

WHAT CANADA COULD LEARN FROM U.S. DEFENCE PROCUREMENT: ISSUES, BEST PRACTICES AND RECOMMENDATIONS

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SUMMARY

Despite differences in scale, Canada and the U.S. face common challenges in military procurement and there is much Canada can learn as both countries pursue reforms. The U.S. employs a system of systems approach, based on requirements, resource allocation and acquisition. The process begins with the Joint Capabilities and Development System, focused on identifying and prioritizing needs and assessing alternatives. This is followed by the Planning, Programming, Budgeting and Execution System, which leads to the creation of a budget and provides guidance for the project's execution. The third and final step is the Defense Acquisition System, which oversees the development and purchase of the new equipment. While deceptively simple in summary, U.S. defence procurement is dogged by problems — particularly cost overruns, a surfeit of key players and delayed schedules which degrade troops' performance in the field. Additionally, the defence products market is restricted, inevitably limiting competition, encouraging misbehaviour on the part of business and driving up prices. The DoD is in the midst of consultations with contractors and Congress is undertaking an effort to rewrite acquisition laws. But the most pressing questions remain: Does a best procurement practice exist? If so, what criteria define it? In light of Canada's new Defence Procurement Strategy (DPS), some lessons are clear. Further analysis is needed to figure out whether reforms can succeed in so narrow a marketplace. More attention must be paid to shaping contracts and clarifying expectations about sticking to schedules. And Ottawa must think carefully about the military's needs, as it pushes ahead with the DPS. In surveying change at the DoD, this brief draws pointed conclusions to which Canada's defence planners must pay heed, if they're to leave the military stronger than they found it.

This policy brief presents the U.S. system of defence procurement, examines issues faced within that country, provides some thoughts about what constitutes a best procurement practice and concludes with some recommendations for Canada. Despite a greater procurement capacity in the U.S., the two neighbours face common challenges such as ensuring equipment is procured in a timely and cost-effective manner, employing procurement dollars to encourage development and finally, developing procurement strategies that answer short-term needs, but are flexible given long-term uncertainty. The Canadian and American governments should have mutual interests in each other's defence procurement policies, given they share NATO and NORAD mandates in addition to the task of jointly defending North America. Recent reforms to U.S. defence procurement and Canada's newly announced Defence Procurement Strategy (DPS)¹ present an opportunity to identify some recommendations as Canada moves towards changing its acquisition practices.

1. THE U.S. DEFENCE PROCUREMENT PROCESS

The 2014 U.S. Department of Defence's Congressional Budget² for defence procurement exceeds \$84 billion USD with nearly 34 percent dedicated to aircraft, and ships accounting for another 18 percent.³ 36 percent of the resources are spent developing original products. According to the 2014 DoD budget, 31 new projects exceeding \$250 million USD result in nearly \$30 billion USD of expenditures. The five largest major defence acquisition programs (MDAPs) are the Virginia-class submarines (\$3.4 billion USD), the P-8A Poseidon (anti-submarine & anti-surface warfare) aircraft, the F-35 joint strike fighter (JSF), the EA-18G fighter, and the Evolved Expendable Launch Vehicle (\$1.85 billion USD). In contrast, only about seven percent of the funds are allocated toward modifying existing projects. There are 20 projects with budgets exceeding \$100 million resulting in a total allocation surpassing \$6.4 billion USD. Modifications to the C5-M transport aircraft and Trident II SLBM (ballistic missile) account for one-third of this category's allocations.

The U.S. develops very few products using international partnerships but tends to invest heavily when it does do so. The U.S. has six projects under development in international partnership with budgets in excess of \$2.5 billion USD: the M982 artillery shell, Air Burst Weapons, the JSF, RIM-116 Rolling Airframe Missile, and NAVSTAR (NAVigation System using Time And Ranging). That said, the JSF accounts for 94 percent of the resources spent on partnerships.

Acquiring existing products from abroad is rarely done in the U.S. A report titled *U.S. Purchases from abroad* includes defence items, construction, and petroleum purchases; therefore, the percentage spent on defence items varies from nine to 13 percent of total purchases from 2007-2012.⁴ The 2004 National Defense Authorization Act (P.L. 108-136) required reporting of prime contracts on defence items and

¹ Appendix 1 contains a list of acronyms.

² (2014 DoD CB). Excludes data for R, D, T & E that are a separate budget category. Data do not differentiate between new and continuing projects.

³ Defense Technical Information Center. "FY2014 DoD Congressional Budget Data – House Armed Services Committee" available at http://www.dtic.mil/congressional_budget/. Accessed on 26 September 2013. Classification into Jenkins Report categories done by author.

⁴ DoD. "Report to Congress on Purchases from Foreign Entities, FY 2007," Office of the Deputy Undersecretary of Defense for Acquisition, Technology, and Logistics (ATL), Washington, DC, May 2008; & "Report to Congress on FY2011 Purchases from Foreign Entities," May 2012; "Report to Congress on FY2012 Purchases from Foreign Entities," July 2013. Reports do not indicate new procurement.

components⁵ from foreign sources; in FY2007⁶ spending in that category accounted for 10 percent.⁷ Of all DoD acquisition that year only two percent of contracts were awarded abroad; Canada obtained 40 percent of them receiving over \$495 million USD.⁸ With respect to budgeting for 2014, the 2014 DoD CB indicates two projects are procured from abroad totalling less than \$250 million USD: the German XM320 grenade launcher and the Israeli Iron Dome all-weather air defence system.⁹

A multisystem process

The U.S. employs “a multivariate ‘system of systems’ approach composed of the requirements, resource allocation, and acquisition systems.”¹⁰ As Schwartz summarizes, “every weapon system in the U.S. arsenal is created to satisfy a specific military need (...the *requirement*), must be paid for by the federal *budget*, and is designed and built with an *acquisition system*.”¹¹ Only after completing the steps of identifying the requirement and obtaining a budget can the process of acquiring the product start.

Before discussing the process itself, it is useful to understand the rules of the game and its players. U.S. procurement is governed by three sets of hierarchically organized regulations starting with those applying to all branches of government (i.e., Federal Acquisition Regulations or FAR), then those specific to the DoD (i.e., DFAR)¹² followed by those specific to its components.¹³ A Major Defence Acquisition Program “...may need to develop as many as 60 different documents, 28 required by statute and 32 required by regulation, during its life.”¹⁴ In addition to the game being played in a structured environment there are also multiple actors, each with their own priorities, and no single actor is responsible for all aspects of defence procurement. Key actors include Congress, the Offices of Management and Budget, the Secretary of Defense, and the Service Secretary, the Service Acquisition Executive, the military service material commands, program management offices, functional support organisations, and industry.¹⁵

⁵ Included are airframes, aircraft engines, other aircraft equipment, missiles & space systems, ships, combat vehicles, non-combat vehicles, weapons, ammunition, electronic & communications equipment.

⁶ DoD. “Foreign Sources of Supply: FY2007 Report,” Office of the Under Secretary of Defense for ATL, Washington, DC, Sept. 2008. A recent report could not be located.

⁷ DoD. “Report to Congress: Purchases from Foreign Entities, FY2007,” Ibid.

⁸ In comparison, the UK received nearly 19 percent of the contracts at \$475 million USD.

⁹ Together procurement among those options is nearly 47 percent of the budget with munitions/missiles accounting for 15 percent and defence-wide programs and items another 25 percent.

¹⁰ Schwartz, Moshe. “Defense Acquisitions: How DOD Acquires Weapons Systems and Recent Efforts to Reform the Process,” CRS Report RL34026 (Washington, DC: Congressional Research Service, 2013).

¹¹ Schwartz, Ibid., 2.

¹² Federal Acquisition Regulation System, July 2009; U.S. DoD, Defense Federal Acquisition Regulation Supplement, 21 July 2009.

¹³ Army, Navy & Marine Corps, Air Force, Defense Logistics Agency, U.S. Special Operations Command.

¹⁴ Watts, Barry D. and Todd Harrison, *Sustaining Critical Sectors of the U.S. Defense Industrial Base* (Washington, D.C.: Center for Strategic and Budgetary Assessments, 2011), 30.

¹⁵ Fox, J. Ronald. *Defense Acquisition Reform, 1960-2009: An Elusive Goal* (Washington, DC: Center of Military History, 2011), 14.

Several monitoring agencies are also involved, such as the Justice Department and the inspectors and auditing offices of the DoD and the services. Congress employs the Government Accounting Office¹⁶ for program evaluations and the CBO for budgeting, in addition to the CRS and OTA for analyses. Inefficiencies arise from the fragmentation of authority and accountability. Requirements, budgeting, and project management are undertaken by different agencies, each of which is separately monitored, increasing bureaucracy and agency costs.

The procurement process for a MDAP consists of a three-step system¹⁷ (i.e., requirements, budgeting, and acquisition). Each step is a system itself but taken together, they are considered the “Big A” of acquisition.¹⁸ It starts with the **Joint Capabilities Integration and Development System (JCIDS)**, which “identifies, assesses and prioritizes what capabilities the military requires.”¹⁹ Sometimes changes in doctrine, training, or organisation are sufficient to meet the requirement eliminating the need for a DAP. The JCIDS begins with a Capabilities- Based Assessment that examines both needs and gaps while recommending solutions. The *Initial Capabilities Document (ICD)* justifies the material solution, if recommended. The Joint Requirements Oversight Council (JROC) identifies and prioritizes requirements, approves the ICD and may recommend a solution. After ICD approval, an *Analysis of Alternatives*, comparing all aspects (i.e., cost, effectiveness, risk, technology) of the possible alternatives to the proposed DAP is completed.

The second step/system is the **Planning, Programming, Budgeting and Execution System (PPBE)**. A *Joint Programming Guidance* document presents needs and guides proposals. The *Program Objective Memorandum* outlines the proposed DAP’s missions, objectives and budget and guides programming. The budgeting stage occurs with programming, though the review processes differ. The execution stage occurs with the budget and program evaluations.

The final step/system is the **Defense Acquisition System (DAS)**²⁰ or the management process to develop and buy weapon systems (i.e., select a source). Each MDAP is managed by an office headed by a Program Manager who is supported by a staff and reports to a Program Executive Officer. The DAS uses a series of milestones to monitor and manage programs, ensuring they meet statutory and regulatory requirements. There are three milestones, the first of which (A) initiates the technology development followed by (B) the second that initiates the engineering and manufacturing that is succeeded by (C) the third that initiates low-rate production and limited deployment. Schwartz adds, “a program can enter the acquisition system at any point in the process as long as the program meets the requirements for that phase of the system.”²¹ There is no clear demarcation between the steps because of the iterative nature of development, thus steps occur simultaneously.

¹⁶ Government Accountability Office, Congressional Budget Office, Congressional Research Services, Office of Technology Assessment

¹⁷ See Figure 1 in appendix 2.

¹⁸ The final system, the Defense Acquisition System, is the “Little a” acquisition process telling government how to buy but excluding requirements and budgeting.

¹⁹ Schwartz, *Ibid.*, 3.

²⁰ DoD Directive 5000.01, the *Defense Acquisition System*, is a brief document identifying the overarching principles of the DAS. The more detailed (80-page) DoD Instruction 5000.02, *Operation of the Defense Acquisition System*, describes processes and requirements. The 900-page (and under review) Guidebook serves as the reference regarding information and best practices.

²¹ Schwartz, *Ibid.*, 7. Each milestone includes a number of decision points that must be reviewed by a Milestone Decision Authority. See Schwartz’s summary pp7-8.

The winning contractor(s) for a MDAP is selected by a Source Selection Authority, “based on 1) comparative evaluations of proposals, 2) costs, 3) risk assessment, 4) past performance, 5) contractual considerations, and 6) surveys of contractor capabilities.”²² Moreover, little is known about the effects of “technical levelling” where a proposal’s technical or design approaches are revealed to competitors “to allow them to consider incorporating the proposal’s better and/or less costly features into their own proposals.”²³ Source selection may be treated as a sub-process in defence procurement, as it involves some different agents and is a game with its own separate structure.

2. REFORM ISSUES FACED IN DEFENCE PROCUREMENT

DoD efforts to deal with “cost overruns, schedule delays and an inability to get troops in the field the equipment they need when they need it”²⁴ resulted in key policy documents being updated over the last decade.²⁵ Steady growth in per-unit costs because of “the longstanding preferences of the military services for state-of-the-art weaponry and the cost insensitivity built into the acquisition system both before and after source selection”²⁶ is the main problem. A study examining six U.S. MDAPs²⁷ experiencing critical cost growth identified common causes among a majority, such as an underestimation of the baseline cost, insufficient R, D, T, & E, increases in component costs, unanticipated technology integration issues, and inadequate/unstable funding.²⁸ Other DoD reforms under consideration include linking manager seniority and experience with the risk of the MDAPs, as opposed to the dollar amount, and completing a competition utility analysis for each MDAP.

Congress engages in reform as well through its annual National Defense Authorization Act as well as stand-alone laws.²⁹ Fox cites “the lack of satisfactory information”³⁰ as a key reason for Congressional involvement, due to the technical complexity of the systems precluding good estimates of schedule, costs, etc., ambiguous program needs affecting estimates of a weapon’s effectiveness creating indecision and extending schedules, and program managers not providing full information about delays/obstacles.

Market structures also inhibit reform. While proposals for system reforms are based upon the belief that the defence market is a free market, the reality is that in that sphere the invisible hand cannot produce efficiency, because buyer’s choices are not based on price and price is not set by the interplay of supply and demand.³¹ In the U.S. defence market, there is one buyer that is also the regulator and a few large prime contractors. Only the source selection process involves competition, since after primary contract selection the remainder of the development, production, and in-service support is conducted by the contractor, giving it a monopoly. Government dependence upon a particular contractor creates price insensitivity. Gansler argues policy and DoD regulations, as well as Congressional statutes to improve

²² Fox, *Ibid.*, 30.

²³ Fox, *Ibid.*, 30.

²⁴ Schwartz, *Ibid.*, 12.

²⁵ Including a new DoD Instruction 5000.02 (the DAS process and requirements document) in 2008 followed by an updated instruction document for the JCIDS in 2009, as well as a new version of the JCIDS itself in 2012.

²⁶ *Ibid.*, Watts & Harrison, 25.

²⁷ Zumwalt-class Destroyer (DDG-1000), JSF, Longbow Apache Helicopter, Wideband Global Satellite, Excalibur artillery round, Navy Enterprise Resource Program

²⁸ Bickstein, Irv; Charles Nemfakos and Jerry M. Sollinger. 2013. “Digging out Root Causes: Nunn-McCurdy in major defence acquisition programs,” *Defence ARJ*, Vol. 20, No. 2 (July 2013): 128-153.

²⁹ The most recent being the May 2009 Weapon System Acquisition Reform Act (S.454 /P.L. 111-23).

³⁰ Fox, *Ibid.*, 16.

³¹ Watts and Harrison, *Ibid.*, 13.

procurement, are predicated upon the free market presumption and “have not had the desired effects.”³² In 2011, Carter maintained the 2009 reforms relied on “normal market forces to make the most efficient adjustments.”³³

Solutions tend to focus on contracts as the focal point for delegating responsibilities; thus inefficiencies may be linked to inappropriate contract design. In defence contracts written prior to 2001, profit was negotiated as a percentage of the estimated costs (cost-plus-fixed-fee contracting). It created perverse incentives for contractors where spending more creating the product increased profits. In 2002, a movement towards award-plus-fixed-fee contracting emerged. In 2013 the Undersecretary for ATL emphasized that no single contract type can transform defence efficiency.³⁴ That acknowledgement creates an opportunity for recasting defence contractual relations. In February 2014, the Director of Defense Procurement & Acquisition Policy invited public comments from contractors and industry to identify the undesired impacts, if any, of the over 400 federal defence regulations³⁵ when it comes to contracting. An effort to rewrite DoD acquisition laws is underway by Congress and the Pentagon.³⁶ The aim is to increase the process’ efficiency and speed.

Information problems are another source of inefficiency. Since contractors have private information (about the technology, production possibilities, etc.), which they use to craft proposals, they may distort or misrepresent schedules and capacities. Contracts manage and protect the partners from the lack of information prevalent in defence. Contract drafters should identify the sources of risk before negotiations and integrate appropriate responses (e.g., penalties, cost-sharing, and flexibility) into the contract. If contractors could bind themselves successfully by consenting to penalties if at fault, then overruns and delays could be reduced. If the sources of information problems are strategic (i.e., the contractor shaping information), then honest actors could commit to modifying behavior. If the problems’ sources are structural, i.e., poorly designed contracts, then the solutions are more complex but implementable among willing partners.

Another source of inefficiency is contract designs that fail to account for the interaction between the uncertain speed of technological development and the proposed project schedule. Schedule slippage occurs in the development phase due to the uneven nature of technological advances. One solution is to engage in pre-contractual negotiations during the development phase. One author reports that, “Since most cost overruns occur in the early stages of a project’s lifetime due to the uncertainties associated with new technology, effective *ex ante* monitoring, as exemplified by credible pre-contractual risk assessments, is crucial to cost containment.”³⁷

A further solution is to divide the blame for overruns between the contractor and the government in a spirit of fairness and responsibility. In French defence procurement, “Firms are required to make final bids on the delivery of finished systems and they must, at least in theory, accept all the risks associated with any cost overruns that occur.”³⁸ However, due to the uncertainties of the industry, contracts are incomplete by nature, leading to renegotiations to decide who is responsible for extra costs and how they will be shared. Kapstein shows that “the French have introduced a responsibility principle into

³² Gansler, Jacques S. *The Defense Industry*, (Cambridge, MA: MIT Press, 1980), 96.

³³ Carter, Ashton. Undersecretary of Defense for ATL, “The Defense Industry Enters a New Era,” remarks at Cowen Investment Conference, New York, NY, February 9, 2011.

³⁴ Parrish, Karen. “Acquisition Chief Discusses ‘Better Buying Power 2.0,’” *Armed Forces Press Services*, 10 September 2013.

³⁵ DoD. “Review of Statutory and Regulatory Requirements,” 12 February 2014, <http://www.gpo.gov/fdsys/pkg/FR-2014-02-12/html/2014-03038.htm>

³⁶ Weisgerber, Marcus. “Pentagon, Congress Begin Rewriting DoD Acquisition Laws,” 16 February 2014, <http://www.defensenews.com/article/20140216/DEFREG02/302160012/Pentagon-Congress-Begin-Rewriting-DoD-Acquisition-Laws>.

³⁷ Kapstein, Ethan B. “Smart Defense Acquisition: Learning from French Procurement Reform,” Policy Brief, Washington, DC: Center for New American Security, December 2009, 3.

³⁸ Kapstein, Ibid, 3.

(fixed price) contracting, meaning that those who are actually responsible for failing to meet contractual obligations, whether government or industry, must generally pay the costs.³⁹ However, a shared sense of fairness and contract flexibility are crucial for the principle to operate.

Realizing that the contract must also please multiple actors with divergent priorities is also important, since Congress and other agencies prioritize budgets in contrast to the military's emphasis on performance followed by schedule. Delays could be managed through time-certain acquisition according to a 2006 assessment panel report on DoD acquisition.⁴⁰ Scheduling would be a critical factor in "balancing trade-offs between cost and performance" and that for most MDAPs a nominal six-year timeline from Milestone A to the delivery of the first operational acceptable capability is reasonable.⁴¹ The largest risk reduction opportunities exist between Milestones A and B.⁴² For it to succeed, the services must sacrifice performance in favour of a schedule. It also requires penalty enforcement for programs failing to meet that schedule. However, if contractors were prepared to tie their hands by committing to a schedule, then a proposal's value is increased. The same recommendation goes for offsets, if contractors limit offset demands and agree to distribute a meaningful percentage towards U.S.-owned firms, then a proposal's value similarly increases.

3. DOES A BEST PROCUREMENT PRACTICE EXIST?

The question of whether a best procurement practice exists requires criteria for identifying the best. Should it be considered the most efficient (i.e., products delivered on-time within budget), most effective (i.e., products perform as expected), most economical (i.e., products are provided at low cost), most diversified (i.e., products are developed/modified from multiple sources), most innovative (i.e., potential for spin-off technologies and commercial applications) etc.? Each of those considerations, if prioritized, implies trade-offs with respect to the others. Ranking performance as most important, as for example the JSF and its variations, results in cost and schedule being sacrificed (e.g., three critical cost breaches from 1997-2009 and multiple schedule extensions). Best practices reflect a knowledge-based approach, where ensuring a certain level of knowledge (i.e., technical maturity, stable product design and capable manufacturing processes) is acquired before proceeding to the next phase. MDAPs experiencing cost overruns often fail to adhere to that approach.

A nation's relative size shapes its need for best practices as states with limited resources cannot absorb risks and negative effects as easily as larger states. Overruns and delays have smaller impacts when budgets are larger. Larger budgets make possible more original product development. Budget size is a non-negligible structural constraint shaping choices since original MDAPs involve risk. The risk increases with technological immaturity are counterbalanced by the profit potential from technological development, spin-offs, and commercial applications.

Around 47 percent of the 2014 DoD budget was divided among the four procurement options with the largest slice (36 percent) going toward developing original products followed by modifying existing products (seven percent). Allocating so much of the budget to original products is simply too much risk for a medium-sized economy. Rather it should distribute about 30 percent of the budget between modifying existing products and procuring foreign products favouring off-the-shelf procurement over potentially costly modifications. Around 10 percent of the budget should go to developing original products domestically. The remaining five percent should be allocated to development in international

³⁹ Kapstein, *Ibid.*, 3.

⁴⁰ Kadish, Ronald. *Defense Acquisition Performance Assessment*. Washington, D.C.: DoD, 2005, 13.

⁴¹ *Ibid.*, 50.

⁴² See section 1.b. for milestones.

partnerships. Distributing resources as such places only 15 percent of the budget in the riskier options (i.e., original and partnership products). The choice of which MDAPs to place in the riskier options should be shaped by the availability of alternative options to meet the requirement, feasibility (i.e., technical feasibility given current capacities), comparative advantage, exportability for profit, and the capacity for innovation spin-offs and follow-on income in the commercial sector. Original development is riskiest for a medium-sized country so partnering to develop products is recommended. Though Canada has the most experience partnering with the U.S. when it comes to defence production, it should seek to diversify both its partners and defence product suppliers by looking towards key allies in Europe and Asia.

4. CONCLUSION AND POLICY RECOMMENDATIONS

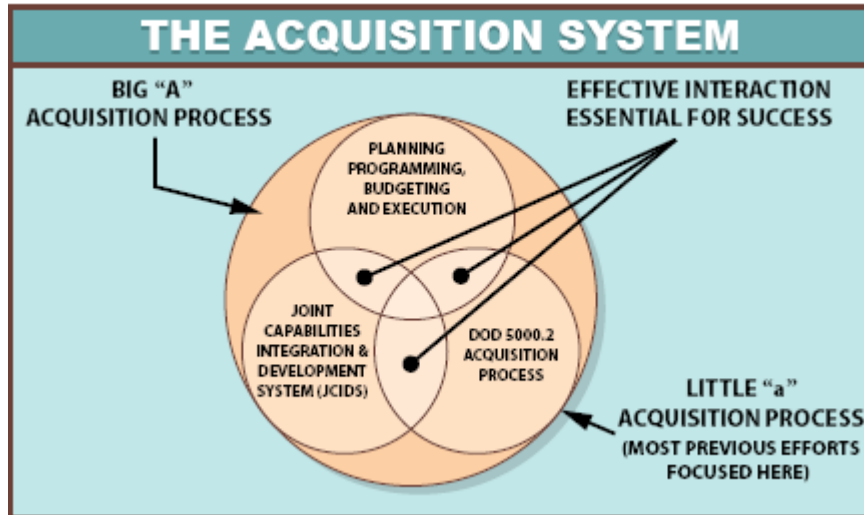
In light of Canada's new DPS, there are several lessons to extract from this analysis of U.S. defence procurement. First, greater analysis is needed to determine how/if procurement policy reforms can succeed given the special nature of the defence market. Second, the defence procurement contract is at the center of the transaction and greater attention is needed to ensure that contracts delineate expectations in the case of overages or delays. Contractors should also be willing to tie their hands by committing to schedules and minimizing offsets. Finally, Canada must carefully consider its capacities, strengths, and mandates as it further implements its DPS in order to maximise the benefits from this opportunity.

APPENDIX 1

ATL	Acquisition, Technology & Logistics
DPS	Canada's Defence Procurement Strategy
CBO	Congressional Budget Office
CRS	Congressional Research Service
DAS	Defense Acquisition System
DFAR	Defense Federal Acquisition Regulations
DoD	Department of Defense
DoD CB	Department of Defense Congressional Budget
FAR	Federal Acquisition Regulations
GAO	Government Accounting Organization
ICD	Initial Capabilities Document
JCIDS	Joint Capabilities Integration and Development System
JROC	Joint Requirement Oversight Council
JSF	F-35 Joint Strike Fighter
(M)DAP	(Major) Defense Acquisition Program
R,D,T &E	Research, Development, Testing and Evaluation
USD	U.S. dollars

APPENDIX 2

FIGURE 1 DOD'S DEFENCE ACQUISITION STRUCTURE



Source: Schwartz, *Ibid*, 3.

About the Author

Anessa L. Kimball is an associate professor of political science at Université Laval where she has been on the faculty since 2006. Dr. Kimball employs principally quantitative methods in the study of international security cooperation and the design of security institutions using rationalist and institutionalist approaches. She teaches courses on international relations theory, international institutions, U.S. Foreign Policy, and security issues as well as political science methodology. Dr. Kimball's research on international alliances has appeared in the *Journal of Peace Research* and she has also co-authored chapters on such topics as U.S. foreign policy and international organizations as conflict actors in the book *Conflits dans le Monde* (Presses ULaVal) edited by G. Hervouet and M. Fortmann.

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