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May 2019

# POLICY PAPER

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## **ANATOMY OF A BUY: THE FOUR DIMENSIONS OF PROCURING A FUTURE FIGHTER FOR CANADA**

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## ► Executive Summary

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*Purchasing a fleet of fighter aircraft is a complex process with many variables and the Canadian government has a duty to ensure the billions of procurement dollars required are properly spent. The interplay between the four dimensions involved in military procurement (military, technological, economic, and political) defies simple analysis. The government has directed the Canadian Armed Forces to ensure Canadian sovereignty, defend North America, and engage in extraterritorial missions. The Royal Canadian Air Force (RCAF) has responded to its responsibilities to support these commitments with a thorough, capability-based Statement of Requirements for the future fighter, taking critical functionalities of operating in the future battlespace and emerging technologies into consideration.*

*The fighters expected to be offered by the four qualified suppliers represent two significant cleavages. The first cleavage is technological/sustainability, namely between fourth- and fifth-generation fighter aircraft and revolves around long-term sustainment costs and future technological adaptability. The second cleavage is commercial/security, specifically European (Eurofighter/Gripen) versus American (F-35/Super Hornet) and enmeshes national security compliance with the government's desire for tailorable economic packages. The specificity of these cleavages is important to understand as they have repercussions in each of the four decision-making dimensions.*

*The government's choice to ensure a competitive process with more than three bidders has resulted in modifications to the assessment of mandatory criteria in critical operational functions, lowering the threshold of performance measurements identified by the RCAF. Suitability and adaptability to two- and five-eyes requirements will be a crucial operational determinant. However, application of the current Industrial and Technological Benefits policy and the measure of points awarded for the economic offset portion in the Request For Proposal appears to undermine the primacy of meeting military needs. Thus, leading to the spectre of the Liberal government's promise that "We will not buy the F-35 stealth fighter-bomber" becoming a reality through other policy means.*

*Canada is a North American state with responsibility to protect not only ourselves but our most important strategic partner and neighbour. To maximize effectiveness, any future fighter will need to be fully integral to the North American battlespace as opposed to simply being integrated and interoperable as is the accepted practice in NATO. The deputy minister of National Defence has stated that capability is the core component in the procurement process. Allowing economic benefits to prevail over capability during evaluation inevitably changes the empirical equation of the stated government policy that initiated the purchase in the first place. A fair and balanced competition for the future fighter, uninhibited by overt political interference, needs to occur to ensure the right fighter aircraft is chosen.*



The release of the auditor general of Canada’s report<sup>1</sup> in November 2018 provided independent confirmation that Canada’s fighter force is in trouble and further evidence of political mismanagement as the root cause. There is plenty of bipartisan blame to go around regarding political gamesmanship on the fighter replacement file. However, the report highlighted the Department of National Defence’s (DND) due diligence in identifying that personnel shortage problems were the most critical aspect of closing the government’s “capability gap” narrative, not the purchase of interim fighters. Importantly, the report raises the unanswered question of why the government chose to ignore this professional military advice and fabricate a security crisis to pursue a sole-source purchase of additional aircraft. Misrepresenting the facts and manipulating the procurement process have only damaged the government’s integrity and credibility, for they lead to the conclusion, as one national paper stated, that “incompetence is now layered atop mismanagement to such an extent that it’s almost breathtaking to behold.”<sup>2</sup>

Purchasing a fleet of fighter aircraft is a complex process with many variables and the government has a duty to ensure the billions of dollars required are properly spent. Unfortunately, [the politicization of the CF-18 replacement](#) has led to significant misinformation and distortion of the factors surrounding this essential capital procurement. Conflation of idiosyncratic design features, such as stealth and one versus two engines, into critical determinates undermines public understanding of the four dimensions that constitute military procurement decision-making – political, military, technological and economic/commercial. To avoid having to address the many inaccuracies embedded in the various narratives, this paper will explore the future fighter requirement from an evidence-based framework. It is not intended to be an all-encompassing and exhaustive analysis, but to highlight the interconnected, multifaceted nature of the task and to identify many of the competing factors that are involved.

## Requirement

The release of the Canadian government’s 2017 *Strong, Secure, Engaged: Canada’s Defence Policy (SSE)* statement reaffirmed that the Canadian Armed Forces’ (CAF) principal roles are ensuring Canadian sovereignty, the defence of North America, and contributions to international peace and security as determined by government. These three traditional pillars<sup>3</sup> have been the foundation of Canadian defence policy since they were introduced in the 1971 white paper on defence. In particular, *SSE* directed that Defence adhere to 10 key points in order “to succeed in

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<sup>1</sup> Auditor General of Canada, “Report 3-Canada’s Fighter Force-National Defence,” *2018 Fall Reports of the Auditor General of Canada to the Parliament of Canada*, Office of the Auditor General of Canada, Nov. 20, 2018.

<sup>2</sup> View, “The Liberals Promised New Fighter Jets. They Delivered Utter Lunacy Instead,” *National Post*, Nov. 23, 2018. Available at <https://nationalpost.com/opinion/np-view-the-liberals-promised-new-fighter-jets-they-delivered-utter-lunacy-instead>

<sup>3</sup> See Murray Dixon and Elizabeth Inrig, “2017 Defence Policy Review: Impact on Capability Based Planning,” DRDC-RDDC-2017-L239, *Defence Research and Development Canada Scientific Letter*, Aug. 3, 2017, for a good comparison of core missions in *Canada First Defence Strategy* and *Strong, Secure, Engaged*.



an unpredictable and complex security environment”.<sup>4</sup> Two of these are significant to the future fighter purchase – “Act as a responsible, value-added partner with NORAD, NATO and Five-eyes partners” and “Work with the United States to ensure NORAD is modernized to meet existing and future challenges.”<sup>5</sup>

The Royal Canadian Air Force (RCAF) is responsible for delivering four core capabilities foundational to air forces worldwide: control of the air, air attack, air mobility and air ISR (intelligence, surveillance and reconnaissance).<sup>6</sup> In Canada, fighter aircraft are currently the exclusive aviation platforms used for control of the air and air-to-ground attack while contributing to air-to-sea attack operations along with specialized maritime-air assets. In determining future needs and defining fighter requirements, the CAF employs an evidence- and capability-based planning (CBP) methodology that analyzes defence policy, logically deducing the future capability requirements to achieve a desired result. Inevitably, compromises in achieving these requirements are required to meet financial and force structure constraints. In 2014, the chief of force development released the “Analysis of Options to Sustain a Canadian Forces Fighter Capability”, which concluded that “Canada replace the CF188 with another manned fighter aircraft.”<sup>7</sup>

Significantly, this report stated that capability is relative and will erode as technologies and external military capabilities improve. Today, advances in computer technology and emerging artificial intelligence (AI) are true game-changers in any future battlespace. The advent of fifth-generation fighter designs incorporates such emerging technologies, thereby introducing the potential for fighter aircraft to move beyond performing multi-role tasks to being a multi-mission<sup>8</sup> platform that can be networked as localized command, control, communications, computer ISR (C4ISR) assets on future multi-domain battlefields. Such technological advances are already appearing in our daily lives and are at the heart of the national security debate over the potential risk of espionage from Chinese manufacturer Huawei Technologies’ involvement in 5G networks.<sup>9</sup>

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<sup>4</sup> Canada, National Defence, *Strong, Secure, Engaged: Canada’s Defence Policy*, Ottawa: Minister of National Defence, 2017, 14. NORAD is the North American Aerospace Defence Command, NATO is the North Atlantic Treaty Organization, and the five-eyes partners are Australia, Canada, New Zealand, the United Kingdom and the United States.

<sup>5</sup> Ibid. NORAD and defence of North America involve extremely sensitive two-eyes security intelligence and bilateral technological sharing arrangements that are highly classified and seriously administered under U.S. Special Access Programs.

<sup>6</sup> Canada, National Defence, *Royal Canadian Air Force Doctrine*, B-GA-400-000/FP-001, Commander Royal Canadian Air Force, 3<sup>rd</sup> edition, November 2016, 32-37.

<sup>7</sup> Government of Canada, “Task 2 - Chief of Force Development - Mission Needs Analysis,” *Summary Report – The Evaluation of Options for the Replacement of the CF-18 Fighter Fleet*, Dec. 10, 2014, 2. Available online at <http://www.forces.gc.ca/en/about-reports-pubs/mission-needs-analysis.page>. Although based on the Harper government’s *Canada First Defence Strategy*, the analysis provides a relevant baseline as the roles and missions found in *SSE* are relatively unchanged.

<sup>8</sup> Although identified as a multi-role fighter, the F-35 can operate as a C4ISR platform and an electronic warfare jammer while on a ground attack mission – thus Lockheed Martin characterizes the F-35 as multi-mission. See “Multi-Mission Capability for Emerging Global Threats,” F-35 Lightning II. Available at <https://www.f35.com/about/capabilities>, Jan. 18, 2019.

<sup>9</sup> “5G marks a massive leap forward in such wireless technology. Unlike earlier networks, which essentially connected devices through one-way interactions, 5G would have countless points of connectivity, creating something that could be thought of as a grid pattern, or what experts call a ‘network of networks’.” Jesse Snyder, “From Huawei to the Internet of Things: A Brief Explainer on 5G and the Risks to Canadian Security,” *National Post*, Jan. 29, 2019.



## Cleavages

In February 2018, Minister of Public Services and Procurement Carla Qualtrough announced that Lockheed Martin, Boeing, Saab, Dassault<sup>10</sup> and Airbus were named to Canada's official fighter jet supplier list, allowing these qualified suppliers to be the sole bidders on the program. The aircraft expected to be offered to replace the CF-18s include Lockheed Martin's F-35, Boeing's Super Hornet, the Airbus Eurofighter and Saab's Gripen. These fighter aircraft represent two significant cleavages in the replacements being offered. The first cleavage is technological/sustainability, namely between fourth- and fifth-generation fighter aircraft, and the second cleavage is commercial/security, specifically European (Eurofighter/Gripen) versus American (F-35/Super Hornet). The specificity of these cleavages is important to understand as they have repercussions in each of the four decision-making dimensions.

Although there has been much debate regarding the definition of fifth-generation fighters, the essence of the distinction between fourth- and fifth-generation fighters rests in the design concepts. Adapting to evolving technologies, fifth-generation are purpose-built, low-observable designs to enhance survivability against increasingly lethal defensive missile systems. Embedded multi-sensors networked with integrated avionics, along with sensor fusion to external sources, provide the pilot with unprecedented situation awareness and ability to perform multi-mission objectives simultaneously. Fifth-generation aircraft have immense growth potential with a projected life expectancy to 2070.

Fourth-generation fighters are based on proven 1970/1980 platform designs that have been updated with contemporary avionics and sensors but are unable to incorporate fusion technology. These aircraft are categorized as 4.5-generation and although fitted with leading-edge defensive electronic countermeasure suites, the observable airframes are highly vulnerable to modern air defence systems. Fourth-generation aircraft have very limited growth potential in their architecture and long-term sustainability is questionable as air forces plan on divesting the majority of these aircraft by the mid-2040s.

The European-versus-American cleavage revolves around the emphasis that the government places between security and economic interests. These often competing issues transcend all four dimensions that constitute military procurement decision-making, as national security issues intersect both the desire for political economic largesse and commercial interests, which can result in modification of military/technological requirements through political interventions. A non-linear example of the complexity revolves around the legitimate interests of the U.S. military-industrial complex. Although the Canadian government has stated that it will accommodate technological transfer challenges in the bid process, each fighter manufacturer has commercially sensitive intellectual property that it protects vigorously; particularly, the more technologically advanced the aircraft. As two European groups have recently announced plans for the development of sixth-generation fighters, the U.S. will undoubtedly be far more protective of the

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<sup>10</sup> Dassault has since announced it will not participate in the fighter bid. "The three sources said the company's decision is related to the difficulties facing the European company in meeting the need to integrate its equipment with the Canadian and American militaries." Daniel Leblanc, "European Fighter-Jet Manufacturer Pulls Out of Canadian Competition to Replace CF-18s," *Globe and Mail*, Nov. 6, 2018.



inadvertent transfer of advanced technologies to competitors, thus limiting the adaptability of non-American fighters for Canadian use. This will inevitably lead to modification of the stated military requirement in order to meet political direction for economic reasons. Politicians must clearly understand the implications to national security in each cleavage while considering economic ramifications, to sagaciously determine what is in the public's long-term best interest.

## Operating Environment

As much as some may wish to exercise exclusive sovereignty when purchasing the next fighter, Canada's geostrategic position and alliance commitments constrain the choices that are available. Absent from most Canadian discourse is acknowledgment that the international security environment directly shapes the North American strategic defence posture and that NORAD is central to that defence. This makes airspace defence an issue of "complex sovereignty"<sup>11</sup> since NORAD functions as the guarantor of Canadian as well as American airspace sovereignty and is the principal defender of North America from air attack. The choice of Canada's next fighter aircraft will need to be factored into the future multi-domain battlespace the U.S. is constructing and not simply through the notional threat-to-Canada environment of the moment.

Geostrategically, the United States employs a three-layer approach<sup>12</sup> to its national security. Homeland protection is the first layer and is paramount in American eyes. This was clearly stated in the 2017 *National Security Strategy of the United States of America*, where the president has pledged to keep the United States military as the world's pre-eminent force and to use "all elements of America's national power – political, economic, and military" to ensure its national security. The United States is obsessive in its commitment to safeguarding its military and technological advantages, first judiciously sharing with two-eyes partners, then five-eyes countries, then other allies if at all. Although critical to homeland protection, Canada occupies the second layer of United States defences – the approaches – and shares a deeply held responsibility to which the U.S. entrusts some of its most technically advanced capabilities through two-eyes bilateral protocols. To maximize effectiveness, any future fighter will be expected to be fully integral to the North American battlespace as opposed to simply being integrated and interoperable as is the accepted practice in NATO.<sup>13</sup>

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<sup>11</sup> Canada and the U.S. have shared jurisdiction of North American airspace, negotiated and administered through the NORAD agreement. The concept of complex sovereignty between Canada and the U.S. emerges from the evolution of complex interdependence into shared issues of sovereignty where each country accepts the legitimate sovereign concerns and interests of the other. See Louis Pauly and Christian Reus-Smit, "Negotiating Anglo-America: Australia, Canada, and the United States," in Peter Katzenstein, ed., *Anglo-America and its Discontents: Civilizational Identities Beyond West and East* (New York: Routledge, 2012) 127-151.

<sup>12</sup> The U.S. homeland is the first layer, the approaches to the U.S. are the second layer and the away game that includes alliances such as NATO is the third layer.

<sup>13</sup> The F-22 and F-35 are designed for seamless functionality in the future multi-domain battlespace. This will include the North Warning System replacement which will also be integral to the system. Fourth-generation platforms can be integrated into future systems in varying degrees through connecting technologies that provide real-time data exchange for harmonious operations while less capable platforms can be made interoperable through technological and operational standardization. Military effectiveness decreases and operational costs increase the more technical requirements a platform needs to function within the designed system.



## Military Dimension

Through *SSE* policy direction and the CBP process, the government of Canada has established the operational baseline from which the RCAF developed its business case analysis and Statement of Requirement (SOR) for the Future Fighter Capability Project (FFCP). This recent documentation was prepared using a professional, evidence-based *U.S. Defense Acquisition Test and Evaluation Management Guide Framework* – ensuring that it met the rigorous standard the auditor general of Canada’s 2012 spring report said the previous CF-18 replacement documentation lacked.

In its primary role, the fighter force acts as a strategic deterrent to those who may wish to challenge Canada’s sovereignty. It must possess the high-speed armed response capability that enables the CAF to effectively protect the 10-million-square-kilometre Canadian landmass. By design, these fighter aircraft are an integral part of the bi-national NORAD command-and-control (C2) structure, whether performing national sovereignty missions or those in defence of North America. This makes the fighter force unique as the only Canadian military force that is operationally interdependent with the U.S. in day-to-day operations.<sup>14</sup> It is therefore extremely difficult to operationally de-link air superiority operations in the first two principal CAF roles identified in *SSE* – Canadian sovereignty and defence of North America – given the integrated infrastructure and bi-national command-and-control arrangements.

Although the four qualified suppliers’ fighter aircraft will have met the basic high-level mandatory requirements (HLMR) to compete in the FFCP bid, the RCAF has identified sub-system requirements that will ensure they are fully able to operate in current and future battlespace environments. Without these sub-systems, operational risks increase to the point that a future fighter becomes marginally employable in domestic (NORAD) and/or expeditionary (NATO) operations. Each platform candidate will be rigorously assessed through a measure of effectiveness and evaluation scale, in the context of an increasingly complex and contested threat environment, for interoperability, ability to maintain awareness, capability to discern friend from foe, survivability and sustainability. Given Canada’s continued fighter commitment to NATO<sup>15</sup> in the tertiary role identified in *SSE*, it is mandatory that each platform be measured against a highly capable adversary in this potentially high-intensity threat environment, to ensure strategic alignment with government policy.

Significantly, the U.S. has embarked on a multi-domain operations concept and the United States Air Force (USAF) is developing a “Multi-Domain Command and Control (MDC2) [system] – the ability to seamlessly analyse, fuse, and share what was once domain-centric information into a single C2 system that supports all domains and all levels of war.”<sup>16</sup> The USAF has partnered with

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<sup>14</sup> This is a prime example of complex sovereignty. As one of three regional commands under NORAD, “The mission of the Canadian NORAD Region (CANR) is to provide aerospace surveillance, identification, control and warning for the defence of Canada and North America. 1 Canadian Air Division is responsible for providing CANR with combat-ready air forces to meet Canada’s commitment to the defence of North America and maintain the sovereignty of North American airspace.” NORAD. Available at <http://www.norad.mil/About-NORAD/Canadian-NORAD-Region/>

<sup>15</sup> *SSE*, 34, “The Royal Canadian Air Force will acquire 88 future fighter aircraft to enforce Canada’s sovereignty and to meet Canada’s NORAD and NATO commitments.”

<sup>16</sup> Tim Zadalis, “Multi-Domain Command and Control: Maintaining Our Asymmetric Advantage,” *Joint Air Power Competence Centre Journal* 26, June 20, 2018. Available at <https://www.japcc.org/multi-domain-command-and-control/>



the U.S. Army to explore developmental avenues for joint and NATO MDC2 integration. This represents the future operational command-and-control environment that the Commander USNORTHCOM/Commander NORAD will employ in defence of North America and is an acknowledged imperative in the RCAF's *Future Concept Directive*.<sup>17</sup> The RCAF has already begun moving toward operations in a multi-domain environment with construction of sensitive compartmental information facilities (SCIF) in order to use U.S. Special Access Program<sup>18</sup> (SAP) products needed for operations. Previously a Level II secret endeavour, alliance and coalition operations have now become a Level III top secret enterprise.

The current Commander USNORTHCOM/NORAD, Gen. Terrence O'Shaughnessy, testified before the Senate Armed Services Committee on Feb. 26, 2019 that "USNORTHCOM and NORAD are driven by a single unyielding priority: defending the homeland from attack" and that he "view[s] the Arctic as the front line in the defense of the United States and Canada" given "[t]he diverse threats arrayed against the United States and Canada [that] challenge our defenses in a number of domains and along multiple avenues of approach."<sup>19</sup> In a companion piece, O'Shaughnessy cited advanced procurements in modernizing the NORAD North Warning System and operating fifth-generation aircraft out of northern bases as military capabilities needed for effective homeland defence.<sup>20</sup> These two capability components are seen as central pieces in the construction of the future battlespace in North America.

Whichever fighter aircraft is ultimately chosen, it must be technologically advanced enough to be a strategic deterrent as articulated on page 50 of *SSE*, and not seen by the U.S. and potential adversaries as a weak link in NORAD. To achieve this, Canada's future fighter aircraft needs to be integral to, and not simply integrated into, the evolving C2 structure of the future. Canada holds a unique and prestigious position in the only bi-national military command the U.S. has permitted, one that the U.S. relies upon to ensure its homeland security. Along with this enormous military responsibility, there is little doubt that the U.S. will hold Canada directly accountable for any breaches in the defence of North America that can be attributed to Canada minimizing its commitment to military preparedness. Moreover, Canada benefits greatly from enhanced air defence without paying the costs of establishing a complex, stand-alone Canadian C2 system.

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<sup>17</sup> Royal Canadian Air Force, *Future Concepts Directive Part 2: Future Air Operating Concept*, Aug. 15, 2016, 9. "Therefore, the RCAF must be prepared to adapt to the evolving NORAD roles and US multidomain concepts of future air operations." Also see John R. Allen et al., "ONE ALLIANCE: The Future Tasks of the Adapted Alliance," The GLOBSEC NATO Adaptation Initiative, November 2017, 7, identifying the NATO need for multi-domain forces. Available at <https://www.globsec.org/wp-content/uploads/2017/11/GNAI-Final-Report-Nov-2017.pdf>

<sup>18</sup> There are three categories of SAPs within the Department of Defense: 1) Acquisition SAPs, which protect the "research, development, testing, modification, and evaluation or procurement" of new systems; 2) Intelligence SAPs, which protect the "planning and execution of especially sensitive intelligence or CI units or operations"; and Operations and Support SAPs, which protect the "planning, execution, and support" of sensitive military activities.

<sup>19</sup> Statement of Gen. Terrence J. O'Shaughnessy, United States Air Force Commander, United States Northern Command and North American Aerospace Defense Command, before the Senate Armed Services Committee, Feb. 26, 2019.

<sup>20</sup> Gen. Terrence O'Shaughnessy, "Look North to Find the Front Line of America's Defense," *Defence News*, Jan. 29, 2019.



## Technological Dimension

SSE identifies the rapid evolution of technology as one of three key security trends that will continue to shape world events. Embracing leading-edge technology in order to gain operational advantage has always been central to air forces worldwide. In most instances, short-term advancements in force development can be accommodated in modern platforms, but there are eventually generational changes that are structural in nature and new systems cannot easily be adapted in older platforms. The current CF-18 is a case in point. Advanced defensive electronic warfare systems cannot be incorporated into the next upgrade that takes the fighter fleet service life to 2032, due to antiquated wiring that would be prohibitively expensive to change. This limits the CF-18's use to low-threat theatres of operation, as the 40-year-old airframe design is highly visible – and therefore vulnerable – to modern air defence systems.

Canadian officials state that a future fighter platform requiring a life expectancy past 2060 will need to be adaptable, flexible and expandable beyond the known current trends. Emerging technologies like artificial intelligence will change the dynamics of decision-making, not only in the platforms such as companion drones and drone swarms, but in the C2 system as well. The cyber-domain will be both an enabler and a threat as sophisticated systems become ever more reliant on computation and information networks. Space is becoming prevalent in all aspects of military operations. The Royal Air Force recently launched the Carbonite 2 satellite with the intention of delivering real-time, high-quality imagery and 3D video footage into the cockpit of every plane. Importantly for Canada, the RCAF leverages two-eyes U.S. space capabilities for remote northern operations and is the only ally on the system.

Former F-15 pilot Gen. David Goldfein, USAF chief of staff, sees a fifth-generation fighter as a computer that happens to fly and part of the connective tissue under the concept of multi-domain operations.<sup>21</sup> The by-design fighter characteristics of sensor information fusion, advanced weaponry, increased survivability through low observability and networked-enabled mission support are essential aspects of the next generation of fighter aircraft. Although the multi-domain concept envisions an open architecture for allies to plug and play, the American approach differs from that of some European nations. Whereas the U.S. maintains separate platform functionalities, France, Germany and Spain have embarked on development of the Future Combat Air System (FCAS). This FCAS concept will comprise multi-platform and multi-node capabilities, such as manned and uninhabited aerial vehicles, remotely piloted aircraft systems, cruise missiles and swarming drones that will work in concert to deliver combat effects.<sup>22</sup> The key elements are to be introduced over the next 20 years and fourth-generation fighters will be kept in mixed fleet air forces long enough to make the expected transition to this sixth-generation fighter system around 2040.

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<sup>21</sup> Sydney J. Freedberg, Jr., “A Computer that Happens to Fly’: USAF, RAF Chiefs On Multi-Domain Future,” *Breaking Defense*, April 18, 2018. Available at <https://breakingdefense.com/2018/04/a-computer-that-happens-to-fly-usaf-raf-chiefs-on-multi-domain-future/>

<sup>22</sup> Gareth Jennings, “Analysis – Euro-Fighter: France, Germany, and Spain Set Out Drivers for Next-Gen Combat Aircraft,” *Jane’s Defence Weekly*, Nov. 19, 2018, and Robbin Laird, “Recrafting the Fighter Role,” *FrontLine Defence*, vol. 15, no. 6, 2018.



As there are significant commercial and national security interests in maintaining military and technological advantages by the U.S. government, fighter manufacturers and equipment suppliers, there will inevitably be significant resistance to enabling non-American fighter aircraft access to advanced, sensitive technology should Canada choose a European model. Canada may have to do without a desired system given two-eyes/five-eyes restrictions, or will likely have to pay exorbitant amounts to have the equipment integrated into the operational flight program (OFP) as access to intellectual property (IP) is highly contained. However, the main question regarding purchase of fourth-generation fighters revolves around how long they can remain technologically relevant into the future advanced operational and threat environments without restrictions to their intended roles identified by government policy.<sup>23</sup>

## Economic/Commercial Dimension

At a cost estimate of \$15 billion to \$19 billion, the FFCP will be the second most expensive procurement in Canadian history, behind the recently announced Canadian Surface Combatant. The government has a fiduciary responsibility to exercise due diligence in seeking the most cost-effective solution and the best value for money. This concept, however, is complicated as various actors within the decision-making process have differing responsibilities with conflicting priorities that compete for short- and long-term interests. Therefore, the process of shaping the bid through mandatory requirements and weighting of evaluation criteria in the final Request for Proposal (RFP) becomes a significant tool in determining preferred outcomes. In the FFCP bid process, two issues of concern to an open and transparent competition have arisen.

The first involves the government's determination to optimize competition through ensuring a sufficient number of qualified bidders. In response to Dassault's decision to withdraw from the bid process due to difficulties in meeting mandatory five-eyes/two-eyes requirements, the government's response was: "We can't have an aircraft that doesn't meet it, but what we've done is we've created the test in a different way ... If your proposal, your aircraft, cannot meet [a requirement] today, we are not saying automatically that you're out; but you have to tell us what is your solution to meet it, at what price and what schedule."<sup>24</sup> This has the effect of abrogating stated military requirements and opens up the possibility of purchasing incompatible equipment that meets a lower threshold. It begs the question of how a foreign business entity can provide an acceptable solution that requires U.S. government approval from the departments of State, Commerce and Defense, which all need to sanction any inclusion of U.S. classified capability.

Second, the government of Canada has a long-standing policy to ensure defence dollars are reinvested into meaningful economic benefits for Canadians. Through the Industrial and Technological Benefits (ITB) Policy, the Department of Innovation, Science and Economic Development (ISED) determines the requirements for economic benefits to create jobs and

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<sup>23</sup> For an American example of the challenges, see Lara Seligman, "How to Get F-35s, F-22s Talking to Fourth-Generation Fighters," *Aviation Week & Space Technology*, Sept. 29, 2016, 1-1.

<sup>24</sup> Daniel Leblanc, "European Fighter-Jet Manufacturer Pulls Out of Canadian Competition to Replace CF-18s," *Globe and Mail*, Nov. 6, 2018.



economic growth in Canada. The policy's objectives are to support the long-term sustainability and growth of Canada's aerospace and defence sectors, support the growth of prime contractors and suppliers in Canada, enhance innovation through R&D in Canada and increase the export potential. Offset obligations such as this have become a favourite tool of government to meet its socio-economic goals, "[b]ut this approach can become dangerous when secondary objectives overtake the primary one and, for example, industrial development objectives trump the goal of acquiring the best military solution."<sup>25</sup> Indirectly, the government of the day can shape a military procurement to meet its short-term interests when it wants through ITB requirements.

In the case of the FFCP acquisition, the ITB requirement is a problematic issue for a fair and transparent process, in part due to conflicts with agreements signed between Canada and the U.S. as part of Canada's participation in the Joint Strike Fighter (JSF) Program. When questioned, a senior official at ISED stated, "The ITB policy is a market-driven approach; it doesn't prescribe to bidders how they need to invest in Canada," and "it will be up to Lockheed Martin to determine how it can meet Canada's requirement for regional offsets if it wants to bid on the contract." This statement is disingenuous for two reasons. First, applying ITB specificity to the guaranteed amount that requires reinvestment contravenes section 7.6 of the PSFD MOU,<sup>26</sup> which explicitly states that F-35 partners will not impose such requirements. Second, it also fails to acknowledge that U.S. government agencies are forbidden, under the U.S.'s *Arms Export Control Act*, from entering into offset obligations within a co-operative project. This supposedly leaves only the more costly option of a foreign military sale (FMS) case to bid the F-35 in the FFCP competition. However, this is not an option so long as Canada remains a JSF program partner. Industry Canada acknowledged this in a 2012 joint strike fighter report:

- If Canada chose to remain in the Program and acquire the F-35, it would do so according to the conditions of the PSFD MOU, including that the IRB Policy would not be applied.
- If Canada wanted to apply its IRB Policy to the acquisition of the F-35, it would need to exit the F-35 JSF Program and (forgo) preferential access to JSF industrial opportunities.<sup>27</sup>

With respect to industrial benefits by participation in the JSF program to develop the F-35 fighter, Alan Williams, former assistant deputy minister (materiel), has written that "Canadian industry's success has been outstanding."<sup>28</sup> Without any obligation to buy, "Canadian companies have so far won more than \$1.2 billion in contracts related to the F-35, according to the government."<sup>29</sup> Eight

<sup>25</sup> Pierre Lagueux, "The Defence Procurement Market is Unlike any Other," *Policy Options*, Jan. 12, 2016.

<sup>26</sup> On Dec. 11, 2006, the deputy minister of National Defence, on behalf of the government of Canada, signed a Production, Sustainment and Follow-on Development Phase Memorandum of Understanding (PSFD MOU). Section 7.6 states: "No requirement will be imposed by any Participant for work sharing or other industrial or commercial compensation in connection with this MOU that is not in accordance with this MOU. However, this will not prevent the Participants' industries from establishing arrangements with JSF Contractors regarding work outside the scope of work of this MOU." Available at [http://www.jsf.mil/downloads/documents/JSF\\_PSFD\\_MOU\\_Update\\_4\\_2010.PDF](http://www.jsf.mil/downloads/documents/JSF_PSFD_MOU_Update_4_2010.PDF)

<sup>27</sup> Government of Canada, "Canadian Industrial Participation in the F-35 Joint Strike Fighter Program," *Industry Canada*, December 2012, 6. This was reaffirmed with the disclosure of letters from the U.S. to the Canadian government in Richard Shimooka, "The Catastrophe: Assessing the Damage from Canada's Fighter Replacement Fiasco," Macdonald-Laurier Institute, May 2019.

<sup>28</sup> Alan S. Williams, "Canada, Democracy and the F-35," *The Claxton Papers*, Queen's University, Kingston, 2012, 10.

<sup>29</sup> Lee Berthiaume, "Canada Forced to Pay Bigger Share of F-35 Fighter Jet Development Costs – Even Though it May Never Buy Any," *National Post*, Jan. 30, 2019.



of the nine partner nations have already purchased the F-35 under the agreed consortium MOU. Countries like Denmark provided specific ministerial dispensation from policies similar to Canada's ITBs so that "the evaluation [was] on an equal footing with initiatives from Boeing and Airbus for, among other things, to ensure equal treatment of the candidates."<sup>30</sup> With Canada contributing \$72 million this year to remain in the JSF program, it is evident that the government does not wish to lose the privileges and economic benefits the program provides. However, without a transparent levelling of the ITB assessment criteria contained in the final RFP, the spectre of the Liberal government's promise that "We will not buy the F-35 stealth fighter-bomber" becomes a reality through other policy means.

The latest concession is that "Ottawa will no longer force all bidders to commit 100 per cent of the value of the aircraft's acquisition and sustainment on spending in Canada. Instead, manufacturers will lose points in the scoring system if they do not make this commitment."<sup>31</sup> This is still inadequate, particularly as the latest reshaping change increases the ITB requirement point score from 15 to 20 per cent of the bid. In a bid, every point counts and the government still fails to concede that the JSF program has already created high-end, sustainable jobs in Canada but that the consortium it belongs to cannot guarantee comprehensive economic outcomes. The current objective scoring system disadvantages the subjective nature of the consortium agreement in which projected potential economic benefits could ultimately surpass the returns required by the ITB policy. A more equitable approach would be to revise the scoring to account for the projected potential earnings from the JSF program as well as the negative repercussions from job losses when JSF contracts are inevitably suspended as a consequence of Canada no longer being a consortium partner. Given the re-emerging great-power competition, it is important to ensure that socioeconomic factors do not inordinately bias the overall cost-benefit analysis needed for Canada to receive the best product for military requirements that still meets beneficial economic returns.

Further explanation for the decision to retain the ITB requirement and preserve a large bidder pool stems from the governing party's short-term parochial interests. In an election year, qualified suppliers will be encouraged to support economic announcements in key political ridings with the expectation that this will positively position their bid when ITBs are assessed. The promise to assemble aircraft in Canada certainly provides work-related incentives, but one must question the long-term economic benefits and export potential of building fighters in a country that refuses to sell civilian helicopters to the Philippines. Additionally, the offer of complete transfer of intellectual property for relatively unique European platforms is a double-edged sword. Without the benefit of a large pool of resources, the costs associated with developing and continually modifying the Operational Flight Program (OFP) – the embedded software that performs the functions and sub-functions necessary for aircraft weapon systems to operate – are huge. After 15 years of operation, Canada stopped producing unique OFP software for the CF-18s and purchased off-the-shelf upgrades from the U.S. Navy due to the costs associated with development and the

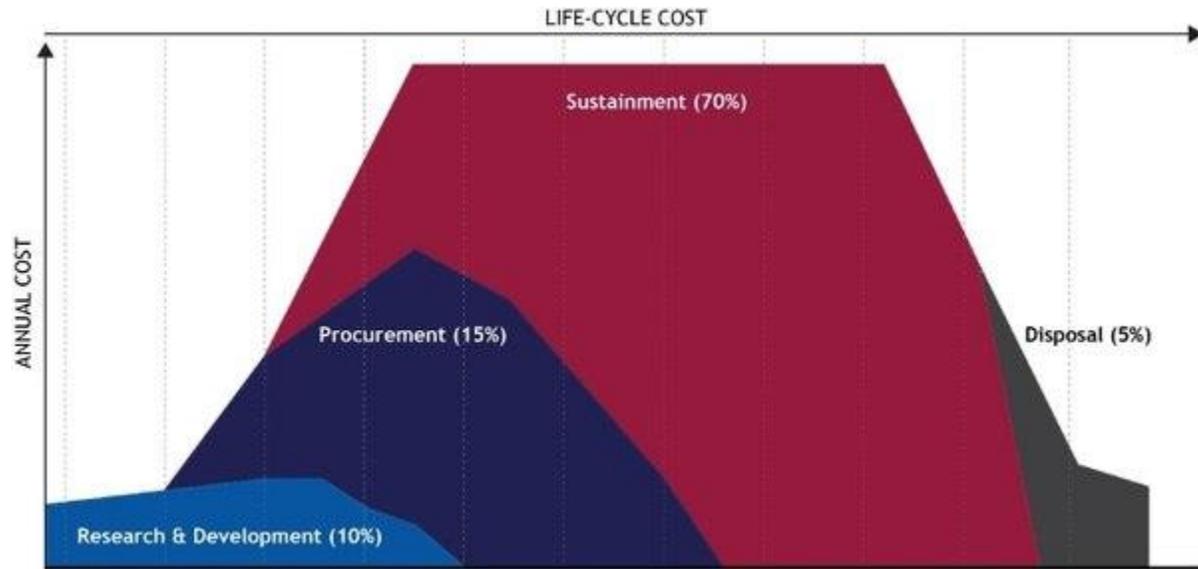
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<sup>30</sup> Denmark Forsvarsministeriet, *Type Selection of Denmark's Future Fighter: Evaluation of Eurofighter, Joint Strike Fighter and Super Hornet*, 2016, section 5.2.1 Special for the Joint Strike Fighter and the Equal Treatment of Candidates, 89-90. Available at <https://fmn.dk/eng/allabout/new-fighter/Pages/nye-kampfly-f35.aspx>

<sup>31</sup> Daniel Leblanc, "Ottawa Changes Fighter-Jet Tender Rules to Address U.S. Pressure Over F-35," *Globe and Mail*, May 9, 2019.



stringent test and evaluation requirements. Getting the OFP wrong results in accidents such as the recent crash of the Ethiopian Airlines Boeing 737 Max. Attempting to integrate discordant equipment into unique platforms is difficult and imprecise. Modifying military requirements to meet short-term parochial socioeconomic interests and benefits can entail unintended costs and consequences.



(Defense News)

DND determines Canada's technical requirements and specifications for the RFP but is also responsible for the long-term operational and sustainment costs associated with the choice of fighter. The RCAF knows the synergistic savings that accrue when operating a common fighter with Canada's principal ally in both domestic and deployed operations as well as in training. Sustainment is the most costly, complex and challenging aspect of the lifecycle cost of the fighter, making this element singularly important to DND when the RFP is developed and the bids are assessed. Fourth-generation fighter aircraft represent the end of the production line, as most air forces look to divest themselves of these fighters by 2040, when these aircraft will be operationally obsolete. It's worth noting that the FFCP is scheduled to achieve final operational capability in 2031, nine years before Canada's key allies plan to divest their fourth-generation aircraft. Sustaining a diminishing or orphan fleet of fourth-generation aircraft until 2060 would be prohibitively expensive and operationally irrelevant.

Fifth-generation fighters are not without their procurement and sustainment problems.<sup>32</sup> U.S. defence officials have questioned the initial capital costs and the affordability of maintaining the fleets. However, reports from the F-35 Joint Program Office (JPO) estimate the cost of Lot 14 F-35A aircraft will decrease to \$76.8 million, thus making the initial procurement comparable to, or cheaper than, some of its competitors. Additionally, the U.S. Secretary of Defense directed the

<sup>32</sup> Shirley J. Franko, "DoD's Sustainment Problem: The Expensive Elephant in the Room," *Defense News*, Dec. 19, 2018, and Valerie Insinna, "US Air Force Aims to Lower F-35 Sustainment Costs to that of an F-16," *Defense News*, March 29, 2018.



JPO to substantially improve sustainability, and measured improvements have been reported to date. In October 2018, Belgium's government chose the F-35 over the Eurofighter primarily on price<sup>33</sup> and the savings benefits accrued over the 40-year life of the aircraft. Belgium chose it from a projected production pool of 3,000 aircraft, defying the myth of the F-35 being an overpriced fighter.

## Political Dimension

Politics is ubiquitous in issues of national security. Governments must determine Canada's defence needs, articulate the way they are to be achieved, provide the means to meet the stated requirements and sell these decisions to the electorate. Unfortunately, under Canada's parliamentary system, the cycle of major Crown projects is progressively out of sync with the electoral cycle and political parties take short-term advantage of the procurement process, which has been the history of the CF-18 replacement. Military needs – the basis for spending the money in the first place – have been obfuscated in the replacement process and significant political capital has been expended through bipartisan mismanagement with no tangible results in procuring a future fighter. One must question the utility and fairness of a competition when the current government is on record for making disparaging statements about both American products. *SSE* sets a very high standard for the fighter force to meet, but for this to be achieved, government's continuous manipulation of the requirement needs to stop and military advice to be respected.

Canada's allies watch with dismay over what should be a very straightforward procurement decision. As an ally and partner in NORAD, the U.S. must wonder how reliable and trustworthy Canada truly is as it witnesses the dithering over an essential element of its shared defence structure. With increasing antipathy, various U.S. agencies have borne the costs of the Harper government's request to realign the F-35 delivery schedule to accommodate Canada, the Trudeau government's aborted request for an FMS procurement of Super Hornets, and the on-again, off-again signals in Canada's commitment to participate in the JSF program.<sup>34</sup> As national security is paramount in the U.S., the president and senior military officials will not look favourably on a marginally useful fighter aircraft defending the country's northern border.<sup>35</sup> Diluting the requirement to select the lowest cost product will require even more American support to be functional. With negotiations on the replacement of the North Warning System imminent, Canada should consider the ramifications of American tolerance to lopsided cost-sharing arrangements. Without a greater strategic outlook on this procurement, Canada risks its reputation as a trusted neighbour, as well as the significant cost savings it enjoys as an integral

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<sup>33</sup> Robin Emmott, "Belgium Picks Lockheed's F-35 over Eurofighter on Price," *Reuters Business News*, Oct. 25, 2018. Available at <https://www.reuters.com/article/us-aerospace-belgium/belgium-picks-lockheeds-f-35-over-eurofighter-on-price-idUSKCN1MZIS0>

<sup>34</sup> Shimooka, 11-12.

<sup>35</sup> "... the American government called on Canada to make sure its fighter jets can operate alongside U.S. military aircraft around the world. The 'crucial' point, according to the American government, is Canada's participation in the North American Aerospace Defence Command (NORAD) that controls the Canadian and American airspace." Daniel Leblanc, "U.S. Government Again Urges Canada to Acquire American Fighter Jets, Despite Pentagon Threats," *Globe and Mail*, May 7, 2019.



partner in North America's defence. At some point, Canada needs to pull its weight, not simply punch above it.

Since there are few votes to be had for defence issues, successive governments have minimized long-term geostrategic considerations through competition in domestic politics.<sup>36</sup> In an election year, there is great temptation for political interference in the procurement process for political advantage in the guise of regional benefits. Granted, philosophical differences in play among political parties will affect how they view economic benefits to Canada. The supply-side economics model of the JSF program<sup>37</sup> is based on industry providing the best value to the program, allowing Canadian aviation industry to compete globally and potentially reap benefits outside the confines of state intercession. This contrasts with the Keynesian economic model of state intervention through mandated ITB reinvestment criteria that are easily targeted, tracked and identified. However, if this is a deterministic factor, the government has an obligation to state this clearly. Otherwise, unwarranted political interference in shaping the process to favour a specific product has a deleterious effect on the professional women and men in the military and public service who see the political spin for what it really is – the self-interest of political parties.

ITBs have been used successfully in many cases for strategic industrial investments; however, this policy also allows the sitting government the ability to target influential ridings with promises of economic gains.<sup>38</sup> The distinction between using ITBs for political party interests or the public good requires that the electorate understand the economic trade-offs to stated military requirements and then hold politicians to account. To ensure this, an RFP based on principled public policy should balance the competing economic models when assessing the overall merits of the future fighter and not presumptuously define the outcome. As the application of ITBs is a policy choice for the FFCP, the current government will determine whether the competition is open and transparent through its decision whether or not to allow equal treatment of candidates in choosing the right fighter to meet national security requirements. Pierre Trudeau's government set the standard when it established the new fighter aircraft program that provided sufficient latitude for public servants and military officers to independently evaluate and present their findings to cabinet for a final decision between two platforms – the F-16 and F-18.<sup>39</sup> The choice of the CF-18 was prescient and has stood the test of time. It would behoove the current government to remember the reason why it is procuring a new fighter fleet in the first place and follow a similar hands-off approach to the FFCP process.

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<sup>36</sup> Matt Gurney, "Nine Years. Two Elections. And Still No New Fighter Jets for Canada," *National Post*, April 18, 2019.

<sup>37</sup> The JSF program is designed to promote best business practices within the aviation industry during the production of the F-35. The real value to Canadian industry accrues through the long-term benefits in the provision of sustainment for the entire F-35 global supply chain.

<sup>38</sup> In announcing that Airbus could possibly "host a fighter plant assembly line and satellite construction plant" in Quebec if the Typhoon is chosen, Simon Jacques acknowledged this situation when he said: "The RFP is coming out in mid of this year, right before the election," Garrett Reim, "Eurofighter Typhoon to Bid to Replace Canadian CF-18 Fleet," *FlightGlobal.com*, Jan. 14, 2019, and The Canadian Press, "Airbus Says Fighter Plane Assembly Plant in Quebec a Possibility if Company Wins Federal Bids," Jan. 14, 2019.

<sup>39</sup> James Robinson and Julienne Jessup, "CF-18 Project," *Canadian Major Projects Association Digest*, April 1992.



## Conclusion

Purchasing a critical military asset that will define the RCAF's defence capability for the foreseeable future is complex and multifaceted. The interplay between the military, technological, economic and political dimensions defies simplistic analysis. The government has directed the CAF to ensure Canadian sovereignty, defend North America and engage in extraterritorial missions at government prerogative. The RCAF has responded to its responsibilities to support its domestic, NORAD and NATO commitments with a thorough, capability-based SOR for the future fighter, taking emerging technologies and critical functionalities of operating in the future battlespace into consideration. The government's choice to have a competition with more than three bidders has resulted in modifications to the assessment of mandatory criteria in critical operational functions, lowering the threshold of acceptable performance measurements. The future fighter needs to be integral to the future North American battlespace – and not merely integrated into it – if Canada is going to fulfil its NORAD/domestic sovereignty obligations and “ensure NORAD is modernized to meet existing and future challenges” (*SSE*).

The European/American product cleavage is more complicated than simply requiring the platform to meet minimum standards, as it pits superior-performing aircraft against platforms that provide more tailorable economic packages. The current government has marginalized the American products in public and appears to favour inclusion of the European fighters for domestic economic reasons by reshaping assessment criteria. Without significant weighting of economic benefits in the RFP, it is unlikely the European companies would compete at all. Suitability and adaptability to two- and five-eyes requirements will be a crucial operational determinant. However, the current ITB policy and measure of points awarded for the economic offset portion in the RFP appears to undermine the primacy of meeting military needs.

The fourth- versus fifth-generation cleavage revolves around long-term sustainment and future technological adaptability. Sustainment represents 70 per cent of the total lifecycle costs of any aircraft. Fourth-generation aircraft are nearing obsolescence and will be difficult to maintain due to diminishing numbers as air forces retire their inventories. With contemporary avionics and weaponry, they will serve as an interim intergenerational solution for Canada but require the military to go back to Treasury Board in 15-20 years' time to ask for a replacement. Either the RFP needs to change the stated requirement that the future fighter last until 2060 and re-scope the project to last only 20 years, or a mixed fleet will need to be considered in the near future. Re-scoping the requirement as an interim solution may be the only justifiable means to allow selection of the fourth-generation and European cleavage platforms.

Canada is a North American state with responsibility to protect not only ourselves but our most important strategic partner and neighbour. Purchasing a North American product makes eminent sense for a host of reasons, but none as important as signalling Canada's commitment to maximizing our effort to help protect the U.S. and remain a “responsible, value-added partner” (*SSE*). The only fifth-generation fighter on offer will likely be the longest surviving platform and is the choice of U.S. element NORAD and eight NATO, plus four allied, nations. This may not be the best fighter aircraft for Canada, but only through an equitable, fair RFP evaluation, free from



political interference, can the best value for money be determined. Reassessment of the ITB policy and its unbalanced application to the FFCP is warranted and needed.

The deputy minister of National Defence has stated that capability is the core component in the procurement process. Allowing economic benefits to prevail over capability during evaluation inevitably changes the empirical equation of the stated government policy that initiated the purchase in the first place. The choice of a future fighter is critical and should have bipartisan support since it now occurs every two generations. To put this into human terms, the first new pilots eligible to fly the next fighter will be graduating from high school this year. Those in kindergarten will have served 35 years in the RCAF by the time the next fighter is purchased. When one reflects on the costs involved and the changes that will occur over the next 40-50 years, the government has a responsibility to deliver the best value to Canadians for the roles it has instructed the military to perform. It also has a duty to ensure that these young women and men – Canada's future aviators – will have the best equipment that Canada can provide to perform the hazardous duties they will be assigned. *SSE* promises this upfront. A fair and balanced competition for the future fighter, uninhibited by overt political interference, will achieve this result, as it did when Pierre Trudeau's government chose the CF-18.

## ► About the Author

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***Alan Stephenson** is an aviation consultant and a 35-year veteran of the Canadian Forces. Colonel (ret'd) Stephenson's extensive knowledge of NORAD and NATO airpower follows from his experience as a CF-18 pilot with 3600 hours flying fighters and as a staff officer at all levels of command. Having held senior appointments such as Special Assistant to the Vice Chief of the Defence Staff, Special Assistant to the Deputy Chief of the Defence Staff, Chief of Tactical Evaluation, and Director of Western Hemisphere Policy, he has a broad understanding of military and interagency operational and strategic interaction, both domestically and internationally. Operationally, he commanded Task Force Aviano during Op ECHO (1999/00) and 410 Tactical Fighter (Operational Training) Squadron, Canada's basic and advanced "top gun" training schools.*

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