One of the most challenging and rewarding accomplishments in my life was completing the Fighter Pilot Course (FPC)—10 months of intense training—and being granted the title of CF18 fighter pilot. It served as the final step toward realizing my life-long dream of joining a tactical fighter squadron as a qualified fighter pilot. But before achieving that goal, I would endure over 250 hours of ground-school instruction, numerous written exams, simulator training under the watchful eyes of instructor pilots (IP) and, of course, approximately 80 hours of flying in the CF188 Hornet (shortened to CF18 by almost everyone). The Fighter Pilot Course is held at 410 Tactical Fighter Operational Training Squadron (Tac F [OT] Sqn) at 4 Wing Cold Lake, Alberta. Since the initial cadre trained on the CF18 in 1982, each FPC has been numbered in sequence. Currently, FPC 52 is in the final phases of the course, with FPC 53 just beginning.
For most, starting any new course brings many emotions—fear and anticipation being at the top of my list. Not fear of the airplane, nor fear of the instructors—the fear that I recall from my course in 2004 was of not living up to my own personal expectations and not succeeding on the course. At the age of 27, I had been in the military for over eight years, having never known anything other than being a “student” or “trainee.” But this time it was different. This was the course that every other course had prepared me for, since the Basic Officer Training Course (BOTC) in Chilliwack, British Columbia. In my personal case, I had dreamed since I was 10 years old that this day would come. I had to be a fighter pilot; it was all I had ever wanted to do. If I could graduate from FPC, I would fulfill my wish to fly in the CF18 and make “fighter pilot” my career title, not just my dream.

As I sat in the 410 Sqn main briefing room in October of 2004 for the Commanding Officer and Wing Commander’s welcoming remarks, I certainly never imagined I would be where I am today as an instructor at the operational training unit (OTU). To be honest, at that point in my life I never wanted to do anything other than fly the Hornet operationally. I recall that I wanted be a tactical instructor—a fighter weapons instructor—but that I would never want to just teach a bunch of students how to take-off and land the Hornet. Instructing at 410 Sqn was something I could not see myself doing. Like most things in life, you just do not know where your path will take you. I now occupy the office that as a student I recall standing at attention in the doorway of, addressing the major who, at that time, seemed like a long-in-the-tooth veteran of the CF18 at the ripe old age of 32.

And so, now, here I am, the 410 Sqn Weapons and Training Officer. This is exactly where I more recently realized that I wanted to be—teaching pilots and helping them realize their dreams.

I arrived at 410 Sqn in May of 2013 as a fighter weapons instructor with about 1,000 hours in the jet, having never instructed before, except on the operational squadron; something much different. Instructing at the squadron started with teaching wingmen (recent graduates of FPC) and went all the way to instructing on the Fighter Weapons Instructor Course. But 410 Sqn is different. Certain assumptions are made when you teach someone with experience in the aircraft—things like basic aircraft handling, adherence to training rules and an understanding of aircraft systems and how to employ them. Teaching at an operational unit focuses much more on refining technique and developing leadership skills as new element (2-ship) and section (4-ship) flight leads. But as I embarked on my tour at 410 Sqn, my approach to instruction would need to change. Yes the principles of instruction are quite similar, but a distinct mindset adjustment would be in order. I could not expect students with 20 or even 40 hours in the jet to perform to the level I had grown used to over the past 8 years. And make no mistake; fighter pilots expect performance out of themselves and their peers, no matter what their level of experience is.

At first my concern about instructing was how to measure student performance with a limited frame of reference, other than my own experience as a student. Of course, there is the definition of grade levels (anyone who has gone through any military pilot training has experienced the same). 410 Sqn runs every IP through a Fighter Instructor Course (FIC) upgrade to assist in giving the new IP an idea of what to expect from students throughout the phases of the course. My concern was making a mistake in grading—either expecting too much of the students and grading them too low or overcompensating for that and being the “Santa Claus” IP that every student wants to fly with. In the end, it came down to trusting my own judgment and experience, using an analytical yet fair approach to assessment and applying the standard consistently and without bias.
It Ain't Easy! Training a Canadian Fighter Pilot

The FPC begins like any other course with intense classroom instruction; exams, including aircraft operating instructions and emergency “red pages” written word for word from memory; and then simulator training. The simulator is a very realistic, state-of-the-art system, which allows multiple aircraft to link together and fly in a virtual environment with or against each other or other computer-generated adversaries and targets, including surface-to-air and airborne threats. One of the students’ first “threats” is learning how to conduct a full procedure VOR IFR (very high frequency omnidirectional radio range instrument flight rules) approach into Prince Albert, Saskatchewan, in instrument conditions (zero reference to the ground, using only on-board systems to navigate); learning to “fight” in the aircraft comes much later in the course.

The FPC is broken down into phases and subphases. Pilots from other communities will recognize terms like clear-hood and instrument, but the Transition phase (which encompasses clear-hood, instrument, formation and air-to-air refuelling subphases) is just the first month or so on the flight line and is a basic introduction to flying and handling the aircraft in various weather conditions. Following a handful of simulator missions and only four instructor-monitored flights in the two-seat aircraft (three clear-hood missions in fair weather and one instrument mission in not-so-good weather), students who meet the required performance levels will take the CF18 flying for their first solo.

With less than six hours in the aircraft, students (albeit Royal Canadian Air Force [RCAF] pilots with wings) are trusted with the fastest aircraft in the country to conduct a solo mission in the local airspace and then “beat up the pattern” at 4 Wing Cold Lake. It is an experience that every fighter pilot remembers for the rest of their life. It is not the hour-long thrill ride that most expect; it is an hour of intensity and focus that goes by faster than any hour the student has experienced before. But as the engines are shut down and the sound of jet noise turns to the quiet clatter of fan blades in the intakes and crackling brakes, there is a realization in every student’s mind—I just flew the CF18 Hornet, BY MYSELF! I AM LIVING MY DREAM! Not much time to celebrate, the very next day the training continues.
With the completion of the Instrument and Formation subphases, the Transition phase is complete, and the similarities to previous courses end. The next step is learning the most critical sensor on the aircraft, the APG-73 radar. The Air-to-Air phase is divided into three subphases: Basic Fighter Manoeuvres (BFM), Advanced Combat Manoeuvres (ACM) and Air Combat Tactics (ACT). After an introduction on employing the radar and conducting night intercepts against other aircraft, formation take-offs and landings at night (without night vision goggles [NVGs], using only small strips of lights on the aircraft as references), the students progress to learning how the CF18 handles as a FIGHTER instead of just as an airplane.

The BFM subphase is the first time students will employ the aircraft as a weapon system. With BFM simulator missions complete, students learn advanced and slow-speed handling in the Hornet. The Hornet is designed to be a superior fighter in the slow-speed regime. It handles extremely well and is very controllable at speeds not much faster than a Cessna would fly, yet it can be quite unforgiving for the untrained pilot. The BFM subphase immerses the students in a very dynamic three-dimensional environment in which they must manoeuvre in relation to another Hornet (flown by an IP, the flight lead), gain an angular advantage relative to that aircraft and direct the weapon systems on board the aircraft to “shoot” the three main weapons within the allowable parameters at the adversary. Hours of ground school, including scientific analysis of the performance characteristics of the CF18 and techniques for correct tactical manoeuvring, form the foundation for this subphase.

It is challenging and yet extremely exciting for the students. It can also be rather challenging for the instructors, both physically and mentally. Instructor pilots must be hyper vigilant to anticipate errors and intervene (take control from the back seat), if necessary, prior to catastrophe. Closure rates between two aircraft can reach 800 knots [1,482 kilometers per hour]; aircraft will meet head-on in less than 10 seconds from inside of 2 miles [3.2 kilometers]. G-forces will be at the maximum capability of the aircraft, up to 7.5 g (7.5 times the force of gravity), and can leave IPs monitoring from the back seat with aches and pains after multiple high-g sorties in the same subphase.

Training rules are briefed before every mission and must be strictly adhered to by the students. Failure to honour the training rules can, depending on the severity of the infraction, lead to mission failure, which is far better than the alternative—midair collision, near miss or mishandling leading to impact with the ground. In general terms, no messing around; mistakes in this business will kill you.

As if BFM was not dynamic enough, now take a third aircraft—the flight lead—and add that to the mix. During the ACM subphase, students learn to fight a single adversary aircraft as part of a two-ship element. Although it sounds like a tremendous advantage, the set ups begin with the element on defence with the bandit (hostile aircraft) having a distinct positional and altitude advantage. The students must learn to react appropriately, communicate and deconflict with their lead, manoeuvre their aircraft in relation to a threatening adversary, and employ simulated weapons to “kill” the adversary aircraft (of course this is simulated with very specific criteria). The ACM subphase is typically when most students begin to experience the greatest difficulty on the course. Few students make it through this subphase unscathed—without at least one red tick (performance grade below the required level) or worse, an UNSAT (unsatisfactory [failed]) mission.
Failed missions can become a student’s worst nightmare. Individually, a failed mission is significant but not the end of the world. Each one results in extra attention—scrutiny from the standards and training officers—and an independent review, which examines the student’s performance throughout the course up to that point. As with any other military course, there are constraints on how much time a student has to get it right. There are limited attempts and flying time available to meet the required standard. In the case of FPC, failing two consecutive syllabus missions leads to a progress review board (PRB). That equates to more unwanted attention on the student and further analysis as to whether the student is consistently meeting the standard expected on the course within the given time constraints for training. In some cases, the PRB recommends that the student continue with some limited remedial training. But in most cases, by the time it reaches PRB, the additional training has been exhausted and the board has no choice but to recommend that the student cease training. This is the part of my job that I certainly do NOT enjoy. Seeing the look in a student’s eye when they are told that their dream of becoming a CF18 fighter pilot is over is by far the worst part of instructing. Any instructor who takes even a hint of pleasure in telling a student that they have failed, whether it is a sequence on a flight, a syllabus mission or the course itself, has no business instructing students at any level. I remind myself on a regular basis what it was like to be a student on this course and how I felt about the way I was treated by IPs, both good and bad. I use that every day to help me become a better instructor at 410 Sqn, and I try to set an example for other IPs to do the same.

Following ACM, students progress to the ACT subphase. This is the longest subphase of the entire course and develops the students’ abilities to employ the aircraft from beyond visual range (BVR) all the way to within visual range (WVR) against adversary airborne aircraft. It covers every facet of the air-to-air mission that a new wingman will be expected to perform.
Their training begins with stern intercepts (required in a North American Aerospace Defence Command mission) and progresses to simulated weapons employment, starting at long range against hostile aircraft and then working closer to the threat and defending all the way to the merge to conduct BFM/ACM as previously learned. The culmination of the ACT subphase is the defensive counter-air (DCA) missions. DCA involves manning a combat air patrol (CAP) to defend a section of airspace or area on the ground against threat aircraft and is the first combat scenario on the FPC where students begin to experience all of the previous aspects of the course in one mission. It may involve an instrument departure to transit to the area of operations, air-to-air refuelling, formation procedures, BVR sensor and weapons employment as well as WVR engagement of adversaries to conduct ACM.

Students who make it to ACT have demonstrated their ability in all the required Air-to-Air phase performance categories and now combine all knowledge and skills in a 1.5-hour mission. 410 Sqn typically will run a wartime scenario that will have two-ship formations (with students flying as the wingmen with IPs in the backseat) constantly manning a combat air patrol and taking off in sequence to cover an extended period of time. Adversaries are played by numerous aircraft from a variety of units including other squadrons and, if available, other visiting nations. It makes the last three missions of the ACT subphase very exciting and realistic and gives students a raised level of confidence and understanding of their role as fighter pilots. ACT concludes with a solo mission, flown as wingman of a two-ship, conducting this relatively complex DCA mission. Students at the end of this subphase are deemed Air-to-Air complete, and some will go directly to their newly assigned squadrons for up to six months. Others will continue immediately on to the Air-to-Ground phase to complete the course. In both cases, students will complete the entire syllabus, whether interrupted or not, prior to receiving the ADKH qualification code and being deemed a CF18 fighter pilot.

The Air-to-Ground phase can be completed in as little as four or five weeks with ideal weather and required resources. It can be completed in a multitude of locations and often occurs while 410 Sqn is deployed to the United States during periods of inclement weather in Cold Lake. Regardless of the location, students on the Air-to-Ground phase will complete additional ground school, simulator missions and flights. These will focus on the remaining three subphases of the course: Conventional Weapons Delivery (CWD), Air Interdiction (AI) and Close Air Support (CAS).

Conventional Weapons Delivery teaches the students the techniques for delivering unguided weapons (dumb bombs) against stationary targets as well as strafing using the 20 millimetre M61A1 cannon. Both of these deliveries are conducted using training rounds that replicate high explosives. Weapons accuracy is scored on an academic range with a 200-foot [61-metre] circular target area. Each student has six modular practice bombs (MPBs) per mission and will normally have 150 to 250 rounds of 20 millimetre ammunition. Strafing scores are calculated using an acoustic sensor on a 20-foot [6.1-metre] banner, which certainly seems a lot smaller when the open fire range for most deliveries is greater than 6,000 feet [1,829 metres]. Although aided by information presented to the pilot in the heads-up display (HUD), the gun is aimed manually through a gun sight called a reticle and requires a steady hand on the controls to effectively attack the target. The gun is fixed in the aircraft, and thus, the entire aircraft must be accurately flown to point the sights at the target. Imagine that you are flying in the rifle and the rifle can only hit the target as accurately as you aim. Each mission includes approximately 24 or more attacks (bombs and strafing) on the scored targets.
During the AI subphase, students learn two-ship and four-ship self-escort strike missions, involving airborne adversary aircraft; radar emitting simulated surface-to-air threats, which students must react to accordingly as if a real SAM (surface-to-air missile) was being launched at them; and surface targets against which they will employ a variety of actual weapons, including conventional (dumb) bombs and precision- (laser) guided training weapons. This is conducted as a wingman while striving to maintain the correct tactical formation, communicate with the flight lead, adhere to safety training rules and successfully employ simulated air-to-air weapons against assigned airborne threats to fight through to the target and back home again. The missions often include air-to-air refuelling with CC130T or CC150T aircraft as operational AI missions would. They also include GCI (ground controller interception) controllers who provide long-range radar surveillance to assist fighters with targeting airborne threats in accordance with the flight lead’s brief. A syllabus mission during the AI phase can involve up to 10 or more personnel, all dedicated to one or two students executing this single realistic mission. The final AI mission is flown as a four-ship (section) against multiple adversaries, with students in positions “2” and “4.” It is very dynamic and very challenging, yet for students who have worked extremely hard to get to this point on the course, it is extremely rewarding and exciting (and yes, even enjoyable) to complete.

The CAS subphase, although unopposed by airborne threats, adds a new level of complexity to the Air-to-Ground phase. Students learn how to coordinate with troops on the ground via a joint terminal attack controller (JTAC, also known as a forward air controller). Many of the IPs at 410 Sqn have experience as qualified JTACs and served in various roles in Afghanistan over the past several years. The CAS subphase teaches the complexity of employing lethal weapons against ground targets when they are in close proximity to friendly troops or sensitive collateral personnel or buildings. Students must be able to master all systems on board the CF18, including
the SNIPER advanced targeting pod equipped with a laser spot tracker to detect laser target designations on the ground from JTACs or other aircraft. In addition, students must be able to employ all weapons (some of them real) against training targets in strict compliance with JTAC direction and in accordance with clearly defined procedures as in a theatre of operations. Students once again step through a building-block approach during this subphase, learning first how to operate as a single aircraft supporting the JTAC and then as a wingman in a two-ship element in a more complex mission.

The Air-to-Ground phase is the shortest, yet for many students, it is the most challenging phase. It combines every aspect of the course. Every sequence flown from pre-start to shutdown is evaluated, with a high standard of performance expected. The final mission on the Air-to-Ground phase (as students are often reminded) is the last dual (instructor-monitored) flight for a long time. Instructor pilots take this very seriously as students must demonstrate “terminal habits.”

The FPC can be an emotional experience for some. I remember hearing while on on-job training (OJT) in Cold Lake that as a student at 410 Sqn you do not know on Monday if you will have a job by Friday. That may be a bit overstated, but the reality is that it does not take long to drift away from the learning curve. Like any other military course, standards must be reached within limited time constraints. By the time students commence training at 410 Sqn, they have spent years in pilot training, not to mention the initial professional development that all officers undergo. The success rate of FPC averages about 90 per cent. For the 10 per cent who do not make it to the end of the course, other career opportunities as an RCAF pilot normally remain open. But for those who graduate from FPC, it is the beginning of an exciting career as a fighter pilot.

Instructing at 410 Sqn is a rewarding and challenging experience. Students often find new and exciting ways to scare you beyond your wildest imagination—not intentionally (at least I hope not!) but due to a lack of experience or understanding of the performance of the aircraft. It demands an incredible amount of vigilance when either observing from the “trunk” (affectionate term for the back seat of the two-seat model CF18B) or while leading a solo student in a single seat jet from another aircraft. Fortunately, the average IP at 410 Sqn has between 500 and 1,500 hours of experience in the aircraft and goes through training to know what to expect from students throughout the phases of the course. I have learned in my first six months instructing that you can never assume that a student has it all figured out. The IP is the aircraft captain, signs for the jet and is responsible for the conduct of the mission in its entirety. The gravity of that responsibility must not diminish over time.

While instruction has its stressful moments, it is incredibly rewarding to see a student progress from their first flight in the aircraft to their final syllabus mission. Knowing that you played an instrumental part in the development of each student that you flew with can give instructors a sense of pride. Every IP at 410 Sqn had their beginning as a student in the same hangar, and watching students graduate brings you back to the emotions experienced as a student not too many years before. In comparison to other fleets in the RCAF, the fighter force is relatively small. Fighter pilots will inevitably work with each other on more than one squadron over the course of a career, which certainly makes you feel like part of a family once you graduate from FPC. It also gives instructors a sense of responsibility to mentor students on FPC as they may one day be your wingman in combat.
When I first joined the RCAF 17 years ago, the last time CF18s had deployed to combat was 1991 during the Gulf War. As an OJT pilot in Cold Lake, there were still a number of pilots who had served in that mission. And then in 1999, Operation ALLIED FORCE—yet another two-way shooting war—saw CF18s deployed to combat. Later as a young second lieutenant in Cold Lake, ironically while on OJT at 410 Sqn, 9/11 happened. Never would I have thought that the events of that day would impact my life so much; it led to a ground tour in Afghanistan and living in a drastically different world where threats came from both inside our borders and out. And then only a few years ago, CF18s once again deployed; this time to participate in combat operations over Libya.

The reality of the world today should weigh on every IP’s mind when instructing fighter pilots. We are not training pilots to simply fly the CF18. We are training our future wingmen for the next deployment, wherever that may be. The FPC is an extremely challenging course and rightly so. The demands of operational deployments do not tolerate incompetence and laziness, and when faced with a potential future enemy who will make every effort to bring your aircraft down, fighter pilots must be prepared with the skill set to not only survive but also accomplish the assigned mission. That learning begins at 410 Sqn on day one of FPC but does not stop on graduation day. Successful fighter pilots never stop learning, never stop self-improving. As an instructor at 410 Sqn, I hope to impart that attitude to the students I fly with, knowing that one day we may find ourselves in combat in the same formation.
Major Ian “Duste” DeCarlo joined the Canadian Forces in 1996 under the Regular Officer Training Plan. He attended the Royal Military College of Canada in Kingston, graduating with a Bachelor of Science degree in 2000. Upon completion of Fighter Lead in Training at 419 Tactical Fighter Training Squadron in Cold Lake, he began the Fighter Pilot Course (#36) at 410 Tactical Fighter Operational Training Squadron in Cold Lake, graduating in May 2005. Major DeCarlo spent his first operational tour on 441 Tactical Fighter Squadron in Cold Lake, which merged with 416 Tac F Sqn in 2006 to become 409 Tac F Sqn. He graduated from the Fighter Weapons Instructor Course in 2008 and later that year was chosen to deploy to Afghanistan as a forward air controller with Task Force 3-09. He served on Operation ATHENA as Officer Commanding – Tactical Air Control Party (OC TACP), from October 2009 until April 2010. In July 2010 he was posted to 1 Canadian Mechanized Brigade Group Headquarters in Edmonton, Alberta, as the OC TACP. He was then posted to 410 Tac F [OT] Sqn in Cold Lake in May 2013, assuming the title of Squadron Weapons and Training Officer.

**Abbreviations**

- ACM: advanced combat manoeuvres
- ACT: air combat tactics
- AI: air interdiction
- BFM: basic fighter manoeuvres
- BVR: beyond visual range
- CAS: close air support
- DCA: defensive counter-air
- FPC: Fighter Pilot Course
- IP: instructor pilot
- JTAC: joint terminal attack controller
- OC: officer commanding
- OJT: on-job training
- PRB: progress review board
- RCAF: Royal Canadian Air Force
- Sqn: squadron
- TAC: tactical air control party
- Tac F: Tactical Fighter Operational Training Squadron
- Tac F [OT] Sqn: Tactical Fighter Operational Training Squadron
- WVR: within visual range

**Notes**

1. Clear-hood refers to a pilot being able to discern a natural horizon when flying. It originated in the early days of instrument flight training when a trainee was denied any outside reference in an aircraft or simulator by means of a cloth barrier or hood. This forced the individual to concentrate on the aircraft’s instruments. Clear-hood indicates the removal of the “hood” and means that the trainee gets their visual cues from the horizon. The aircraft is manoeuvred with visual reference to the horizon.

2. Military avionics equipment comes with its own multi-lettered code depending upon the type, where it is utilized (aircraft, ships, etc.) and what it is utilized for. In this case APG stands for airborne, radar, ground fire control. All systems on-board the CF18 are given a letter/number designation such as this.

3. This “split stream” approach is the operational training unit’s on-going effort to increase student production while maintaining given resources and is still in its early stages of implementation. It has created new challenges in managing a fragmented training plan but has the intention of ultimately reducing the training bill per student. Students who return to 410 Sqn after a period on the operational squadron have a slightly reduced flying syllabus for the Air-to-Ground phase, as they have been given an opportunity to gain some experience in the aircraft. The effectiveness of the split stream will be determined after the first Air-to-Air graduates return to 410 Sqn to complete the Air-to-Ground phase in the fall of 2013.

4. Terminal habits refer to the student achieving an adequate level of performance on the course that can be maintained, without supervision, for their entire career. These are the graded performance items that must be demonstrated to an acceptable level in order to succeed on the course. Terminal habits would include basic items such as consistently landing the aircraft safely and properly, up to how the radar in the aircraft is properly interpreted to ensure mission effectiveness.