



DND photo CX2012-0152-37 by Sergeant Robert Bottrill

Canada's 2012 Demonstration *Hornet* soars over the Strait of Georgia and Vancouver Island's coastline, 4 May 2012.

CANADA'S FUTURE FIGHTER: A TRAINING CONCEPT OF OPERATIONS

by Dave Wheeler

"Canada leads the world in developing simulation technology, and we export this technology throughout the world," Lieutenant-General Yvan Blondin, Commander of the RCAF, said recently.

"I plan to take advantage of this – to review our requirements and determine where and how we can use simulation. In fact, I want the RCAF to be a leader in this among international air forces.

"I believe we can achieve better training through simulation and achieve operational savings. In doing so, we can extend the life of our aircraft, and, at the same time, reduce our carbon footprint. This is good for the RCAF operationally, and will also be good for Canada fiscally."

Although using simulators to train pilots has been with us since before the Second World War, rapid advances in computer technology have led us to a point where the virtual world of a simulator is incredibly realistic – almost

indistinguishable from reality, in fact – and gives pilots the sensations and challenges of flying a real aircraft. With simulation, we can control different variables, such as weather, terrain, and threats, and conduct training that can actually be more rigorous and varied than flying the actual platform. As a result, much of our training *can* – and *should* – be conducted on simulators.

As we look toward the future, and as technology continues to improve, we know that the amount and quality of training we will be able to conduct in simulators and in virtual realities will continue to grow. This has significant implications for training on all our platforms, but especially for the very expensive training of fighter pilots. We anticipate that a large percentage of the initial training for the RCAF's future fighter, the replacement for the CF-188 *Hornet*, could be carried out using simulators.

The Royal Canadian Air Force intends, therefore, to 'lead from the front' in the use of state-of-the-art simulation technology and concepts in order to best prepare its fighter pilots for combat and support operations.



Carleton University

The CF-188 cockpit display at the Carleton University simulation laboratory.

veillance and control of vast amounts of airspace and surface waters. This includes covering the entry corridors on the east and west coasts, as well as Canada’s internal airspace, including the airspace across the entire Canadian Arctic.

The defence of North America and its airspace is also critical, and it is carried out through the North American Aerospace Defense (NORAD) agreement. The benefits of this relationship continue to contribute to our national interest and to international peace and stability.

Contributing to International Security. Canada’s values and interests are global in nature, and to that end, the Canadian Forces will continue to contribute to international security. Canada will play an active military role in the United Nations (UN), the North Atlantic Treaty Organization (NATO), the Organization for Security and Co-operation in Europe (OSCE), and coalition forces as deemed appropriate by the Government of Canada.

This new training concept of operations for fighter pilots will have the additional advantage of reducing expenses for fuel and sustainment, thereby reducing the carbon footprint of the aircraft, which is in line with the RCAF’s environmental policy.

Operational Roles of Canada’s Future Fighter

Operating Environment. The environment in which our future fighter force will be employed will cover a wide variety of missions, often in very complex scenarios. The Canadian Forces will, therefore, require its future fighter aircraft to be able to operate worldwide in all weather conditions, employ a wide range of air-to-air (A/A) and air-to-surface (A/S) missions, and be interoperable with coalition partners.

Our fighter operations will continue to include overland and coastal operations throughout Canada (including the Arctic), as well as over the landmass and coastal areas of other countries during deployed operations.

Defending Canada and North America. Maintaining Canadian sovereignty involves ensuring Canadian law is respected and enforced within its area of jurisdiction.

There are increasing challenges to our sovereignty from those who wish to exploit our nation’s immense size and resources through illegal activities. Securing Canada’s borders against such actions is paramount and involves the sur-

Force Generation

The training concept of operations for pilots of our future fighter will be significantly different from the manner in which we currently train CF-188 *Hornet* pilots.

At present, all Canadian Forces officers selected for the pilot occupation begin their training with Primary Flying Training, conducted at Portage La Prairie, Manitoba, which introduces them to military flying and procedures.

The next phase is Basic Flying Training, conducted at 15 Wing Moose Jaw, Saskatchewan, under the auspices of the NATO Flying Training in Canada (NFTC) program. This phase contains the bulk of flying training and, upon completion, pilot candidates are selected for one of three training paths: helicopters, multi-engine aircraft or fighters.

The third phase is Advanced Flying Training, after which pilot trainees receive their pilot wings. For fighter pilots, this phase involves training on the CT-156 *Harvard II* under the NFTC program.

These three phases are not expected to change significantly under the new training concept.

After Advanced Flying Training, fighter pilots begin their Phase IV *Hawk* Transition at 15 Wing, and their Fighter Lead-In Training (FLIT) at 4 Wing Cold Lake, Alberta.

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VIEWS AND OPINIONS

FLIT is followed by training at an Operational Training Unit (OTU), also at 4 Wing, where pilots fly the CF-188 *Hornet*. Finally, fighter pilots undertake their Combat Ready Training, at their main operating base (MOB), either 3 Wing Bagotville, Quebec, or 4 Wing.

The new concept could eliminate the need for OTUs, which require a full complement of aircraft, pilots, maintainers, support personnel, and infrastructure to run.

Newly-winged fighter pilots would, in the future, go through three phases of training:

- An Enhanced Fighter Lead-In Training (FLIT) Phase.
- A simulation-intensive Conversion Phase conducted at a Virtual Training Unit (VTU).
- An extended Combat Ready (CR) Phase.

This new three-phased concept would result in an effective and efficient manner of producing new pilots for the fighter force. As well, it would make additional fighter aircraft available to the Commander of 1 Canadian Air Division for force employment, and it would reduce expensive training costs.

Enhanced Fighter Lead-In Training (FLIT) Phase. A large portion of the tactical training currently taught at an OTU could be devolved to the less expensive Enhanced FLIT Phase, while some aspects would remain in the Conversion Phase.

The Enhanced FLIT Phase, envisioned to be conducted at 4 Wing, would require a new aircraft to replace the CT-155 Hawk advanced tactical jet, as part of the follow-on training contract that will eventually succeed the NFTC program.

This aircraft would ideally have an integrated but unclassified cockpit in the style of the future fighter, complete with

a simulated avionics capability. The *Hawk* replacement would closely replicate the ergonomics of the future fighter (although not its performance) and would include simulated radar, data-link, weapons system, an electronic warfare suite, and more. The new training aircraft would need to be a two-seat variant, permitting an instructor to act as a backseat safety pilot during the critical initial combat training missions.

To ensure consistency of tactics, techniques, and procedures (TTPs), pilots flying the FLIT aircraft may well use the same tactical manuals that they would use on the future fighter.

Editor's Note: To provide a measure of the cockpit sophistication required for the *Hawk* replacement, the cockpit displays of representative next acquisition fighter aircraft are presented on following pages, in no particular order.

While it is anticipated that the Enhanced FLIT would be longer than the current FLIT Phase under the NFTC program, it would not necessarily result in an increase in flights because of a greater emphasis being placed upon the use of simulation. Along with ensuring a better selection of future fighter pilots, the concept would also allow pilots to begin their conversion training to the future fighter with more flying experience, a good grasp of aircraft functionality, and situational awareness with the TTPs.

The core fighter pilot skills that could be devolved to the Enhanced FLIT syllabus include:

Air-to-air (A/A):

- Basic fighter manoeuvres (BFM).
- Air combat manoeuvres (ACM).
- Air intercept (AI).



DND photo CK2005-0284-02, by Corporal Jean-François Lauzé

CT-155 *Hawk* advanced jet trainers in formation.



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Lockheed-Martin F-35 *Lightning II* cockpit.

- Radar theory and radar intercepts.
- Beyond visual range (BVR) weapons tactics.

Air-to-ground (A/G):

- Low-level awareness training (LLAT).
- Air-to-ground academic weapons (AW) delivery.
- Air interdiction (AI).
- Close air support (CAS) (up to two aircraft).
- Air-to-ground tactical employment.
- Suppression/destruction of enemy air defence (SEAD/DEAD).

Other pilot training conducted at the FLIT would include:

- Visual flight rules (VFR) skills.
- Instrument flight rules (IFR) skills.
- Night flying.
- Formation flying (up to four aircraft).
- Reconnaissance.
- NORAD procedures.

Conversion Phase. The Conversion Phase would take full advantage of the experience that pilots would gain during the Enhanced FLIT Phase. This phase would focus heavily upon simulation, using the actual future fighter only for con-



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Boeing F/A-18E/F *Super Hornet* cockpit.

firmation sorties and additional training where required. The simulation training could be conducted through the concept of virtual training within a Virtual Training Unit (VTU).

Simulator training would be based upon the training plan and qualification standard approved by the Fighter Standards and Evaluation Team, and it is envisioned that the simulator-to-flying ratio for the Conversion Phase would heavily favour the simulator. The objectives of focusing upon simulation would be to maximize the operational availability of the future fighter for force employment, while reducing training costs and optimizing training effectiveness.

The flying portion of the Conversion Phase would be conducted by a combination of qualified fighter force instructor pilots who are members of the VTU, the wing standards section, or tactical fighter squadrons. No fighter aircraft would be permanently assigned to the VTU; the relatively small amount of time spent flying the future fighter would take place using aircraft assigned to the tactical fighter squadrons.

Combat Ready Phase. The Combat Ready Phase would ideally begin once the new fighter pilot has completed the Conversion Phase and has been assigned to a tactical fighter squadron.

The bulk of flying training in the future fighter would be flown in this phase, which would be conducted at tactical fighter squadrons by tactical fighter squadron-qualified instructor pilots and wing standards pilots. Simulator support would be provided by the VTU facilities, although there would be a higher flying ratio in the Combat Ready Phase than in the Conversion Phase.

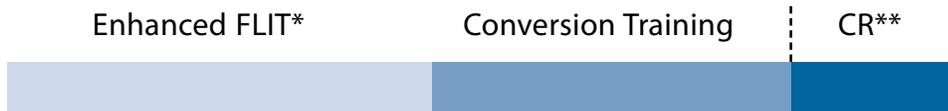
As in the current system, the new fighter pilot would become a combat-ready wingman after completing the Combat Ready Phase.

VIEWS AND OPINIONS

CF-188 Training Distribution



Future Fighter Training Distribution



* Fighter Lead-In Training

** Combat Ready Training

Centre of Excellence. It is anticipated that a Centre of Excellence would be created to support force generation, and to prepare the fighter force for force employment requirements. The Centre would be the home of the Fighter Standards and Evaluation Team, the VTU, and the Fighter Operational Test and Evaluation Flight. It would support all fighter force courses, including the Conversion Phase, the Combat Ready Phase, and post-graduate level courses, such as the Fighter Weapons Instructor Course, and instructor pilot training.

While the *development* and *command and control* of these courses would be held within the Centre of Excellence

Team and controlled by the Fighter Community Advisor Group. The program would be a blend of ground, simulation, and aircraft training to ensure a safe and effective fighter force that is capable of carrying out all prescribed tasks *at or above* the standard.

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It is anticipated that simulation will play a key role, and will represent a significant percentage of training hours during the continuation training phase.

Fighter pilots may indeed spend up to 50 percent of their continuation training time in a simulation seat, maintaining their qualifications, and filling some experience gaps that could only be addressed in very specific scenarios. Even during deployed operations, we can already



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Eurofighter cockpit.



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Dassault Rafale cockpit.



© Saab AB 2010

Saab 39D *Gripen* front cockpit.

envisage the potential of reaching optimal readiness levels by using a deployable mission rehearsal trainer, which would have multiple advantages from the perspectives of mission success, safety, and resource management.

‘YFR on Demand.’ Concretely, relying more upon simulation will mean that the RCAF fighter force would very likely consume considerably less flying hours to achieve the desired level of fleet and individual readiness. This reduced yearly flying rate (YFR) would correspond in similar proportions to reduced requirements for routine maintenance and other sustainment dimensions. It must be stressed, however, that the ability to surge training and operational activity is paramount to the successful completion of fighter aircraft missions – as demonstrated recently during Operation *Unified Protector*, conducted in response to the crisis in Libya. That surge capability would require immediate access to flying hours, which implies that sufficient ‘on demand’ maintenance and sustainment resources must be available at all times. The concept of ‘YFR on Demand’ is similar to the ‘just in time’ production and delivery

strategies that gave modern industry the efficiency, agility, and increased productivity it needed to meet demanding and fluctuating market expectations. The fighter community could reap similar advantages from a much more flexible and efficient use of precious flying hours.

Training through Transition. The transition from the CF-188 to our future fighter should be conducted in the most efficient and effective manner possible, while remaining ‘resource neutral,’ and ensuring an appropriate combat ready capability.

The Way of the Future. In conclusion, there is little doubt that increased simulation is the way of the future for fighter training as well, as for training on other aircraft. The CC-130J *Hercules* community has already embraced simulation training with the opening of the Air Mobility Training Centre at 8 Wing, Trenton, Ontario, in September 2012. The 17,000-square metre centre houses cutting-edge equipment, such as a J-model *Hercules* flight simulator and fuselage trainer that are being used to train aircrew and technicians.

Canada is a world leader in simulation, and the Royal Canadian Air Force will put this world-class capability to work to train the pilots of our future fighter. Simply put, training that combines flying aircraft and simulators will be more effective, safer, less expensive, and better for the environment. It is a ‘win-win deal’ for everyone.

Brigadier-General Dave Wheeler, CD, is a former CF-188 *Hornet* fighter pilot. Among other postings, he has served as Commander of 4 Wing Cold Lake, Alberta, and Deputy Director of the Air Operations Control Centre at ISAF HQ in Kabul, Afghanistan. He is currently Director of Air Staff Coordination for the Commander of the RCAF in Ottawa, Ontario.



Cockpit of the CC-130J *Hercules* flight simulator at the new Air Mobility Training Centre in Trenton, Ontario.

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