

## March Meeting

Topic: "Canada's New Fighter Comparisons"

Speaker: Richard Banigan

Reporter: Gord McNulty

CAHS Toronto Chapter 2<sup>nd</sup> Vice-President Neil McGavock introduced a familiar presenter to the Chapter in Richard Banigan. A noted Canadian aviation artist and historian, Richard lives in Tiny Township near Penetanguishene. He is a founding partner of Studio High Techniques, a computer graphics and desktop publishing firm. He previously spoke to the Chapter in December, 2006, on Canadian Mosquitoes in the Chinese Civil War (Flypast Volume 41, Number 5). He also spoke to the Chapter in March, 2011 about "Postwar Canadian Lancasters (Flypast V45 No. 6). Richard joined the RCAF out of Etobicoke Collegiate in 1960. He obtained his Wings at Gimli, Manitoba, in May, 1962. He was sent for multi-engine training and ended up on Lancasters. Richard flew FM104 and FM213 at 107 Rescue Unit, Torbay, Newfoundland, then KB882, KB976, and KB839 with 408 Squadron, Rockcliffe. He finished on C-119 Flying Boxcars and Dakotas at Trenton.



Speaker: Richard Banigan

*Photo Credit - Neil McGavock*

Richard returned to school and graduated with a B.A. from York University in 1968. He worked in the public relations department at de Havilland Canada from 1967 to 1969, then received a fellowship to study at Stanford University in California for a couple of years. He started teaching at St. Clair College in Windsor in 1972. Richard then married and acquired an instant family of six in 1975. He continued teaching at Sheridan College in Oakville from 1979 and obtained his M.Ed. from OISE/UT in 1986. Richard started his own computer graphics and desktop publishing business in 1987. He co-founded the Toronto Aerospace Museum (now the CASM) in 1995 and is member #2. His father worked on Mosquitoes at de Havilland in World War II, and his grandfather was office manager in 1931. He can be reached at 705-533-1495 or [banigan@thunderstar.net](mailto:banigan@thunderstar.net)

Richard's PowerPoint presentation was based on Internet research, much of it in the past year as debate raged about the choice of a replacement for Canada's CF-18s. The Harper government's sole-source plan to acquire the Lockheed Martin F-35 fifth-generation stealth fighter in July, 2010, originally announced at \$9-billion, ignited huge controversy. Faced with soaring cost overruns, performance issues, delays and uncertainty among other partners in the Joint Strike Fighter program, the government put the F-35 on hold in December, 2012 and began to re-examine fighter options.

Richard welcomed comments from the audience. He started with an overview of the potential threat posed by contemporary Russian bombers and fighters. Many Russian military aircraft are now found throughout the Third World. The international climate has evolved considerably since CF-18s originally entered service in the interceptor role. CF-18s were deployed to fly top cover in the Gulf War, as well as to Bosnia, for ground attack, and in Libya, for ground attack, in addition to the

traditional role of defending Canada's security and sovereignty in the Arctic. "Fortunately, the CF-18 turned out to be a very good multi-role fighter," Richard noted. He said that although the Hornet isn't "the fastest horse in the stable," and doesn't have the greatest range, it does most of its jobs quite well.

Russia's Tupolev Tu-95 'Bear' long-range turboprop is still flown in reconnaissance and Arctic sovereignty roles, supported either in service or storage by the Tupolev Tu-222M 'Backfire' and the Tupolev Tu-160 'Blackjack,' both of which were designed as supersonic, swing-wing bombers. The 'Blackjack' is slightly larger than the Rockwell B1-B Lancer. Russia doesn't threaten to deploy these aircraft as long-range bombers with the thawing of the Cold War, but they remain part of its arsenal. Russian fighters are led by the Sukhoi Su-27 'Flanker' family of twin-engined, well-armed, highly manoeuvrable fighters, dating back to the prototype first flight in 1977. Variants include the Su-30 dual role fighter, the Su-33 naval fleet defence interceptor and the Su-35 'Flanker E' improved air defence fighter.



Sukhoi Su-37 Flanker F Demonstrator  
*Photo Credit - www.airforce-technology*

The latest generation Su-37 demonstrator has thrust-vectoring nozzles as well as independently controllable canards. Richard considers the 'Flanker' to be "the current world beater," in some respects at least. It has superb takeoff performance, is very fast, highly agile, and has excellent armament and range. The Su-37 has impressed at numerous air shows, performing spectacular manoeuvres such as backflips and tail slides. As outstanding as these low-speed aerobatic feats are, Richard questioned how effective they would be in combat when the priority is often to find a target quickly and get out quickly. The Su-37 remains experimental and has not entered production so far, but as many as 19 countries have other models of the 'Flanker,' even Venezuela. China purchased the Su-27 and then made its own copy, the Shenyang J-11. Richard noted the 'Flanker' has become widespread as it's relatively cheap. He said four could be purchased for the price of a single F-35.



Sukhoi Su-37 Showing two-dimensional thrust vector control engines  
*Photo Credit - www.airforce-technology*

The capability of the 'Flanker' was shown in an exercise known as Cope-India involving Sukhoi Su-30s and MiG-21s of the Indian Air Force and U.S.A.F. F-15C Eagles, reported in Aviation and Space Technology magazine. The radar on the MiGs was turned off. Instead, the Indians cleverly improvised and had the Su-30s fly top cover with their advanced radar, almost like an Airborne Warning and Control System (AWACS) aircraft. The Su-30 pilots were able to simulate-fire their Russian-made missiles first, and they showed a clear advantage over the F-15s. Richard said that in reality, an F-15 has never been lost in combat but the Indian exercise "really opened some eyes." Further

proliferation of the 'Flanker' to countries that aren't friendly to the West, is possible. One potential deal, for example, could conceivably involve a trade between China and Iran to supply China with oil and Iran with the 'Flanker.'

Design of stealth fighters is challenging in several ways. They tend to be large in size, partly as a result of space required to store weapons internally. That means a larger airframe and invariably, bigger engines. The stealth advantage can be lost when the armament bay doors are opened. Another worry is that the Russians are way ahead of the West in infrared sensing technology. Stealth fighters require a large amount of maintenance and are very expensive. High costs led to the retirement of the Lockheed F-117 Nighthawk in 2007 and to massive cuts in the F-22 Raptor program. Growing problems with the weight and cost of the F-22 were evident after its inception in 1991 when, as the YF-22, it won the Advanced Tactical Fighter stealth competition over the Northrop YF-23. Production ended in 2011 after 195 F-22s were built.

As for Russian stealth designs, Sukhoi has the PAK FA, a twin-engine fighter intended to be the successor to the MiG-29 and Su-27 and serve as the basis of a fighter program being developed with India. The PAK FA T-50 prototype first flew in January, 2010. China, for its part, also has the Chengdu J-20, a twin-engine stealth fighter which first flew in January, 2011. It will be some time before it enters service, though observers have been surprised at the progress. The J-20 has a long and wide fuselage, with a nose section and canopy resembling the F-22. Some of its features also resemble the F-117. There is speculation that the J-20 may have used stealth coatings and partial engineering from an F-117 shot down over Kosovo in 1999 after its armament bay doors were opened. The Chinese also have the Shenyang J-31, another twin-engined stealth fighter, believed to be smaller and more agile than the Chengdu J-20. The J-31 first flew in October, 2012. Japan, meanwhile, is developing a stealth fighter, the Mitsubishi ATD-X Shinshin, moving ahead after the U.S. banned the export of the F-22.



PAK-FA Russia - India  
*Photo Credit - Wikipedia*



F-35A  
*Photo Credit - Postmedia News*

Discussing the F-35 Lightning II, Richard noted three models of this single-engine fighter are planned: F-35A (conventional takeoff and landing); F-35B (short takeoff and vertical landing); F-35C (carrier-based.) When Richard first saw the F-35, he felt the fighter looked as if it was overweight and it has proven to be. The project originated with the X-35, which won the Joint Strike Fighter stealth competition over the bulky Boeing X-32 in 2001. Staggering costs and delays continue to jeopardize the F-35. The New York Times estimated the eventual cost per aircraft will be \$137 million, compared to \$75 million originally. Life-cycle costs for all three variants

were projected as rising to \$1.1 trillion --- or two-thirds the cost of the Afghanistan war. A congressional report stated the F-35 was overweight, and that steps to reduce weight could make it more vulnerable in combat. Richard also questioned the value of a large Gatling-type rotary cannon, internally mounted on the F-35A and external on the F-35B and F-35C, which adds weight. He made the eye-opening statement that the vectored thrust tailpipe on the F-35B is patented by Sukhoi, requiring Lockheed to pay royalties.

Richard noted that several observers believe the F-35 is a failure because its design was compromised in trying to meet the conflicting needs of three branches of the U.S. military. "I think we need a multi-role fighter, but this isn't it," Richard said. The program now faces even more pressure with defence budget cuts in the U.S. which Richard suggested will curtail the F-35B. He described a litany of problems with the F-35B. Overall, the large infrared signature of the F-35 series makes the aircraft vulnerable to heat-seeking missiles, and the single engine is another issue. Richard noted that Israel found in the Yom Kippur War that almost all of its single-engined Skyhawks were shot down in the first couple of days, but its twin-engined Phantoms fared much better. They were able to survive if one engine was knocked out.

Richard provided an overview of other Western fighters that could potentially replace the CF-18:

*Boeing F-15E Strike Eagle:* The F-15E is a derivative of the proven F-15 long-range, high-speed, multi-role fighter that is a mainstay of the American, Israeli and Saudi air forces and has flown operations in Iraq, Afghanistan and Libya. F-15s have scored impressively in combat over the years. For example, 33 Iraqi jets were destroyed by F-15Cs during Operation Desert Storm in 1991. The F-15 is not a stealth aircraft, but like the 'Flanker,' has evolved over the years and is considered vastly superior to many potential adversaries. A further upgrade, the F-15SE Silent Eagle, contains stealth features such as internal weapons storage and radar-absorbent material. A demonstrator first flew in July, 2010. The F-15 is touted as being cheaper to maintain and operate than the F-35.



Boeing F-15E Strike Eagle  
Photo Credit - U.S. Air Force

*Boeing F/A-18 Super Hornet:* The Super Hornet, an advanced version of the proven F/A-18 and CF-18 Hornet, is about 20 per cent larger than its predecessor. It has a 25 per cent larger wing area and GE 414 engines that produce 35 per cent more thrust than the 404 in the CF-18. The Super Hornet also has 33 per cent additional internal fuel to improve mission range and endurance, though the range is less than the F-15. It's considered to be at least partially stealthy and its avionics have commonality with the CF-18. More than 400 are in service with the U.S. Navy and 24 with the Royal Australian Air Force. The extra strong landing gear and short takeoff capability of the Super Hornet makes it good for operations from short or rough runways. Boeing is now making a strong pitch to convince Canada to buy the Super Hornet at much lower cost than the F-35. Richard observed, however, that the Super Hornet would not be able to compete with the 'Flanker' except at lower speeds. He described the Super Hornet as "not quite" world class.

*Eurofighter Typhoon:* The highly agile Typhoon is described as a superb dogfighter, with the lowest wing loading of any of the current fighters. While it has limitations, such as range and payload, and isn't designated a stealth aircraft, the Typhoon is very fast and popular with pilots. More than 300 are in service with five European air forces and Saudi Arabia. While reported to have proved lethal against American non-stealth jets in war games, its range could be problematic for Canada.



Eurofighter Typhoon  
*Photo Credit - BAE*

*Dassault Rafale:* France's multi-role Rafale isn't as fast as the Typhoon but it's faster than the Super Hornet, is highly agile and is considered partially stealthy. It's being produced for the French air force and for carrier operations with the French navy, and has seen combat in Afghanistan, Libya and Mali. India has chosen the Rafale after a close competition with the runner-up Eurofighter. It will be built in India by Hindustan Aeronautics. The Rafale has raised concerns about lack of interoperability with Canadian and NATO forces and about complexity in trying to serve multiple roles.



Saab JAS-39 Gripen E/F  
*Photo Credit - Saab*

*Saab JAS-39 Gripen:* Sweden's Gripen (Griffin) has found its niche as a cost-effective, lightweight, multi-role fighter. The Gripen falls into the mid-range in terms of speed and range, is considered the least expensive of all the contenders, and is fully compatible with NATO. From Canada's perspective, a drawback is its single engine. It isn't considered a stealth aircraft but like the Typhoon and the Rafale, the Gripen has a reduced radar signature. It has done well in the export market, flown by South Africa, the Czech Republic, Hungary, and others. Interestingly, it has been flown by the British Empire Test Pilots School since 1999. Saab has offered to allow Bombardier to

build the Gripen in Canada. Some observers have written articles recommending the Gripen as Canada's best choice, but others believe it's better suited to smaller countries.

Richard answered a number of questions. He said it's very difficult to compare the various contenders, all of which have strengths and weaknesses. When assessing performance, much depends on the suitability of the role as decided by Canada's defence department. "To me, the number one job our military has is protecting our national sovereignty," Richard said. "So Arctic sovereignty flights have to be a top consideration. For that we need range...not necessarily speed, but range, yes. Two engines? Yes, definitely." Richard questioned the concept of making stealth and ground attack priorities, suggesting that stealth would be needed only for conflicts such as Bosnia and Libya requiring strike capability. He suggested that after the initial strike, stealth aircraft lose the element of surprise. While he said stealth has some value, it shouldn't be emphasized to the point of compromising airframe design to the detriment of overall performance. Stealth drives cost up, and payload down.

Bob Winson, Programs Volunteer, thanked our speaker for his most enjoyable, enlightening and comprehensive overview and presented a gift in appreciation. Richard brought CDs of his presentation for sale at a bargain-priced \$10 each. He finished with a bang by showing a stunning, full-sound video of the 'Flanker' in action...you could call it "Thunder over Toronto!"

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The contents of this article were originally presented to the CAHS Toronto Chapter at a previous meeting or event. All / or some material has been edited and adapted for this website. Many thanks to CAHS Toronto Chapter for their courtesy in the use of this material. CAHS Toronto Chapter Meeting & Membership information is available elsewhere on this website