ON TRACK

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Defence Procurement Reform: International Perspectives and Best Practices

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ON TRACK is the official journal of the CDA Institute. Through its pages, the CDA Institute promotes informed public debate on security and defence issues and the vital role played by the Canadian Armed Forces in society. ON TRACK facilitates this educational mandate by featuring a range of articles that explore security, defence, and strategic issues that may have an impact on the Canadian strategic interests and on the safety of its citizens. The views expressed in ON TRACK are those of the authors and do not necessarily represent those of the CDA Institute.

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Introduction

Colonel Charles Davies (Retired)

This edition of On Track is focused on the perennially controversial topic of defence procurement. The Carney government, like a number of its predecessors, came into office promising to reform how the government does this critical function, but unlike previous administrations appears intent on going beyond mere words and actually making significant changes. The question this time therefore seems not to be "will they actually do anything substantive?" but rather "what direction will they take – and to what effect?"

The papers in this collection provide a broad range of domestic and international perspectives intended to inform discussion and debate about the subject both inside and outside government. We have particularly sought out international contributors with useful insights to offer, as Canada is not alone in trying to improve the efficiency, effectiveness – and most importantly speed – of defence procurement in the face of rising global instability and conflict. The unprovoked Russian invasion of Ukraine in particular has focused all Western governments' attention on the urgent need to boost both defence capabilities and the capacities of their industrial bases to sustain them in any future intensive conflict – and well-managed, well-executed procurement is central to achieving both results.

We begin with an examination of the domestic environment within which Canadian defence procurement is executed. CAE executive Jeff Tasseron provides an insightful industry perspective on the new procurement environment and how relationships both between government and industry, and within industry, are quickly evolving and need to evolve further if Canada is going to successfully meet the defence and security challenges it is facing.

His paper is followed by three providing diverse perspectives from international contributors. First, German economist Professor Jörg Schimmelpfennig challenges some of the popular orthodoxies surrounding defence procurement: competitive contracting, the value of Public-Private Partnerships and others. Then, Michel Rademaker and Ron Stoop of the Hague Centre for Strategic Studies in the Netherlands discuss the challenges faced by Europe's defence industries, arguing that they need to improve innovation and collaboration and urging governments to streamline procurement procedures, better leverage civilian technologies and act to secure supply chains for critical materials. Our third international contributor is Rena Sasaki, a PhD student at Johns Hopkins University in Baltimore, who provides an analysis of Japan's innovative Agile Defense Acquisition reforms. All three of these international papers contain useful insights and information Canada should consider in charting its own way forward, the two European contributions having particular relevance as this country works towards closer defence and defence industry cooperation with the European Union.

Our final paper is my own contribution, which argues in favour of an integrated Canadian defence capability acquisition and support organization headed by a single minister, as opposed to the more limited defence procurement agency model that has been proposed by some.

The CDA Institute welcomes feedback and invites further perspectives and views on these or other topics. Submission guidelines for papers, articles and Op-Ed piece, as well as contact information for Institute staff, can be found on the Institute's website.

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Old Wine in New Bottles: Defence Procurement Reform in Action

Jeff Tasseron

It may seem surprising, but in contrast to previous years the 2025 iteration of CANSEC was uncharacteristically positive, even slightly upbeat. Normally, defence shows in Canada combine gloom and foreboding over the degraded state of international geopolitics with fruitless handwringing over the similarly degraded state of Canada's defence estate. Certainly, there is no lack of sobering news to reflect on. The dreadful toll on humanity of conflict in Europe and the Middle East is seasoned by the whiplash of US trade policy and the seemingly overnight ideological transmogrification of the world's preeminent champion of democracy into… something else. At home, the Prairies are smoldering, the economics of many of our most significant industrial sectors teeter on a tariff-freighted brink, and Canada seems no closer to solving seemingly intractable last-century problems such as access to clean drinking water in underserviced indigenous communities, affordable housing for youth and newcomers, or availability of timely and efficient medical services for a growing (and aging) population.

These are all issues that by the measure of most Canadians would seem to relegate defence and defence procurement to the customary back burner. But even with these dire challenges, and despite only limited signs that Canada's military is beginning to turn the corner on endemic recruiting, training, and readiness shortfalls, there was a buzz in the air at CADSI's annual tour de force that was as refreshing as it was unanticipated. At risk of resorting to tired hockey metaphors (I think we've all had enough of "elbows up" to last a while) there was a real sense that like a perennially underperforming Stanley Cup contender, Canada is still in the game, and could yet eke out a conference title. However improbably, it felt like defence and security had suddenly become real again, even among Canadians for whom DND has traditionally been a four-letter word.

Of course, in the meeting rooms and hallways of CANSEC, and in the booths and over the rubber chicken, the collective sense of a rising tide opportunity had much to do with Prime Minster Carney's pre-election pledge to push Canada to the 2% GDP goal a full five years sooner than previously committed. For industry, Government, and military alike, this represented a powerful (if daunting) commitment – at once an inducement for defence procurement stakeholders of all stripes to work together to overcome decades of procurement shortfalls, but also a challenge to those invested in preserving a status quo whose acceptability largely relied on public indifference to the importance of defence and the defence industrial enterprise.

But even as a new crop of Ministers hit the CANSEC floor, and well in advance of the subsequent 9 June announcement[1] of a $9B funding increase to FY25-26 defence expenditures (coupled with other measures to expand the numerator of NATO-eligible spending), the tenor and substance of the defence procurement conversation had shifted. It seems more than the usual miniscule fraction of defence academics and practitioners had read the excellent Business Council of Canada paper on the linkages between industrial, economic, and national security[2] and were starting to discuss the potential impact of a decently ambitious defence industrial strategy. Others noted that despite the caretaker convention, many of the ongoing PSPC, ISED, and DND efforts to advance novel in-service support and procurement policy reforms (including continuous capability sustainment[3] and strategic partnering[4]) had more or less

continued without delay, despite the election. And on the show floor, particularly in the expanded footprint for small, new, and non-traditional players, there was a clear reminder of the breadth and potential inherent in the sector – assuming Government commitments to accelerate defence modernization, attack the 2% GDP spending target, and invest in building a more resilient defence and aerospace sector in Canada spur real action.

Of course, more jaded observers would note that while the geostrategic imperative may be new, Canadian defence reform is replete with examples of fine words and noble intent falling by the wayside as soon as the hard, practical work becomes evident. In the past, this has meant even major muscle movements such as defence capability blueprints, investment plans, and White Papers have ultimately had only indeterminate impact after their initial fanfare. Meaningful defence reform in the Canadian context has always been a contested activity, pitting the interests of too many major Departments and central agency stakeholders against one another, with elected leaders and rank and file defence personnel alike reduced mostly to spectators, alongside perennially exasperated industry hecklers.[5] So it is all too easy to look at even more tangible recent moves such as the acceleration of platform choices with skepticism, or to see new initiatives such as continuous capability sustainment and strategic partnering as new wine in old bottles. Measured against the historical record, even a firm commitment to establish a standalone Defence Procurement Agency risks becoming merely yet another example of performative political artifice,[6] doomed to founder on shoals of self-interest and legislative complexity.

But what if this time, the moment is real? Certainly, the end-June announcement that Canada will seek to go beyond the 2% threshold, and will aim to spend 3.5% of its GDP on core military capabilities and a further 1.5% on dual-use defence and security infrastructure and readiness[7] signals an almost un-Canadian clarity of intent and resolve. However, this does little to address the critical mechanical elements of what is to be done, really, and in what order of priority. Equally, if one accepts the premise that real change is as much about stopping doing things as it is about starting them, what are the practices and behaviors we most need to unlearn?[8]

For a start, we need to collectively recognize that revolution is definitely not welcome, likely not needed, and probably not possible. Ian Mack's observation that only so much of an aircraft can be rearchitected in flight before a crash is inevitable is as valid today as it was in 2019.[9] On the surface, the June 9 announcement makes a decently modest start that mostly feels achievable. Funding pay increases and devoting additional resources to recruiting and retention are realistic goals with measurable outcomes that much of the existing apparatus should be able to encompass. Similarly, focusing a portion of the new spending on repair and sustainment of equipment and infrastructure makes eminent good sense. These days, one has only to visit a Canadian Wing or Base to be treated to a spectacle of decrepitude reminiscent of that found in ex-Warsaw Pact military facilities in the late 1990s. However, with only a little under $1.5B earmarked to infrastructure (including additional spending on new digital infrastructure as well as bricks and mortar), this is nowhere near what is required to really return Canada's defence real estate holdings to fighting form. Nor will the remaining money be enough do more than make a start at correcting pressing sustainment deficits with many of our major platforms. Nevertheless, on top of sustainment commitments made in the "Our North, Strong and Free" defence policy update, it at least signals the expansion of more targeted sustainment efforts in the CAF as a whole, beyond those already underway in the RCN.[10]

But as we look deeper into the details, admittedly still limited, the real challenges quickly become evident. With over $4B of projected investment between them (almost half of the total spending announced) there is daunting practical complexity to be found in policy imperatives such as "Strengthening Canada's Relationship with the Defence Industry" and "Developing Stronger Defence Partnerships" – to say nothing of the

potentially profound implications inherent in the idea that some portion of the funding will also go towards new investments in the civilian workforce to "(allow) the CAF to focus on operational requirements."[11] How do defence procurement stakeholders transform words such as these into spending choices that deliver greater defence capability and enhance industrial productivity? Are we really ready as a collective defence enterprise – government, military, and industry alike – to depart from the creature comforts of current practice, however dysfunctional?

The danger of such prescriptive statements is not lessened by tying them to real resources, but increased. At least in the past, when we ignored or soft-pedaled our best-laid plans, we could fall back on the sad reality that since our national ambitions were so under-resourced in the first place, there was a limit to how much money would be wasted. This time around, that doesn't feel like the case: Canada is being called upon not merely to spend, but to spend well and to good effect. This makes solving for the policy ambiguity as much a moral imperative as a functional one, if we are to avoid creating a post-millennial "Cross of Iron"[12] of debt and military-industrial wastage for successive generations of taxpayers to bear.

To avoid this, the right subset of defence professionals must have a serious discussion about where it makes better sense to invent new policies and approaches, and where as a country we need only adapt what we have. Against the omnipresent narrative of an irreparably broken defence procurement process, it can be difficult to suggest (particularly coming from an industry standpoint) that there are elements of existing practice that work fine, which could and should be usefully retained if perhaps with minor amendments. But that is indeed what industry must be prepared to do, and even champion in the face of opposition, if only from the perspective that we collectively have neither the luxury of time or available conceptual bandwidth to aspire to more than what is "enough" to make real progress now. The perfect cannot be allowed to become the enemy of the good.

Fortunately, that debate has already begun, focused not only on theoretical policy reform but also on practice. Indeed, some moves have already been quite tectonic when measured against traditional procurement doctrine. For example, Canada's decision to commit directly to the P-8 platform came early and fairly unexpectedly, despite what might normally have been a bitter, long fought campaign with a distinctly nationalist flavour. Whether the platform decision was right or wrong (or whether it would be the same today, in the shadow of annexation threats from the US administration) is immaterial from the standpoint of procurement reform. After all, this was no "C-17" moment, where no other credible alternatives existed in the marketplace. Rather, it was one where the Government used the full machinery at its disposal to arrive at and commit to a sole-source procurement path, putting the critical platform decision up front in an environment where other alternatives existed, and sticking to its guns despite obvious political drawbacks.

Of course, nothing is ever as good or as bad as it seems. Even in taking the comparatively bold decision to press ahead where delay and dithering might have been less contentious, Canada again missed key opportunities to use the power of its chequebook to secure greater sovereign IP and supply chain resilience, and derive better economic and industrial advantage – a regrettable pattern industry has observed over many past programs. But the key lesson was clear: it is possible to push existing, flawed procurement mechanisms through a wider range of motion, albeit with some risk and discomfort, when a coherent and compelling imperative can be articulated. It will therefore be interesting to observe whether the Canadian Patrol Submarine Project (CPSP) will follow a similar path – and whether that program (or whichever the next "smart directed" procurement opportunity comes to the fore) will be viewed as an opportunity to further refine the domestic / sovereign industrial benefits approach, inspired by the goal of building greater sovereign training and sustainment

capacity. In its reply[13] to recent OAG pronouncements on the efficacy of the Industrial Technological Benefits (ITB) policy[14] the Government certainly acknowledged this to be a legitimate goal. However, particularly in the press of current events, it remains to be seen whether the headlong rush towards 2% ends up occupying so much procurement bandwidth that Canada once again misses the chance to fix smaller, seemingly less-significant things that lie on the periphery of large platform acquisitions and high-profile ribbon cutting.

While less overtly tectonic, the new thrust towards developing and implementing a more robust relational contracting framework with selected industry partners under the general rubric of Strategic Partnering (SP) is another encouraging move. Although still in its very early stages, this construct is explicitly intended not only to supplement Canada's organic procurement capacity by better leveraging industry resources, but also to address the vastly more complex procurement environment Canada must now confront. After all, even achieving the 2% GDP threshold (much less pushing onwards to 3.5%) is only the beginning of a massive, multi-year commitment devoted to sustaining that level of ongoing procurement, which by necessity[15] will require Canada to **simultaneously**:

- select, buy, and introduce multiple new platforms into service more quickly than ever done in the post-Cold War era, outside of periods of acute conflict (such as Afghanistan);
- fill key personnel gaps and reinvest in training systems needed to ensure sufficient trained personnel are available to operate the equipment and provide effective through-life sustainment;
- reconstitute obsolescent defence training and operational in-service support (ISS) infrastructure on multiple bases, to ensure new and legacy systems can be safely and effectively supported;
- establish (finally) the secure, data-centric information management and command and control architectures necessary to operate and support modern platforms, as well as to support domestic and participate in multinational operations; and,
- expand declarable spending across all NATO-recognized defence and security categories by aligning DND procurement with that of other security stakeholders (including not only integration of the Coast Guard but also potentially other Federal border control, policing and security functions).

In this context, it is clear that SP cannot fully replicate the advantages of directed buying. The Government will need to continue to use traditional sole-source mechanisms including Foreign Military Sales (FMS) in cases where time pressures or national interests legitimately preclude competition or other approaches, albeit more selectively and depending on the geostrategic situation. However, projects such as the CF-35 show the limitations of FMS or similar sole-source constructs for complex programs. In particular, complex platforms and capabilities with sovereign operational, training or in-service support (ISS) dependencies fit poorly with the traditional FMS model, given its focus on delivering US DoD pattern in-service weapon systems, extant support chains, and training suites aligned with US doctrine and personnel needs. This virtually guarantees significant disconnects or outright misalignment between the product as furnished, and the buying country's capability to induct it into service, operate it, and sustain it in a sovereign manner.

While the F35 may exemplify this challenge (and is a feature not a bug, at least from the manufacturer's standpoint) there is an argument to be made that almost any highly-complex foreign-origin weapon system will face similar challenges. When Canada elects to buy a platform via FMS or sole-source, and attempts to bundle the entire capability (including training and sustainment) as a turnkey offering from the manufacturer, it accrues sovereignty risk, misses the opportunity to build industrial resilience within the wider domestic ecosystem, and will likely incur unpredictable downstream costs to adapt the purchase to Canadian needs or infra-

structure realities. There is no "easy button" when it comes to complex weapon system purchasing – Canada needs to have the freedom and procurement mechanisms required to select the best platforms from the global marketplace, and should do so when required. But it cannot allow factors like process inflexibility or workforce limitations to dictate procurement strategies that sacrifice long-term industrial and operational viability for the short-term "gain" of a program announcement.

To address this challenge, Canada is actively exploring whether and to what extent it can realize "FMS-like" advantages of speed to procurement and risk reduction by running traditional procurement processes along a more commercially-mediated path. While enhanced national sovereign benefits are to be expected from such an approach, this doesn't necessarily imply a dogmatic "Canada-first" ruleset. For example, L3Harris was the inaugural SP chosen, not for its delicate maple flavour, but on the strength of its longstanding and highly credible Canadian CF-18 mission support capabilities and excellent domestic supply chain relationships, and its ability to extend that role into CF-35 sustainment. While CAE was second past the post as Canada's SP for the Future Fighter Lead-In Training (FFLIT) system, the Government seems likely to entertain similar arrangements with other foreign and domestic firms alike - and is well-advised to do so. Particularly for programs delivering platforms or capabilities that reside outside of the existing Key Industrial Capability (KIC) categories,[16] or in domains where domestic firms can't meet SP selection criteria, Canada would logically wish to apply the SP model to non-Canadian selectees to avoid risk or better meet operational, cost, or schedule requirements. The goal (as always) should very much be focused on maximizing net strategic benefits to Canada – balancing operational, economic, and industrial outcomes by demanding industry-leading competence and demonstrated technical and programmatic performance, but also a compelling domestic footprint and supply chains.

This is where industry and company behaviors and culture will assume a new level of importance. In particular, companies cannot and should not expect to execute SP procurements as though they were conventional sole-source programs. For example, to enhance industrial resilience or spread benefits more widely, Canada might reasonably require SPs to cede workshare that the strategic partner firm might normally expect to perform itself. Similarly, as a condition of SP selection, the Government may require additional levels of commercial transparency around rates and profits, or impose more rigorous IP sharing or ITB expectations. Finally, SPs will need to examine traditional corporate approvals and gating processes as well as traditional sets of terms and conditions to eliminate practices build up over decades of essentially adversarial procurement conflict – and acknowledge that in the current situation (perhaps even as a condition of privileged access to Canada's defence market via the SP construct) a degree of commercial forbearance may be required for the common good. While we may not yet be at the juncture where transition to a full "wartime economy" is needed,[17] this doesn't absolve the defence industrial base from looking at its practices in a more global context, and perhaps even considering which lessons from the past might profitably inform preparations for the future.[18]

At the same time, as other industry leaders have commented,[19] this doesn't place the onus exclusively on companies to think and behave differently: CAF materiel and Departmental purchasing authorities alike have a significant part to play as they work through the process of establishing baseline strategic partnering tactics, techniques, and procedures. This hits directly at the idea that it is as important to stop certain behaviors as it is to embrace new ones: chief among them being the demonstrably self-defeating tendency for government and military procurement authorities alike to delude themselves into thinking they understand what impels and constrains business in its decisions. There is not a senior defence executive working in Canada today who has not ground their teeth at being told they need to "proceed at risk" or "put some water in their wine" when it comes

to costs and profit. These and other exhortations - "you have plenty of room in your markup to add scope" "you should be able to eat some cost up front" - are not the product of malice, but they are the vapid musings of unmarried marriage counselors nonetheless. Early SP efforts may help to shift these behaviors, but creating a framework for Government / industry relations where participants can no longer talk past each other but instead are forced to communicate will be crucial, to the point that it probably deserves specific treatment in the upcoming Defence Industrial Strategy (DIS).

Even here, there are encouraging indications of change. Quietly and without fanfare, a small group spun off from the Defence Industrial Advisory Group (DIAG) has been beavering away on laying the basic foundations for new continuous capability sustainment (CCS) practices. While CCS has occasionally been oversold (unjustifiably, and not by its working group participants) as a bit of a panacea for obsolescence management of complex systems, the contracting and through-life sustainment issues being debated are substantive, and the focus on rapid transition from real-world pilot to broad implementation again signals a notable willingness to do and try things, rather than simply talking about them. This has not been a process of superficial "consultation" with industry, at arms length through online surveys and carefully curated blather. Rather, it is an approach that with significant effort has assembled a small "coalition of the willing," done the difficult and time-consuming work to level-set participants, and then challenged the group with a series of increasingly complex problems in an effort to arrive at specific, implementable actions.

Admittedly, the task isn't done. There are questions as to whether the sample C-130 avionics problem set used to drive the analysis really gets at the hardest elements of complex weapon system sustainment. In addition, the policy itself has yet to be drafted in a way that will support and encourage wider implementation, and it remains unclear how CCS should dovetail with wider policy imperatives around competitive sourcing, sovereign resilience, or ITBs, among others. But the vector is manifestly positive: even when fueled by bad coffee, companies (even competing ones) can set aside their biases and focus on proposing solutions that benefit Canada first, but will also generate predictability and fair returns. Government can agree that profit-motivated behaviors aren't always suspect or inherently malign. And military procurement authorities can agree that over-prioritizing or maximizing near-term operational capability at the expense of longer-term outcomes may not always be either wise or necessary. Most encouragingly, this effort has explicitly rejected what might easily have been an ambiguous, policy-centric outcome and instead opted for substance over symbolism. No matter that it remains undercooked, CCS **will be implemented** and iterated forward – a bias to action that fits well with the tenor of the times.

While it is still too early to celebrate, similarly positive signs can be seen in the nascent DIS effort. After a rather protracted period of lurching about - including several rounds of quite superficial and unsatisfying "formal" industry engagement counterbalanced by quite a lot of equally good and deep informal discussion between a broad range of industry, DND, and PSPC participants (largely on the margins of various academic and panel sessions) – the Government is signaling its intent to coalesce input and put at least an initial draft on the street, if not into action. Assuming a decently ambitious and forward-looking document is released, this could be a pivotal indicator of how Canada intends to move industry partnerships forward in its defence spending plans, and should provide clearer sightlines on a significant portion of the previously-mentioned $4B.

After all, there is only so much that can be achieved with a combination of directed buys, novel partnering approaches, and more robust sustainment and obsolescence management. These are critical waypoints on a journey towards accelerated CAF modernization, enhanced operational capability, and improved defence procurement. But they are not a plan of travel, nor do

they describe a compelling destination for industry, Government, or Canada. Even the DIS, assuming somewhat optimistically that it gets about "right" most of what is needed in terms of creating a more performant and resilient defence industrial base, will not be able to encompass or structure the myriad of plans needed to align and gain efficiencies of execution across dozens of impending major acquisition programs. Without such plans, how does Government ensure that in the race to spend it derives real value for money, that it balances meaningful operational enhancements with smart strategic investments in the right sectors, and that even with the best intentions we avoid either inadvertently confusing mere political activity with economic and operational progress?

To return to the opening theme of this paper, we need to collectively start by taking a breath, and reminding ourselves that Canada is very much still in the game. For the first time in a long time, there are new faces at the table, new voices to be heard, and new interest in listening and communicating rather than merely talking. As this paper has attempted to identify with specific examples, there is also a very encouraging bias to action emerging that feels fresh and invigorating. Time is a challenge, of course, but it can also be an advantage, in that we know we don't have the luxury of aiming for perfection in our efforts. It also means that across the spectrum of defence procurement professionals, we need to be judicious about what we toss overboard, and really look to improve or augment elements of our current policies and processes where we can – where warranted decanting old wine into new bottles - while also being ruthless in calling out and culling counter-productive behaviors. The fact that we are seeing novel approaches emerging organically, in muscle movements large and small alike, merits celebration - as should our ability to "unlearn" things that might have seemed important in the past.

I would close by noting that we all need to keep alert to the reality that as much as sound incremental reforms are beneficial, there is still some ways to go to make sure there are the right plans in place to keep these reforms moving Canada in the desired direction, and that we continue to refine the idea of what our ultimate strategic destination should be as a country. It has been a long time since Canada has had such a debate, but it won't be the first time that issues of sovereignty, defence, and economic resilience loom large in the discussion. Two years ago, it didn't seem like such a debate would be possible, or that it could yield meaningful change. Today, I would offer that the lesson CANSEC 2025 reinforced was that we are ready, certainly as an industry, but also as defence professionals in and out of uniform, in Government, and as Canadians. Drop the puck.

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Military Spending Limits Cause Higher Economic Costs and Reduce Military Readiness: A Thesis

Professor Jörg Schimmelpfennig, Ruhr University Bochum

Introduction

Before discussing the impact of military spending limits on economic costs and military capabilities, it is imperative to understand the specific nature of the industry that enables the research into and the development, production, and maintenance of military weapons systems and/or their components and parts to meet military requirements. The so-called "Defence Industrial Base", or DIB, is unlike any other industry, even if some industries might look similar to each other such as, e.g., the one for military aircraft and the one for civilian aircraft. The peculiarities of the DIB will be explained in the following section before effects of military spending limits can be properly addressed in the third section. A summary, and a subsequent plea to disentangle military expenditure from restrictions imposed on any other government spending, concludes the paper.

The Defence Industrial Base

Military procurement and competitiveness, let alone anything close to perfect competitiveness, is, by and large, an oxymoron. The reasons are threefold. First, even if there existed a number of arms manufacturers abroad to hypothetically make the market look like a competitive one, no such global market would materialize, at least not for megaprojects such as tanks, ships or aircraft. If purchased from another nation's manufacturer, supply of spare parts or replacements could not be guaranteed in times of crisis should that nation, while being a military and political ally at the time of purchase, become a future adversary. Further, foreign manufacturers may be reluctant and/or be banned by their respective governments to sell technologies to other nations' armies because of their sensitive nature. Either way, planning and/or buying domestically would quite often be the only option.

Second, due to their high development cost, i.e. fixed cost, relative to their procurement cost large-scale military projects are natural monopolies. One of the most extreme examples from the field of mature aircraft programs is the F-22: its final development cost was $32,650.3 billion[1] and almost equalled its procurement cost of $32,884.9 billion. It would be unwise to have more than one manufacturer: fixed costs (including development costs) would multiply while variable costs would remain unchanged at best or, more likely, rise because with unit numbers produced by one manufacturer going down, the labour cost per unit would go up because economies of learning would be less effective.[2]

Third, as, e.g., the next fighter plane design will only surface after another 20 or so years, keeping the winner of the current design fully occupied for the current project's lifetime, competitors that lost out would find it difficult to survive until the next large-scale project shows up, at least during peacetime. To give three examples, the number of U.S. military fixed-wing aircraft prime contractors went down from eight in 1990 to three in 2020, that of tracked combat vehicle prime contractors from three in 1990 to just one in 2020, that of surface ship prime contractors from eight in 1990 to two in 2020.[3] Anyone hoping for something like competitive markets would thus see his or her dreams dissolve quickly.

One might look for second-best solutions though. Two have arisen over the past 100 years, the

first has been multi-stage procurement, or more illustratively four-stage procurement, the second is batching. The idea of the former is to divide procurement into several stages. In the case of four-stage procurement, these are (A) design, (B) building a prototype, (C) manufacturing and (D) maintenance. Tenders would be invited for the first stage, the best bid would win and every contestant would be reimbursed. The process would be repeated for the second stage, the third stage and the fourth stage, and industrial policy-wise the best outcome would of course show four different winners. In particular, if the manufacturing contract and the maintenance contract were won by different bidders, at least their future would be safe for the lifetime of the project. Multi-stage procurement had been practised in Britain during the inter-war years, where some manufacturers, like Supermarine Aviation Works, even built a prototype the Air Ministry hadn't yet asked for let alone offered to pay for. Ironically, their design, the Spitfire, turned out to become the mainstay of the Royal Air Force in World War II.[4] The advantage of multi-stage procurement is sharing the spoils across more than one manufacturer, thereby increasing the chances of keeping more than one competitor alive.

On the other hand, batching is about awarding production batches to different contractors. It is a sine qua non in times of war because of the limited capacities of any one single supplier as was the case in the U.S. during WW2, when, e.g., 30 different shipyards produced three frigate classes.[5] Batching comes at a cost though. Assuming constant elasticities of learning, economies of learning can be modelled as

$$(1) \qquad y = a \cdot X^{-b},\ a > 0,\ 0 \leq b < 1,$$

where y denotes man hours/unit and X cumulative output at a time. a would give the (total) man hours for the first unit of output. b = 0 would indicate no economies of learning, b = 1 can be ruled out because it would imply a perpetuum mobile. Total man hours would be given by $a \cdot X^{(1-b)}$. Empirical studies,[6] looking at, e.g., military aircraft, avionics, helicopters or tanks, suggest to be at least 0.75.[7] Therefore, to illustrate the magnitude of learning effects on labour cost, assume b = 0.75 and total output being split across say four manufacturers with equal batch sizes. Applying (1) shows that labour costs would rise by 183 percent.

Military Spending Limits

If military expenditure limits are to be met by reductions in procurement, either whole programs would have to be scrapped or numbers would have to be cut by ordering less aircraft, tanks or ships than originally planned. Either would damage the viability of the nation's defence industrial base. But even if reductions were expected to be only temporary, partially postponing orders into future fiscal years would amount to no more than damage limitation. Initially, it would imply unlearning, resulting in labour cost increases similar to those generated by batching. To give an example, staying with b = 0.75 and hypothetically assuming that production is split in two halves to be delivered over two points in time rather than just one, (1) shows that total labour costs would increase by 67 percent. However, keeping total production unchanged is highly unlikely because it would require future increases in military expenditure to exceed past reductions due to the unit cost increase. Total numbers would still go down due to the self-inflicted cost increase and a temporary loss of business would become permanent: some arms manufacturers might not survive and whatever kind of competition still existed would be further reduced.

A different approach coming into fashion in Europe in particular is to offer public-private partnerships (PPPs) when it comes to procuring military goods and services. PPPs are well-known from other fields of public services provision, ranging from operating facilities in healthcare to building and maintaining motorways and toll roads and are particularly attractive to state entities facing public expenditure constraints too. As payment would, similar to leasing, be stretched over many periods, the total price has to incorporate the resulting

higher opportunity costs of capital. On the other hand, when it comes to public services benefits could arise too because the private sector, as has been shown by almost countless empirical studies, should be expected to provide public services at a lower cost than the public sector. The reason quite simply is that industry can offer monetary incentives to its employees, unheard of in the public sector, to overcome the principal-agent problem. Further, PPPs would benefit from competition as the numbers of firms able to offer public services should suffice, at least in theory, to yield the best possible, i.e. lowest, price to be paid by the taxpayer.

Things are different when it comes to military procurement though. As with public services, costs would rise because of higher opportunity costs of industry's capital. On the plus side though, there is not only nothing to offset this as the number of available contractors has already come down to less than a handful: the kind of competition seen in other public services will be non-existent, and therefore no such gains are to be expected. Worse though, there are more negative effects, both dollar-and-cent-wise as well as military readiness-wise too.

A common feature of PPPs is that maintenance contracts with the original supplier are included, if only not to violate warranty conditions, i.e. the manufacturer winning a military PPP would be contractually obliged to also provide maintenance facilities and maintenance personnel. The price for maintenance would of course include a sector-specific mark-up. Still, one might argue that, following the classical bureaucracy argument, private firms are always better suited than public firms, in this case the armed forces. Unfortunately though, maintenance contracts are, as, e.g., has been the case with army vehicle maintenance in Germany since 2005, often cost-plus rather than fixed-price, even though, using the words of Ellen Lord, there are hardly "unknown unknowns" in maintenance: during her tenure as Under Secretary of Defense for Acquisition and Sustainment Lord went along the maxim to "typically only do [a cost-plus contract] when you have a development contract where you are looking at technology where there are unknown unknowns … we use fixed price where we believe there are many fewer unknowns".[8] It boils down to the question who can be trusted more when it comes to handling public funds responsibly, industry tempted by an open-ended contract, or soldiers who have committed themselves to put their lives in harm's way, intrinsically motivated by the desire to protect their fellow citizens' lives and freedom. Empirical studies suggest that intrinsic motivation must not only not be underestimated but will prevail because of, and not in spite of, no financial incentives being offered.[9] On the other hand, open-ended contracts would more often than not become a license to print money.

Further, as the personnel provided by the manufacturer obviously consists entirely of that firm's employees, i.e. civilians, they could only be tasked with maintenance in peacetime and could therefore not be a substitute for a Combat Support Group's maintenance specialists, i.e. the latter could not be disbanded and their facilities and equipment would have to be mothballed. It implies that during peacetime there would be two maintenance units, but one of them would be idle. Once a military conflict becomes kinetic, the military maintenance specialists would have to take over from there but private maintenance facilities would still have to be paid for.

Finally, on top of doubling total cost during peacetime – thanks to cost-plus it might even be more than doubled – there is another disadvantage. As maintenance had been outsourced in peacetime, military maintenance units had far less opportunities to train and thus are lacking practise. Because maintaining equipment is not that dissimilar from manufacturing equipment in as much as manufacturing is about assembling while maintaining is about disassembling and reassembling, military units would suffer from de-learning according to (1) too: significantly more man hours per unit to be maintained would be required and the unit would subse-

quently be less ready in battle.

Finally, due to the exclusivity of the maintenance part of PPP contracts, the fourth stage in four-stage procurement – maintenance – would no longer be on the table as a policy instrument trying to offer a larger number of competitors the chance to stay afloat.

Summary

No government budget is unlimited, and neither can military spending be. Still, a reminder is due that military spending in a democracy must never be subjected to the same kind of restrictions and party-political haggling as any other kind of government expenditure. If a democracy cannot be defended, there would be no free society left. Granite Staters would be tempted to add their state's motto: "Live Free or Die!"

This should of course not serve as an excuse for not submitting military spending to the same scrutiny as any other government expenditure as a tendency of bureaucrats to misspend other people's money will not easily go away, even though it may be less distinct because of a higher intrinsic motivation to be expected in the armed forces. Either way, one has to be aware that every spending limit on military procurement, even when playing catch-up in future years, will both lead to higher unit costs and damage the viability of a nation's domestic DIB. Trying to alleviate the economic impact of limits on military procurement by switching to PPPs, as has almost become a fashion trend in Europe, will only replace one evil with three others. Not only will procurement unit costs rise, though for slightly different reasons. As peacetime maintenance will transfer from the armed forces to the manufacturer as part of any PPP arrangement while military maintenance facilities and equipment would still have to be kept for wartime use and neither could Combat Support Groups be cut back, respective costs would effectively be doubled. Four-stage procurement as a policy tool to prevent the domestic DIB from any further shrinking would become unavailable. Military readiness with regard to maintenance would deteriorate because maintenance specialists would be devoid of proper training opportunities in peacetime.

In times of a fiscal squeeze the armed forces have more often than not served as an easy political target in Western countries. Anyone inconsiderately calling to limit military spending and/or toying with alternative ideas of military procurement should understand though that not only will economic costs on, pun intended, several fronts rise, but worse, that the very purpose of military spending will be harmed.

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A Roadmap to Strengthening the European Defence Industry

Michel Rademaker and Ron Stoop

The defence industry is a critical sector that plays a vital role in national security, technological advancement, and economic stability. This paper discusses the challenges faced by the (European) defence industry. To strengthen the defence industry, tactical and strategic innovation should be pursued, procurement procedures should be streamlined, collaboration within and between countries should be improved, civilian technologies should be leveraged and raw materials supply chains should be secured.

Introduction

A robust defence industry has become strategically vital again, in an era of increased geopolitical competition for which deterrence and strategic autonomy is more important than ever. Around the world, defence budgets are increasing, with large sums spent on personnel, equipment and research and development.[1] The European defence industry is currently undergoing a significant transformation, partly driven by Russia's invasion of Ukraine, partly by the changing cross-Atlantic relations. Next to the 3.5% and 1.5% spending pledge agreed upon by all NATO allies during the 2025 NATO Summit in The Hague, there have been efforts within the European Union Member States of NATO to consolidate capabilities, enhance interoperability, and reduce reliance on non-European suppliers.[2][3] The Readiness 2030 strategy of the European Commission outlines the EU's plan to boost defence readiness and industrial capacity by 2030 through increased funding up to €800 billion, joint procurement, and improved military readiness.[4] Given the high stakes involved with ensuring national security, understanding the challenges modern defence industries (including the ones in Europe) face becomes increasingly important. Although each national defence industry has slightly differing characteristics, there are common themes that apply to most defence industries.

Tactical and strategic innovation

To ensure a robust and adaptable defence industry, governments must maintain a delicate balance between on the one hand maintaining existing defence capabilities and on the other hand nurturing tactical and strategic innovation cycles. Innovation in the defence sector must occur at different levels, from tactical, to keep up with developments on the battlefield, to strategic, to ensure filling capability gaps for the future.

Tactical innovation often involves rapid adaptation and improvisation, as seen in Ukraine, where drones have been used extensively to change the dynamics of the battlefield. The integration of unmanned aerial vehicles (UAVs) has enabled forces to gather intelligence, conduct surveillance, and engage targets with unprecedented efficiency.[5] The Ukrainian military's ability to adapt quickly to changing circumstances—often within days—demonstrates a high degree of tactical innovation. Such innovations are cost-effective and can be implemented rapidly, making them highly effective in fast-paced conflict environments. In warfighting in Ukraine, resource scarcity has prompted military leaders to develop cost-effective solutions that leverage civilian technologies for dual-use applications. To take an example: Ukraine mitigates its disadvantage in conventional airpower and traditional artillery by developing a so-called "drone line" that uses First Person View (FPVs) drones and UAVs that saturate the battlespace

with intelligence, surveillance, reconnaissance and strike capabilities.[6] This innovation has so far proven effective in offsetting Russian numerical superiority, particularly in contested zones. According to analysis by the Royal United Services Institute (RUSI), drones now account for approximately two-thirds of Russian battlefield casualties.[7] This creative approach has led to novel tactics that enhance operational effectiveness while, e.g. for Ukraine, minimizing costs. For example, AI is now used to predict enemy attacks based on algorithms that analyse movement data.[8]

On the other hand, strategic innovation involves long-term investments in complex, high-technology systems that require significant research and development. This type of innovation is essential for maintaining military dominance but requires substantial financial resources and collaboration between governments, academia, and industry. While tactical innovations can be implemented swiftly, strategic innovations typically follow a longer cycle due to their complexity and resource requirements. An example of this is the Future Combat Air System[9] (FCAS) programme in Europe, which has a multi-decade strategic focus. These types of innovation cycles require consistency, political alignment and adequate funding, and can therefore be more challenging to maintain. An example of such an innovation cycle failing was the pan-European (France, Germany, Spain) development of the Tiger Attack Helicopter, which was plagued by diverging national models, constantly changing requirements, delayed upgrades and operational issues.[10] Other challenges remain, such as political alignment on advanced weapons systems like the European Sky Shield Initiative (ESSI). Political alignment is and most probably will stay relevant in defence innovation. Despite the development of the European FCAS programme, Italy has committed itself to another air combat platform in cooperation with Japan and the UK (GCAP), which could result in doubling of R&D efforts and higher overhead costs.[11]

Governments must find an approach that can accommodate both short- and long-term innovation cycles. For tactical innovations, modular design principles and spiral development processes should be utilised to harmonise continuity and innovation.[12] For strategic innovation, political and financial commitment as well as trust-building among NATO allies is key.

Streamlining procurement

Defence procurement is a unique and complex process, often characterized by long-term contracts and rigid specifications. These contracts can hinder innovation by limiting the flexibility to adapt to new technologies or changing operational needs. The traditional procurement model is risk averse and parsimonious in nature. It focuses on detailed specifications and proven technologies, which can discourage risk-taking and the adoption of new, untested solutions. The UK's Watchkeeper WK450 drone program is an example of this rigid, risk-averse and overspecified procurement approach which resulted in a UAV system that entered service years later than planned and was shelved only six years later due to operational limitations.[13]

The regulatory landscape surrounding defence procurement further complicates matters. Military goods are subject to stringent regulations regarding their production and distribution, which can inhibit market entry for new players and innovations. Additionally, these regulations often create barriers that prevent timely responses to changing market conditions or technological advancements like strictness on emissions, aviation, and environmental regulations, working and rest time rules, plus rigorous enforcement of accounting and privacy laws.

To foster an environment conducive to innovation, there is a pressing need for more flexible procurement frameworks and practices that prioritize performance outcomes rather than strict adherence to processes and specifications. By allowing for iterative testing and modification during development cycles, defence organizations can better respond to emerging

technologies and operational needs.

Increased collaboration

International cooperation among NATO member states is essential for improving collective defence capabilities and fostering innovation across borders. Collaborative initiatives can lead to standardization of equipment and interoperability among allied forces—key factors for effective joint operations.

By working together on joint projects and sharing best practices, nations can leverage their combined resources to develop cutting-edge technologies while reducing costs through economies of scale. Furthermore, international cooperation fosters trust among allies and strengthens collective security arrangements.

While international collaboration presents numerous advantages, it is crucial to balance national interests with collective goals when distributing contracts among participating countries. Tensions have arisen in the Franco-German-Spanish FCAS project after France reportedly demanded 80% of the workshare for the FCAS program, leading to frustration in Berlin and likely causing further delays.[14] Ensuring equitable access to contracts prevents dependency on a few dominant suppliers while promoting healthy competition within the defence sector.

This balanced approach not only strengthens national capabilities but also reinforces alliances by ensuring that all parties contribute meaningfully to shared objectives. By fostering a collaborative environment where knowledge sharing is encouraged, NATO member states can enhance their overall defence posture.

Moreover, fostering collaboration between governments, industries, and research institutions can facilitate innovation within domestic supply chains. Establishing partnerships focused on research and development will enable countries to remain competitive in an increasingly globalized market while enhancing their strategic capabilities.

Leveraging civilian technologies

Civilian technologies have emerged as valuable assets in enhancing military capabilities through dual-use applications. By integrating civilian innovations into military operations, defence organizations can achieve cost-effective solutions while accelerating the pace of technological advancement.

The integration of civilian technologies into military operations is a key aspect of defence innovation. By leveraging advancements in fields like artificial intelligence (AI), data analytics, and communication technologies developed for civilian applications, defence forces can achieve cost-effective solutions (FPV drones and Starlink satellite equipment) while accelerating technological advancement.

To maximize the benefits of dual-use technologies, it is essential to encourage participation from non-traditional players in the defence sector. Engaging startups and technology firms like Helsing GmbH that are into AI and munition production, with expertise outside traditional defence paradigms can introduce fresh perspectives and innovative solutions that may not be readily available within established defence contractors. In the Netherlands, two initially civilian tech companies (Robin Radar Systems and Lobster Robotics) have proven to be able to deliver state-of-the-art solutions for defence purposes.[15]

By creating an inclusive ecosystem where civilian entities are integrated into the innovation process early on—during concept development phases—defence organizations can harness diverse ideas that drive creativity and adaptability in military operations. Moreover, simplifying licensing procedures for dual-use technologies could encourage greater participation from civilian industries in defence-related projects.

Strategic autonomy and Critical Raw Materials
Strategic autonomy is vital for ensuring that nations can independently develop and maintain their defence capabilities without excessive reliance on external suppliers.

This autonomy is particularly relevant for European nations within NATO as they seek to bolster their military readiness amid rising geopolitical tensions.

The reliance on foreign sources for e.g. critical materials poses significant risks to supply chain resilience. For example, Europe remains heavily dependent on imports from countries like China for essential metals used in advanced weaponry. This dependency not only jeopardizes supply security but also undermines strategic autonomy by making European nations vulnerable to external pressures.

To enhance strategic autonomy, it is imperative for European nations to invest in domestic mining and refining capacities for critical materials.[16] By developing local sources for essential metals and components used in defence systems, countries can reduce their dependence on foreign suppliers while simultaneously boosting their industrial base.

Conclusion

The challenges facing the defence industry require comprehensive reforms aimed at fostering innovation while enhancing strategic autonomy. As nations navigate an increasingly complex security landscape characterized by rapid technological advancements and evolving threats, adopting flexible procurement practices becomes imperative.

To remain competitive on both tactical and strategic fronts, it is advised to:

1. Balance existing capabilities with innovation: investing in buildup of current capabilities alongside short-term tactical innovation and long-term strategic innovation ensures combat readiness while future proofing the defence industry.
2. Embrace flexible procurement models: Transitioning towards more adaptable contract structures will enable quicker responses to emerging technologies while encouraging risk-taking among industry players.
3. Promote international collaboration: Fostering partnerships among NATO member states will improve interoperability while facilitating knowledge sharing—key components for effective collective defence.
4. Leverage civilian innovations: Integrating dual-use technologies from civilian sectors will accelerate technological advancement within military operations while introducing fresh ideas into traditional paradigms.
5. Invest in domestic mining, refining and manufacturing capabilities: Strengthening local supply chains through investments in mining and refining capacities will enhance strategic autonomy while reducing reliance on external suppliers.

By implementing these strategies, European and other NATO Member States can strengthen their defence industry, enhance their military capabilities, and contribute effectively to international security efforts.

In conclusion, the defence industry faces significant challenges in terms of innovation, procurement, and strategic autonomy. However, by adopting flexible procurement models, investing in domestic capabilities, promoting international cooperation, leveraging civilian technologies, and encouraging non-traditional participation, nations can enhance their military readiness and safeguard their national interests in an increasingly complex world.

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Building Faster: Institutional Pathways for Agile Defense Acquisition in Japan

Rena Sasaki

Introduction

In recent years, the international security environment has deteriorated significantly. At the same time, rapid advances in emerging technologies, including artificial intelligence, unmanned systems, quantum science, and hypersonic weapons, have the potential to fundamentally reshape the character of warfare. In this context, the ability to procure defense equipment rapidly and flexibly, and to deploy it effectively, has become a shared strategic challenge for many nations. Procurement agility itself has emerged as a critical source of strategic advantage.[1]

In response to this situation, many countries have pursued reforms of their peacetime procurement systems, sought to leverage commercial technologies, and accelerated the introduction of equipment designed for rapid deployment. However, in addition to these global challenges, Japan faces unique structural constraints rooted in its defense industry base.[2] Japan's defense industrial base has limited access to international markets and has been overly dependent on the Ministry of Defense (MoD) as its sole buyer, resulting in an inability to achieve economies of scale. Furthermore, anti-militaristic norms rooted in Article 9 of the Constitution and demographic challenges such as rapid aging are further constraining industrial capabilities. Moreover, Japan's fiscal-year-based and sequential procurement processes have proven ill-suited to meet the demands of modern, high-speed warfare. In recent years, Japan has experimented with institutional reforms, simplified procurement procedures, the establishment of new organizations, and the introduction of new design philosophies. Yet these efforts have not been systematically organized, and the effectiveness, limitations, and interrelationships of each approach have not been fully analyzed.

To fill this gap, this paper introduces an original analytical framework that categorizes Japan's acquisition reforms into three core pillars. The first is the reform of contract systems and procurement processes, focusing on how to shorten and front-load conventional procedures. The second is innovation in development and design philosophy, including phased and flexible acquisition through block and modular approaches. The third is the promotion of technological innovation through discontinuous reform, using mechanisms such as short-term demonstration programs and newly established institutions.

The paper also analyzes the gap between fast production and sustained deployment. Early delivery does not guarantee mass production or unit deployment, and advanced prototypes may lack utility if production maturity is low. This highlights a key challenge: speed alone does not ensure military effectiveness. Japan has made progress through reform and rising awareness of the need for agility, but a more integrated strategy—focused on deployment, scale, and sustainment—is essential.

Japan's Institutional and Organizational Initiatives: Three Pillars

1. Reform of Contract Systems and Procurement Processes

To accelerate equipment delivery, Japan has introduced several reforms aimed at streamlining contract-

ing and procurement processes. These efforts focus on reducing procedural bottlenecks, advancing contracting timelines, and increasing flexibility during the acquisition lifecycle. Two major initiatives in this area are the Special Contract Clauses for Rapid Acquisition and the practice of Quarterly Advanced Contracting.

Special Contract Clauses for Rapid Acquisition (2023)

The Special Contract Clauses for Rapid Acquisition represent a new contracting framework established by the Japan's MoD to expedite the deployment of cutting-edge technologies.[3] Traditionally, separate contracts were signed for each phase of equipment acquisition, including research prototyping, development, and mass production. Under the new Special Contract Clauses, however, a single contract covers the entire sequence: concept demonstration, modification, operational testing, and acquisition. Specifically, the contractor fulfills its obligations by following the procedures defined in the specifications and by completing a consolidated report covering all phases from concept demonstration to operational validation.

The MoD, as the contracting authority, conducts periodic progress reviews and inspections during execution and works collaboratively with the contractor to resolve any problems that arise, ensuring flexible oversight. By eliminating the need for multiple separate contracts, the new framework aims to reduce time loss and shorten the timeline to operational deployment. The clauses were finalized in 2023 and are being applied to contracts starting from fiscal year 2025.[4]

Quarterly Advanced Contracting

The Quarterly Advanced Contracting initiative refers to efforts by the MoD to accelerate the execution of procurement and contracting procedures by moving them earlier than the conventional schedule, thereby expediting budget execution.[5] Japan's fiscal year begins in April. Under the conventional system, however, bid preparations would only start after the new fiscal year commenced, delaying contract signings until June or later and thereby shortening the actual execution period. This caused particular problems for orders involving equipment and uniforms, as production work became heavily concentrated in the second half of the fiscal year after October, increasing the burden on small and medium-sized enterprises and creating delivery bottlenecks. To address these issues, the MoD began taking countermeasures around 2014.

Specifically, the MoD and contractors now complete bidding and contract preparations during the fourth quarter of the previous fiscal year, enabling bids and contract signings to occur immediately after the new fiscal year begins in April. These efforts also contributed to easing the burden on contractors, optimizing production line operations, and strengthening the national defense industrial base by leveling procurement schedules. In recent years, as part of the broader effort to fundamentally strengthen Japan's defense capabilities, the MoD has made it an explicit goal to conclude contracts for critical equipment during the first half of the fiscal year by the end of the second quarter.[6]

2. Innovation in Development and Design Philosophy

To accelerate deployment and enhance flexibility, Japan has adopted two key development concepts. Block development enables early delivery by fielding basic capabilities first and upgrading them in stages. Modularization improves scalability and adaptability by designing systems with interchangeable components. Together, these approaches aim to shorten timelines and increase operational agility.

Block-Based Development

"Block-based development" refers to a phased approach in which the development of defense equipment is divided into multiple blocks, with incremental improvements introduced at each stage.[7] This approach was introduced to shorten the development timelines for increasingly advanced and complex defense systems. It involves the initial fielding of a Block 1 model with core functions, followed by the sequential development and

deployment of enhanced variants, Block 2 and beyond. This enables early deployment without waiting for the final configuration, while allowing for capability upgrades in response to technological maturation or shifts in the threat environment.

A notable example is the development of the Hypervelocity Gliding Projectile (HVGP) for island defense. The MoD applied a block-based schedule to HVGP's development, which began in fiscal year 2018. The early deployment version was designated as Block 1, and the upgraded, higher-performance version as Block 2.[8] Block 1 is scheduled to be operational by fiscal year 2025, while Block 2 is planned for deployment by fiscal year 2028. The HVGP is a novel weapon concept that launches from long distances, glides at hypersonic speed, and strikes its target using a warhead guided by GPS and inertial navigation. Although similar systems are under development in several countries, none have been fielded yet, and Japan aims to be among the first to operationalize this capability.

Modularization

"Modularization" refers to a design approach that divides defense systems into functional modules—individual component blocks—that can be standardized and reconfigured.[9] This approach allows systems with similar functional or performance requirements to share modules, improving efficiency across the broader equipment architecture. For example, radar and communication systems—commonly required across multiple platforms—can be modularized so that once a component is developed, it can be reused in other systems, reducing both development time and cost. Moreover, when specific systems become outdated due to environmental or technological changes, they can be upgraded at the module level, making it easier to optimize the entire system.

Modularization also supports parallel development and enhances long-term scalability. Because each module can be developed and tested independently, the overall time required for system integration can be reduced compared to a linear development model. In addition, by standardizing interfaces, modularization promotes component interoperability across different companies and projects, aligning well with open architecture principles. Modular structures are already being applied to current equipment under development, including software and hardware. For instance, future destroyers and fighter aircraft systems are being designed with some modular components to accommodate future upgrades. Japan is also moving toward the adoption of international module standards in joint development projects with the U.S. and the UK.

3. Promotion of Technological Innovation

In addition to reforms in contracting and development models, Japan has sought to harness emerging technologies more effectively through institutional innovation. New programs and organizations have been established to foster rapid experimentation, collaboration with the private sector, and the swift adoption of breakthrough technologies into defense applications.

Short-Term Rapid Technology Demonstration Program

The Short-Term Rapid Technology Demonstration Program is an initiative by the Acquisition, Technology, and Logistics Agency (ATLA) designed to apply advanced technologies—already in use in the civilian sector—to defense applications within a short timeframe.[10] Launched in 2017, the program aims to rapidly incorporate fast-evolving advanced technologies, such as artificial intelligence (AI), into defense equipment development. It seeks to address challenges faced by Self-Defense Forces units by bringing together civilian engineers and military operators to jointly verify the effectiveness of emerging technologies. The goal is to achieve equipment-level operationalization within approximately three years. The program is intended to keep pace with technology fields that are advancing too quickly for conventional research and development methods to follow.

The program proceeds in two phases: "con-

ceptual design" and "demonstration through prototype testing."[11] In the initial stage, the program gathers operational needs from the Self-Defense Forces and collects information on relevant civilian technologies to identify potential solutions. The process then moves to a conceptual design phase, lasting less than a year, during which developers design an equipment concept that incorporates performance requirements and cost targets. This is followed by a short-term demonstration phase using prototype systems. The approach aims to reduce risk while ensuring that MoD requirements are reflected in the final product, enabling the rapid development of effective equipment.

In addition, the program's outcomes are expected to have secondary benefits, such as reducing the cost and maintenance burden of defense products through broader application in the civilian market. Notable examples include five prototype demonstrations conducted between 2018 and 2019 based on conceptual designs developed in fiscal year 2017, and several contracts in fiscal year 2020 covering themes such as AI-based system maintenance technologies.

Defense Innovation Science & Technology Institute (DISTI)

The Defense Innovation Science & Technology Institute (DISTI) was newly established within the ATLA in October 2024. It serves as an organization responsible for surveying and analyzing advanced scientific and technological trends and facilitating the transition of future technologies into defense applications.[12] Unlike traditional organizations, DISTI undertakes more ambitious initiatives aimed at creating defense innovation. To realize this objective, it operates under three defining principles.

First, it seeks to generate transformative defense innovations by setting ambitious goals that break away from conventional trajectories and pursuing research and development without fear of failure, aiming for technological breakthroughs. Second, it actively incorporates external expertise. In order to integrate rapidly evolving scientific and technological advances, DISTI recruits researchers from universities and private industry to maximize outcomes through synergistic collaboration. It follows an open innovation model that absorbs knowledge from disciplines not traditionally associated with the defense sector. Third, it prioritizes speed. By simultaneously exploring multiple technological solutions and concentrating investment on the most promising candidates, DISTI seeks to accelerate the deployment of advanced technologies. It aims to compress the timeline from research to operational use, enabling rapid fielding of new capabilities.

Specific initiatives include the launch of proprietary programs such as "Innovative Breakthrough Research" and "Demonstration-Oriented Breakthrough Research," which focus on creating and validating disruptive technologies for future operational concepts. DISTI also manages the Security Technology Research Promotion Program, which provides funding for basic research at universities and corporations, thus establishing a framework that accelerates defense technology innovation from fundamental science through applied research.[13] In addition, DISTI serves a think tank-like role by analyzing domestic and international trends in advanced science and technology and proposing ways to apply them to defense. Overall, DISTI is expected to function as Japan's equivalent of DARPA and to become a central driver of innovation within ATLA.

However, since only six months have passed since its establishment, it is too early to evaluate its effectiveness. On the ground, concerns have been raised that the reality remains opaque compared to the ambitious goals set forth. Although DISTI's emphasis on "risk-taking without fear of failure" has been positively received, some observers point out that there is insufficient discussion at the mission level regarding what constitutes "success," leaving uncertainty about its ability to generate long-term value.

Institutional Limits and Structural Challenges

As explored in the previous sections, efforts to accelerate defense equipment acquisition in Japan have involved a wide range of initiatives across institutional, design, and technological dimensions. However, many of these efforts have focused primarily on expediting initial deliveries. This section identifies three structural challenges that these initiatives must confront.

1. Structural Bias Toward Initial Delivery

Many of Japan's acquisition initiatives prioritize achieving the first delivery of equipment with elevated Technology Readiness Levels (TRLs). However, institutional mechanisms for scaling up production, securing the quantities needed for operational deployment, and ensuring long-term reliability have not been sufficiently developed. For example, programs such as the Special Contract Clauses for Rapid Acquisition and the Short-Term Rapid Technology Demonstration Program emphasize prototype-level introduction but offer limited incentives or financial frameworks to support mass production and sustained fielding.

This tendency reflects a broader institutional mindset that equates early introduction with acquisition success. As a result, there is an inherent risk that "building quickly" does not directly translate into "building operational capability." Furthermore, initiatives such as early delivery and the use of civilian technologies often proceed without a clearly defined strategic context—specifically, without a clear articulation of how these efforts strengthen actual defense capabilities. This misalignment creates a structural gap between the goal of rapid introduction and the objective of force effectiveness.

2. Neglect of Manufacturing Readiness Levels (MRLs)

The concept of Manufacturing Readiness Levels (MRLs), widely adopted in countries such as the U.S., has not been sufficiently incorporated into Japan's acquisition system design.[14] A system design heavily weighted toward TRLs often fails to adequately assess the maturity of production lines, manufacturing management systems, and supply chains. As a result, there is a frequent gap between technical feasibility and mass production readiness, a situation where systems can be built in prototypes but cannot be produced at scale. This reflects a lack of institutional perspective that distinguishes between achieving a prototype and ensuring operational viability at the production stage.

Moreover, Japan's industrial structure, in which small and medium-sized enterprises (SMEs) play a major role in manufacturing infrastructure, tends to exacerbate the gap between technological success and the establishment of stable mass production capabilities. Consequently, there is a risk that it will take significantly longer than anticipated to field necessary equipment, or that rising costs will force program cancellations or delays.

3. Lack of Lifecycle Design and Industrial Base Sustainment

Another major structural challenge is the insufficient integration of lifecycle-based thinking—from system introduction to retirement—into Japan's procurement systems and development frameworks. In particular, under the single-year budget system, it is difficult to establish medium- to long-term contracts with companies. Although activities tend to be vigorous during the research and development phase, there are frequent cases where continuous upgrades, maintenance, and follow-on development efforts diminish after initial fielding.

The Defense Industrial Base Reinforcement Act, enacted in 2023, institutionalized mechanisms for long-term contracting and stable supply. However, as of fiscal year 2024, actual cases of implementation remain limited, and it will take time for these practices to become fully embedded in contracting operations.[15] There have also been cases in the past where production lines

for armored vehicles and next-generation machine guns could no longer be sustained due to declining demand. As a result, companies withdrew from the defense sector, and skilled workers left for other industries.[16] This situation not only leads to a shortage of available equipment but also creates the risk of permanently losing the ability to manufacture certain systems. As a result, continued withdrawals of companies from the defense sector and the outflow of skilled personnel threaten to turn "rapid initial fielding" into a trade-off with the erosion of the defense industrial base.

A deeper structural constraint is Japan's limited access to international arms markets. For decades, the Three Principles on Arms Exports—lifted in 2014—effectively excluded Japanese firms from global competition, reinforcing their dependence on the MoD as the sole buyer. Although these restrictions have been relaxed, export volumes remain negligible.[17]

Conclusion

Recent institutional reforms, including revisions to contracting terms, innovations in development approaches, and greater flexibility in introducing new technologies, have certainly improved the speed of defense acquisition in Japan. However, speed itself is not the ultimate objective. The essential question is whether these accelerated processes can deliver equipment that functions effectively as military capability in the field.

For example, even if early delivery is achieved, unless the system transitions to mass production and is deployed across operational units, its contribution to overall defense capabilities remains extremely limited. In this sense, speed is merely a means. The true goal must be to establish a system of equipment that can be fielded in sufficient numbers and maintained over time. Rapid acquisition efforts should not merely aim to accelerate procurement timelines but should be rooted in mission engineering—the optimization of force structure based on mission achievement criteria.[18] Yet within the MoD and the Self-Defense Forces, a systematic approach that designs development and operations by working backward from mission requirements has yet to fully take hold. As a result, the linkage between rapid acquisition and force effectiveness remains weak.

Moreover, agility in modern defense acquisition does not simply mean delivering equipment quickly. This must be positioned within a broader framework of strategic mobilization design, which anticipates the full cycle from development to mass production, deployment, and continuous improvement.

In Japan, many initiatives for rapid acquisition still suffer from sectoral fragmentation across institutional reform, technology development, and operational deployment. As a result, even advanced ideas introduced at the policy level often fail to achieve real "connectivity" as force capability. Beyond reforming procedures, cultural transformation is essential—encompassing organizational culture, budget execution frameworks, and the training and development of acquisition personnel.

This need for cultural change resonates with recent lessons from the U.S. Department of Defense. For instance, the U.S. Air Force's Continuous Capability Development and Delivery (C2D2) concept emphasizes the seamless integration of development and acquisition to ensure that initially fielded systems continue to evolve and remain operationally effective over time.[19] Therefore, Japan's approach to rapid acquisition must evolve to reconsider the very meaning of "speed." Future efforts should shift toward a design philosophy that simultaneously achieves institutional continuity, sustainability of equipment, and operational flexibility. Japan's experience may also offer useful insights for countries like Canada, which face similar challenges in reconciling limited industrial capacity, bureaucratic procurement processes, and the need for greater agility in defense acquisition.

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Make Form Follow Function: A Path Towards "Fixing" Defence Procurement

Colonel Charles Davies (Retired)

Context[1]

Depending on who you ask, Canada's defence procurement model is either "broken" or functioning exactly as intended. Critics argue that the current multiplicity of ministerial points of authority over procurement complicates process and obscures accountability. They also see the absence of an effective system-level performance management framework as undermining effective oversight and making it difficult to discipline the execution of transactions or identify and fix the true sources of procurement delays and poor outcomes.

Defenders of the existing system dispute both the critics' characterization of the problem and any need for a radical change, arguing that the government's Defence Procurement Strategy[2] is working and progressively delivering meaningful improvements. They further argue that this measured approach is more effective than a major, likely disruptive, restructuring of the function. Also, they see the interdepartmental collaboration model as a strength, not a weakness, and a way to ensure that each major defence procurement appropriately balances national priorities and has broad consensus support across government.

This debate, however, will not mean much to most Canadians. Fundamentally, they just want their government to manage defence procurement as effectively as possible to ensure that it both delivers required outcomes for the Canadian Armed Forces and obtains appropriate value for taxpayers' dollars. Given the sheer volume and diversity of acquisitions, most people will not necessarily expect perfection every time, but they do expect competent and efficient administration of procurement. So the question becomes: how can government best deliver this?

The Immutables of Defence Procurement

First, it needs to be recognized that there are certain immutable factors that can complicate defence procurement no matter how the function is managed. While many acquisitions go relatively smoothly with little fanfare or controversy, others will inevitably generate public interest and debate, and these tend to be large, expensive and complex programs that are inherently difficult to plan and implement for a number of reasons:

- The imperative for procurements to be seamlessly connected with equipment life-cycle management, the force generation of integrated military capabilities, and/or the conduct of operations;
- The diversity of defence needs and operational circumstances;
- The unique risk profiles of many defence procurements;
- The technological complexity of many systems; and
- The limited marketplace for major advanced defence systems, meaning that true competition among suppliers is often difficult to find and expensive for governments to try to create.

No matter what machinery the government adopts for executing the function, these factors will inevitably pose challenges for those doing the work and making decisions. They also make major defence procurements inherently controversial.

International Best Practices

Canada is not alone in facing these challenges. In recent decades, a number of Western nations have undergone systemic reform of how they do defence procurement, and their experience is worth an examination in considering a way forward for this country. The most prominent common feature of most of these international examples is that the reforms have typically been guided by a more strategic perspective of the procurement function. Rather than looking at it as almost a standalone process, they have adopted business models that integrate procurement into an end-to-end full life-cycle management framework for defence equipment and the support of military capabilities. This holistic construct is based on internationally recognized best practices codified in the NATO Policy for Systems Life Cycle Management and its associated implementation guides, and ISO Standard 15288 System and Software Engineering – System Life Cycle Processes, upon which the NATO policy is built.[3] Figure 1 below provides a high-level view of the

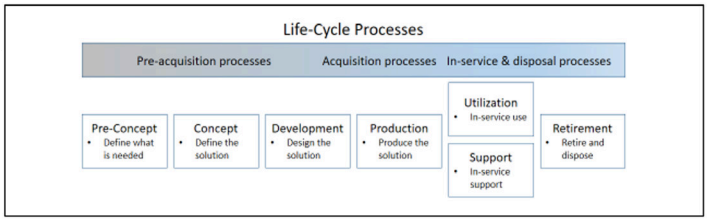

Figure 1

To be sure, the NATO policy is not prescriptive in terms of the organizational structures nations should adopt in managing life-cycles, but both the Alliance itself and many nations have applied a "form follows function" approach that closely aligns organizational structure to process by creating integrated, end-to-end acquisition and operational support entities. We see this, for example, in the NATO Support and Procurement Agency,[4] the UK Defence Equipment & Support organization[5] and Australia's Capability Acquisition and Sustainment Group.[6] All of these, and others, integrate the procurement function into their organizations. While they do recognize and cater for the fact that different skill sets and processes are needed for different activities in the various phases of a life-cycle, at the strategic level there is unified management of the totality of process from end-to-end.

In no case has this approach, by itself, guaranteed consistently successful program delivery because, as we have seen, it is inherently a tough business. However, neither has it short-circuited any government's ability to apply political filters to decisions, or achieve wider national objectives like ensuring effective governance of procurement and obtaining wider economic benefits from defence spending. Most nations with these kinds of unified organizations do all these things.

What this model does is save time (and time is money in defence procurement) and enable better and more timely decision-making by government. It does so in three ways:

- Improving quality and consistency in the analysis of issues by bringing work previously dispersed across different organizations into one rationalized structure and making that work part of its core business;
- Where the various wider government policy objectives come into conflict (not uncommon in most democracies) by establishing a unified management framework within which balanced but timely decisions can be made, the reasons documented and decision-makers held accountable. It similarly improves the agility with which systemic improvements and innovative processes can be tested, decided upon and implemented; and
- Enabling the establishment of an effective system-level performance management framework to support continuous improvement.

In fact, an example of this kind of unified framework already exists in the Government of Canada. Shared Services Canada has such a business model for end-to-end management of government information

and communications systems life-cycles, including the procurement function.[7]

How Difficult Would it be to Adopt a Unified Model?

It has been argued that a major change to Canada's existing defence procurement business model would be too disruptive, but is this true? Again, international experiences may offer useful insights.

Both the UK and Australian organizations mentioned above went through lengthy and difficult metamorphoses from their initial more diversified structures into unified entities, and took years to complete transitions into what they are today. In both cases the road was bumpy. However, in large measure the difficulties they faced resulted from factors that do not apply to the Canadian context. For example, both nations needed to strengthen unified management among their multiple military services and central ministries of defence. Both were also merging formerly separate acquisition and in-service management organizations, each of which had its own culture.[8]

Canada, on the other hand, unified command of its armed forces and integrated management of the civilian-military defence institution starting in the late 1960s. Also, DND's Materiel Group merged its equipment acquisition and in-service business areas in the 1990s, adopting an integrated Equipment Program Management structure based on NATO's life-cycle management policy.[9]

The challenges faced by Canada are therefore different, and in many ways much easier to deal with. The main issues to overcome relate to the fact that, by statute, defence procurement is not a National Defence activity but rather a Government of Canada function involving at least four ministers. Their respective roles are specifically defined in legislation, in particular:

- Section 10 of the Defence Production Act, which gives the Minister of Public Services and Procurement exclusive authority to buy or otherwise acquire defence materiel. Section 12 of the same Act also gives the Minister responsibility for managing Canada's defence industrial policies and capabilities;
- Section 36 of the National Defence Act, which gives the Minister of National Defence exclusive authority to determine defence equipment requirements; and Section 4 of the same Act which gives the Minister responsibility for the management of defence resources, programs and operations;
- Section 4 of the Department of Industry Act, which gives the Minister of Innovation, Science and Economic Development responsibility in areas such as industry, technology, science, intellectual property and small business, all of which can have direct and indirect connections to defence procurement, and
- Section 7 of the Financial Administration Act, which gives the Treasury Board wide powers to define government administrative policies, set limits on ministers' authorities, and oversee departmental programs and plans.

Other ministers may also have a say in specific procurements, for example the Minister of Public Safety in the case of domestic search and rescue capabilities.[10] This complex business architecture, with its multiple ministerial accountabilities, is unique to Canada. Treasury Board has attempted to establish some structure for it by issuing a suite of policies aimed at clarifying the roles of the respective players and guiding how all government procurements are to be planned and executed.[11] However, beyond this the government has not established any formal mechanisms for the end-to-end control of its procurement machinery – the regulating of its overall throughput and the management of system performance. What integrated system management can be said to exist is a largely organic, informal framework of bilateral and multilateral relationships among individuals at many levels.

Implementing a Unified Model

With at least four major Acts of Parliament defining Canada's current defence procurement business model, it may seem that any substantive change to it is well-nigh impossible. However, in reality the problem is not that difficult. An integrated defence capability acquisition and support organization that includes the procurement function can be created without immediate legislative change if the government wants to do so. Further, all of the organizational elements required for it already exist in forms that would facilitate the process quite well.

To begin with, as noted earlier, the backbone architecture for end-to-end life-cycle management (less contracting for procurement) is already in place within DND's Materiel Group. Also, Public Services and Procurement Canada segregated its defence and marine procurement activities from its general government procurement business and into a separate branch a number of years ago. Bringing the Materiel Group and Defence and Marine Branch together under unified management would require some administrative effort, but pose no insurmountable challenges. An Order-in-Council under the Public Service Rearrangement and Transfer of Duties Act can be used to reassign the powers of the Defence Production Act from the current minister to either the Minister of National Defence or, given the scope and complexity of responsibilities, perhaps a new minister within the defence portfolio – for example an Associate Minister of National Defence for Capability Acquisitions and Support. The Act itself can be amended later. An important caveat: it is critical that these responsibilities not be assigned to a minister outside the defence portfolio. Military personnel and equipment are inseparable components of defence capability, and fragmenting management of these would create a substantially more dysfunctional business model than the status quo and have a seriously disruptive impact on Canadian Armed Forces capabilities and operations.

With respect to industrial policy objectives, the Defence Production Act already includes comprehensive (if little-used in recent years) authorities related to defence industries, so much of the current involvement of Innovation, Science and Economic Development Canada in defence procurement can be handed over to the new minister as a simple administrative action. There would need to be clarity on how defence procurement will continue to support the achievement of relevant wider national industrial, technology and other objectives – in particular those of the Industrial and Technological Benefits Policy[12] assuming the government wants to continue applying it to most defence acquisitions – but achieving this should not be difficult. If anything, the realignment would enable the resurrection of a long-dormant government focus on meeting the defence industrial objectives set out by Parliament in Section 12 of the Act.[13]

Finally, no change would be needed in the role or responsibilities of Treasury Board, although it has been persuasively argued that in order to more effectively and efficiently exercise its management and oversight function Treasury Board Secretariat should upgrade the skills and expertise of its defence program analysts and related policy-makers.[14]

Creation of a unified defence acquisition and support organization would most easily be done in two phases. Phase one would be an initial as-is grouping together of DND's Materiel Group and the Defence and Marine Branch of Public Services and Procurement Canada under the designated minister, with their existing business practices. Some work would be needed to decouple the latter organization from its current corporate policy, oversight and support services and connect it to the new organization. Concurrently, relevant defence industrial responsibilities would be transferred from Industry, Science and Economic Development Canada to the new entity.

Phase two would take much longer and involve work to design and implement the future organizational

and governance structure, progressively adjust and optimize its business processes, integrate its enterprise IT systems and build an effective performance management capacity. Doing all this while at the same time delivering an expanding, complex and demanding defence acquisition and support program would be challenging, but there is no need to pursue an aggressive schedule for it and, provided the organization is properly resourced through the transformation period, the challenge can certainly be met. DND's Materiel Group successfully went through an arguably more difficult metamorphosis under tight time and resource constraints in the 1990s, while also supporting intensive military operations in the former Yugoslavia, Afghanistan and elsewhere.

Conclusion

The Government of Canada owes its citizens and taxpayers reasonable consistency, competence and efficiency in its management of defence procurement. It also has to deliver results in the form of adequate defence capabilities for the nation. All of this demands an effective business model designed to meet these requirements, and there are many clear indications that – despite the recurring efforts of successive administrations to make it work – the existing one is not entirely fit for purpose.[15] At some point it has to be recognized that continuing to invest in a failing enterprise is futile, and it is time to consider a different path.

The Carney government has evidently come to the same conclusion and there are a number of alternative business models it could potentially develop or adapt. It has, for example, talked about the concept of a "Defence Procurement Canada" organization that, as described by its proponents, does only that.[16] The problem with this model is that it would simply perpetuate, in a new form, the current fragmented execution of key activities in the end-to-end management and support of defence capability life-cycles. Consequently, it would not materially improve the nation's ability to optimize the military value it can obtain from defence spending.

So why attempt to re-invent the wheel? There is an established, proven model that works very well in other Westminster democracies and beyond, and it can be relatively easily implemented here. Furthermore, all the required constituent elements are already in place. A unified, integrated organization responsible for managing defence equipment, supplies and supporting services through all phases of military capability life-cycles – including the procurement function – is by far the lowest risk and best solution for Canada, just as it has proven to be for so many other nations.

Colonel Charles Davies *(Retired) served for four years as the strategic planning director for DND's Materiel Group and three years as the senior director responsible for defence materiel acquisition and support policies, business practices and standards. He also a former chair of NATO's Life Cycle Management Group. Since retiring from DND in 2013 he has been researching and writing about defence issues, including defence procurement, defence policy, defence management and other related subjects. He is a Senior Fellow of the Conference of Defence Associations Institute and the author of True North Strong? A Canadian Citizen's Guide to National Defence.*

Endnotes

[1] For a more comprehensive overview of the context surrounding defence procurement see Charles Davies, True North Strong? A Canadian Citizen's Guide to National Defence (Ottawa: Baico Publishing, 2024), Chapter 8. This article contains edited extracts from the book. Following the Liberal Party's 2025 election commitment to create a Defence Procurement Agency, a short opinion piece containing edited extracts from an early draft of this paper was published by the CDA Institute.

[2] "Defence procurement strategy," Defence and marine, Procurement services, Public Services and Procurement Canada, last modified February 23, 2025, https://www.canada.ca/en/public-services-procurement/services/acquisitions/defence-marine/procurement-strategy.html.

[3] The author is a former chair of the NATO Life Cycle Management Group that developed and manages the NATO Policy for Systems Life Cycle Management.

[4] "NATO Support and Procurement Agency (NSPA)," North Atlantic Treaty Organization, accessed March 30, 2025, https://www.nato.int/cps/em/natohq/topics_88734.htm.

[5] "DE&S," Ministry of Defence, accessed March 30, 2025, https://des.mod.uk/.

[6] "Capability Acquisition and Sustainment Group," Defence, Australian Government, accessed March 30, 2025, https://www.defence.gov.au/about/who-we-are/organisation-structure/capability-acquisition-sustainment-group

[7] "Shared Services Canada," Government of Canada, last modified March 21, 2025, https://www.canada.ca/en/shared-services.html.

[8] For example, see Bernard Gray, Review of Acquisition for the Secretary of State for Defence: An independent report by Bernard Gray (London: Bernard Gray, 2009).

[9] The author was a member of both the organization design team and implementation support team for the 1990s Materiel Group restructuring.

[10] The National Search and Rescue Secretariat, which coordinates planning among all departments and agencies involved in the function within Canada, is part of Public Safety Canada.

[11] See, for example "Directive on the Management of Procurement," Policies, directives, standards and guidelines, Government of Canada, last modified January 17, 2025, https://www.tbs-sct.canada.ca/pol/doc-eng.aspx?id=32692.

[12] "Industrial and Technological Benefits," Government of Canada, last modified September 27, 2022, https://ised-isde.canada.ca/site/industrial-technological-benefits/en.

[13] "Duties of Minister. 12. The Minister shall examine into, organize, mobilize and conserve the resources of Canada contributory to, and the sources of supply of, defence supplies and the agencies and facilities available for the supply thereof and for the construction of defence projects and shall explore, estimate and provide for the fulfilment of the needs, present and prospective, of the Government and the community with respect thereto and generally shall take steps to mobilize, conserve and coordinate all economic and industrial facilities in respect of defence supplies and defence projects and the supply or construction thereof." Neither Public Services and Procurement Canada nor either of its predecessor departments has included reference to any actions taken to meet this duty in any departmental performance report for decades.

[14] Ian Mack, "Robust Military Procurement Reform Now," policy Perspective, Canadian Global Affairs Institute (July 2024), https://www.cgai.ca/robust_military_procurement_reform_now.

[15] To cite only one authoritative indicator, see House of Commons, Standing Committee on National Defence, "A Time for Change; Reforming Defence procurement in Canada," June 2024, https://www.ourcommons.ca/DocumentViewer/en/44-1/NDDN/report-12/.

[16] E.g. Alan Williams, "Three ways to improve defence procurement," Policy Options, February 1, 2016, https://policyoptions.irpp.org/magazines/february-2016/three-ways-toimprove-defence-procurement/.