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Pilot Error
Why the F-35 stealth fighter is wrong for Canada

By Steven Staples

Main findings

1. Canada does not need the F-35 stealth fighter either for North American/domestic roles or for expeditionary roles.

2. The Canadian government should not proceed with the planned procurement of the F-35.

3. Instead, Canada should—

   a) curtail the expeditionary role for Canadian fighter aircraft;

   b) stretch the life of Canada's existing CF-18 fleet by restricting the aircraft to the North American/domestic air surveillance and control role;

   c) investigate the acquisition of the next generation of unarmed long-range, long-endurance pilotless aircraft; and

   d) use the money saved by the above measures to contribute to Canadian and global security in more effective ways.

On July 16, 2010, the Harper government announced that it intends to purchase 65 F-35 aircraft to replace Canada's CF-18 fleet, beginning in 2016.[1] This decision is fundamentally flawed.

The F-35 is a "fifth generation," multi-role fighter-bomber equipped with "stealth" technology that is being designed and built by the U.S. arms industry giant Lockheed Martin. The United States will be the major buyer of the F-35, with versions of the aircraft acquired by the U.S. Air Force, Navy, and Marine Corps. It is expected that the United Kingdom, Australia, Israel, and a number of other U.S. allies will also purchase the aircraft.

The Canadian government intends to award a sole-source contract (i.e., without a competition among possible alternative aircraft) to Lockheed Martin for the purchase of the aircraft. According to the government, this approach will have the benefit of locking in the purchase price of the aircraft at about $9 billion, avoiding the possibility of future price increases. Contracts for support/maintenance work, however, which could cost another $7 billion, would remain to be negotiated later.[2]

The total cost of the acquisition is thus estimated to be approximately $16 billion, not including the actual costs of operating the fleet. In fact, the cost could run even higher. Other estimates suggest that total life-cycle maintenance costs could run as high as $21 billion, for a total cost of some $30 billion.[3] By committing Canada to the F-35, the government has

put Lockheed Martin in an extremely strong bargaining position in future negotiations over maintenance costs. Canada will need support for the aircraft, and it will have no option as to the source of this support. It will have to contract with Lockheed Martin regardless of the ultimate cost of that support. It may well have been Lockheed Martin's strategy to offer an apparently "low" purchase price to Canada with the intent of recouping the difference through higher support costs once Canada had committed itself to the aircraft.

The sole-source nature of the contract and its expected cost have been widely—and appropriately —criticized. One of the most prominent critics has been the Liberal Party, which has stated that it intends to put the purchase on hold pending a review of military procurement if it wins the next election.[4]

Several other aircraft have been suggested as possible contenders for the contract if it is opened to competition. Such aircraft include the Super Hornet, an enlarged and modernized version of the F-18 fighter that Canada currently operates (the CF-18); the Strike Eagle, a modernized F-15 fighter; the Gripen, a Swedish fighter; the Rafale, a French fighter; the Eurofighter Typhoon, which is being produced by a European consortium and currently being procured by several NATO allies; and even Russian and Chinese aircraft. Some of these aircraft could be worth investigating for Canada as it is likely that a number of them would be able to perform the roles currently performed by the CF-18 at lower cost than the F-35.

However, there is a broader question that needs to be asked about the F-35 procurement. Does Canada really need an aircraft with such capabilities? Do the roles currently assigned to the CF-18 reflect Canada's true security requirements? These questions have received much less attention.

Current CF-18 roles

The CF-18 is currently assigned two major roles in Canadian defence planning:

1. The surveillance and control of Canadian and North American airspace, in co-operation with U.S. forces through the North American Aerospace Defence Command (NORAD); and

2. Participation in expeditionary operations, potentially including air-to-air combat, precision guided munition/bomb delivery, and close air support of forces on the ground.

Canadian/North American roles

The surveillance and control of Canadian and North American airspace entails the identification and control of both civilian and military aircraft in or approaching North America. The civilian air traffic control system is sufficient to handle routine aircraft identification and control, but that system relies on the co-operation of the aircraft being monitored (communication with air traffic control, operation of transponders, etc.). Fighter aircraft are required to visually identify and if necessary use force against unknown or unco-operative, potentially hostile aircraft such as bombers, hijacked civilian aircraft, and smuggler aircraft.

Prior to the 9/11 attacks, civilian aircraft were not considered to be a high priority for air defence operations. Indeed, some experts claimed that NORAD operations were no longer important to the United States and that the organization would be disbanded unless Canada agreed to participate in joint ballistic missile defence operations. This proved to be a short-sighted view. The identification and control of civilian aircraft has now assumed great importance in Canadian and U.S. defence planning.

The immediate reaction of defence planners was to adapt the air defence organization originally established to deal with Russian bombers to deal with civilian aircraft threats. The requirements of the two kinds of operation are similar, but they are not identical. Bomber training flights are normally detected many hours or even days (through their staging operations at forward bases) before their approach to North American airspace; and if a training flight is not intercepted through some failure in the system, the consequences are minimal as no actual hostile action is intended during these flights (an actual attack would be different, but that would imply nuclear war between Russia and the United States, during which attempts at air defence would be irrelevant in any case since the primary delivery vehicle would be intercontinental and submarine-launched ballistic missiles). In the case of a hijacked civilian flight, by contrast, little or no advance warning can be expected, and, while the likelihood of such attacks may well be lower than feared, the

consequences of failing to make an intercept could be very high.

If interceptor aircraft are to play a role in responding to such attacks, however, it is important that they be in the right place at the right time. Large numbers of aircraft are not needed in one place at any one time for this purpose, but the ability to be at multiple, for the most part unpredictable, locations in Canada or the surrounding airspace at very short notice would be highly desirable. This implies an aircraft based near cities or that can be routinely operated away from its main bases, that can fly long ranges at high speeds, and that can also fly at low speed in order to perform intercept and escort procedures on potentially very slow-flying aircraft.

Neither current nor future fighter aircraft such as the F-35 are especially well suited to these requirements. Such aircraft are highly capable in air-to-air combat against other advanced fighters; they can drop precision-guided weapons from high altitude, and, if they have "stealth" capabilities, they are difficult to detect on radar, but none of these capabilities is required to intercept and if necessary shoot down an airliner. Furthermore, it is too expensive to procure large numbers of them, and it is costly to routinely operate them away from their main bases.

Aircraft can be pre-positioned to deal with situations where a higher risk is anticipated (such as during the recent G8/G20 summits), but for the most part such threats are not predictable. It is quite possible, therefore, that if a 9/11 situation were to occur in Canadian airspace, our CF-18 (or F-35) aircraft would not be in position to respond in time. A much less advanced, simpler to maintain, and cheaper interceptor that could be deployed at multiple locations would probably provide much better coverage in this respect.

The traditional NORAD role does not require an especially capable interceptor aircraft, either. The only country that operates bomber aircraft capable of reaching North America is Russia. Russia maintains a small, residual nuclear bomber force composed of aircraft the same age as, or older than the CF-18 fleet: 32 Bear H6 turboprops, 31 Bear H16 turboprops, and 13 Blackjack jet bombers. All are equipped to carry nuclear-armed cruise missiles, but none carry weapons during routine training flights. The Russian government has announced that it will eventually build a new generation of bomber, but nuclear force procurement announcements are frequently made in Russia and rarely acted on; it remains to be seen when or even whether such an aircraft will be built.[5] A number of maritime reconnaissance variants of the Bear are also still in service; these aircraft are sometimes detected off the East Coast, but they pose no more threat to Canada than an Aurora maritime patrol aircraft would pose to Russia.

Russia continues to conduct occasional bomber training and reconnaissance flights near North American airspace. Some of these flights enter the Canadian Air Defence Identification Zone (CADIZ) near the Beaufort Sea in the North and near Newfoundland and Labrador,[6] but none enter Canadian sovereign airspace.[7] During the Cold War, it was considered desirable that Canadian aircraft demonstrate the ability to intercept these bombers, not because it was feared that they might attempt to enter Canadian airspace in normal peacetime, and not because air defence would be useful during an all-out nuclear war, but because it was feared that the Soviets might attempt to pressure Canada (and the United States) by flying bombers into North American airspace during a major global crisis or conventional war if there were no air defence forces to stop them. Presumably this far-fetched scenario, dubbed "Bears over Winnipeg," or some modern variant involving bombers or reconnaissance aircraft flying into Canadian airspace with impunity if we aren't there to stop them, is still the major justification for conducting the intercepts.

Whatever the purpose, it is manifestly *not* to discourage Russia from maintaining a strategic bomber force. In fact, it has been and remains long-standing U.S. policy to encourage Russia to shift its nuclear forces toward greater reliance on bombers. The warhead counting rules incorporated in the recently signed New START agreement, which deeply discount bomber weapons, reflect this goal. Bomber forces are considered by the U.S. to be more stabilizing than intercontinental ballistic missile forces.

Such intercepts do not in any case require an aircraft with the advanced technology of an F-35. Cutting-edge air-to-air combat and "stealth" capabilities, in particular, are irrelevant. Bombers (and spy planes) do not dogfight, and they don't operate search radars, for the simple reason that to do so would expose their

own location and thus make them more susceptible to being shot down.

The continuing need for identification and control of civilian aircraft (and the desire to prevent theoretical "Bears over Winnipeg" options) argue against the elimination of all air defence capabilities, but these roles do not require a capability even more sophisticated than that of our existing CF-18 force, and it might even be preferable to have a less capable, but cheaper and more numerous, force.

Expeditionary roles

The other major existing role for Canadian fighter aircraft is participation in expeditionary operations. Such participation could include air-to-air combat missions, precision-guided munition/bomb delivery, and close air support of forces on the ground.

Canadian air forces have participated in several expeditionary operations since the Second World War, including the Korean War (1950–53), the first Gulf War (1991), Bosnia (1997), and the Kosovo war (1999). Canadian troops are currently involved in another expeditionary operation, the war in Afghanistan (2001–present), but other coalition members have provided the fighter-bomber forces used in that conflict. All of these missions have been coalition operations, led by the United States and involving a large number of U.S. allies and other countries; there is no prospect of Canada going to war overseas in the absence of such a coalition.

Several points are worth making about such operations.

1. Participation in expeditionary operations is a matter of choice, for Canada as well as for other countries. Canada should limit its participation in such missions, restricting its operations under normal circumstances to UN-led missions, and those only when Canada decides that the mission makes sense, has a reasonable chance of success, and serves Canadian as well as global interests.

2. Despite our position as the 13th largest military spender in the world *(see Table 1),* Canada has limited military power relative to the big spenders. Also, as the second largest country in the world, a significant portion of our military spending should be dedicated to disaster relief, search-and-rescue, and constabulary patrols along our three coasts. Our potential military contribution to expeditionary missions will be neither necessary nor sufficient for the success of operations involving significant use of force. It will always be at the margins. Thus, the nature of the forces we contribute, and—of particular relevance to this analysis—whether and in what way Canada contributes air forces to such operations are also fundamentally matters of choice for Canada, in consultation with its partners. Such contributions may be valued by our allies, but they will not be essential.

3. Canada has never attempted to supply all types of air capability on such missions, and it would not make sense for Canada to attempt to do so. Canada does not possess the full range of air capabilities; its allies (especially but not only the U.S.) already maintain air forces much larger and more capable than Canada's; and airfield space in the theatre of conflict typically limits the size of the air forces that can be brought to bear far more than any potential shortage of capability among coalition partners. It would be ridiculously inefficient for all countries to try to maintain all forms of military capability: the effort to build mini all-purpose armed forces is one of the main reasons that the non-U.S. members of NATO, Canada included, often seem to have little capability to show for the $300 billion per year they spend on their militaries. This point may be especially relevant to the F-35. As another critic of the purchase has pointed out, the capability that the F-35 is expected to provide that other aircraft do not is penetration of enemy air defences on the "first day" of a war, prior to their comprehensive destruction.[8] This is a niche first-strike capability that the U.S. will maintain, regardless of Canada's procurement decisions, and for which there is no requirement for Canadian participation.

4. Specializing in a smaller range of more general-use capabilities would enable Canada to make a much more significant contribution per dollar spent to those missions that Canada does choose to join. Those contributions might normally consist of land forces. If, however, Canada wished to retain the option to make occasional air contributions to such missions, it could leave air superiority and other high-end air combat roles to its allies and focus on capabilities such as pilotless surveillance aircraft, transport planes, and heavy-lift helicopters. Such aircraft would be useful for a much broader spectrum of operations than those for which fighter-bombers are suited, including

humanitarian and peacekeeping as well as combat missions.

The fundamental point is that Canada does not *need* high-end fighter-bomber capabilities for expeditionary roles; the decision to acquire such capabilities is thus a matter of choice, not necessity. Since such capabilities are also not required for the surveillance and control of North American airspace, there is no good argument for procuring the F-35. This basic fact needs to be borne in mind when assessing the more specific claims that have been advanced by the government in defence of purchasing the aircraft.

Specific claimed benefits of the F-35

Fifth generation/stealth technology

It is claimed that the Canadian Forces need, or at least deserve to be provided with, the cutting-edge "fifth-generation" fighter-bomber capabilities that the F-35 will carry. These capabilities will enable Canadian fighters to penetrate highly advanced air defences and/or defeat other fighters currently in service or planned for production.

But where is Canada likely to run into such adversaries? It won't happen in Canadian airspace, which is well out of range of all but the Russian long-range bomber force, against which (as noted above) fifth-generation stealth capabilities are of no relevance.

The only conceivable circumstances under which Canada might find a use for such capabilities would be in expeditionary roles, if Canada, presumably in co-operation with the U.S. and other international partners, chose to intervene militarily against a country that, unlike Afghanistan, possesses a highly advanced fighter aircraft fleet and/or a highly advanced air defence system of its own. As noted above, even if this were to occur, it does not follow that Canada would need to contribute "fifth-generation" fighters to the coalition effort.

Furthermore, potential adversaries with highly advanced air combat or air defence capabilities are surprisingly hard to find. There is no way to acquire a highly advanced fighter aircraft fleet and/or air defence system on the cheap. Iraq spent billions of dollars on its air defences prior to the first Gulf War, yet the effectiveness of its defences against the coalition air forces of 1991 was almost negligible. As for other countries, it takes more than a couple of high-profile purchases of a Russian surface-to-air missile, no matter how advanced, to make a cutting-edge integrated air defence system.

Table 1. Top military spenders, 2009[9]

	($US billions)
1. U.S.	661
2. China	100
3. France	63.9
4. U.K.	58.3
5. Russia	53.3
6. Japan	51.0
7. Germany	45.6
8. Saudi Arabia	41.2
9. India	36.3
10. Italy	35.8
11. Brazil	26.1
12. South Korea	24.1
13. Canada	***19.2***
14. Australia	19.0
15. Spain	18.3

Only a very few countries have the economic and technological strength to acquire aircraft or air defence systems of sufficient size and even close to sufficient technology and capability to require "fifth generation" capabilities such as those promised for the F-35.

Table 1 shows the top 15 military spenders in the world in 2009; together these countries accounted for 82% of the entire world's military spending.

The first thing to note is that most of the countries on the list are U.S. allies, or at least fundamentally "Western" aligned. Aside from the Western world, only Russia, China, and India are among the top 15 spenders. All three are large, potentially extremely powerful countries. But the chances of war with any of them are very small. All three are nuclear-armed, and all three are strongly focused on expanding their trading relationships with the rest of the world. Our relations with them are for the most part good, and there are no issues at stake between any of these countries and the Western world that any country would consider justify nuclear Armageddon. Even Russia, painted by some as a potential competitor in the Arctic, is firmly committed to applying the law of

the sea to delimit the extent of its jurisdiction there, and recently resolved a major boundary dispute with Norway, a NATO member. None of the three countries is a likely military adversary.

Moreover, even if such a war did take place, a Canadian contribution of 65 aircraft (or fewer) to allied expeditionary efforts would be marginal at best. It would be irresponsible—from both a defence and economic perspective—to base Canadian military purchasing priorities on the procurement of token forces for a high-tech version of the Second World War against any of these countries.

Interoperability

The government also argues that procurement of the F-35 will ensure that Canada's air force remains interoperable with those of our closest allies.

But what does that mean? The new "battlespace" information-sharing and processing technologies that are to be incorporated into the F-35 are not present in current aircraft, and it is fair to say that only aircraft that contain those technologies will be able to operate in a fully integrated manner with other aircraft using those technologies.

But that does not mean that the thousands of other fighter aircraft that will still be in the skies for many years to come will no longer have any ability to play a role in combined operations. Even if it is true, as some argue, that improvements in air defence technologies are changing the paradigm of offensive air operations, making older generations of aircraft obsolete, that problem would arise only against a small number of potential adversaries, and only in the very initial phases of a conflict: the likelihood that these new technologies will dominate the skies in places like Afghanistan in coming years is very small.

Something else seems to be going on here. "Interoperability" in this case seems to be a code-word for maintaining equipment identical to that operated by the United States. (A number of other allies, most notably the U.K., are also planning to procure the F-35, but it has been a long time since Canadian procurement policy placed any special significance on acquiring British, still less Australian, Norwegian, Turkish, Israeli, etc., equipment beyond the general issue of interoperability within the alliance as a whole.)

The U.S. is the dominant military power in NATO, and indeed the world, and also Canada's partner in North American security, so it is hardly surprising that the Canadian government should consider the ability to conduct combined operations with the U.S. important. But there is no reason to conclude from that fact that we must acquire identical equipment in order to participate in combined military operations. Canada never operated F-15 or F-16 fighters. We never acquired F-117 stealth fighters, nor will we acquire F-22s. We haven't operated strategic bombers since the Second World War. We stopped operating aircraft carriers 40 years ago with the retirement of HMCS *Bonaventure*. Our army fights alongside that of the U.S. without operating M-1 tanks, Bradley armoured fighting vehicles, Apache attack helicopters, the Multiple Launch Rocket System, the Patriot anti-aircraft missile, or many other key pieces of U.S. equipment. It has been fighting in Afghanistan for nine years, and not once during that period has the Canadian government felt it necessary to deploy Canadian fighter capabilities to that country.

In short, Canada does not need to operate identical types of equipment—or even to maintain identical kinds of capability—in order to conduct combined operations with the United States and other allies.

Canada's ability to conduct combined operations with its allies, which is the important issue, depends on agreed command and control arrangements, compatible doctrine, compatible communications, suitable combined operations training, compatible (at least to some degree) logistics systems, and at least somewhat complementary—but not necessarily identical—capabilities. These are the kinds of factors that will determine how well the Canadian Forces are able to conduct combined operations with the forces of other countries, and they will not be threatened by a failure to procure the F-35. A decision to procure more useful capabilities would actually increase the ability of the Canadian Forces to contribute to combined operations with Canada's allies.

Industrial benefits

Another claim advanced by the government is that purchase of the F-35 will bring significant economic benefits to Canada by opening the way for Canadian businesses to participate more deeply in production of the aircraft. In its F-35 press release, the government

suggested that "Canadian industrial opportunities could exceed CAD$12 billion."[10] As Project Ploughshares has demonstrated, however, such claims are dubious at best.[11] The F-35 program contains none of the spelled-out "offsets" that are typically built into large military procurement projects, and thus claims of future economic benefits are based on little more than hope. Canadian defence companies should insist on specified offsets before they support the F-35 program, and their shareholders might wish to question why they are not. Even when Canadian companies do secure production contracts related to the program, the sales they make will likely be smaller than currently estimated, as rising costs cause the number of countries that can afford to purchase the aircraft, or the number of aircraft they can afford to purchase, to shrink.[12]

At the same time, there may well be foreign policy costs to industrial participation in the program. As with the other arms components it produces for U.S. systems, Canada will have essentially no control over which countries are permitted to acquire the F-35. This will be determined by U.S. foreign policy priorities, which, although similar in many respects, to Canada's are not identical.

The "industrial benefits" argument is in any case deeply flawed. The expenditure of $16 billion on virtually any government program, such as commercial aircraft or light rail systems, would provide similar or greater benefits to the Canadian economy. Such "benefits" do not create a justification for buying an aircraft that we do not otherwise need.

Fighter pilots love them?

Finally, Defence Minister Peter MacKay has argued that Canada needs to buy the F-35 because procuring an advanced aircraft like the F-35 will make it easier to recruit and retain future fighter pilots.[13] This claim sounds very much like the kind of "toys for boys" explanation that would normally be rejected out of hand by defence ministers and their like, but even if he were serious, it would hardly represent a convincing justification for spending $16 billion or more.

The way ahead

As the preceding analysis demonstrates, Canada does not need the F-35 either for North American/domestic roles or for expeditionary roles. The North American/domestic air surveillance and control role is not a highly demanding task, and the Canadian expeditionary fighter-bomber role is entirely optional—neither we nor our allies have any requirement for a Canadian capability to undertake such operations.

A decision to curtail the expeditionary role would enable Canada to restrict the operations of our existing CF-18 fleet to the North American/domestic air surveillance and control role. With fewer aircraft flying, less demanding flight profiles being flown, and technological obsolescence not an issue, this would enable the CF-18s to continue serving for many more years, delaying any need to seek a replacement for the aircraft.

Cancelling the F-35 procurement would save Canadians many billions of dollars, which could then be used to contribute to Canadian and global security in more effective ways.

Delaying the CF-18 replacement would also provide more time for pilotless aircraft technology to mature. In the future, it may be possible to transition to the use of pilotless aircraft to perform many of the roles currently assigned to the CF-18. Canada should investigate the acquisition of a fleet of unarmed long-range, long-endurance pilotless aircraft for domestic and coastal surveillance,[14] assistance in search operations for search and rescue, and surveillance on overseas missions. More advanced versions of such aircraft may even be able eventually to take on the North American/domestic air control task as the CF-18s reach the end of their extended operational lives.

Conclusions

Canada does not need the F-35, either for North American/domestic roles or for expeditionary roles.

The Canadian government should not proceed with the planned procurement of the F-35.

1. Instead, Canada should :

    a) curtail the expeditionary role for Canadian fighter aircraft;

    b) stretch the life of Canada's existing CF-18 fleet by restricting the aircraft to the North American/domestic air surveillance and control role;.

c) investigate the acquisition of a fleet of unarmed long-range, long-endurance pilotless aircraft for domestic and coastal surveillance, assistance in search and rescue, surveillance on overseas missions, and eventually the North American/domestic air control task; and

d) use the money saved by the above measures to contribute to Canadian and global security in more effective ways.

Steven Staples *is a defence policy analyst, CCPA Research Associate, and president of the Rideau Institute. He is author of* Missile Defence: Round One *and co-editor of* Afghanistan and Canada*. His other works includes studies on defence procurement, defence spending, Afghanistan casualties, and Arctic security.*

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Notes

1 "Canada's Next Generation Fighter Capability – The Joint Strike Fighter F-35 Lightning II," *DND news release BG–10.018*, 16 July 2010 (http://www.forces.gc.ca/site/news-nouvelles/news-nouvelles-eng.asp?cat=00&id=3471)

2 Michel Comte, "Canada to buy 65 Lockheed Martin fighter jets," Agence France Presse, 16 July 2010 (http://www.google.com/hostednews/afp/article/ALeqM5jkHYYq3Bp6NFLAbvfjp9tQuacnFw).

3 Kenneth Epps, "Why Joint Strike Fighter aircraft? Program costs rise and benefits carry risks," *Ploughshares Briefing 10/3*, August 2010 (http://ploughshares.ca/libraries/Briefings/brf103.pdf).

4 "Liberals will put a hold on sole-sourced fighter jet contract," Liberal Party of Canada, 15 July 2010 (http://www.liberal.ca/newsroom/news-release/liberals-will-put-a-hold-on-sole-sourced-fighter-jet-contract/).

5 Nor would it matter. Routine training flights, regardless of the age of the bomber, do not entail hostile intent, and such bombers would play a small role at most during a nuclear war; such a war is extremely unlikely, except through accident or miscalculation, and air defence would play essentially no part in its outcome, which would inevitably entail global devastation. The only protection against such a war is its prevention, ultimately through the elimination of nuclear weapons.

6 For recent statistics, see David Pugliese, "NORAD logs few Russian flights," Ottawa Citizen, 4 September 2010 (http://www.canada.com/technology/technology/3482196/story.html).

7 Parts of the CADIZ overlap Canadian territory, but the areas where Russian training flights take place are in international airspace.

8 Mark Collins, "What the F-35 in mainly about," Unambiguously Ambidextrous blog, 8 September 2010 (http://unambig.com/what-the-f-35-is-mainly-about/); but see Carlo Kopp, "Assessing Joint Strike Fighter Defence Penetration Capabilities," *Air Power Australia Analysis 2009-01*, 7 January 2009 (http://www.ausairpower.net/APA-2009-01.html) for a sceptical view of the F-35's capabilities in this regard.

9 "The 15 countries with the highest military expenditure in 2009," Stockholm International Peace Research Institute, 2010 (http://www.sipri.org/research/armaments/milex/resultoutput/milex_15).

10 "Canada's Next Generation Fighter Capability – The Joint Strike Fighter F-35 Lightning II," *DND news release BG–10.018*.

11 "Why Joint Strike Fighter aircraft? Program costs rise and benefits carry risks," *Ploughshares Briefing 10/3*.

12 *The Economist* recently speculated that the United Kingdom will reduce its order by more than half to around 60 aircraft: "Into the storm," *The Economist*, 9 September 2010 (http://www.economist.com/node/16994358?story_id=16994358).

13 John Geddes, "One thing about new fighter jets – fighter pilots love them," *Macleans.ca*, 16 July 2010 (http://www2.macleans.ca/2010/07/16/one-thing-about-new-fighter-jets%E2%80%94fighter-pilots-love-them/).

14 U.S. drones are already patrolling the Canada/U.S. Border. See, for example, "Predator drones patrolling Canada-U.S. Border," *National Post*, 24 June 2010 (http://www.nationalpost.com/news/story.html?id=1727873).