would be in the national interest to have a strong domestic defence industrial base, one that goes well beyond the basic capability of maintenance and repair to the actual sovereign production of key goods and services. In addition to a sovereignty rationale, defence-related industries are important sources of technological dynamism and innovation. They are leading-edge participants in global value chains, and generators of high-value exports and well-

paying jobs. Accordingly, they should be supported as drivers of long-term growth and prosperity.

The identification and promotion of KICs provides a targeted approach to such support. The Panel believes that KICs should balance Canada's short-term practical needs with the long-term goal of high value-added participation in global markets. This leads to selection criteria based on three broad perspectives:

- Specific needs identified by the Canadian Forces—*the operational requirements perspective*;
- Success in penetrating global markets—*the market opportunity perspective*; and
- Potential for new or improved (i.e. innovative) products—*the innovation perspective*.

The innovation criterion is key and is reinforced by the trend in U.S. defence requirements, with increasing emphasis on technology-driven solutions for threats of the future relative to a traditional “boots on the ground” focus. It is also reinforced by the need for future planning of mission requirements, and for defence platforms to take on a modular approach to technologically advanced sub-systems, recognizing that innovation evolves at different rates. A modular approach not only helps contain costs, but also ensures a long useful lifetime for the platform.

As the Panel addressed a process to identify KICs, it found neither adequate data nor the analytical base to support a thorough evaluation based upon the foregoing criteria. Although the Panel developed an overall impression of key trends, it has only a limited understanding of international market opportunities, of competitive positioning among foreign suppliers, of detailed Canadian

industrial capabilities in potential KICs areas, and of Canada's specific defence procurement requirements.

Given the urgency of the situation—created by anticipated decisions on major Canadian procurements over the next three years and the prospect of increased competition due to shrinking defence markets in the U.S. and Europe—decisions on KICs cannot await the outcome of a major analytical initiative. The Panel has therefore opted to propose to the government an initial set of KICs based on the available evidence and its consultations.

In this context, two stages are proposed: first, identify an initial set of KICs to inform pending decision-making; and second, conduct a regular and more robust review, initially within the next four years, to validate or amend the initial selection based on experience and better data and analysis. To expedite the latter, the Panel believes that the government should move immediately, in partnership with industry and academia, to facilitate the establishment of an independent, third-party defence research and analysis capability in Canada.

In order to identify an initial group of KICs, the Panel mapped existing Canadian capabilities against the three proposed selection criteria, taking particular note of the objectives and requirements outlined in the CFDS document, and the views of U.S. military representatives concerning the complementarity of American and Canadian industrial capabilities. The Panel also considered a list of sixteen capabilities (see Annex 5) of the members of the Canadian Association of Defence and Security Industries (CADSI).

Based on these considerations, the Panel recommends the following six KICs clusters:

- Arctic and Maritime Security
- Protecting the Soldier
- Command and Support
- Cyber-Security
- Training Systems
- In-Service Support

The Panel estimates that these KICs represent approximately a quarter of Canada’s total defence procurement related to equipment and readiness, or approximately 10 per cent of total CFDS planned spending (see Exhibit 4).

Success Factors for KICs Implementation

Identifying KICs is only one step in developing a strategy to enhance long-term, sustainable growth in Canada’s defence-related industries. KICs identify areas of greatest potential but will remain inert if not integrated into the government’s policy and program frameworks. In order for KICs to be strong catalysts of enhanced industrial performance, the government should make

changes both to its demand-side defence procurement policies and to related supply-side programs that support defence R&D and technology transfer.

The following is an illustrative list of policy and program areas where special “KICs tracks” could be established:

- For major acquisitions from foreign prime contractors—requiring all bidders to specify the value their proposals will add to Canada in KICs areas, based on factors such as technology transfer and IP retention, in-country innovation, global product mandates, development of specific skills and training and future overall economic impact;
- For defence procurement in specific KICs areas—preferred sourcing from Canadian suppliers, such as already occurs through the Munitions Supply Program;
- For defence-related technology support programs—special segmented KICs elements, coordinated across programs;
- For the planned military component of the Canadian Innovation Commercialization Program (CICP)—incentives for KICs-related proposals; and

Commodities

e.g., commercial off-the-shelf (COTS) products such as furniture and office supplies

KICs

e.g., products that embody significant innovation, market potential or that meet special needs of the Canadian Forces

Major Platforms

e.g. large and sophisticated weapons systems such as jets and helicopters

Exhibit 4: KICs Within the Defence Procurement Continuum

- For the Integrative Trade Global Strategy: Defence and Security—the designation of KICs as priority areas for defence-related exports.

During the Panel’s consultations with industry and government officials, a number of policy and program issues clearly came to the fore, the most critical of which relate to the demand side:

- There is a lack of transparency with industry on DND’s planning for specific acquisitions. This limits the ability of Canadian businesses to make informed investment decisions.
- The fundamental contractual concept of value for money is interpreted narrowly to the detriment of long-term economic benefits.
- Procurement practices discriminate against Canadian companies that benefit from government-provided innovation support.
- Long-term economic benefits are sacrificed in favour of performance risk mitigation by designating prime contractors as the single point of accountability (SPA) for major acquisitions.
- There is a lack of specificity regarding industrial objectives for major acquisitions, on both direct participation and indirect participation through IRBs.
- IRB proposals are not rated as part of overall bid evaluation. This stands in contrast to the rating of “value propositions” that was included in the National Shipbuilding Procurement Strategy (NSPS).

The Panel believes that strategic use of procurement requires going beyond a series of

decisions on specific acquisitions under the CFDS to implementing a “portfolio” approach that strikes a balance among the following four basic procurement options to avoid over-reliance on any one option, and thus to reduce risks in respect of performance and cost.

1. Developing an original product domestically;
2. Adapting an existing product to Canada’s needs;
3. Developing a product in international partnership; and
4. Acquiring an existing product from abroad.

The benefit for the Canadian economy arising from the existing portfolio of procurement approaches relies heavily on the large IRB commitments associated with major platforms—i.e., Option 4. Effective risk management requires increasing the use of other ways to achieve benefits for Canadian industry, including elements of Options 1 and 2, to reduce reliance on IRBs as currently structured. In this regard, the Panel believes that over time no single procurement option should be greater than 50% of the overall portfolio.

In addition to rebalancing the overall defence procurement portfolio, it will be important to make changes within the various options to maximize the benefits of a KICs-centred approach. Specifically regarding Option 4, two principal challenges arise: the practice of requiring an SPA; and application of the IRB policy.

With respect to SPA, the current practice is to assign it to a prime contractor throughout the lifespan of a procurement. This not only tends to preclude Canadian participation in In-Service Support, it may also restrict Canadian companies from moving up the value chain as they develop

niche solutions that contribute to these platforms. To promote the development of specific Canadian capabilities, and to have Canadian firms potentially emerge as prime contractors, the accountability model for platform acquisitions should take into account not only operational efficiency, but also give significant weight to the economic development opportunity.

With respect to IRBs, even with increased use of other procurement options, they will remain an important means of stimulating economic activity in Canada. However, the current design and implementation of the IRB policy is yielding sub-optimal results in today's environment. The policy's "market-driven" approach—in which the selection of IRB activities is at the sole discretion of the prime contractor—may have been appropriate at its inception in the 1980s when a dollar spent anywhere, irrespective of the nature of the activity being supported, helped to create needed jobs. This approach is much less appropriate in 2013 when the quality, not the quantity, of Canada's job opportunities is a more significant public policy challenge. IRBs should therefore be better targeted to high-skill, high-wage opportunities. This calls for more proactive management of the IRB policy to promote Canada's interest rather than the prevailing approach that leaves decisions on IRBs essentially at the discretion of prime contractors.

In such a revised approach to IRBs:

- KICs would be used to define Canadian industrial interests in the context of procurements from foreign prime contractors;
- KICs would also guide primes in the development of their IRB packages as well as plans for direct Canadian participation in product platforms; and
- The inclusion of undertakings to involve Canadian suppliers in KICs areas, in both existing and proposed IRB contracts, would help inform the evaluation of prime contractor bids.

Under normal circumstances, significant policy, program and institutional changes take substantial time to implement effectively. However, there now needs to be a "forcing function" to ensure that the desired changes take place quickly before most remaining significant defence procurement decisions are taken over the next few years. This translates to one essential requirement—there must be clearly accountable leadership of a joined-up effort across government departments and agencies and in collaboration with industry, with clear goals, measurement and evaluation.

Review of Aerospace and Space Programs and Policies

The Panel also considered the recommendations of the Review of Aerospace and Space Programs and Policies, which was published in November 2012. The Review's aerospace element included several recommendations that clearly intersect with and reinforce the Panel's findings:

- Identify no more than 10 priority aerospace technologies;
- Seek criteria-based advice on the selection of technology priorities from a network of industry, academic and government experts;
- Require prime contractors to partner with Canadian firms for the delivery of In-Service Support and to transfer technical data and intellectual property; and
- Require prime contractors to provide detailed industrial and technological benefits plans as

an integral part of their proposals, and weigh these plans in selecting successful bids.

Overall, there is compatibility between the Panel's work and the thrust of the Aerospace Review's recommendations.

Recommendations

The Panel strongly endorses implementing the concept of Key Industrial Capabilities (KICs) as a driving and enabling force to fully leverage the economic opportunities for Canadians as a result of planned defence procurement. The following high level recommendations—the rationale for which is developed throughout this report—represent the Panel's advice for achieving this objective.

1. A sense of urgency is needed regarding implementation of a KICs-centred set of initiatives, given that:
 - a. decisions are scheduled to be taken over the next three years on the majority of significant remaining military procurements arising from the Canada First Defence Strategy (CFDS);
 - b. there is a need to leverage Canadian capabilities in light of the rapidly changing competitive dynamic in the global defence procurement marketplace/environment; and
 - c. there is an early opportunity to capture the economic benefits of a KICs-centred approach to defence procurement.
2. The selection of KICs should be based on the following criteria:
 - a. Specific needs identified by the Canadian Forces;
 - b. Success in penetrating global markets; and
 - c. Potential for innovative products.
3. Given the urgency, the following set of KICs should be adopted on an interim basis to inform defence procurement decisions:
 - Arctic and Maritime Security
 - Protecting the Soldier
 - Command and Support
 - Cyber-Security
 - Training Systems
 - In-Service Support
4. To better inform future procurement and support the review of KICs on a regular basis, the government should develop a robust work plan for data gathering and analysis in respect of global demand and supply conditions in defence-related industries. As part of that work plan, the government should facilitate the establishment of an independent, third party defence analysis institute or network.
5. The government can achieve the full benefits of KICs only by making modifications to its existing defence-related procurement policies and programs. Recommended changes include:
 - a. Make innovation and contribution to Canada's economy key drivers for future military procurements by requiring bidders to specify upfront, as a rated requirement, the value they propose to add to Canada's economy as a result of their bid proposal.

- Bids should include at least the following elements: technology transfer and IP retention, in-country innovation, global product mandates, and development of specific skills and training.
- b. Review and reform defence procurement policies and practices addressed in this report—for example, in relation to the National Security Exception and Canadian Content Policy—to more effectively encourage and incent Canadian industrial innovation.
 - c. Review the practice of having the prime contractor as Single Point of Accountability (SPA). Each procurement plan should be required to examine the impact of Single Point of Accountability on the implementation of a defence procurement strategy.
 - d. Contracts in respect of In-Service Support (ISS) should require, in the interests of sovereign control and economic benefit, participation and leadership by Canadian firms, including, as necessary, reasonable access to the required Intellectual Property.
6. To reduce reliance on Industrial and Regional Benefits (IRBs), the government should strive to achieve better balance over time within the portfolio of procurement options – (1) developing an original product domestically, (2) adapting an existing product to Canada’s needs, (3) developing a product in international partnership, and (4) acquiring an existing product from abroad. No single option should be greater than 50% of the portfolio.
 7. The government should take measures to ensure the good governance of KICs-centred procurement by:
 - a. appointing a senior official to be accountable, through a supportive governance process, for the implementation of a KICs-centred strategy from policy through to operations, with the objective of achieving a set of cohesive “whole of government” outcomes that maximize economic benefit to Canada;
 - b. appropriately resourcing areas of key importance, particularly the management of Industrial and Regional Benefits (IRBs); and
 - c. following through on the CFDS undertaking to consult with industry early in the procurement process to improve business planning and investment decisions.
 8. In view of the urgency to implement a defence procurement strategy, there should be, within one year, a report from the government on progress in respect of the foregoing recommendations.
- There is a compelling case for a KICs-centred defence procurement strategy. The scope and size of planned procurement under the CFDS demands an early, substantive response from government, as this is a once-in-a-lifetime opportunity to leverage defence procurement into long-term, sustainable economic advantage. The development of KICs as a focus for government action is the critical, catalytic element of that response.

SECTION 1

INTRODUCTION



The primary objective of the government's defence spending is to ensure that the Canadian Forces (CF) are supplied with the high-quality equipment and services required to meet its operational requirements in a timely and cost-effective manner. In 2008, the Government of Canada established the Canada First Defence Strategy (CFDS) which provides stable long-term funding and a detailed roadmap for the modernization of the CF over a 20-year period. This will require the most significant investment in Canada's defence capability in the last half century (see Exhibit 1).

The CFDS commits to a total investment of \$490 billion over 20 years in equipment, readiness, infrastructure and personnel (see Exhibit 2 on page 2). The published CFDS figures should be regarded as directional and, while they will be updated from time to time, the Panel anticipates that the totals will be not be materially changed. The government has stated that it intends to use the unique opportunity created by this exceptional investment to support the competitiveness of Canadian industry and to promote sustained

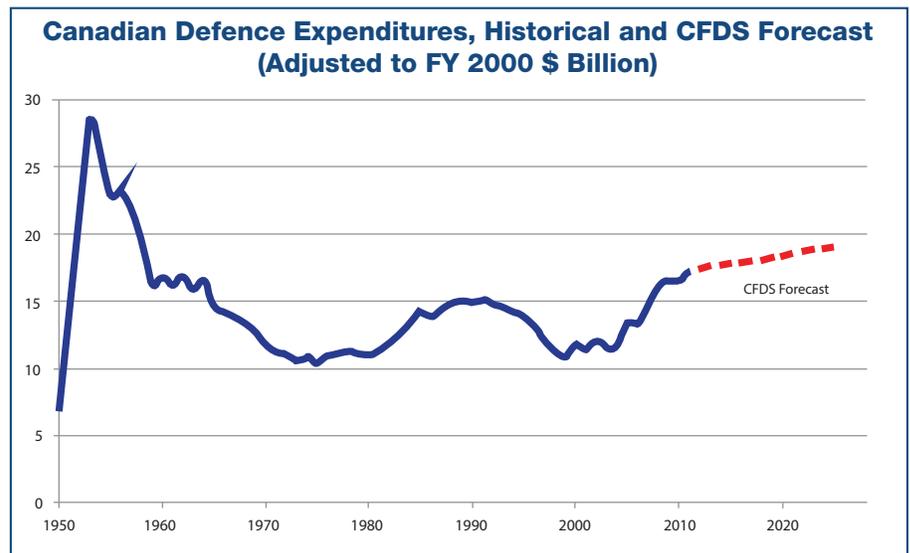


Exhibit 1 (Sources: Dr. Craig Stone, Canadian Forces College and the CFDS)

economic growth and job creation. In the words of Prime Minister Harper in the CFDS document:

By unveiling a detailed plan for the future replacement of key equipment fleets, we are providing Canadian industry the opportunity to more effectively meet defence procurement requirements, and to position themselves for global excellence.

While a significant number of CFDS procurements have occurred or are in progress, many others are forthcoming and represent the potential for very

CANADA FIRST DEFENCE STRATEGY – TOTAL DEFENCE SPENDING (2008/09 – 2027/28)			
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Infrastructure	\$40B	8%	rebuilding and maintenance
Readiness	\$140B	29%	spare parts, maintenance and training
Total Spending	\$490B	100%	

Exhibit 2 (Source: Canada First Defence Strategy)

substantial long-term economic benefit for Canada.

The government has already taken a number of initiatives to support the development of a defence procurement strategy. Budget 2012 announced a commitment to include a military element in an expanded, permanent Canadian Innovation Commercialization Program (CICP). Another important milestone was the successful launch in 2010 of the National Shipbuilding Procurement Strategy (NSPS)—see NSPS box on right. The strategy involved a rigorous process to select two shipyards to meet the government’s marine fleet renewal requirements over a 20-30 year period. This process was driven by industry engagement, the use of experts, decision-making informed by independent third-parties with no direct stake in the outcomes, and Deputy Minister-level governance.

The ongoing development of the government’s defence procurement strategy has been informed by the work of an Expert Panel on Federal Support for Research and Development, chaired by Mr. Tom Jenkins, which included a Special Report on Procurement. One of the policy directions suggested in that report was for Canada to

emulate the approach of most other allied countries by supporting the development of more globally competitive industrial capabilities through its defence procurement process, particularly given the leveraging potential afforded by \$240 billion of

National Shipbuilding Procurement Strategy

On June 3, 2010, the Government of Canada announced the National Shipbuilding Procurement Strategy (NSPS), a long-term plan to rebuild the fleets of the Royal Canadian Navy and the Canadian Coast Guard. Under the NSPS, the government has established a strategic relationship with two Canadian shipyards (Irving Shipbuilding Inc. in Halifax for combat vessels and Seaspan in North Vancouver for non-combat vessels) and designated them as sources of supply to build the government’s large ships.

Over a 20-30 year period, the strategy will support thousands of jobs and generate significant economic benefits across Canada (\$35 billion over three decades). This will involve high-value jobs in such areas as steel manufacturing, information technology, and defence systems development and integration, and result in significant business for small and medium-size enterprises across Canada.

investment planned over twenty years from 2008/09 through 2027/28.

The government engaged Mr. Tom Jenkins in September 2012 as Special Adviser to the Minister of Public Works and Government Services (PWGS) to inform the further development of its strategy. Mr. Jenkins was requested to identify the criteria and process to guide the selection of Key Industrial Capabilities (KICs) associated with Canada's defence-related industries. Mr. Jenkins was supported in this work by an expert panel composed of four distinguished Canadians from across Canada with diverse experience relevant to this undertaking (Mr. Ray Castelli, Ms. Christyn Cianfarani, Major-General (ret'd.) David Fraser, and Dr. Peter Nicholson—see Annex 1 for biographies of members).

The Panel began its work immediately following the Minister's announcement of Mr. Jenkins' appointment on September 26, 2012. There were extensive consultations with industry representatives from the Canadian Association of Defence and Security Industries (CADSI) and from the U.S. defence industry, as well as with officials in the Canadian, U.S. and other foreign governments, and outside experts (see Annex 2 for the list of organizations consulted).

Economic Significance of Defence Procurement

The principal objective of this report is to outline an approach that can maximize the overall industrial and economic benefits of planned CFDS investment through a strategy that: is driven by Key Industrial Capabilities, supports the requirements of the Canadian Forces, and uses procurement practices that are consistent with Canada's trade obligations.

Globally, defence industries are unique in that governments are primarily their only customers. The production and trade of military goods and services is therefore powerfully influenced by governments, usually in ways that strongly encourage the development of the home country's defence industry. The reasons for this are two-fold—first, to strengthen sovereignty by maintaining an up-to-date domestic capacity to supply critical requirements for national security; and second, to promote industrial development and economic growth. Many of the most highly industrialized countries—e.g., the U.S., the U.K., France, Sweden, the Netherlands, among others—have explicit or implicit strategies that promote their defence sectors. This is undertaken in recognition of the fact that an innovative, dynamic defence industry contributes importantly both to sovereignty, and to economic growth. In short, a nation's defence industry is inextricably linked to government policies and practices. The only question is whether that linkage is strategically proactive or relatively passive: this report advocates a proactive approach.

A KICs-centred defence procurement strategy would not be without cost. For example, there may be extra risk to supporting a home-based supplier of a sophisticated product, or some price premium relative to lowest cost globally. However, as many of Canada's allies recognize, the benefits of enhanced sovereign control and of opportunities to stimulate long-term economic growth can more than offset any extra short-term cost. A key reason for this is that many aspects of defence production are particularly effective growth promoters. This is because they are technologically advanced and thus rich in opportunities for innovation and the development of leading-edge human skills that can also find application outside the defence industry. These characteristics are precisely the

Canadian Defence Industry Success Stories

CAE Inc.



Founded in 1947 and headquartered in Canada, CAE entered the simulation business in 1952 with a contract from the Royal Canadian Air Force to develop a CF-100 flight simulator. Following the first sale, the company sold another 10 units, including a first export order to the Belgian Air Force. In 2009, CAE was awarded an Operational Training

Systems Provider (OTSP) contract to provide the training systems and services for Canada's tactical airlift, medium-to-heavy helicopter, and potentially other aircraft fleets. The OTSP will help create and maintain high-quality and highly-skilled jobs throughout Canada, including an estimated 1,330 person-years through the CC-130J aircrew training and 1,040 person-years through the CH-147F Chinook helicopter aircrew training.

Since its inception, CAE has sold more than 1,300 simulators and flight training devices to civil and military customers; growing its revenues to \$1.8 billion in 2012. Today, it sells its products and services in over 190 countries and employs more than 8,000 people. CAE is the world leader in simulation equipment, commercial aviation training, helicopter aviation training, military virtual air training, and healthcare simulation technology.

General Dynamics Land Systems Canada - Light Armoured Vehicle (LAV) III



General Dynamics Land Systems Canada (GDLS-C), London, Ontario is today a world leader in the design, manufacture and support of wheeled Light Armoured Vehicles (LAV) and a multi-billion dollar firm with over 2,300 highly-skilled employees.

General Dynamics Land Systems Canada had its origin as a division of General

Motors of Canada. In the mid-1970s, Diesel Division General Motors of Canada (DDGM), signed a contract with the Canadian government to supply 350 Armoured Vehicles General Purpose (AVGP), which later increased to 491 vehicles. In 1977, the government provided a range of assistance to DDGM to support export of the AVGP. The subsequent export sales included 800 units for the U.S. Marine Corps. During the 1990s, the government contracted DDGM for the supply of 203 Coyote reconnaissance vehicles and 651 LAV III armoured personnel carriers. A

version of the LAV III was offered to the U.S. Army and led to the development of the Stryker vehicles (almost 4,500 units valued at about \$9.5B sold to the U.S. Army between 2001 and 2011). DDGM became GDLS-C in 2003.

From these procurements, GDLS-C has since generated direct LAV sales in excess of \$17B over the last 35 years or so, has created approximately 500,000 person-years of employment in Canada, and has established a supplier base of over 400 Canadian companies located in every province.

AirBoss-Defense



AirBoss-Defense has its roots dating back to the 1920s as one of many rubber footwear plants in Canada and the U.S. By the end of the 1990s, only a few of these plants remained in North America and were focused on niche markets, including fire-fighting and defence footwear. AirBoss-Defense is the last hand-assembled rubber footwear plant in North America.

During the 1990s, the Canadian government played a key role, through

partnerships and collaborations with industry, in developing new technologies to meet the needs of the Canadian Forces and helping to maintain Canadian R&D. An example of this partnership is the CB Moulded Glove jointly developed by AirBoss-Defense and DRDC Suffield, with approximately 120,000 pairs sold to DND in the last decade. The real benefit came from the IP Licence that allowed AirBoss-Defense to become the prime supplier to the U.S. Department of Defense and numerous off-shore customers. These sales generated not only jobs for many years, but

also over \$3 million in royalties to the Canadian government.

In 1991, AirBoss-Defense generated approximately \$2.5M in revenue. By the end of the 1990s, the company was selling to the U.K., the U.S., Germany, Scandinavia and Pakistan, with sales of approximately \$8M. Over the next eight years, the company grew to become AirBoss of America Corp's most important division with current annual sales of over \$50M.

ones needed for export success and for the transfer and adaptation of defence-related capabilities to commercial markets.

Procurement policies and practices play the central role in a strategy that aims to maximize the leveraging potential of military procurements for Canada. The reason for this is that they are the principal means by which the key customer, the Government of Canada and specifically the Department of National Defence (DND), can foster the innovative capabilities that characterize a world-class defence industry. In this regard, the Expert Panel on Federal Support for Research and Development found that the second most important source of ideas that created innovation for Canadian firms, after employees, was clearly clients or customers (see Sources of Firms' Innovation Ideas box on page 6).

The role of the government as customer in building an innovative defence industry is key, and the proof is that virtually every successful company in Canada's defence sector today—several of which also have large commercial businesses—got its start with a Government of Canada contract (see Canadian Defence Industry Success Stories box on page 4). The first contract is vital, not only in refining the cost and performance characteristics of any new or improved product, but also to validate it beyond the domestic market. In fact, the Panel did not find any example of a successful Canadian defence supplier of scale, the creation of which was “self-generated” under regular market forces.

The expected return on investment of a defence procurement strategy includes good Canadian jobs in the short term. However, the far more important measure of success in the long term is the number of high-growth companies created.

The body of this report:

- begins with the global context for defence-related industries;
- outlines the competitive position of Canadian industry in that context;
- addresses specifically, the case for KICs;
- proposes criteria and a selection process;
- outlines a proposed interim set of KICs clusters;
- assesses the recommendations of the recently completed Aerospace Review chaired by the Honourable David Emerson; and,
- outlines the policy and program requirements for the successful implementation of a defence procurement strategy based on KICs.

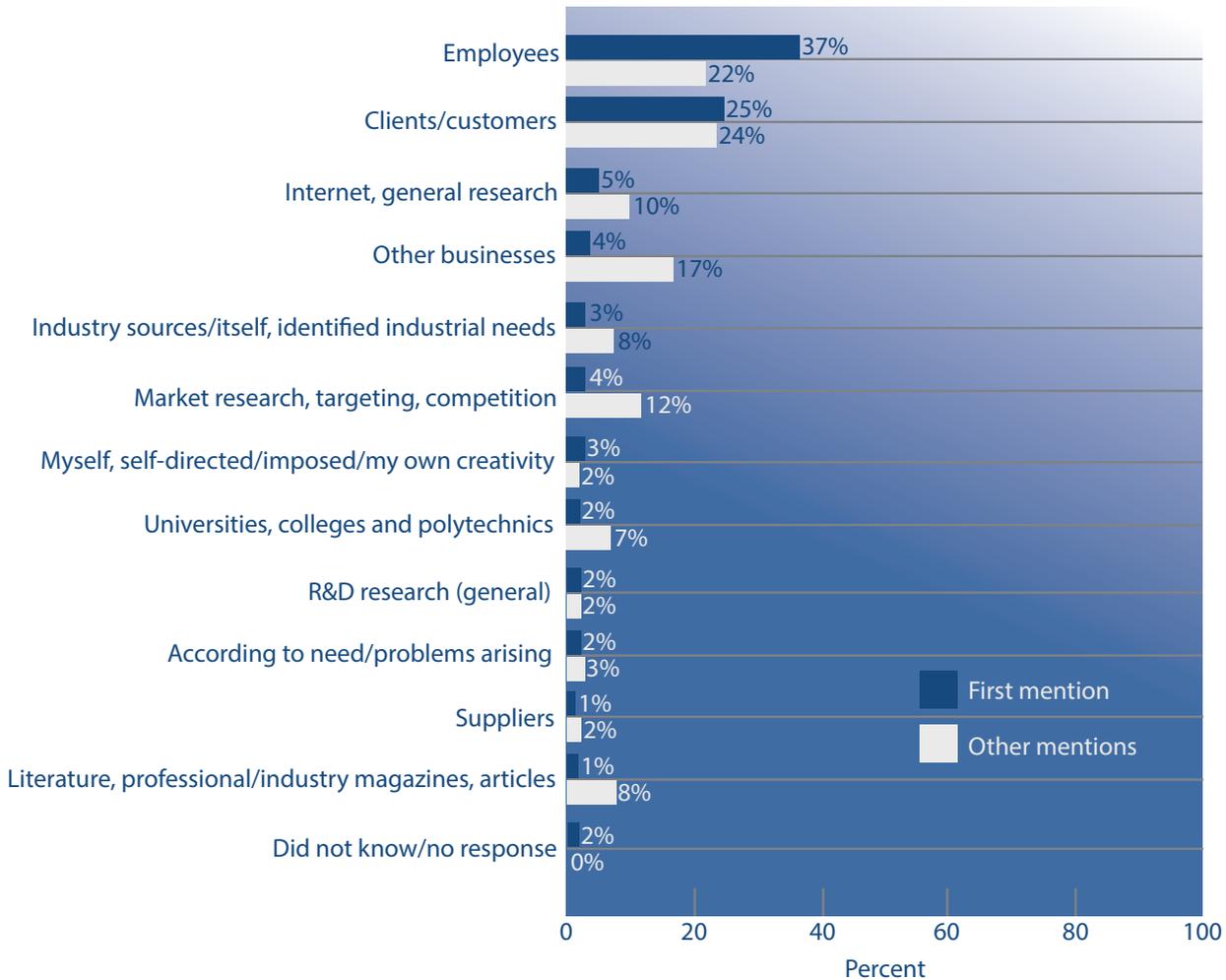
Sources of Firms' Innovation Ideas

The R&D Review Panel undertook a survey of R&D-performing firms in Canada with a sample of more than one thousand companies randomly selected to be representative along the dimensions of size, region and sector. A key question in the survey asked: "What are the most important sources for your firm's innovation ideas?" (Respondents were able to identify multiple sources). More than a third (37 percent) first mentioned "employees" as the most important source of innovation ideas, and an additional 22 percent identified employees in further mentions. The next most important source was "clients/customers" (25 percent of first mentions) (25 percent of first mentions). No other source of innovation ideas was first mentioned by more than 5 percent of the surveyed R&D-performing businesses.

Most Important Sources of Firms' Innovation Ideas

"What are the most important sources for your firm's innovation ideas?"

[Open ended – Multiple responses accepted]



Source: Results from a survey of firms conducted for the R&D Review Panel by EKOS Research Associates Inc., 2011.

SECTION 2

THE GLOBAL CONTEXT FOR DEFENCE PROCUREMENT

Globally, defence spending is in a period of rapid transition from the immediate past. This is being led by the United States which accounts for almost 50% of global defence spending (see Exhibit 3).

The United States

The U.S. is recalibrating its needs amid shifting defence priorities and impending budgetary reductions. Current expectations are that annual U.S. military spending—comprising the budgets of the Department of Defense and “Overseas Contingency Operations”—will decline from a peak of almost \$700 billion in 2010-2011 to a steady state somewhat above \$500 billion by fiscal year 2014 as that country disengages from major conflicts. This represents a potential 30% reduction in annual spending in a three-year period¹.

By contrast, Canada is continuing to re-equip its land, sea and air forces, with sustained levels of expenditure not seen in sixty years. Canada has benefitted from a preferential position in the U.S. market through bilateral defence production sharing agreements dating back to the 1950s. In fact, Canadian defence-related suppliers are, with

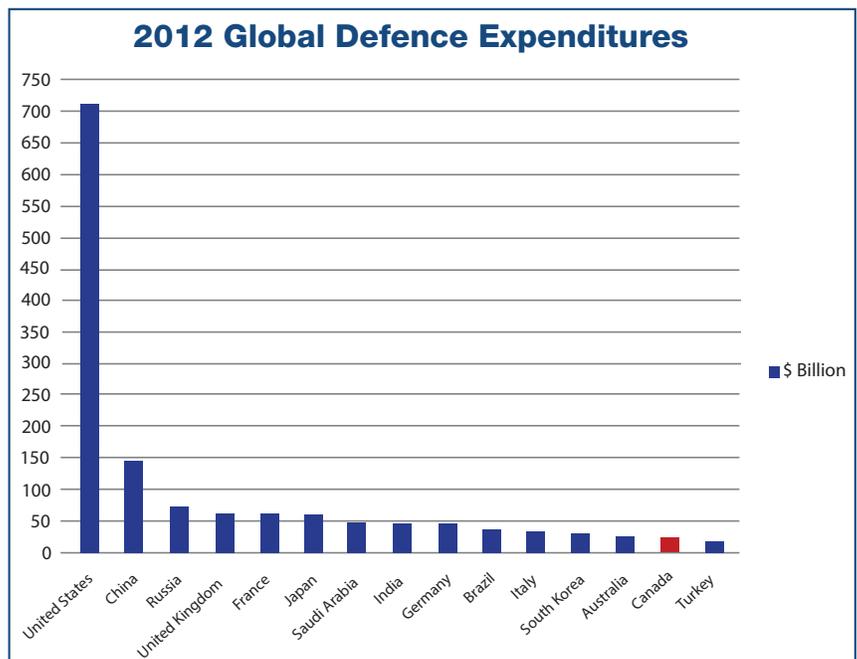


Exhibit 3 (Source: 2012 Stockholm International Peace Research Institute (SIPRI) Yearbook)

some exceptions, considered part of the U.S. industrial base².

Exhibit 4 (see page 8) traces the actual and projected decline in U.S. spending on those sub-categories that comprise the bulk of the market for defence-related companies—i.e., operations and maintenance; procurement of equipment; and R&D and test and evaluation. While these items do not include personnel cost, they constitute slightly more than 70% of military

¹Source for these figures is: *National Defense Budget Estimates for FY 2013*; Office of the Under Secretary of Defense (Comptroller); March 2012; Table 6-1. There are many different classifications of defence and security expenditures in the U.S. depending on whether they include/exclude certain domestic agencies such as Homeland Security; or “Overseas Contingency Operations” (e.g., the cost of fighting in Iraq and Afghanistan)

²Canada’s participation in an integrated North American industrial base dates from the Defence Production Sharing Agreement signed in 1956, giving Canadian companies access to procurements from the Department of Defense (DoD). It was amended in 1963 to include provision for a rough balance of trade over the longer term. Contracts with DoD and NASA are managed by the Canadian Commercial Corporation (CCC).

spending comprising both the Department of Defense and Overseas Contingency Operations.

Budget authority for the items in Exhibit 4 peaked at \$512 billion in FY 2011 and is projected by the U.S. Government to decline 25%—a contraction of \$128 billion—by FY 2014. Measured in constant (2013) dollars, spending between 2008 and 2014 is projected to fall by 31%. These steep reductions are before any possible further cuts that might result from new deficit-reduction measures in 2013.

The rapid cut-back in the United States is likely to have a substantial negative impact on Canadian industry since, as shown in Exhibit 5 (see page 9), the U.S. currently accounts for about three-quarters of Canada’s defence-related exports (or about one-third of all Canadian defence production).

The reduction of U.S. defence spending is occurring while it reviews its long-term defence posture. Based on the Panel’s consultations with U.S. defence stakeholders, the following structural shifts in its defence priorities are anticipated:

- a shift in threat to cyber and electronic warfare, combined with a shift in capability to intelligence and surveillance;
- a shift in geographic focus to the Asia-Pacific region;
- a corresponding shift in military capabilities to naval and unmanned aerial systems; and
- a shift from reliance on new platforms to upgrading and maintenance of existing platforms.

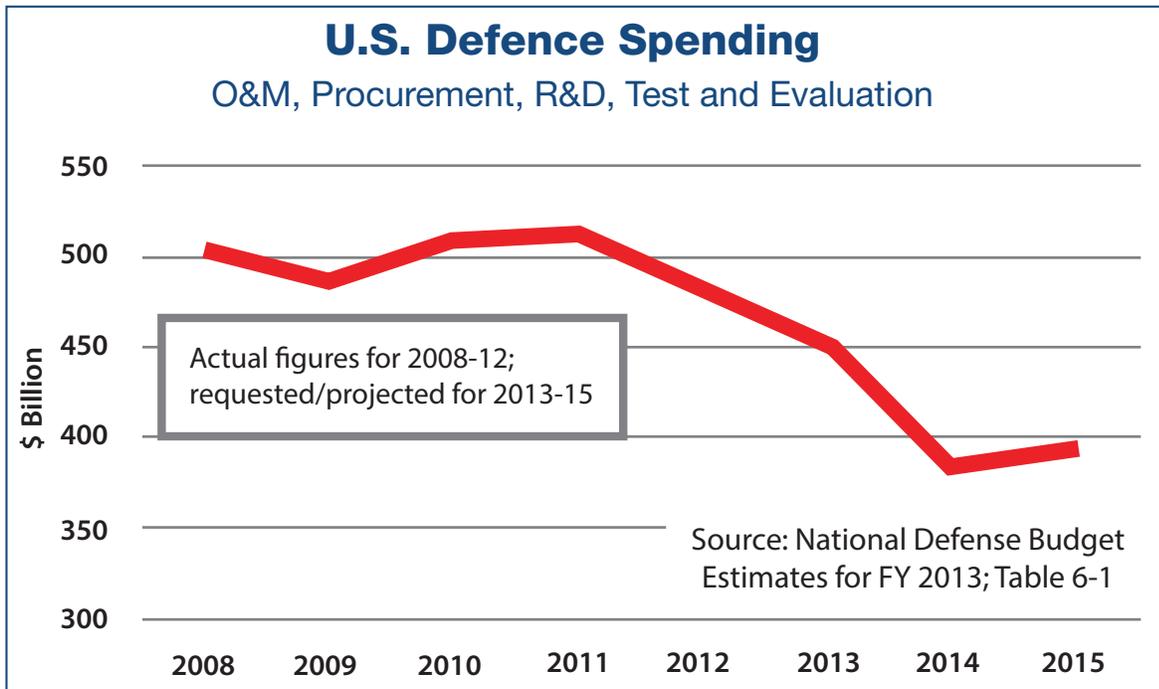


Exhibit 4 (Source: U.S. Department of Defense)

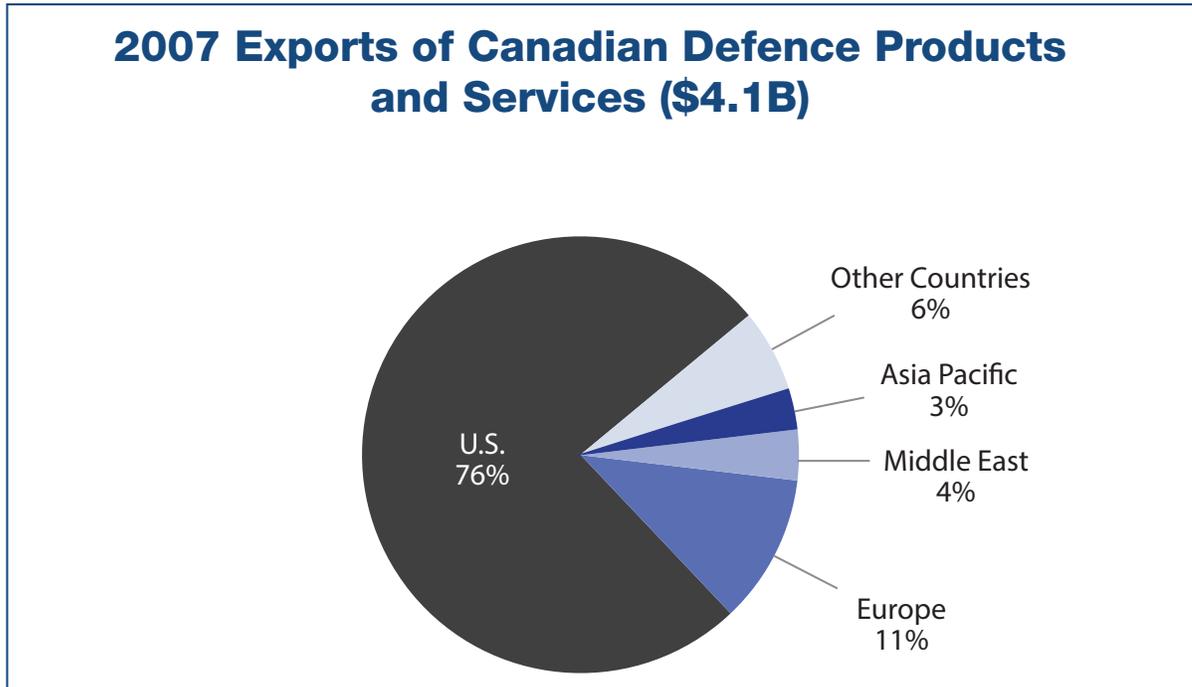


Exhibit 5 (Source: Statistics Canada, 2007)

Note: A KPMG report lists the total exports as roughly \$6 billion for 2011

These changes will have a profound impact on the competitive landscape in the U.S. defence market. U.S. Government officials informed the Panel of their ongoing systematic review of American companies that are considered critically important to the U.S. defence industrial supply base to assess risks to future defence supply capability. There is growing concern among independent U.S. defence analysts that

...in light of the fiscal austerity likely to constrain U.S. defence spending in the years immediately ahead, and the growing complexity and dangers in the nation's security environment, a long-term strategy seems imperative if the vital sectors of the defence industry are to be preserved.³ (p. xii)

The Panel also learned how U.S.-based companies are responding to the shifts outlined above.

Reduced Department of Defense emphasis on expensive new platforms is causing these companies to focus on specialized capabilities for existing platforms. The result is that U.S. firms are competing more directly with Canadian firms in areas of the U.S. market in which Canadian firms have existing or potential niche capabilities. Prime contractors are also responding to anticipated spending reductions by vertically consolidating their defence business—by acquiring smaller companies in their supply chains—and horizontally diversifying into related commercial fields, particularly IT, logistics, and maintenance—all areas of Canadian expertise.

These changes, accompanied by inevitable pressures on Congress for new protectionist measures, portend a much tougher competitive environment in the U.S. market for Canadian-based firms. The changes are also expected to lead

³ Barry Watts and Todd Harrison, *Sustaining Critical Sectors of the U.S. Defense Industrial Base*, Center for Strategic and Budgetary Assessments (2011)

to greater competition from financially distressed U.S.-based firms in the comparatively healthy and open Canadian defence market. These effects will combine to put severe pressure on Canada's defence-related industries.

On the other hand, the relatively attractive opportunities in the Canadian market will give the Government of Canada significant leverage with foreign bidders to negotiate contracts that include enhanced strategic benefits for Canadian suppliers. Furthermore, enhanced Canadian supply capabilities in areas complementary to U.S. capabilities, such as Arctic and Maritime surveillance, and interoperability will help strengthen the overall North American industrial base, a benefit that U.S. government officials acknowledged.

Allied and Emerging Markets

NATO allies in Europe are also dealing with changing priorities and budgetary constraints, with a forecast overall defence spending decrease of almost 5% between 2009 and 2016. One result is increased pressure from domestic industries to further protect their already-restricted defence markets. This presents another market challenge for Canada's defence-related industries as Europe represents about 11% of our defence exports (recall Exhibit 5, see page 9), with the U.K. alone accounting for about 40% of that share. Although Canada's access to the U.K. defence market is relatively unfettered, other NATO partners, notably France, Germany and Italy, are highly restrictive on import access.

The biggest markets of the remaining 13% of Canadian defence exports are currently Australia

and New Zealand; but the fastest growing markets are in the Middle East, South and East Asia and South America, with overall expected growth of over 40% from 2009 to 2016. For example, the very large Indian defence market, particularly due to the size of its standing army, is expected to grow 5-10% annually in real terms over the next fifteen years. This represents a major opportunity in areas where Canadian defence suppliers have proven capabilities (see Weatherhaven in Emerging Markets box on page 12).



Prime Minister Harper and Prime Minister Singh of India
(Photo source: Government of Canada)

Canadian Market

While U.S. and allied markets face long-term reductions, Canadian requirements are ramping up as the government pursues a \$240 billion re-equipping of all three branches of the Canadian Forces. Of this amount, the key element that drives spending on Readiness (spare parts, maintenance, repair, and training) is the \$60 billion allocated to Equipment, comprising major fleets and other capital.

In accordance with the CFDS spending estimates, approximately \$12 billion or 20% of this \$60 billion total will have been allocated by the end of 2012/13. This leaves \$48 billion in planned expenditures through 2027/28 (see Exhibit 6). The Panel understands that a number of the remaining significant procurements are planned to be allocated over the next three years, implying that the unique window of opportunity to obtain maximum leverage defence procurement is closing rapidly. This opportunity is expected to include the following major fleet replacement projects:

- Fixed Wing Search and Rescue (FWSAR)
- Close Combat Vehicle (CCV)
- Medium Support Vehicle System (MSVS) - Standard Military Pattern
- Joint Support Ships (JSS)
- Next Generation Fighter Capability (NGFC)
- Arctic/Offshore Patrol Ships (A/OPS)

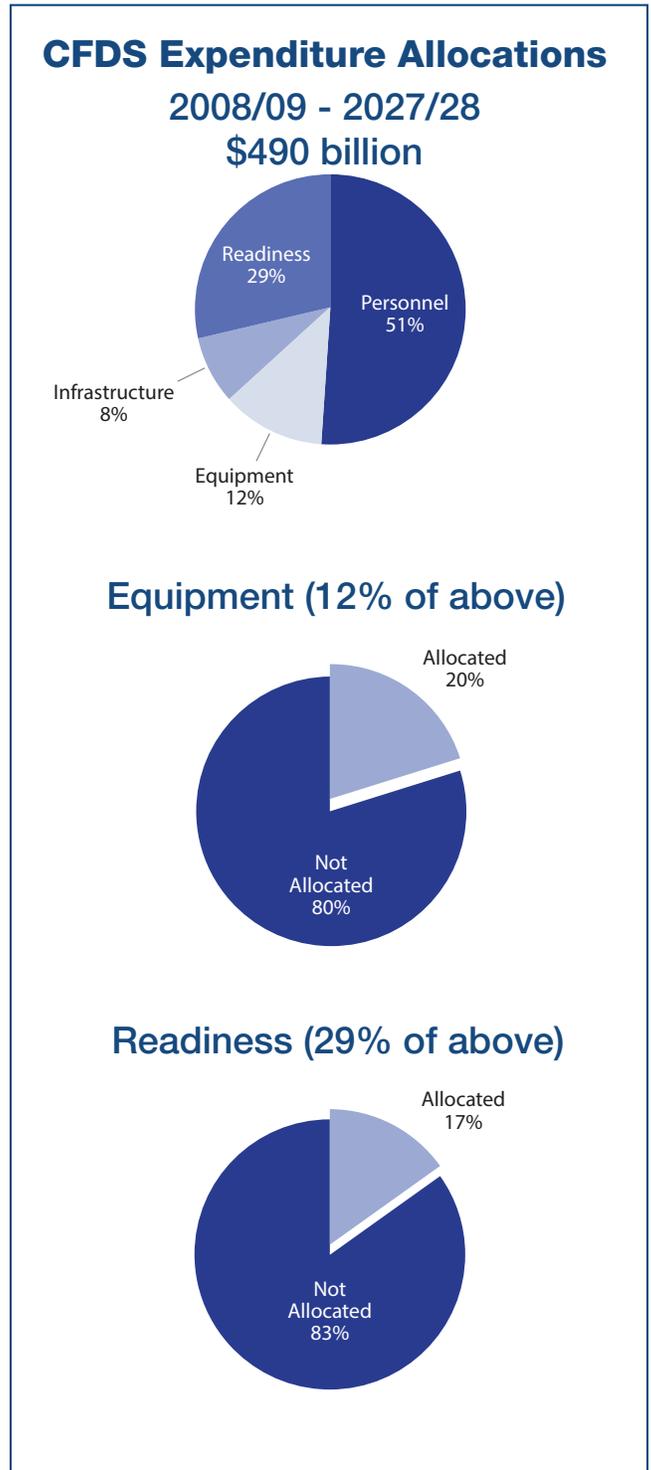


Exhibit 6 (Source: Department of National Defence, November 2012)

There is urgency in leveraging the enormous potential of defence procurement given that it is anticipated that after 2015, only two major elements in the CFDS plan will remain to be actioned:

- Multi-Mission Aircraft (CP-140 replacement)
- Canadian Surface Combatant (CSC)

The \$140 billion Readiness pillar of the CFDS is about two and a half times the dollar value of the Equipment pillar. Approximately \$24 billion of this amount has already been allocated, leaving \$116 billion over the life of the CFDS through 2027/28.

Repair and maintenance activities, which are often performed through an In-Service Support (ISS) contract, are spread over the life of the acquisition and can amount to as much as 4-5 times the initial equipment acquisition cost over a life cycle of 30 years or more. ISS ranges from relatively routine tasks to very sophisticated, high-value work dependent on Intellectual Property (IP) owned by the prime contractor. Canadian firms' access to the higher end of the ISS market therefore heavily depends on contracting terms and conditions established at the front end of each major acquisition, given that these terms determine whether, and on what conditions, Canadian ISS providers will have access to the required IP.

In this regard, the Panel was told by industry representatives that, in the past, the government would buy the IP data packages from prime contractors and compete the ISS, often to the benefit of Canadian suppliers, and for less overall cost to the taxpayer. However, beginning in 2008, ISS and other elements such as operational training were bundled with the equipment acquisition to achieve what is known as "single

point of accountability" (SPA). The rationale for this approach is to mitigate risk in contract performance. This decision has had the unintended consequence of inhibiting Canadian firms from competing for ISS or other work. This barrier is likely to become even greater given the

Weatherhaven in Emerging Markets



Weatherhaven is a 30-year old Vancouver shelter company that has provided redeployable temporary camps (RTC) solutions to the Canadian Forces since 1989.

Building on its Arctic mining camp heritage, Weatherhaven was able to develop unique container-based camp solutions in close collaboration with DND. These solutions, used for everything from portable field hospitals to command centres, have been deployed on every Canadian peacekeeping (e.g., Kosovo) and disaster relief (Haiti) mission since.

The Canadian Forces are very highly regarded by other militaries for its innovative and practical solutions. These foreign missions became literal "showcases" for Weatherhaven's unique solutions, enabling the company to introduce their products and develop customers in many emerging markets (such as Brazil, Peru, Turkey, Malaysia and South Africa).

Emerging markets like these are a huge opportunity for Canadian defence products. With growing demands to contribute to global peace and security, and little domestic defence industry of their own, these markets are ideal export targets for Canadian solutions.

For example, Weatherhaven has been able to sell about 200 of its patented and flagship Mobile Expandable Containers (MECC) to the Canadian Forces over the past 15 years. During the same period the company has been able to sell more than 2,500 of this Canadian-developed product to more than 20 military customers around the world—a real world example of the leveraging potential of defence procurement, innovation and building exports to emerging markets.

anticipated propensity of prime contractors to keep work in-house in a more difficult competitive environment. As a recent exception, during the most recent Fixed Wing Search and Rescue Industry Day (October 2012) the government confirmed that a Canadian ISS solution will be part of the associated procurement strategy.

Canada has a long-standing policy of requiring winners of major defence contracts to spend the equivalent of the dollar value of contracts—which are often awarded to foreign firms—within Canada and in support of Canadian industry. The government’s Industrial and Regional Benefits (IRB) policy—often referred to generically as an “offsets” policy—stipulates that IRBs can be provided directly through sub contracts for the acquisitions themselves, or indirectly through contracts unrelated to the subcontracts. The IRB policy was updated in 2010 to provide greater incentives for primes to help move Canadian companies up the value chain.

It is impossible to forecast the precise time path of the growth of the cumulative value of IRB obligations as the major acquisitions are implemented. The Panel estimates that annual growth will accelerate, resulting in total new IRB obligations of approximately \$58 billion over the period, 2012-2027 (see Exhibit 7a on page 14). The total amount of IRB obligations, including approximately \$23 billion already accumulated by 2011, plus the additions anticipated through 2027, will likely exceed \$80 billion. To put this exceptionally large number in perspective, it is greater than the Bank of Canada’s current reserves of \$67 billion. In the context of a defence procurement strategy, IRBs are far larger than all other federal government industrial support programs combined (see Exhibit 7b on page 14).

Key Features of an IRB (“Offsets”) Policy

- IRB commitments are part of most major defence procurement contracts, and require companies to undertake activities in Canada valued at 100% of the contract, but the IRB plan is not rated as part of bid evaluation.
- The approach is market-driven—i.e., the contractor selects its IRB recipients with no specific requirements/priorities from government.
- Recent changes to the policy are designed to create greater incentives for high-value-added IRB commitments, including multipliers for R&D and related commercialization.
- The policy has only just started targeting a list of technologies identified as strategic by the DND end-user.

In fact, the 20-year total defence expenditure under the CFDS (\$490 billion) is on a scale greater than the projected investment in the oil sands over a comparable period.

Given that the fulfillment of IRB obligations involves many different organizations, the pace of fulfillment is difficult to forecast accurately.

Scale of Economic Impact

Planned investment by industry in Alberta’s oil sands over 25 years:

\$364 billion

Planned investment by Canadian government in Defence over 20 years:

\$490 billion

Sources: Conference Board of Canada *Fuel for Thought: The Economic Benefit of Oil Sands Investment for Canada’s Regions* and the Canada First Defence Strategy

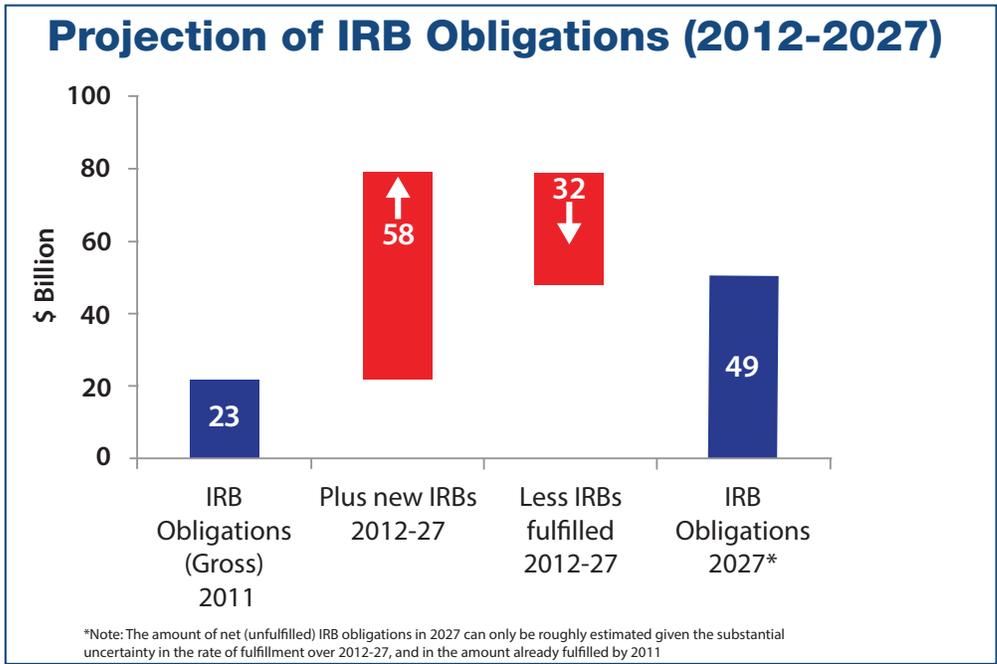


Exhibit 7a (Panel projection - See Annex 3 for projection assumptions)

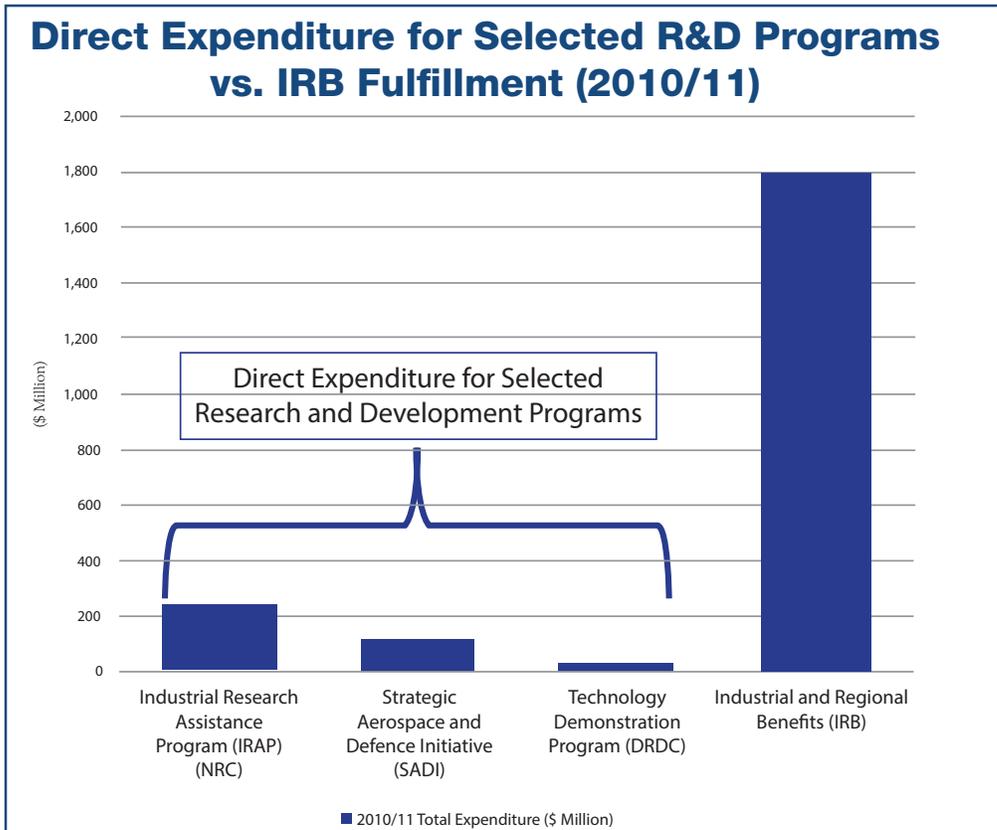


Exhibit 7b (Sources: Review of Federal Support to Research and Development – Expert Panel Report and Industry Canada)

The fulfillment rate of IRB obligations has averaged about \$1.5 billion per year over the period 2007-2011. As CFDS-related IRB obligations accumulate, the rate of fulfillment can be expected to increase and might average about \$2 billion per year through 2027, or potentially higher depending on the absorptive capacity of Canadian industry. The annual fulfillment of IRB obligations, if effectively targeted, represents an enormous opportunity to foster a more innovative and globally competitive defence sector in this country (see Boeing CC-177 Globemaster III—Industrial and Regional Benefits box on page 16).

The importance of the IRB policy and the level of current and anticipated IRB obligations suggest the need for a strong, well-resourced administration of this policy. More can be done in this regard. With respect to administration—including the data collection and analytical capability needed to optimize the targeting, and therefore the benefit of the IRB policy—it should be resourced to fulfill its greatly expanded opportunity.

In summary: looking forward, the potential market for Canadian defence-related industries under the CFDS comes from the estimated \$164 billion expenditure—\$48 billion for equipment and \$116 billion for readiness. Recognizing that foreign prime contractors are likely to dominate major equipment acquisitions, there is a huge ancillary market in the form of IRBs which are, by design, restricted to Canadian-based firms. Firms the Panel consulted had a clear preference for direct contracts, rather than, in effect, the consolation prize of IRBs. The obvious reason for this is that direct contracts tend to be qualitatively superior in terms of leading-edge, technologically-advanced products that employ highly-skilled people. They are clearly preferred to typical IRBs that, while

being perhaps of equivalent dollar value, are completely at the discretion of prime contractors and are often restricted to lower value, non-recurring, build-to-print operations. IRBs can nevertheless be potentially powerful provided that they are designed and implemented in a manner that will give Canadian firms greater access to opportunities at the higher end of the value chain than is presently available.

Although the ramp-up of defence procurement under the CFDS represents a major opportunity for Canadian industry, Canada's defence market is one of the most open compared with other countries that have substantial defence sectors. Canada is therefore very attractive to foreign competitors facing the prospect of declining sales in their home markets. Consequently, past performance will not necessarily carry over into the future.

Unfortunately, data are scarce on the respective market shares in Canada of domestic and foreign suppliers. In 2011, the consulting firm, KPMG, undertook a study for the Canadian Association of Defence and Security Industries (CADSI)⁴ of the economic impact of the defence-related industries in Canada. The study shows that the domestic market for capital, operations and maintenance expenditures was valued at about \$8 billion in 2011, with Canadian industry enjoying a 75% share or \$6 billion in revenues. Canada's share refers to total sales, not the value-added provided by Canadian firms. Value-added is a more appropriate measure of domestic economic impact than share of sales. Therefore, without knowing the source and cost of inputs associated with the Canadian activity, the Panel could not determine the true economic impact of KPMG's finding. Moreover, the finding only pertains to 2011, during which time many of the expenditures were on

⁴KPMG *Economic Impact of the Defence and Security Industry in Canada* (2011). Note that the study includes DND, RCMP, other police services, CBSA and CSC expenditures, with DND accounting for 84.3% of the total.

domestically-dominated services and infrastructure and not on capital equipment, an area in which foreign suppliers tend to dominate.

Analysis of DND spending data suggests that Canadian industry's share of DND's market between 2009 and 2012 averaged approximately two-thirds. However, this level could be much

lower in any given year due to the distribution over time of the cost of major acquisitions. Given these variations, better metrics on this and other relevant indicators of industry performance are required to establish a baseline against which to evaluate the impact of potential policy and program changes.



Royal Canadian Air Force Boeing CC-177 Globemaster (Photo Source: Department of National Defence)

Boeing CC-177 Globemaster III – Industrial and Regional Benefits

Boeing, as part of its IRB commitments related to the Strategic Airlift Project is providing funding over a five-year period to a joint project between the University of British Columbia (UBC) and Simon Fraser University (SFU) to evaluate and improve visual analytic processes for interpreting complex data. The goal of the project is to develop new processes for using 2D and 3D visual analytical models and statistical data to improve the maintainability and reliability of new aerospace products. The investment will help this university consortium become a

leader in applied visual analytics. The project includes the development of an applied visual analytics curriculum and its results will be published, and shared in workshops. In addition to Boeing's financial contribution, the universities will benefit from the firm's engineering staff expertise and in-house internship opportunities. The relationship among Boeing, UBC and SFU is proving successful, by resulting in significant research, published work and internship opportunities.

Quick Facts:

- Acquisition contract (February 2007) was for US \$749M, and the In-Service Support (ISS) contract, US \$746M
- Period for IRB achievement for Acquisition contract: 2006-2017 (IRB obligation is 100% of contract value)
- Period for IRB achievement for ISS contract: 2006-2032 (IRB obligation is 100% of contract value). As of November 2012, 90% of IRB on Acquisition contract has been identified, and about 60% for the ISS contract has been identified.

SECTION 3

CANADIAN DEFENCE INDUSTRIAL CAPABILITIES



Canada's defence-related industries represent more than two thousand companies, over 70,000 employees, and an estimated \$12.6 billion in annual revenues in 2011, almost equally split between domestic and export sales. Many of these companies are predominantly commercially-oriented, with related military capacity.

According to the KPMG report referenced earlier, the key areas of Canadian defence-related activity are:

- In-Service Support (ISS);
- Command, Control, Communications, Computers, Intelligence, Surveillance and Reconnaissance (C4ISR);
- Armoured vehicles;
- Small arms and ordnance;
- Aerospace;
- Technical and professional services;
- Shipbuilding and repair;
- Personal protective clothing and equipment;
- Infrastructure; and
- Non-armoured vehicles.

Canadian-based defence-related industries generally operate in various "tiers" of the global value chains (GVC) of large, mainly U.S., prime contractors (also often referred to as Original Equipment Manufacturers (OEMs)). Integration with U.S. industry is reinforced by longstanding bilateral defence production sharing agreements.

Although this special relationship improves access to U.S. defence markets, it also complicates business strategies for Canadian companies in light of International Traffic in Arms Regulations (ITAR). These regulations control trade in goods, services and technical data involving certain sensitive military technologies. This means that a defence or commercial product involving an ITAR-controlled technology cannot be sold to certain countries.

International Traffic in Arms Regulations (ITAR)

ITAR is a set of U.S. government regulations that apply to export and import of defence-related goods and services on a control list. The control list is meant to safeguard U.S. national security and further foreign policy objectives. Items on the control list may only be shared with U.S. persons/organizations, including their non-US subsidiaries, unless the Department of State authorizes an exemption. Canada has an exemption under ITAR but must follow

the same requirements, including the need to obtain prior approval on retransfer to other countries of items on the control list. Heavy fines are imposed for contraventions of the regulations. ITAR is particularly problematic for dual-use technologies since even a single, small ITAR-restricted component renders any product that contains that component also ITAR-restricted. Moreover, ITAR restrictions have increased cumulatively with few components de-listed even if the rationale for inclusion no longer applies.

The implication of this policy is that companies engaged in dual-use technologies for military and commercial applications (e.g., in aerospace) need to establish very sophisticated fire-walls—in effect, ITAR and non-ITAR strategies—to ensure compliance for sales to third country markets, a particular challenge for SMEs. When the Panel consulted Canadian industry on this issue, the majority of companies felt that an ITAR-compliant business segment was essential for long-term success since the global market comprises both ITAR and non-ITAR segments.

The Panel's consultations with industry also revealed that effective management of Intellectual Property (IP) is a significant source of tension between prime contractors and suppliers in their global value chains. The primes often place greater value on maintaining in-house control of IP than on licensing fees, whether it is in relation to subcontracts from procurements (e.g., ISS), or indirectly through IRBs associated with those procurements. Alternatively, primes use their market dominance to charge high fees for IP. The structural changes primes are undertaking in order to cope with reduced demand in the U.S. and other NATO markets will only exacerbate this problem for Canadian companies. Although innovative Canadian companies often develop their own IP, the size and scope of Canada's defence sector implies that most companies must rely to some degree on the licensing of foreign-owned IP.

Based on the considerations described above, the Panel concluded that while Canadian defence-related firms have world-class capabilities in some areas, and a healthy presence in some export markets, opportunities in the domestic market could be significantly improved, leading to greater

Industry Perspectives

The Panel consulted with representatives from over 60 companies engaged in defence-related businesses. Their main points of consensus were as follows:

- Defence procurement is managed trade, with many of Canada's competitors engaging in highly restrictive practices, excluding foreign suppliers and nurturing domestic suppliers with sole source procurement and strong technological support. This suggests that reciprocity should be a key operating principle in the Government of Canada's defence procurement policy.
- Despite the CFDS, and with the exception of NSPS, federal procurement policy has not shifted to a more aggressive "Canada-first" set of initiatives based on the need for sovereign capacity.
- Almost all companies consulted traced their international success, now well beyond the U.S. market, back to a Canadian procurement.
- PWGSC's current defence procurement practices result in "unintended consequences" for Canadian industry, especially SMEs, in terms of preventing their ability to provide innovative, cost-effective solutions in cases where they had received R&D support. (Such support may be deemed to confer an unfair advantage, thus potentially precluding recipients from follow-on contracts).
- DND's practice of a "single point of accountability" for prime contractors has in practice prevented Canadian companies from bidding on ISS contracts that would provide high-value, sustainable jobs over many years.
- DND has not produced for industry a roadmap of its procurement plans and thus has failed to honour the commitment in the CFDS (2008) to provide greater transparency on procurement planning.
- Compliance with ITAR, creates difficulties particularly for dual-use technologies. Most companies nevertheless saw an ITAR-based strategy focussed on the U.S. market as their preferred choice.
- Feedback regarding KICs and their selection criteria was largely consistent with CADSI input. In terms of process, regular review of KICs was considered desirable in light of changing market and supply dynamics.

investment and a more globally-competitive industry in Canada (see Industry Perspectives box on page 18).

Looking forward, two major forces are at play. First, there is looming foreign competition as governments in allied countries reduce their defence-related spending. Second, if the Panel's projection of almost \$60 billion of new IRB by 2027 materializes, Canadian industry's absorptive capacity would likely be strained.

Current application of government policy does not reflect the vulnerability of Canadian defence-related industries to emerging trends. Government of Canada support for these industries has been mainly on the supply side—for example, support for R&D and technology transfer. In fact, demand-side support through procurement has not been a feature of Government of Canada policy for many years, other than in two special sectors—shipbuilding and munitions (see Munitions Supply Program box on page 20)—as well as via IRBs. In the case of IRBs, a lack of strategic intent and focus, and the fact that IRBs are left to the tail-end of the procurement decision process, have combined to impair their efficiency. The most notable example of a new approach is the decision under NSPS to source ships in Canada based upon the need to maintain domestic capacity over acquisition life cycles, including fleet maintenance, repair, and overhaul (MRO).

Government support on the supply side includes: programs of general application such as Scientific Research and Experimental Development (SR&ED); targeted R&D programming by Defence

Research and Development Canada (DRDC); the Strategic Aerospace and Defence Initiative (SADI); marketing support through Regional Development Agencies (RDAs) mainly related to potential IRB opportunities, and DFAIT's Integrative Trade Global Strategy: Defence and Security which targets five priority sub-sectors: armoured vehicles, special mission aircraft, electronic systems and C4ISR integration, simulation, and security.

During its consultations, the Panel observed that support through these various supply-push programs is not coordinated and that each program is based on different nomenclature and data, targeting specific capabilities or technologies as deemed appropriate by the various responsible entities. Moreover, the Panel was told of cases where Canadian suppliers were excluded from bidding on contracts because they had gained what was deemed to be an "unfair" competitive advantage through prior technology development support from the federal government.

Even with a more streamlined and effective "whole-of-government" approach, supply-push policies and programs should be viewed as complementary to the primacy of demand-pull policies through a defence procurement framework that promotes Canadian supply capability in areas determined to be in Canada's long-term interest.

Munitions Supply Program

Background

In the early 1970s, the Government of Canada identified a need to upgrade and modernize Canada's munitions production capabilities. A 1974 Cabinet decision resulted in the creation of the "Program for the Maintenance of Canadian Industrial Capability for the Production of Munitions"—called the Munitions Supply Program (MSP). The objective of the MSP was to maintain a strategic Canadian industrial ammunition manufacturing capacity for the present and future needs of the Canadian Forces.

The MSP was supported by a "Program for the Maintenance of Canadian Industrial Capacity for Small Arms Weapons" which the Government of Canada approved in 1976 and a "Program for the Maintenance of Canadian Industrial Capability for the Production of Munitions" approved by the government in 1978. The federal government remains committed to the Munitions Supply Program with the objective of developing, establishing and maintaining private sector sources located and operated in Canada (and to the extent possible Canadian-owned) for the supply of high volume usage ammunition, related munitions products and associated stores.

Participants

- General Dynamics - Ordnance and Tactical Systems Canada, Le Gardeur, St. Augustin, and Valleyfield, Québec
- IMT Corporation, Port Colborne and Ingersol, Ontario
- Magellan Aerospace Ltd, Winnipeg, Manitoba
- Colt Canada, Kitchener, Ontario



Loading 20mm ammunition into a Royal Canadian Navy Close in Weapon System (CIWS) (Photo Source: Department of National Defence)

Benefits

- Priority given to the Canadian government in times of urgent operational requirements.
- Canada maintains indigenous capability for munitions with security of supply and industry focused on Canadian specifications; that is, Canadian Forces requirements are continually met with high quality products which are customized to their operational needs.
- MSP is a major contributor to North America security and defence industrial base, with significant economic benefits of high technology industry to Canada (1,900 jobs; annual sales of approximately \$420 million, of which about half are exports; and economic impact of \$400-600 million/year).

SECTION 4

THE CASE FOR KEY INDUSTRIAL CAPABILITIES (KICs)



The key to Canadian commercial success in most areas of industrial activity has been to participate in global value chains as specialized, high-value niche players, aided by liberalized trade and investment regimes. Canadian industry has also applied this strategy in the defence field, though with more limited success due to the fact that, in global defence markets, governments are the primary customers and are able to invoke national security exemptions in international trade agreements to restrict foreign access to their markets. Defence trade is, therefore, actually “managed trade”. However, it is often presumed that the defence sector is governed by free market principles. This view has been widely criticized by economists who have studied the industry in the U.S. For example, Merton Peck and Frederic Scherer – authors of *The Weapons Acquisition Process*—concluded that “...weapons acquisition is characterized by a form of economic organization quite different from the market system found in the rest of the U.S. economy.” (p. 582).

Many companies—and particularly those with specialized, innovative products—get their start with one, or a small number of initial customers that have particular needs that correspond to the firm’s product. Working with its early customer(s), the supplying firm navigates a commercialization

learning curve, adapting the product to actual performance requirements and producing it more cost-efficiently. In the case of defence products, the customer is almost always a government, and until a new product is proven, it is unlikely that it can be marketed outside of the domestic market. As previously noted in Section 1, this illustrates why so many successful Canadian defence-related companies today point to one or more federal contracts as the catalysts for their subsequent growth (recall Canadian Industry Success Stories box on page 4). In defence production, governments are the market and therefore cannot avoid a direct role in the outcome for industry; the “free market” idealization does not apply. In fact, the Panel found no evidence of a large-scale “self-generated” Canadian defence-related company. The many past success stories in Canada’s defence-related industries clearly demonstrate the value of a supportive, proactive procurement strategy and the exceptional long-term economic return that can result when government investment is well targeted.

Even in niche areas of Canadian capability, the federal government has generally insisted on open procurement, using a narrow interpretation of value for money which has come to mean the lowest-cost that meets requirements. As a result,

unlike most other comparable countries, Canada has taken advantage of few levers, beyond IRBs and, more recently, NSPS “value propositions”, to promote Canadian-based defence capabilities through its procurement practices.

The case for developing a comprehensive strategy to leverage defence procurement goes beyond the obvious opportunity presented by the unique increase in defence spending associated with the CFDS, and the flexibility available to the Government of Canada under international trade agreements. Even in the absence of a major increase in defence spending, it would be in the national interest to have a strong domestic defence industrial base, one that goes well beyond the basic capability of maintenance and repair to the actual sovereign production of key goods and services. In particular, this would be the case in areas where Canada has specific requirements that may not be met adequately by foreign contractors in terms of timely or secure supply. This argument has been the rationale for the longstanding policy of sourcing munitions from Canadian suppliers and also underlies the NSPS.

Beyond a sovereignty rationale, defence-related industries are important sources of technological dynamism and innovation, are leading-edge participants in global value chains and are generators of high-value exports and well-paying jobs. Accordingly, Canada’s defence-related industries should be appropriately recognized and supported for their significant potential to drive the country’s long-term growth and prosperity.

The KPMG study, referenced earlier, which used Statistics Canada’s Input-Output model of the economy, found that every dollar of economic value-added by the Canadian defence and security industry generated, directly and indirectly, \$1.62 of

GDP—a total of \$9.0 billion in 2011. The Panel believes that this is a reasonable estimate of the defence industry GDP “multiplier” in Canada. A similar methodology yielded a direct employment multiplier of 1.54, implying that Canada’s defence and security industry generated, directly and indirectly, just under 110,000 (full-time-equivalent) jobs in 2011.

The government has exceptional leverage, through the “demand-pull” of procurement, to promote development of Canada’s defence-related industries. This is because a demand-pull approach offers greater potential benefits at lower cost to the treasury than traditional supply-push policies and programs. It allows Canadian industry to achieve an initial level of competitive fitness by:

- dealing with a demanding customer;
- helping to build scale and thus reduce unit costs; and
- providing crucially important capability validation for the pursuit of export markets.

The CFDS promised “a renewed relationship” with Canadian defence-related industries stating that:

The Government will take specific measures to enhance its interaction with industry. For example, it will continue to improve the way it procures new equipment, fostering greater transparency and engaging industry earlier in the process. These ongoing procurement reforms will further streamline the contracting process and ensure that it continues to remain open and fair.

While the Panel understands the intent of those statements, based on its consultations with both government and industry representatives, this undertaking is still a work in progress. For example, there are few details on forthcoming capital projects that would help Canadian industry to better position itself for future procurements. Although it is true that planning for these projects is subject to change, industry understands this risk and a continuing dialogue would enable companies to plan more effectively than is now the case. For the proposed renewed relationship to be meaningful, it needs to go from an *ad hoc* set of arrangements to a more institutionalized approach.

While leveraging defence procurement to support the growth of Canadian defence-related industrial capabilities is a compelling concept, implementing a supporting strategy requires careful thought and smart planning lest it unduly increases cost and risks compromising performance. Consequently, the approach should focus on a limited number of areas of greatest return on investment in terms of fostering sustained capabilities to fulfill particular Canadian defence requirements, as well as promoting innovation and competitiveness. These characteristics will provide a foundation upon which to successfully access global markets.

Given the Panel's mandate, it is apparent that the government is considering the merits of identifying Key Industrial Capabilities as a means of focussing government and industry efforts on a limited number of priorities. Other countries such

as Australia and the United Kingdom have pursued similar approaches with varying degrees of success (see Annex 4). The Panel has learned from their experience and considered the unique features of Canada's circumstances related to its geography and public policy history.

The Panel recognizes that a focussed grouping of KICs raises concerns about "picking winners", although it is emphasized that the selection of KICs involves relatively broad areas of capability, not individual products or companies. Once identified, the policies and programs employed to promote their sustained development must be merit-based and designed to foster global standards of excellence.

It is also emphasized that activities in non-KICs areas should continue to benefit from the panoply of more broadly supportive government policies and programs. In other words, while Canada's defence-related industries as a whole would be strengthened through policies targeted on KICs areas, no particular sub-sector would be weakened.

SECTION 5

CRITERIA FOR THE SELECTION OF KICs



A critical first question in developing criteria for choosing KICs is their definition—how is a Key Industrial Capability to be described? There are several possibilities, ranging from a traditional sector view, such as shipbuilding—which is how industry usually portrays itself and how Statistics Canada classifies industrial activity—to a specific technology focus, such as advanced materials, which cuts across many sectors.

In the Panel’s view, a more appropriate and practical approach would be to define capabilities: (a) in terms of what is actually procured by governments or by prime contractors, and (b) at a sufficiently aggregate level to connote sophisticated innovative capacity in product integration, reflective of Canadian industry’s aspiration to become Tier 1 and 2 suppliers to global value chains. In these circumstances, KICs would be defined as “systems”, such as command and support, or training systems.

The key driver for the selection of KICs should be the acquisition requirements set out in the CFDS. It is highly unlikely that a specific defence industrial capability could be developed in Canada in the absence of a domestic procurement requirement.

With CFDS acquisition requirements as the base against which to apply selection criteria, the Panel believes that the criteria should balance Canada’s

short-term practical needs with the long-term goal of high-value participation in global markets. This leads to criteria based on three broad perspectives:

- Specific needs identified by the Canadian Forces—the operational requirements perspective;
- Success in penetrating global markets—the market opportunity perspective; and
- Potential for new or improved (i.e., innovative) products—the innovation perspective.

The Canadian Forces’ Operational Requirements Perspective

The CFDS - the government’s roadmap for the modernization of the Canadian Forces - sets out

...explicit objectives, based on expectations at home and abroad, the capabilities needed to achieve the desired operational outcomes, and the resources required to generate the required capabilities over a 20-year planning period.

These objectives include sovereignty and security, combat readiness, essential future defence capabilities, and support for NATO, NORAD and other allied commitments.

In translating these CFDS objectives into a criterion for the selection of KICs, concepts such as sovereignty and security are difficult to reflect operationally. Accordingly, the criterion should be based upon the unique needs of the Canadian Forces with respect to the acquisition of goods and services, namely:

- Security of supply (e.g., munitions);
- Customization for Canada-specific requirements (e.g., extreme cold-weather operations);
- Leading-edge, advanced technology requirements for future capabilities (e.g., cyber-security); and
- Support of interoperability with NATO and other allies (e.g., soldier protection).

Regarding security of supply, the intended outcome would be to have first-class Canadian capacity in areas where foreign supply could potentially be interrupted by the exigencies of home-country governments, coupled with diminished capabilities, to the detriment of Canada's own operational capacity. In terms of Canada-specific requirements, there would need to be a unique-to-Canada capability which could be developed more effectively in Canada than by relying on costly modifications by foreign suppliers. Regarding certain advanced technology requirements, capabilities can be so sensitive that they are not fully shared even by close allies, such as the U.S., and thus require independent capacity in Canada. Respecting allied interoperability, and building on our recent experience in Afghanistan, Canada can contribute in-theatre know-how to common allied challenges. Such cases would need to be identified by DND.

The Market Opportunity Perspective

Canadian defence-related industries must become even more export-oriented beyond their current 50% level in order to become more cost competitive through increasing economies of scale, and to meet world-class quality standards.

To put this in context, Canadian-based companies generally operate in Tiers 2-4 of global value chains managed by U.S. prime contractors. As outlined in Section 2, the landscape for these primes is rapidly changing. This presents both a threat to, and an opportunity for, Canadian suppliers: on the one hand, less potential business as primes consolidate and reduce subcontracting while diversifying into direct competition with smaller suppliers; while on the other hand, new growth opportunities in niche areas complementary to revised U.S. capabilities.

Government can help by improving Canadian industry's penetration of the domestic market, however, the key to sustainable long term growth lies in export markets. This is the case for almost all Canadian industries, but applies particularly to defence-related industries and their essential commercial offshoots, in the current challenging competitive environment.

The Innovation Perspective

Innovation is clearly linked to the need for export growth, given that the competitive bar for export success can be even higher than for domestic requirements and is therefore more likely to depend on innovation. The Panel believes, however, that innovation should be a separate criterion since it emphasizes quality and the imperative of continuous improvement, whether the product is intended for domestic or export markets. It is only through a commitment to

innovation that Canada's defence-related industries will move up the value-chain and create a growing number of high-paying, skilled jobs. The possibility of creating incentives for innovation both within these industries as well as through dual-use into commercial markets is a key motivation for implementing a defence procurement strategy for Canada.

Canada must therefore select KICs based on their high innovation potential. This orientation is reinforced by the trend in U.S. defence requirements, with increasing emphasis on technology-driven solutions for threats of the future (cyber, intelligence, surveillance) relative to a traditional "boots on the ground" focus. It is also reinforced by the need regarding future planning of mission requirements for defence platforms to take a modular approach to technologically advanced sub-systems, recognizing that innovation evolves at different rates. A modular approach not only helps contain costs, but also ensures a long useful lifetime for the platform, as has been demonstrated in the F-16 fighter aircraft which has been in production for 35 years.

In defence-related industries the main currency for innovation is Intellectual Property. Development of IP, or access to it through technology transfer, is key to success. Intellectual Property control is also an important anti-competitive weapon wielded by large companies to protect their dominant positions in the marketplace. This tends to put Canadian companies, particularly SMEs, at a disadvantage, absent countervailing efforts by government. In terms of KICs selection, therefore,

IP-richness is a critical sub-set of innovation potential.

There is also considerable scope for KICs-related business through the substantial value of IRB obligations associated with major defence procurements from foreign prime contractors. A detailed examination of current IRB contracts would be needed in order to determine the extent to which potential KICs are covered. Accordingly, one of the early follow-up initiatives in proceeding with a KICs-based approach should be to undertake this analysis, recognizing that it would be primarily a guide to an approach for future IRBs.

Using these three criteria, the Panel undertook a conceptual, deductive process by systematically excluding areas of the CFDS plan: (a) where Canadian companies are not prime contractors—e.g., major platforms (except ships), and (b) commodity areas with little innovation potential—e.g., commercial off-the-shelf (COTS). This left three main categories of KIC potential: (i) Canadian scale programs, like IP-intensive In-Service Support; (ii) specialized supply for prime contractors operating in Canada or abroad, like weapons control systems; and (iii) specific niche solutions, like "modelling and simulation". The Panel estimates, very roughly, that these three areas together represent about a quarter of Canada's total defence procurement related to equipment and readiness, or approximately 10 per cent of total CFDS planned spending. This would, therefore, constitute the universe of KICs-oriented policies and programs (see Exhibit 8).

Commodities

e.g., commercial off-the-shelf (COTS) products such as furniture and office supplies

KICs

e.g., products that embody significant innovation, market potential or that meet special needs of the Canadian Forces

Major Platforms

e.g. large and sophisticated weapons systems such as jets and helicopters

Exhibit 8: KICs Within the Defence Procurement Continuum

SECTION 6

PROCESS TO IDENTIFY KICs



As the Panel addressed a process to identify KICs, it became evident that there was neither adequate data nor the analytical base for a thorough evaluation. Although the Panel has, within the time available, developed an overall impression of key trends, it has been able to gain only a limited understanding of international market opportunities, of competitive positioning among foreign suppliers, of detailed Canadian capabilities in potential KICs areas, and of Canada's specific defence procurement requirements.

Given more time, the first step would have been to develop a more robust analytical base covering these issues. Given the urgency of the situation—created by the imminent major procurement decisions in Canada and the prospect of increased competition due to shrinking defence markets in the U.S. and Europe—decisions on KICs cannot await for the outcome of a major analytical initiative and therefore need to be made on the best evidence available. Should these decisions not occur in an expedient manner, more lost opportunities may result over the next three years.

The Panel had originally contemplated a separate adjudication process that would enable a set of

KICs to be recommended to the government based on the analytical backdrop noted above. To ensure fairness and transparency, the adjudication process would be entrusted to an arm's length group of knowledgeable and experienced individuals with backgrounds in industry, government and academia, similar to what has been recommended in the Aerospace Review (see Section 8). However, in light of the existing exceptional circumstances, the Panel has opted to propose to the government an initial set of KICs based upon evidence made available, including through consultations that were undertaken (see Section 7).

In this context, two stages are proposed: first, identifying an initial set of KICs now, and second, conducting a regular and more robust review—initially within the next four years—to validate or amend the initial selection based upon experience and more precise data and analysis. To expedite the latter, the Panel believes that the government should move immediately to facilitate the establishment, in partnership with industry and academia, of an independent, third-party defence research and analysis capability in Canada.

SECTION 7

SELECTION OF KICs



The objective of a selection process would be to reduce a list of comprehensive Canadian defence-related capabilities to a limited number of priorities to guide the government's defence procurement policies and programs.

For a KICs-centred approach to be successful, a balance between scope and focus, and between ambition and practical management realities is required. To this point, a recently published American study on the U.S. defence industrial base⁵ made the following observation:

Of the perhaps two or three dozen sectors into which the defence industrial base can be logically segmented, the number of strategically critical sectors cannot exceed five to seven. Good strategy is about choice...
(p. xiii)

The Panel concurs with the view that a small number of KICs would be appropriate—five to seven being a reasonable target range.

The concept of basing certain defence procurement policies on KICs has significant precedent in Canada—specifically in the domestic sourcing of munitions and ships. Given that there are already special procurement policies in these domains, the Panel regards them, in effect, as already established “KICs”.

The Panel reviewed an extensive mapping of existing Canadian capabilities against the three criteria proposed in Section 5—i.e., the operational needs of the Canadian Forces, market opportunities, and potential for innovation. The Panel took particular note of the objectives and requirements outlined in the CFDS, as well as the views of U.S. military representatives from all three services with respect to complementarity of American and Canadian industrial capabilities. It also took into consideration the extensive list of sixteen member capabilities provided by CADSI (see Annex 5). Taking into account all of these considerations, and in no order of priority, the Panel recommends the following six KICs clusters:

- Arctic and Maritime Security
- Protecting the Soldier
- Command and Support
- Cyber-Security
- Training Systems
- In-Service Support

Brief descriptions of the aforementioned KICs outlining their context and relevance to Canada are provided below. Examples of the specific capabilities comprised within each of the clusters have been provided for illustrative purposes.

⁵ *Sustaining Critical Sectors of the U.S. Defense Industrial Base*, Center for Strategic and Budgetary Assessments

Arctic and Maritime Security

Canada's vast maritime boundary (three oceans) and arctic landmass present unique and challenging security requirements. These have been made more urgent by climate change and by the prospect of resource extraction and marine traffic that threaten a fragile environment and potentially challenge Canadian sovereignty.

The security imperative is to monitor—with a high degree of coverage and resolution—a vast, harsh and largely unpopulated land and sea territory on a near-real-time basis, and to deploy and support forces as required. To this end, Canada needs specific capabilities in integrated marine, air, and space-based intelligence, surveillance and reconnaissance (ISR); systems for shelter and power generation to enable arctic operations;

search and rescue; and military equipment designed to operate in some of the most severe conditions on the planet.

Protecting the Soldier

Today's soldier must use far more technology, withstand more extreme environments, and survive more lethal weapons than ever before. The equipped soldier is, in effect, a system of systems that greatly enhance situational awareness and enable highly synchronized operations. (These same capabilities can be attributed to police and other civil authorities). The challenge is to equip the soldier to be even better protected and capable while reducing the weight of the "kit" so that he or she can perform at high efficiency. The protection of the infantry soldier is complemented by innovation in armoured vehicle design to



Shelters in Canada's Arctic (Photo Source: Department of National Defence)



Canadian soldier in Panjwa'i District of Kandahar Province, Afghanistan (Photo Source: Department of National Defence)

address novel threats such as the improvised explosive device (IED). Canada is already among the world leaders in soldier protection and enablement. Specific capabilities would include, for example: armoured vehicles; "smart textiles" that respond to the environment and embedded information technology; night-vision technologies; computer-designed camouflage; and self-contained energy generation.

Command and Support

Command and Support refers to the capability to direct defence and security forces towards an objective and to bring support to bear as needed. While this requirement dates back to early

battlefield tactics and communications, the remarkable capabilities of computing, communications and sensing technologies, have brought with them a level of sophistication and pace of development that is unprecedented. Canadian military operations today rely on combat support through integrated suites of technical capabilities usually referred to as "C4ISR" (Command, Control, Communications, Computers, Intelligence, Surveillance and Reconnaissance). Typically, these systems are required to be interoperable with those of our allies. Specific capabilities in this broad domain include several sub-areas of established Canadian



Soldier raising a Vixam radio communications mast at the front of a radio rebroadcast station truck in Haiti, 2010 (Photo Source: Department of National Defence)

strength—advanced systems integration, logistics and mobility, as well as capabilities to ensure interoperability.

Cyber-Security

Cyberspace—which may be defined as the electronic networks used to store, modify and exchange information—is an increasingly vital enabler of modern social, economic and defence functions. It has consequently become a domain of potential conflict just as real as land, sea, air and space. In step with the scope and pace of information and communications technologies, the mission of cyber-security is broad and rapidly expanding. It ranges from protecting the vital domestic networks that, for example, control power grids; to countering the use of devices as simple as cell phones to co-ordinate attacks; or to employing sophisticated techniques such as hacking and jamming to damage an adversary.

The key capabilities relevant to cyber-security include: the hardware and software techniques

and systems needed by civil and military authorities to safeguard our access to, and use of cyberspace; and, in the event of conflict, to disrupt the adversary's ability to operate in cyberspace.

Training Systems

Military and other security technologies continue to become more sophisticated, complex and rapidly evolving as do the situations in which forces are called upon to operate. There is a corresponding need for training systems that can prepare our land, sea, air and civil security forces more flexibly, cost-effectively and interoperably. Fortunately, the same digital information technologies that have increased the capability of our forces, as well as the complexities they have had to master, have also enabled a revolution in training based upon simulation, modelling, visualization technologies and, more recently, gaming technologies. Typically, these methods have dual-use in both military and commercial applications. Canada already has significant capabilities at the leading edge of training systems



Interactive 3-D modelling (Photo Source: NGRain)

and their component elements that include, for example: digital media; modelling and simulation; ultra-large geographic information systems; massively multi-user environments; and human factors.

In-Service Support

In-Service Support (ISS) encompasses the set of activities that support and maintain the performance of military equipment throughout its life-cycle. This includes, as a basic requirement, developing and regularly updating a strategy and

related plans to optimize support. The specific ISS functions include repair and maintenance; modifications to address changing requirements over the lengthy lifetime of most major equipment, as well as extension of that lifetime; and training incident to the ISS mission. The key capabilities within the broad domain of ISS are those that are technologically sophisticated (usually requiring access to the relevant Intellectual Property of the equipment supplier) and those that are needed to maintain critical assets and functions, as well as a leading-edge ISS skills-base in Canada.



CP-140 Aurora in-service support (Photo Source: IMP Aerospace & Defence)

SECTION 8

THE REVIEW OF AEROSPACE AND SPACE PROGRAMS AND POLICIES



The Panel considered the recommendations of the Review of Aerospace and Space Programs and Policies (the Review), which was published on November 29, 2012. The aerospace element of the Review included a number of recommendations that clearly intersect with and reinforce the Panel's findings, although in a narrower context.

One of the key recommendations was for public policies and programs to be focused on those aerospace technologies that have the greatest long-term potential so that support will not be too thinly spread across a wide range of initiatives. The Review observed that:

...the list of priority technologies should be relatively high-level and limited in number. If there are more than 10 priorities, it can fairly be said there are really no priorities at all.
(p. 33)

This view is consistent with the concept of KICs as priorities for Canada's defence-related industries and with the Panel's advice that to achieve a strategic focus, 5-7 KICs be chosen initially. The priority-setting called for in the Review and the

Review of Aerospace and Space Programs and Policies Linkages

The Aerospace Review, headed by the Hon. David Emerson, was mandated to determine how federal policies and programs can help maximize the competitiveness of Canada's aerospace and space sectors.

The Review's key recommendations to the Government of Canada, which the Panel views as relevant to its work include:

- Recommendation 2: A list of aerospace technology priorities – the government should establish a list of priority technologies to guide aerospace-related policies and programs.
- Recommendation 13: Earlier, clearer, firmer commitments on industrial and technological benefits – when the government seeks to purchase aircraft and aerospace-related equipment, each bidder be required to provide a detailed industrial and technological benefits plan as an integral part of its proposal, and these plans be given weight in the selection of the successful bid.
- Recommendation 14: A partnership approach to in-service support – when the government seeks to buy aircraft and aerospace-related equipment each bidder be required to partner with a Canadian firm for in-service support and provide that firm with work and data that allow it to strengthen internal capacity and access to global markets.

proposed selection of KICs in this report are also compatible in practice because support for specific technological priorities would naturally precede the development of various industrial capabilities based upon those technologies.

The Review also suggested that advice on the list of technological priorities should be obtained from a network of industry, government and academic experts and be based upon several criteria, including areas where Canadian industry has a competitive edge; government has procurement requirements; and domestic and global demand is likely to grow. The list would then be used to guide decisions on R&D funding and on IRBs. Other areas would not be excluded but would be required to meet a higher bar to be considered. This is similar to, and compatible with, the overall approach being suggested by the Panel for the treatment of KICs.

The Review included two recommendations that deal explicitly with leveraging procurement—specifically, In-Service Support and industrial benefits. The Review notes that ISS work provides strong benefits through a steady earnings stream that helps develop advanced engineering and design capacity as well as sovereign control. The Review therefore recommends that each bidder on a contract be required to partner with a Canadian firm for ISS and to transfer technical data and IP. The Panel agrees with the desirability of exercising greater sovereign control over ISS, as it is a large,

sustaining element of defence procurement spending, and the associated technology transfer is a key driver of innovation-led growth.

The Review went on to recommend that:

...each bidder be required to provide a detailed industrial and technological benefits plan as an integral part of its proposal and that these plans be weighted in the selection of the successful bid.
(p. 2)

This recommendation is based on the observation, which the Panel shares, that obligations to spend are generated at the time of purchase but typically without sufficient clarity on how they will be satisfied. Negotiating clearer, more specific plans earlier in the process—the point at which the government’s leverage is greatest—should produce tangible and beneficial results more quickly.

Overall, there is compatibility between the Panel’s work and the broad thrust of the Aerospace Review’s recommendations outlined above. There is also thematic agreement in terms of the need to drive innovation-led growth through policies that foster more globally-competitive industry sectors in Canada.

SECTION 9

SUCCESS FACTORS FOR KICs IMPLEMENTATION



Selecting KICs is only a first step in developing a strategy to enhance long-term, sustainable growth in Canada’s defence-related industries. KICs in themselves are simply a focused way to identify areas of greatest potential. KICs will remain inert if not integrated into the government’s policy and program frameworks. This also means that, in some cases, policies and programs will need to be changed substantially in order to achieve the benefits of KICs.

It is intended that KICs bring a level of focus and integration to the government’s existing suite of policies and programs. These range from defence procurement practices themselves, to DRDC’s and other relevant technology support programs, to the new and pending military component of CICP, to IRBs, and to the defence and security component of the Integrative Trade Global Strategy.

A number of federal entities beyond the three core departments – PWGSC, DND and IC – are involved in delivering these policies and programs (e.g., Department of Foreign Affairs and International Trade, Canadian Commercial Corporation and Export Development Canada), and the Panel met with representatives from all of them. These entities perform useful work and cooperate on specific issues. However, the Panel believes that there is not a joined-up effort that would represent a cohesive “whole-of-government” approach to the promotion of

Canadian defence industrial capabilities. This outcome was perhaps to be expected as there is no government-wide set of priorities to promote such capabilities, something that adoption of a set of KICs should provide.

Relevant policies and programs will all require a special KICs track in order to promote Canadian industrial capacity in those selected areas. That said, the existing type and level of government support to areas unrelated to KICs should not be affected by the implementation of a KICs-centred approach. The following list is illustrative of the areas in which special KICs tracks could apply:

- For major acquisitions from foreign prime contractors, the objective is to maximize the innovation and long-term economic impact on Canadian firms by requiring all bidders to specify, upfront, as an element of the rated requirement, the value they will add to the Canadian economy as a result of their bid proposals. This should be based on factors such as technology transfer and IP retention, in-country innovation, global product mandates, development of specific skills and training and future overall economic impact;
- For defence procurement in specific KICs areas, preferred sourcing from Canadian suppliers, such as already occurs through the Munitions Supply Program;

- For defence-related technology support programs, special segmented KICs elements, coordinated across programs;
- For the planned military component of CICP, incentives for KICs-related proposals; and
- For the Integrative Trade Global Strategy: Defence and Security, the designation of KICs as the priority area for defence-related exports.

Based on extensive consultations and reflection, the Panel concluded that merely grafting KICs on to the government's existing set of policies and programs would produce sub-optimal results. In order for KICs to play a strong catalytic role in enhancing industrial performance, the government should make changes to both its demand-side defence procurement policies and to its supply-side programs that support defence R&D and technology transfer.

Demand-Side Elements

Strategic use of procurement requires extending beyond a series of isolated decisions made for specific acquisitions under the CFDS to implementing a balanced approach among a "portfolio" of four procurement options:

1. Developing an original product domestically;
2. Adapting an existing product to Canada's needs;
3. Developing a product in international partnership; and
4. Acquiring an existing product from abroad.

Balance among these procurement options is required—as is the case with an investment

portfolio—to avoid over-reliance on any one option, thereby reducing the risks related to performance and cost. Under the current approach, the benefits to the Canadian economy derive primarily from the large IRB commitments associated with major platforms—i.e., Option 4—given that new IRBs could total almost \$60 billion by 2027 (recall Exhibit 7a on page 14). Such obligations, carried mainly by a handful of foreign primes under duress from declining markets, present a heightened risk of non-fulfillment, partially because these commitments tend to be back-end loaded. Moreover, the formal penalties for non-fulfillment of IRB undertakings, although modest relative to obligations, would be difficult to enforce if the primes were under financial stress.

Effective risk management requires increasing the use of other ways to achieve benefits for Canadian industry—including elements of aforementioned Options 1 and 2—so as to reduce reliance on IRBs as currently structured. Although it is difficult to estimate on a business-as-usual basis how acquisitions would be allocated among the portfolio of four procurement options, the Panel believes that establishing a goal that limits the share of any one option to no greater than 50% will aid in the establishment of a balanced portfolio moving forward.

In addition to an overall strategy to rebalance the defence procurement portfolio, it will be important to make changes within the various options, including Option 4, in order to maximize the benefits of a KICs-centred approach. The ensuing sections examine each of the procurement options in turn.

1. Developing an Original Product

With the exception of the NSPS and the Canadian Patrol Frigate Project preceding it, there is no

evidence to substantiate that Canada has exercised the “design and build at home” option for a major platform over the last fifty years. Even in the case of smaller procurements, the only example on record is the longstanding domestic sourcing of munitions. This option of developing an original product would most often be applied to smaller, stand-alone acquisitions rather than large platform acquisitions where there is less existing Canadian capability. Moreover, it is an option that could be exercised more frequently in the future given the enhancement of domestic capabilities that can be anticipated in the KICs areas—e.g., as requiring certain made-in-Canada elements of larger platform acquisitions.

The six proposed KICs areas are sufficiently broad that the great majority of procurements in those areas could be expected to attract proposals from multiple Canadian-based suppliers, thus ensuring adequate scope for a competitive process among domestic firms. This will spur innovation and provide discipline in proposal pricing. It will, however, require a change in PWGSC’s prevailing interpretation of value for money from a focus on lowest short-term cost to greatest long-term economic benefit to Canada. In this context, there is also a need to review and reform related procurement policies and practices, such as the Canadian Content Policy and the National Security Exception, with a view to enhancing opportunities for qualified Canadian suppliers.

A great majority of the companies that the Panel consulted traced their international success to an initial Canadian government procurement that created unique Intellectual Property (as outlined in Section 4), albeit with no significant example in the past twenty years. With the opportunity created by the CFDS, the conditions have now materialized for implementation of this type of

proven industrial development initiative, with a focus on KICs.

2. Adapting an Existing Product to Canada’s Needs

Even in KICs areas, it is expected that Canada will require some foreign-sourced technology as the basis for product development (as Canada accounts for approximately 2% of the world’s innovation, it must calibrate its objectives appropriately). The practice typically involves purchasing, or otherwise acquiring access to, the Intellectual Property for a product and using the technologies as a base for a made-in-Canada solution. For example, Canada’s highly successful Light Armoured Vehicles (LAV) were based upon technology licensed from a Swiss company. In the interests of meeting defence industrial objectives, there will be times when it is more cost-effective to purchase foreign technology than to develop it from original concept in Canada.

KICs would provide a focus for government in terms of defining which elements it would seek to have undertaken in Canada through adaptation of an existing product. For example, the proposed “Command and Support” KIC could be specified as a made-in-Canada element involving technology transfer from the prime contractor. This would be negotiated as part of the procurement contract and involve payment for the IP. There might be an opportunity for the new defence element of the CICP to facilitate this approach.

More broadly, given the value of ISS over the life-cycle of an acquisition, the government could negotiate the purchase and transfer of IP-rich, KICs-related elements, not only to promote high-wage, high-skill jobs over many years but

also to ensure sovereign control over the operational readiness of the Canadian Forces.

The Panel endorses the intent of the Aerospace Review with regard to foreign primes partnering with a Canadian firm. However, it recommends an approach that is broader than the ISS context whereby elements of foreign prime contractor-led procurements could be carved out for Canadian suppliers, as outlined above. This approach would reduce the size of resulting IRB obligations while achieving KICs-centred benefits for Canada.

3. Developing a Product in International Partnership

This option involves Canadian industry's participation in the co-development of a defence product under the expectation of subsequently manufacturing specific elements of the final product for global markets. This is the approach that Canada and other allies have taken in developing the Joint Strike Fighter. It is attractive from a defence industrial development perspective as the impetus for KICs (and from a broader portfolio perspective as not involving IRBs). In cases where a defence product is developed using an incremental, modular approach, KICs could be built up over time to supply future generations of a product in global markets.

In general, Option 2—adapting an existing product based on technology transfer—will be preferred to Option 3. This stems from the fact that for a country like Canada, there will often be more reward relative to risk by purchasing IP rights for proven technology than by developing new technology as a small business partner on a major international program. This is because these programs tend to involve consortia and higher risks relative to schedule and cost control.

4. Acquiring an Existing Product from Abroad

This is the option most frequently employed in major platform acquisitions. The other three options have been employed comparatively infrequently due to either a lack of industrial capacity, or concerns over contract risk and price.

Under this option, two principal challenges present themselves: the practice of requiring single point of accountability (SPA); and the application of the IRB policy.

With respect to SPA, the current practice is to assign it to a prime contractor (usually foreign) for the lifespan of a procurement. This not only tends to preclude Canadian participation in In-Service Support, it may also restrict Canadian companies from moving up the value chain as they develop niche solutions that contribute to these platforms. In order to promote the development of specific Canadian capabilities, and potentially to have Canadian firms emerge as prime contractors in their own right, the accountability model for platform acquisitions should take into account not only operational efficiency but also give significant weight to the economic development opportunity.

Because of the preponderant value of large, sophisticated platforms in the CFDS acquisition plan, IRBs have become the mainstay of the government's demand-side support for Canada's defence-related industries.

Use of the IRB policy is a reasonable response to prime contractor dominance of international defence markets and will remain an important means of stimulating economic activity in Canada. However, the current design and implementation of the policy is yielding sub-optimal results in today's environment. The policy's "market-driven"

Every Dollar Invested Does Not Have the Same Outcome

Does the economic effect of a defence procurement dollar depend on the nature of the activity on which it is spent? For example; does a dollar spent on activity “A”—say, re-paving a runway—have about the same impact on job creation as a dollar spent on activity “B”—say, purchase of highly sophisticated image-processing software? (These specific examples are illustrations only.)

In each case wages will be earned directly by those spreading the asphalt, or writing the software, and there will be purchases generated in the supply chain—e.g., from asphalt producers or design engineers. In the very-short run, the income and job creation effects may be roughly the same for A and B. But in the case of activity A, the long-term growth prospects are limited. The technology of asphalt production and application, while not completely static, is mature. The opportunities for human skill development are inherently limited. Existing local markets can continue to be served but there is little prospect of export growth.

Activity B has the opposite characteristics—it is technologically dynamic, linked closely in this case to the on-going revolution in information technology. It is skill-intensive with a continuing learning curve that builds human capital. Activity B is rich in opportunities for innovation leading to new capabilities and/or more cost-efficient production. These enable new or expanded markets to be served, both domestic and export. The growing markets are ultimately the source of job and income growth.

Activities A and B therefore have very different implications for the economy in the mid-to-longer term. In the context of defence procurement, there is thus a very big difference between a strategy that simply seeks dollar-for-dollar “offset” spending by prime contractors and one that deliberately targets innovation-rich opportunities that are the real source of growth of income and good jobs.

approach—in which the selection of IRB activities is at the sole discretion of the prime contractor—reflects more the needs of Canada’s economy in the 1980s than in 2013. In past decades unemployment was Canada’s most significant economic policy challenge, and a dollar spent anywhere, irrespective of the nature of the activity, helped to create needed jobs.

This approach is much less appropriate today when the quality rather than simply the quantity of Canada’s job opportunities is a more significant public policy issue. The primary challenge today is to create high-skill, high-wage jobs based upon innovative products that will allow Canadian industry to be internationally competitive. For IRBs, this means that a dollar spent on high-skill

work is a long term investment—an investment primarily in human capital—whereas a dollar spent on low-skill work, where there is little if any addition to human capital, is essentially equivalent to short-term consumption.

IRBs should be much more targeted to high-skill, high-wage opportunities. Although the recent changes to the IRB policy improve incentives for innovative activities, the overall approach is still fundamentally passive, leaving primes to decide where to place contracts. A more proactive, Canadian-interest focus to the IRB policy is needed to counteract primes’ corporate interest which is now being sharpened by difficult market conditions. Should this approach not be changed, high-value investments by foreign primes in

Canadian capabilities are unlikely to be forthcoming voluntarily. In this regard, the Panel endorses the recommendation of the Aerospace Review to negotiate and weigh IRBs up front in the procurement process.

In such a revised approach to IRBs:

- KICs would be used to define Canadian industrial interests in the context of procurements from foreign prime contractors;
- KICs would also guide primes in the development of their IRB packages as well as plans for direct Canadian participation in product platforms, and
- The inclusion of undertakings to involve Canadian suppliers in KICs areas, in both existing and proposed IRB contracts, would help inform the evaluation of prime contractor bids.

The growth of IRB commitments due to the current surge in defence procurement cannot be adequately managed within the current resource levels, particularly if government were to begin to negotiate IRB packages, rate them, and actively monitor compliance. The administration of the IRB policy will therefore need to be upgraded with more staff resources and more sophisticated skill-sets.

Supply-Side Elements

A more effective approach to defence procurement will require complementary supply-side measures. There is an ongoing need for a base level of R&D programming support. The main source of defence-related R&D support is Defence Research Development Canada (DRDC), with an annual budget of approximately \$300 million. In the event that Canada were to commit to a defence

industrial strategy, something more akin to the Defense Advanced Research Projects Agency model in the U.S., with more significant reliance on private sector performance of government-funded R&D, would be appropriate. In this regard, KICs should be the focus for existing and augmented development support.

A key objective for a supply-side instrument will be to assist in adopting and adapting the roughly 98% of technologies created elsewhere in the world. Leverage on foreign companies through the procurement process will facilitate the transfer of IP, but there will be a cost involved which should not be borne entirely in the contract price. If IP acquisition is to be a key element of a strategy, a systematic programmatic response to achieve this objective will be required.

Support for the commercialization of IP is an important and related supply-side measure. The government's Budget 2012 commitment to include a military element in the CICP is a possible model, although its anticipated funding is modest relative to opportunity. Prototyping and demonstrating sophisticated products is very expensive, and a more appropriate model over the medium term might be an arm's length vehicle like Sustainable Development Technology Canada (SDTC).

Funding these types of R&D and commercialization initiatives is challenging in the current fiscal environment. A potential source of funding could be the growing "bank" of IRB obligations. Even a modest percentage of IRB commitments would adequately fund a serious supply-side effort to complement demand-side re-orientation.

Lastly, in linking demand and supply instruments, the Panel was told that there were situations where companies that had benefitted from federal R&D

support were subsequently precluded from submitting proposals on related procurements on the grounds that the support conferred an unfair competitive advantage. This practice is perverse and counterproductive. Not only does it inhibit the collaboration between buyer and seller essential to developing innovative solutions, it also negates the economic benefit of that collaboration.

Priorities for Effective KICs Implementation

During the Panel’s consultations with industry and government officials, a number of policy and program issues clearly came to the fore, the most critical of which relate to the demand side:

- There is a lack of transparency with industry on planning for specific acquisitions. This limits the ability of businesses to make informed investment decisions.
- The fundamental contractual concept of value for money is being interpreted narrowly to the detriment of long-term economic benefits.
- Procurement practices discriminate against Canadian companies that benefit from government-provided innovation support.

- Long-term economic benefits are sacrificed in favour of performance risk mitigation through designation of the prime contractor as the “single point of accountability” for major acquisitions.
- There is a lack of specificity regarding industrial objectives with respect to major acquisitions, on both direct participation and indirect participation through IRBs.
- IRB proposals are not rated as part of overall bid evaluation. This stands in contrast to the rating of “value propositions” that was included in the NSPS procurement.

Under normal circumstances, significant policy, program and institutional changes take substantial time to implement effectively. However, there now needs to be a “forcing function” to ensure that the desired changes take place quickly before the bulk of significant defence procurement decisions are taken in the next few years. This translates to one essential requirement – there must be clearly accountable leadership of a joined-up effort across government departments and agencies and in collaboration with industry, with clear goals, measurement and evaluation.



Halifax-class frigates at sea (Photo Source: Department of National Defence)

SECTION 10

CONCLUSIONS



Canada has an opportunity to leverage the exceptional circumstances that are being created by the sustained increase in defence procurement to promote a long-term growth trajectory for our defence-related industries. This will not happen with a *status quo* set of procurement policies and related programs, particularly in light of anticipated increased competitive pressure from foreign suppliers that are facing declining markets elsewhere. At the same time, it will be important to retain continuity in Canada’s overall approach to procurement, based upon fairness, transparency and competition in the interests of ensuring value for money for Canadian taxpayers.

A balance is required. The Panel believes that fostering Key Industrial Capabilities can provide the basis for such a balance. A KICs-centred approach seeks excellence in a limited number of key areas that constitute a relatively small proportion of total defence procurement expenditures, thereby mitigating short-term costs and risks, while holding

forth the prospect of significant gains in innovation and competitiveness over the long term.

The selection of KICs should be based upon high-level, but pragmatic, criteria emanating from the country’s defence and security needs and the prospects for long-term growth in jobs and income. More specifically, the criteria proposed in this report relate to the unique requirements of the Canadian Forces, to the potential for export-led growth and based upon an innovation-driven world-class supply capacity.

Given that a number of the significant remaining procurement decisions under the CFDS are scheduled to occur over the next few years, an interim set of KICs is proposed (see Exhibit 9 below). These should be used to inform impending decisions, with the understanding that a reassessment will occur approximately every four years, taking into account experience and more precise data and analysis. To assist in the provision



Exhibit 9: List of KICs within the Defence Procurement Continuum

of the latter, the Panel proposes the creation of a third-party defence analysis institute or network.

Special KICs tracks should be created in the government's policies and programs. If KICs are to play an effective role in enhancing defence industrial performance, the government will need to consider substantive changes in both demand-side and supply-side policies and programs. In this regard, there is congruence between the approach

taken in this report and that of the recently published Aerospace Review.

Lastly, it is emphasized that special measures need to be taken in leading and managing the KICs initiative to ensure the timely delivery of an effective "whole-of-government" effort.

SECTION 11

RECOMMENDATIONS



The Panel strongly endorses implementing the concept of Key Industrial Capabilities (KICs) as a driving and enabling force to fully leverage the economic opportunities for Canadians as a result of planned defence procurement. The following high level recommendations—the rationale for which has been developed throughout this report—represent the Panel’s advice for achieving this objective.

1. A sense of urgency is needed regarding implementation of a KICs-centred set of initiatives, given that:
 - a. decisions are scheduled to be taken over the next three years on the majority of significant remaining military procurements arising from the Canada First Defence Strategy (CFDS);
 - b. there is a need to leverage Canadian capabilities in light of the rapidly changing competitive dynamic in the global defence procurement marketplace/environment; and
 - c. there is an early opportunity to capture the economic benefits of a KICs-centred approach to defence procurement.
2. The selection of KICs should be based on the following criteria:
 - a. Specific needs identified by the Canadian Forces;
 - b. Success in penetrating global markets; and
 - c. Potential for innovative products.
3. Given the urgency, the following set of KICs should be adopted on an interim basis to inform defence procurement decisions:
 - Arctic and Maritime Security
 - Protecting the Soldier
 - Command and Support
 - Cyber-Security
 - Training Systems
 - In-Service Support
4. To better inform future procurement and to support the review of KICs on a regular basis, the government should develop a robust work plan for data gathering and analysis in respect of global demand and supply conditions in defence-related industries. As part of that work plan, the government should facilitate

the establishment of an independent, third party defence analysis institute or network.

5. The government can achieve the full benefits of KICs only by making modifications to its existing defence-related procurement policies and programs. Recommended changes include:
 - a. Make innovation and contribution to Canada's economy key drivers for future military procurements by requiring bidders to specify upfront, as a rated requirement, the value they propose to add to Canada's economy as a result of their bid proposal. Bids should include at least the following elements: technology transfer and IP retention, in-country innovation, global product mandates, and development of specific skills and training.
 - b. Review and reform defence procurement policies and practices addressed in this report — for example, in relation to the National Security Exception and Canadian Content Policy — to more effectively encourage and incent Canadian industrial innovation.
 - c. Review the practice of having the prime contractor as “single point of accountability” (SPA). Each procurement plan should be required to examine the impact of SPA on the implementation of a defence procurement strategy.
 - d. Contracts in respect of In-Service Support (ISS) should require, in the interests of sovereign control and economic benefit, participation/ leadership by Canadian firms, including, as necessary, reasonable access to the required Intellectual Property.
6. To reduce reliance on Industrial and Regional Benefits (IRBs), the government should strive to achieve better balance over time within the portfolio of procurement options – (1) developing an original product domestically, (2) adapting an existing product to Canada's needs, (3) developing a product in international partnership, and (4) acquiring an existing product from abroad. No single option should be greater than 50% of the portfolio.
7. The government should take measures to ensure the good governance of KICs-centred procurement by:
 - a. appointing a senior official to be accountable, through a supportive governance process, for the implementation of a KICs-centred strategy from policy through to operations, with the objective of achieving a set of cohesive “whole of government” outcomes that maximize economic benefit to Canada;
 - b. appropriately resourcing areas of key importance, particularly the management of Industrial and Regional Benefits (IRBs); and
 - c. following through on the CFDS undertaking to consult with industry early in the procurement process to improve business planning and investment decisions.

8. In view of the urgency to implement a defence procurement strategy, there should be, within one year, a report from the government on progress in respect of the foregoing recommendations.

There is a compelling case for a KICs-centred defence procurement strategy. The scope and size of planned procurement under the CFDS demands an early, substantive response from government, as this is a once-in-a-lifetime opportunity to leverage defence procurement into long-term, sustainable economic advantage. The development of KICs as a focus for government action is the critical, catalytic element of that response.

PANEL MEMBER BIOGRAPHIES



**P. Thomas (Tom) Jenkins,
O.C., FCAE, MBA, MASC, B.Eng&Mgt.
Executive Chairman and Chief Strategy
Officer, OpenText Corporation**

P. Thomas Jenkins is Executive Chairman and Chief Strategy Officer for OpenText™ Corporation (NASDAQ: OTEX, TSX: OTC) of Waterloo, Ontario, Canada, a \$1 Billion multinational enterprise software firm and the largest software company in Canada. OpenText's software manages electronic information (EIM) which helps organizations improve productivity, automate processes and manage large volumes of electronic content ranging from documents, e-mails, video, web pages and other digital media while at the same time complying with regulatory and other legal requirements.

At OpenText Corporation, he was instrumental in the creation of one of the first internet search engines that was used by Netscape®, Yahoo!® and IBM®. In partnership with Netscape and later Microsoft, Mr. Jenkins went on to direct the development of the first Internet-based Document Management system as well the earliest versions of internet based Workflow, Portals and Social Networking software. Mr. Jenkins is the author of "EIM: Behind the Firewall" and "Managing Content in the Cloud" and he has also co-authored all three books in the Enterprise Content Management Trilogy.

Mr. Jenkins was Chair of the Government of Canada's Research and Development Policy Review Panel which reported in October 2011 which reviewed the \$7 Billion of federal public spending on research to assist the Canadian economy in becoming more innovative. He is also the Chair of the federal centre of excellence Canadian Digital Media Network (CDMN). He is also an appointed member of the Social Sciences and Humanities Research Council of Canada (SSHRC), past appointed member of the Government of Canada's Competition Policy Review Panel which reported in June 2008, and past appointed member of the Province of Ontario's Ontario Commercialization Network Review Committee (OCN) which reported in February 2009. He was also Chair of the Premier of Ontario's roundtable on innovation in 2010. Mr. Jenkins is also a member of the board of BMC Software, Inc. a software corporation based in Houston, Texas. He is also a director of the C.D. Howe Institute and the Canadian Council of Chief Executives (CCCE). Mr. Jenkins is also one of the founders of Communitex—the Waterloo Region Technology Association. Mr. Jenkins was an air cadet and later commissioned as an officer in the Canadian Forces Reserve and he currently serves as Honorary Colonel of the Royal Highland Fusiliers of Canada (RHFC), a reserve infantry regiment in the Waterloo Region.

Mr. Jenkins received an M.B.A. from Schulich School of Business at York University, an M.A.Sc. in electrical engineering from the University of Toronto and a B.Eng. & Mgt. in Engineering Physics and Commerce from McMaster University. He is a recipient of the National Sciences and Engineering (NSERC) post graduate scholarship, the University of Toronto Scholarship, the McMaster Chancellors Scholarship, the 2009 Ontario Entrepreneur of the Year, the 2010 McMaster Engineering L.W. Shemilt Distinguished Alumni Award and the Schulich School of Business 2012 Outstanding Executive Leadership award. He is a fellow of the Canadian Engineering Society. Mr. Jenkins is an Officer of the Order of Canada. ■

Ray Castelli **Chief Executive Officer, Weatherhaven**

Weatherhaven is one of the world's leading suppliers of redeployable camps and shelter systems. With operations on 5 continents, the company has supplied their solutions to more than 20 military customers around the world. A 100% owned and operated Canadian entity, the company is proud to have supported every Canadian peacekeeping mission since 1989.

Mr. Castelli's prior career roles include serving as CEO of a wind energy company, six years as an Executive VP of a global procurement services company as well as six years with Alcan Aluminium as a Director of Strategic Planning and Corporate Development. An alumnus of the INSEAD and Simon Fraser University Business schools, he previously served in the Canadian government as Chief of Staff to the Minister of National Defence.

Born and raised in Prince Rupert, BC, Mr. Castelli holds both Canadian and European citizenship and speaks five languages. In December 2011 Mr. Castelli was appointed by the Premier of

British Columbia to Chair the newly created BC Jobs and Investment Board and has also been appointed to the Canada-Brazil CEO Forum by the federal Minister of International Trade. Mr. Castelli was recently appointed chairperson of the Board of Directors of the Canadian Commercial Corporation. ■

Christyn Cianfarani **Director, Government Programs, Research and Development and Intellectual Property, CAE Inc.**

Christyn Cianfarani is Director, Government Programs, Research and Development (R&D) and Intellectual Property (IP) at CAE Inc. She has been with the company for over 15 years leading a variety of departments from Product Management to Bid Management. In her current role, she is responsible for strategies, business cases, execution, and contract compliance of major Government R&D Programs such as CAE's Strategic Aerospace and Defence Initiative (SADI) and Scientific Research and Experimental Development (SR&ED) in addition to various Provincial R&D Programs. She also holds responsibility for the corporate governance and management of CAE's Global R&D Portfolio and its University and Collaborative Partnership Research Portfolio.

Ms. Cianfarani holds responsibility for Intellectual Property at CAE. She covers the lifecycle of CAE's IP Portfolio, from strategy through to execution, including clearance, disclosure, and patent with a view to monetization and IP protection.

Ms. Cianfarani has represented CAE for the Review of Research and Development in Canada and has participated in the multiple Working Groups contributing to the Aerospace Review.

Ms. Cianfarani holds an MA from University of Toronto and a BA from Royal Military College of

Canada where she served as a member of Canada's Armed Forces (Regular Service) in the Royal Canadian Navy. ■

Major-General (Ret'd) David Fraser

Former Commander, Task Force Afghanistan

Major-General Fraser was commissioned as an Infantry Officer upon graduation from Carleton University with a Bachelor of Arts degree in 1980. He served in various command and staff positions in the PPCLI from platoon to battalion commander in both the Second and Third Battalions. In 1990, he attended the Canadian Forces Command and Staff College in Toronto.

Upon promotion to Lieutenant-Colonel, he was stationed in Calgary as Chief of Staff for Alberta District and in 1996, he assumed command of 2PPCLI. He took the Battalion to Bosnia as the first Canadian Battle Group with SFOR. His tour with the Battalion included support to Quebec Ice Storm in 1998.

After the command, he moved to Ottawa and worked as Director, Land Force Readiness 3, responsible for all Army planning and tasks. He played a major role in planning Canada's participation in Kosovo and Honduras. Major-General Fraser was then assigned as the Project Director for Land Force Reserve Restructure, responsible for developing new Army Capabilities and tasks for the Army Reserve.

Major-General Fraser completed his Master's in Defence Management and Policy from the Royal Military College (RMC) and Queen's University in 2001.

In 2003, Major-General Fraser was posted to the Binational Planning Group in Colorado Springs, Colorado, where he served as the co-director until

2005. He was awarded the United States Legion of Merit for his work. On June 29, 2005, Major-General Fraser assumed command of 1 Canadian Mechanized Brigade Group and was promoted to Brigadier-General shortly thereafter. Major-General Fraser officially assumed command of the Multi-National Brigade (Regional Command South) in Afghanistan on February 28, 2006, until November 2006. For his leadership, he was awarded the United States Bronze Star, the Netherlands Medal of Merit in gold, and the Canadian Meritorious Service Cross. He was the Vimy Award recipient in 2006 for "significant and outstanding contribution to defence and security for Canada" awarded by the Conference of Defence Associations Institute. In 2007, he received the Atlantic Council of Canada award for his 'exceptional contribution to furthering international peace and security for his leadership as Commander of the Multi-National Brigade (Regional Command South) in Afghanistan in 2006.'

Major-General Fraser served as Commandant of the Canadian Forces College from July 2007 until July 2009. He commanded both the Land Forces Doctrine and Training System (LFDTS) and 1 Canadian Division from December 2010 to June 2011 upon which he retired from the Canadian Forces after 31 years of service. ■

Peter Nicholson

Former President and Chief Executive Officer, Council of Canadian Academies

Dr. Nicholson was the inaugural President and CEO of the Council of Canadian Academies. The Council's mission is to provide independent, expert assessments of the science underlying important matters of public interest, and to provide a voice for Canada on behalf of the sciences, both nationally and internationally. A native of Halifax, Nova Scotia, he holds a BSc and MSc in Physics from Dalhousie University and a

PhD (Operations Research) from Stanford University, as well as honorary doctorates from Dalhousie University, Acadia University, McMaster University, and the Université du Québec (INRS).

From 2003 to 2006, Dr. Nicholson was Deputy Chief of Staff for Policy in the Office of the Prime Minister of Canada. Prior to that he was Special Advisor to the Secretary-general of the OECD. Dr. Nicholson's varied career has included senior executive positions in the banking and telecommunications industries, as well as a number of public service positions including Clifford Clark Visiting Economist with Finance Canada (1994-95). Dr. Nicholson is a Member of the Order of Canada. ■

ANNEX 2

LIST OF ORGANIZATIONS CONSULTED



Active Gear Company of Canada Limited

Aerospace Industries Association of Canada
(AIAC)

AirBoss-Defense

Armatec Survivability Corp.

Avcorp Industries

Aversan Inc.

Bell Helicopter Textron Canada

Bombardier Inc.

Canaccord Genuity Corp.

Canadian Association of Defence and Security
Industries (CADSI)

Center for National Policy

Center for Strategic and Budgetary Assessments

Composites Atlantic

Consortium de recherche et d'innovation en
aérospatiale au Québec (CRIAQ)

General Dynamics - Ordnance and Tactical
Systems -Canada

General Dynamics Land Systems - Canada

Government of Australia

Government of Canada

Government of the United States of America

Highland Integrated Surveillance Systems (HISS)

Human Systems Incorporated

IMP Aerospace and Defence

IMT Defence

Institute for Defense Analyses

Integran

ITL Circuits

JPOM

Loma Machine / Hill Acme / Waterbury Farrel
Ammunition Equipment & Press

L-3 Communications

L-3 MAS	Pratt & Whitney Canada
MacDonald, Dettwiler and Associates Ltd. (MDA)	SNC Lavalin Group Inc.
Mawashi Protective Clothing Inc.	Soucy Group
Meggitt Training Systems (Canada) Inc.	Teledyne DALSA, Inc.
Mil-Quip Inc.	Terradyne Armored Vehicles Inc.
Nanaimo Shipyards	Thales Canada, Defence & Security – Optronics
National Defense Industrial Association	Thales Canada Inc.
National Defense University	The Heritage Foundation
Nexter Inc.	The OMX
NGRAIN	
NovAtel Inc.	

ANNEX 3

PROJECTION OF INDUSTRIAL AND REGIONAL BENEFITS (IRB) OBLIGATIONS

A. Data Sources

1. Estimates of project values for future CFDS-related procurements (New Major Fleet Replacements), excluding In-Service Support (ISS) procurements
 - 2013-2015 = \$12 billion (Excluding the Next Generation Fighter Capability project)
 - 2016 and beyond = \$30 billion

Source: Department of National Defence (October 2012)

2. Estimate of gross IRB obligations at year-end 2011 (most recent year with available data)
 - \$23 billion

3. Estimate of gross IRB obligations in 2012
 - \$2 billion

Source: Industry Canada and Department of National Defence (October 2012)

B. Assumptions

1. Contract values for defence capital projects are approximately two-thirds of corresponding project values
2. Contract value for ISS is approximately equal to that of the corresponding Acquisition contract value
3. For both Acquisition and ISS contracts, IRB commitments are 100% of contract values
4. For the forecast period the average annual IRB "outflow" (i.e., the dollar value of IRB obligations that are fulfilled) is \$2 billion

5. The IRB obligations associated with New Major Fleet Replacements for the period 2016 and beyond (\$30 billion in project value) would be determined by 2027. This may not be the case, and if it is not, the accumulated IRB obligations through 2027 would be correspondingly less than shown in Exhibit 7a

C. Projection Calculations

1. Estimate of total Acquisition contract values
 - $((\$12 \text{ billion} + \$30 \text{ billion})) * 0.67 = \28 billion
2. Estimate of total ISS contract values
 - \$28 billion (equal to C.1)
3. Projection of additional IRB obligations (gross) by 2027
 - \$28 billion + \$28 billion + \$2 billion = \$58 billion
4. Projection of total IRB obligations by 2027
 - \$23 billion (total at year-end 2011) + \$58 billion (estimated new obligations) - \$32 billion (estimated fulfilled obligations) equals \$49 billion*

*Note: The amount of net (unfulfilled) IRB obligations in 2027 can only be roughly estimated given the substantial uncertainty in the rate of fulfillment over 2012-27, and in the amount already fulfilled by 2011

ANNEX 4

APPROACHES IN OTHER COUNTRIES



The concept of a defence procurement strategy and, more specifically within that, of setting priorities for developing industrial capabilities is not new, and has been explored or practiced by a number of Canada's allies. It is important to note that while the countries listed here have used or ceased to use the identification of priority capabilities, there is no existing example of the strategy of identifying and supporting KICs as described in this report. These countries are listed so that government can learn from the experiences of allies in this broad area.

Australia

In Australia, the responsibility of defence materiel lies with the Defence Materiel Organization (DMO), an agency of the Department of Defence. The objective of achieving Australia's defence industrial policy objective of integration into the global value chains (GVCs) of large international primes and their major subcontractors is the establishment of a list of Priority Industry Capabilities (PICs). These PICs confer an essential strategic advantage to domestic industries and if not available would undermine its defence and self-reliance capability. Meanwhile, a number of capabilities that did not make the PIC list were designated Strategic Industrial Capabilities (SICs).

The list is regularly reviewed and updated and currently includes the following 12 specific capabilities: acoustic technologies and systems;

anti-tampering capabilities; combat uniform and personal equipment; electronic warfare; system and system of systems integration; high frequency and phased radars; infantry weapons and remote weapons stations; in-service support of submarine combat systems; ballistic and munitions explosives; ship dry dock facilities; signature management; support of mission critical and safety critical software.

The PICs are the sole responsibility of DMO and were selected based on the needs of the Australian Defence Force (ADF), separate from economic or export development. After the PICs were identified, a process began to perform what DMO called "Health Checks" to assess what, if any government tools could be used to improve their development. This process is still underway and comprises of a report for government use, and a shorter, unclassified version to share with industry.

Based on a ten-year, forward-looking capability plan, companies are encouraged to submit innovation proposals relating to PICs for direct funding as development contracts under the PIC Innovation Program with a view to having good prospects for driving additional work in Australian industry or providing cost savings for future defence contracts.

As recently as April 30, 2012, the Australian Department of Defence announced additional

support to the PIC concept, offering further funding of more than AUD 12 million (US \$12.5 million) to Australian companies to commercialize new defence technologies under PICs. This is included in the AUD 45 million over the next seven years to encourage the development of “essential” military technologies and capabilities.

In its consultations with industry in Australia, the Panel heard of some challenges with the country’s approach; the Panel has used these “lessons learned” in formulation of a number of its recommendations, particularly pertaining to the Government of Canada making modifications to its existing defence-related procurement policies and programs.

One concern shared by industry and government was the time-consuming process of implementation of programs under the PIC list, which has taken significantly longer than the creation of the list itself. Industry also expressed concerns that due to the lengthy implementation process, there were in some cases no benefits yet realized to being involved in a priority area. This delay in implementation has resulted in no tangible advantage to many Australian firms (even those involved in PIC areas).

The Netherlands

The Defence Materiel Organisation (DMO) sits under the Ministry of Defence and is responsible for all materiel within the Defence organization: from procurement and major maintenance to disposal. The DMO also establishes internal materiel policy. The DMO was established as a separate element of the Ministry of Defence in 2006. The Commissariat for Military Production (CMP) exists under the Ministry of Economic Affairs, Agriculture & Innovation and its aim is to promote competitive participation of the

Netherlands defence industry and service sector in the development, production and procurement of equipment and services on the (inter)national defence market. In the pursuit of this objective, CMP is responsible for, amongst other duties, the operation of the Netherlands’ offset policy and is also the agency responsible for the country’s Defence Industry Strategy.

On August 26, 2006 the Minister of Economic Affairs, Agriculture and Innovation and the Minister of Defence commissioned terms on developing a strategic vision concerning the Netherlands defence-related industry. In late 2007, these two Ministers jointly issued a Defence Industry Strategy setting out a strategic vision for the country’s defence-related industry and the government’s role in its sustainment. The strategy seeks to harness international opportunities and to promote synergy between the needs of the Dutch armed forces and those in the civil market due to the relatively small size of the Dutch defence industry. This reality has led the Dutch government to prioritize certain areas for specialization. From this context, the strategy identifies fields of technology where Dutch industry has the capability to excel and consolidate its position in the global (primarily European) defence market. The six priority technology areas in the Dutch DIS are: C4I (command, control, communications, computers and intelligence); sensor systems; integrated platform design, development and production; electronics and “mechatronics”; advanced materials; and simulation, training and synthetic environments.

The strategy also accords the defence ministry an important role in acting as lead customer for specific new technologies. In doing so, it recognizes the need for it to take part in multi-national development and production programs

from their earliest start phase, as is the case of participation in the Joint Strike Fighter program.

The 2007 Defence Industry Strategy is in the process of being updated and is expected to be released in the first half of 2013, with the Ministry of Economic Affairs (Commissariat for Military Production) as the lead.

Sweden

Sweden has traditionally maintained a high performing domestic defence industrial base. The nature of its industrial capability is changing however, as prime contractors continue to consolidate. This is most notably the case with two Swedish companies: Hägglunds, an armoured vehicle manufacturer and producer of the CV90 infantry fighting vehicle was acquired by British multinational BAE Systems, while Thyssen Krupp of Germany acquired the Kockums shipyard in 2005. Saab AB, the country's largest aerospace and defence company, is domestically owned.

In Sweden, defence procurement is the responsibility of the Defence Materials Agency or FMV under the Defence Ministry. Meanwhile, since August 2010 responsibility for supporting defence export sales has been transferred to a new agency, also under the Swedish Defence Ministry, the Defence Exports Authority, or FMX. This prioritization of defence exports is due in large part to the fact that export sales account for 85-90% of turnover for many companies in the Swedish defence sector. The country does not have an explicitly stated defence industrial policy, nor does it at present, have a formalized list of protected industrial capabilities.

In 2009, the Swedish State Secretary for Defence Hakan Jevrell signalled the end of Sweden's long-standing, but increasingly unaffordable,

policy of industrial self-reliance and indigenous advanced technology development. He pointed towards a focus on incremental acquisition and off-the-shelf systems, and stated that while the Ministry of Defence would continue to support military research and development, they would do it "more selectively." He stated: "It is a matter of rebalancing priorities and picking projects more carefully", going on to add that the government would continue to fund priority areas "where our research is already world class." One sovereign capability which the government has expressed a desire to retain is its longstanding world class, indigenous capability for the design and construction of submarines.

United Kingdom

The United Kingdom's Defence Industrial Strategy, dating back to 2005, had two essential features: setting out those industrial capabilities required in-country (while recognizing other capabilities will be sought through international collaboration and competition); and explaining more clearly, the factors that will influence procurement decisions—its overall aim being to retain in the U.K., those industrial capabilities (infrastructure, skills, knowledge) needed to ensure sovereignty. The strategy had three interlinked components:

- the defence capability requirements going forward (e.g., new projects, upgrade and modifications to existing equipment) that it seeks to retain in-country;
- a review of different industrial sectors and cross-cutting capabilities (in the context of future needs, including how mismatches between the two can be filled); and

- an outline of how the strategy will be implemented (i.e., the principles and processes that underpin procurement and industrial decisions) and the implications for Defence and industry as a whole.

This policy framework was updated in 2010 first, with the release of a Green (Consultation) Paper and then in February 2012 with the publishing of a government White Paper that steps back from the previous approach. The new White Paper sets out competition as the default position for defence procurement, with the exception of actions to protect technological advantage essential for national security; and it explicitly eschews specific areas of protection as in 2005 in order to maximize freedom of action in a time of constrained budgets and unpredictability of threat, while emphasizing increased support for science and technology and SMEs. To address and explain these changes, then-Minister for Defence Equipment, Support and Technology, Peter Luff, stated in June 2012, that:

The Defence Industrial Strategy of 2005 listed the capabilities industry had. And then said what Government would do to protect them. This allowed everybody and anybody to claim that their capability was essential and that, implicitly, the MOD would have to fund it. An approach that proved to be unaffordable—and downright illogical in an age of rapid change. In contrast, the White Paper National Security Through Technology does what it says on the tin. It sets out an approach that starts with what the State needs for its security. And then it looks at the different ways of achieving it, establishing affordability, what it will acquire, and how it will acquire it. We are now embedding this approach.

United States

While the U.S. officially opposes industrial participation policies and practices, viewing them as distortions of free and open markets, it has a clear, if not explicitly labelled, defence industrial policy, with a Deputy Under-Secretary of Defense responsible for all decisions regarding mergers and acquisitions, domestic and foreign, affecting the U.S. defence industry; the Department's relations with NATO defence and aerospace industries; and the overall health of the U.S. defence industrial base.

There are numerous aspects to U.S. defence industrial policies: assuring sources of supply for critical items; protecting key technologies; generally ensuring a domestic defence industrial base capable of supporting the nation's national security interests, with special attention on the latter issue in recent months, amid shifting demand and supply conditions, in auditing corporate health to measure risks in future supply capabilities.

The scale of U.S. defence procurement, even with potential reductions, has a pervasive impact on American technological capabilities; however, in planning its acquisitions, the Department of Defense identifies promising technologies from all sources, domestic and foreign, creating significant potential for Canadian-developed innovations reaching more than a domestic defence procurement market.

ANNEX 5

CADSI LIST OF MEMBER CAPABILITIES



1. Information Assurance & Cyber – IT Security, Systems Integration, In-Service Support
2. Space-Based Radar Surveillance
3. C4ISR Systems Integration
4. Platform In-Service Support, Integrated Logistics Support, Maintenance, Repair and Overhaul
5. C4ISR Systems and Solutions
6. Ordnance/Ammunition
7. Small Arms
8. Shipbuilding and Marine Industries
9. Armoured Vehicles
10. Aircraft, Special Mission Aircraft, and Aircraft Missionization
11. Simulation and Training Systems and Solutions
12. CBRNE Detection, Protection and Decontamination
13. Personal Protective Clothing and Equipment
14. Shelters and Containers
15. IT, Procurement, Management, Test & Evaluation, R&D Services
16. Engines and Power Generation

LIST OF EXHIBITS



Exhibit 1- Canadian Defence Expenditures, Historical and CFDS Forecast (Adjusted to FY 2000 \$ billion)

Exhibit 2- Canada First Strategy - Total Defence Spending (2008/09-2027/28)

Exhibit 3- 2012 Global Defence Expenditures

Exhibit 4- U.S. Defence Spending

Exhibit 5- 2007 Exports of Canadian Defence Products and Services

Exhibit 6- CFDS Expenditure Allocations (2008/09- 2027/28)

Exhibit 7a- Projection of Industrial and Regional Benefits (IRB) Obligations (2012-2027)

Exhibit 7b- Direct Expenditure for Selected Research and Development Programs vs. IRB output (2010/11)

Exhibit 8-KICs within the Defence Procurement Continuum

Exhibit 9-List of KICs within the Defence Procurement Continuum

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LIST OF ACRONYMS



A/OPS – Arctic/Offshore Patrol Ships

AVGP – Armoured Vehicles General Purpose

CADSI – Canadian Association of Defence and Security Industries

CCV – Close Combat Vehicle

CF – Canadian Forces

C4ISR – Command, Control, Communications, Computers, Intelligence, Surveillance and Reconnaissance

CBSA – Canada Border Services Agency

CFDS – Canada First Defence Strategy

CICP – Canadian Innovation Commercialization Program

COTS – Commercial Off-The-Shelf

CSC – Correctional Service Canada

CSC – Canadian Surface Combatant

DARPA – Defense Advanced Research Projects Agency

DMO – Defence Materiel Organisation (Netherlands)

DMO – Defence Materiel Organization (Australia)

DFAIT – Department of Foreign Affairs and International Trade

DoD – Department of Defense (United States)

DND – Department of National Defence

DPS – Defence Procurement Strategy

DRDC – Defence Research and Development Canada

FMV – Defence Materials Agency (Sweden)

FMX – Defence Exports Authority (Sweden)

FWSAR – Fixed Wing Search and Rescue

GDP – Gross Domestic Product

GVC – Global Value Chain

IP – Intellectual Property

IRAP – Industrial Research Assistance Program

IRB – Industrial and Regional Benefits, Canada’s “Offsets” policy

ISR – Intelligence, Surveillance, and Reconnaissance

ISS – In-Service Support

ITAR – International Traffic in Arms Regulations

JSS – Joint Support Ship

KIC – Key Industrial Capability

LAV – Light Armoured Vehicle

MECC – Mobile Expandable Containers

MOD – Ministry of Defence (United Kingdom)

MSP – Munitions Supply Program

MSVS – Medium Support Vehicle System

NATO – North Atlantic Treaty Organization

NGFC – Next Generation Fighter Capability

NORAD – North American Aerospace Defense Command

NSPS – National Shipbuilding Procurement Strategy

OTSP – Operational Training Systems Provider

PIC – Priority Industry Capability (Australia)

PWGSC – Public Works and Government Services Canada

R&D – Research and Development

RDA – Regional Development Agency

SADI – Strategic Aerospace and Defence Initiative

SDTC – Sustainable Development Technology Canada

SIC – Strategic Industry Capability (Australia)

SMEs – Small and Medium Enterprises

SPA – Single Point of Accountability

SR&ED – Scientific Research and Experimental Development

SSHRC – Social Sciences and Humanities Research Council

