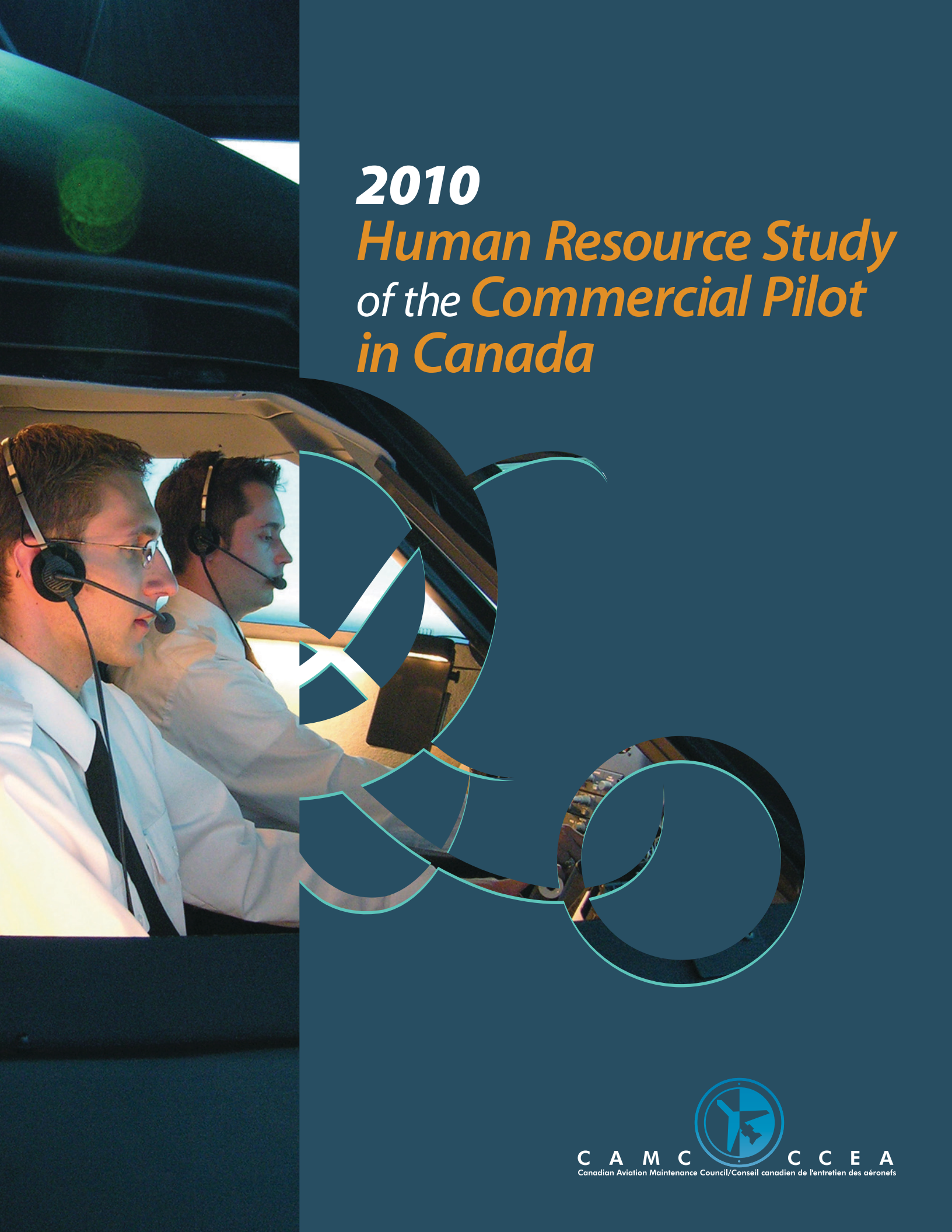# 2010
Human Resource Study
of the Commercial Pilot
in Canada

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2010 Human Resource Study of the Commercial Pilot in Canada

A report prepared by
R.A. MALATEST & ASSOCIATES LTD.

Prepared for the
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EXECUTIVE SUMMARY

While the recent economic environment has led to both domestic and international declines in air passenger and cargo traffic, many signs are pointing to an economic rebound in the industry. Like most other sectors across the country, the aviation industry is likely to experience a significant number of retirements in the near future. Retirements are anticipated to be particularly concentrated amongst commercial pilots. This attrition, coupled with a rebounding economy and industry growth, has led to projections of a shortage in the supply of adequately trained commercial pilots domestically and globally.

In light of these future challenges, the Canadian Aviation Maintenance Council, in partnership with the Air Transport Association of Canada, commissioned R.A. Malatest & Associates to complete the *2010 Human Resource Study of the Commercial Pilot in Canada* — an update to the *2001 Human Resource Study of the Commercial Pilot in Canada*. This executive summary is a brief overview of the findings from the research and data analysis completed for the study, including highlights related to training, regulation, and occupational standards.

Internationally, China and India are leading the way in industry growth and increasing fleet size. This presents an opportunity for Canadian flight training units to fill their current training capacity with foreign students, however, it is also important that Canadian flight training units have the capacity to admit and train sufficient Canadian pilots to meet domestic demand. This is particularly noteworthy, as the domestic supply of commercial pilots may not meet the domestic demand. Both in Canada and in the United States, youth are increasingly unlikely to consider a career as a commercial pilot, as the costs can be prohibitive and there is insufficient funding available for training. In addition, among those who do choose to begin their training, those who do not complete their training do so due to limited job opportunities and/or too little pay. While many student pilots continue to choose to become a pilot for the love of flying, more effective marketing of the career to prospective students is needed through outreach programs, and more funding and training dollars need to be made available.

Historically, Canada has been a leader in flight training, attracting students from abroad and having a reputation for producing many highly skilled and competent pilots for the domestic and international markets. If Canada is to maintain this reputation, it is crucial that its training institutions have access to the latest technology available to the training community. Flight training devices and simulators are becoming more technologically advanced with the ability to recreate in-aircraft scenarios for students under safe and affordable conditions. It is increasingly incumbent on industry, operators, flight training units, and the regulator to take advantage of the benefits these devices have to offer. It is a necessity to increase the number of recognized hours trained in Flight Training Devices (FTDs) and simulators. Transport Canada has looked into the future of flight training developing regulations for flight training units to become Approved Training Organizations (ATO), which will support the Multi-crew Pilot Licence.

Another notable change in the approach to training is the increased popularity of competency-based training over hours-based training. The skills, knowledge, and attitudes required of today's pilots, such as crew resource management, threat and error management, situational awareness, and safety management systems, are

multi-dimensional and interlaced. As such, it is no longer effective to train pilots as though each were a stand alone skill. It is increasingly recognized by operators and flight training units alike that simply logging flying hours does not adequately prepare pilots in these skill areas. Advances in the area of flight instruction — both in course content and how instructors themselves are trained to teach pilots are imminent.

The changes to the industry have resulted in a call to professionalize the flight instructor occupation and to develop professional occupational standards, which identify the skills knowledge and attitudes of various professional pilots' occupations while revisiting the existing national occupational classification (NOC) 2271, which puts pilots, flight engineers, and instructors under one umbrella classification. If air operators and flight training units expect to meet future demands with trained, skilled, and knowledgeable pilots, these issues need to be taken seriously, and be systematically addressed.

SUMMARY OF KEY FINDINGS

Background for the Study

In 2009, the Canadian Aviation Maintenance Council (CAMC), in partnership with the Air Transport Association of Canada (ATAC) commissioned the *2010 Human Resource Study of the Commercial Pilot in Canada* to identify gaps in pilot skills and training capacity. The study was commissioned as a follow up to the *2001 Human Resource Study of Commercial Pilots in Canada*.

The information contained in this report draws on a number of data sources, including an extensive scan of available literature and articles published relevant to the industry; 32 interviews with industry representatives, experts, and others; 13 consultations with pilots and/or pilot candidates; a survey of 110 fixed-wing and 31 helicopter operators; a survey of 51 fixed-wing and 13 helicopter flight training units; and six focus groups in five cities across Canada.

This report presents the findings from the *2010 Human Resource Study of the Commercial Pilot in Canada.* This study was completed by R.A. Malatest & Associates Ltd., in collaboration with Joan Williams and Lawrence Dupuis. Research was prepared under the direction of a multi-stakeholder group, including representatives from the Canadian Aviation Maintenance Council, the Air Transport Association of Canada, the Helicopter Association of Canada, training organizations, and operators.

Key Findings

1) **The current National Occupational Classification (NOC) description for pilots (2271) is insufficient and does not adequately reflect today's pilot profession.**
The aviation industry lacks a systematic method for identifying, updating and sharing the skill sets required by employers in the various commercial operations. NOCs are important for a number of reasons. They help guide people who are making a career choice, they can help identify particular attributes that can inform employers when searching for candidates, and they allow employers to better develop and grow their current employees. The current NOC is limited in four main ways:

   1) it does not include other technical tasks that pilots are required to perform, beyond flying the aircraft;

   2) it does not include the non-technical skills required of pilots, such as situational awareness and decision-making;

   3) it does not adequately convey the differences between various commercial pilot operating environments; and

   4) it does not distinguish between a pilot, a flight engineer, a flight instructor, or even between fixed-wing and helicopter pilots.

In addition to updating the NOC of the commercial pilot, the development of National Occupational Standards will help potential employees, employers, and industry to better understand and identify the skills needed to succeed as a commercial pilot. Sixty-five per cent (65%) of fixed-wing and 79% of helicopter operators believed that developing Occupational Standards for the industry was important.

2) ***The commercial aviation sector experienced significant declines in both traffic and revenue in 2009, but is expected to rebound in 2010.***
In 2008, the overall contribution of the air transportation industry to Canada's GDP was almost 5%. In 2009, both passenger and cargo traffic were down dramatically, but industry experts predict that in 2010 each will grow by 5.6% and 12.7% respectively[1]. Economists also expect that in 2010, the air transportation industry's contribution to the country's GDP will increase, though moderately and not necessarily to the levels prior to the economic downturn. In addition, northern air operations are growing in both cargo and passenger traffic, as exploration and production of natural resources increases in Canada's northern regions.

3) ***The industry is at risk of a shortage of fixed-wing pilots with the appropriate knowledge skills and competencies, if the industry recovers as predicted.***
Several factors point to the potential for a significant gap in trained pilots available to the industry. These factors include both demand and supply side trends. For example, operators reported in the survey that 15% of fixed-wing pilots are expected to retire over the next five years. More than half also reported that they anticipate additional hires in the next five years, beyond replacing those who retire. Furthermore, based on survey findings, it is estimated that only approximately 70% of Canadians obtaining their commercial pilot licence (CPL) will actually become career pilots. The results of the study suggest that Canada could experience a significant shortage in commercial pilots with the necessary knowledge, skills, and experience as the economy recovers.

Examining the supply-demand gap for helicopter pilots, the picture is slightly different. While no shortage is expected in the actual number of trained helicopter pilots available to work, the critical shortage is, and will continue to be, pilot experience. Helicopter operators have reported that often they cannot hire recent graduate helicopter pilots because they lack sufficient flying hours to satisfy the minimum requirements set by many of the clients for whom the operators fly. Additional pressure exists in the helicopter industry with respect to ensuring an adequate supply of instructors, as helicopter instructors are typically required to have experience and flight hours greater than those possessed by new graduates. This is a practice that stands in stark contrast to the fixed-wing flight training industry that typically hires recent graduates as instructors for *ab initio* training.

Operators also report a slightly higher retirement rate among helicopter pilots relative to fixed-wing (17% of helicopter pilots are expected to retire in the next five years relative to 15% among fixed-wing pilots). It should be noted that collective agreements for unionized pilots often stipulate retirement at age 60.

4) ***The current approach to marketing commercial pilot careers to youth is outdated.***
Guidance counsellors suggest that marketing the pilot career using interactive web sessions would be more popular with youth than traditional marketing approaches. During a focus group session, some participants felt that high school guidance

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[1] http://www.iata.org/pressroom/pr/Pages/2010-03-11-01.aspx

counsellors are not provided adequate information about the commercial pilot career to better inform their students. It is incumbent upon flight training units to visit schools to inform prospective students about the career. In addition, few tools are provided to students to compare the professionalism of programs when attempting to choose the right flight training unit (FTU) for training. Only 31% of FTUs provide pilot candidates with information on how to choose a school.

5) ***The primary reasons for non-completion of training are significant financial barriers, and the expectation that salaries will be low and employment opportunities few.***
Youth continue to be attracted to the commercial pilot career for the love and challenge of flying, and less than one-quarter of FTUs reported that students choose to become a pilot for either the salary or the employment opportunities. Nevertheless, financial considerations are a significant factor for students and new pilots alike. FTUs reported that the largest percentage of students who leave the program before graduation, do so because of financial considerations, and that the top two reasons students do not pursue a career as a commercial pilot are low salaries and limited employment prospects.

6) ***A number of operators continue to report skill gaps in key technical and non-technical areas.***
Though the proportion of operators who felt that new pilots were deficient in technical skills has decreased since the 2001 study, 17% of fixed-wing operators who sought skills in meteorology in their applicants noted this skill was deficient, 29% of both helicopter and fixed-wing operators who sought knowledge of SMS (safety management systems) in new applicants reported that applicants were deficient, and 23% of fixed-wing operators who indicated that crew resource management was a required skill reported that applicants were deficient in this area. Other technical skills in which applicants were reportedly deficient included Threat and Error Management, and Flight Management Systems.

Regarding non-technical skills, 78% of fixed-wing and 84% of helicopter operators reported situational awareness as a non-technical skill they sought in applicants. Respectively, 19% and 31% reported that applicants were deficient in this non-technical skill.

7) ***Flight training units are not meeting some of the specialized training needs of the operators who hire their students.***
Fewer than 33% of FTUs have formal train-the-trainer curricula for teaching the technical skills sought by operators in applicants. Only 26% of FTUs reported having such a curriculum to teach meteorology for specialized operations, 24% have a curriculum to teach navigation, and 33% have a curriculum to teach GPS.[2] FTUs reported that the lack of resource materials, funding and qualified instructors were all barriers to using such curricula.

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[2] Over and above Private, Commercial and Instrument Study Guides and ground school requirements set by Transport Canada

8)   *Operators and flight training units agree that there should be a national training standard for flight training programs and are interested in participating in its development.*
More than four in five operators reported that national training standards should be developed for flight training programs, and the majority of FTUs expressed interest in helping to develop these standards. Overall, the largest proportion of operators felt that these training standards should be developed by a committee comprising representatives from industry, operators, training organizations, and industry associations, with input from the regulator.

9)   *More resources need to be dedicated to assisting FTUs in creating an SMS curriculum.*
Knowledge of, and training in, SMS was the sixth most commonly mentioned technical skill sought by operators in new applicants, and approximately 30% of operators who looked for SMS training/knowledge noted this as a deficiency in new recruits. At present, only 48% of FTUs currently teach or plan to teach SMS design and implementation, and 23% of all FTUs surveyed reported having a train-the-trainer curriculum for teaching SMS to student pilots.

Among fixed-wing CAR 705 operators reporting, 60% felt that SMS has had a positive impact on their operation. On the basis of aircraft type, 26% of fixed-wing and 35% of helicopter operators felt that SMS has had a positive impact on their organization.

Threat and Error Management (TEM) is an overarching safety concept regarding aviation operations and human performance. Annex 1 to the *Convention on International Civil Aviation* was amended in 2006 to require training in TEM for all flight crew licences. Canada will conform to this change so that all new pilots will learn how to identify, assess and manage threats and errors, and undesired aircraft states.

10   *A number of training initiatives are being explored and tested in the industry to ensure that pilots possess the knowledge, skills and attitudes required in today's industry.*
The advent of the Multi-crew Pilot Licence (MPL) will help facilitate *ab initio* student pilots' advance to the right seat of a transport category aeroplane. The training philosophy behind the Multi-crew Pilot Licence is competency-based.

A competency-based approach to training is relatively new for flight training units. According to one training organization in the United States, "Competency focuses on what is expected of an employee in the workplace rather than on the learning process, and embodies the ability to transfer and apply skills and knowledge to new situations and environments."[3]

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[3] http://www.icao.int/trainair/meetings/gtc9/Panel%2004%20-%20Nicole%20Barrette-Sabourin.pdf

Scenario-based training, already used by airlines, places flying skills and events within real life scenarios rather than simply isolating them as exercises to be practised. The aim is to incorporate opportunities to build better situational awareness and crew resource management skills.

Evidence-based training is a curriculum design methodology that draws on today's real-life aviation scenarios to shape training programs rather than relying on the history of past events, many of which may no longer occur due to changes in technology. Currently, it draws on aviation events occurring at the airline level.

11) **The flight training industry should commit to a self-education program on the advantages and disadvantages associated with becoming an Approved Training Organization (ATO).**
Given this shift toward more competency-based training, Transport Canada is implementing an Approved Training Organization (ATO) model. Becoming an ATO would allow flight training units flexibility in substituting competency-based standards for hours-based standards.

The concept of an ATO is new for many, if not the majority of, FTUs. At present there is moderate interest in the flight training community in becoming an ATO. Forty-five per cent (45%) of fixed-wing FTUs and 43% of colleges indicated that they would be interested in becoming an ATO. In reality however, the percentage of FTUs and colleges that will qualify for ATO status may be less, as not all will necessarily be able to meet the standards required.

Finally, manufacturers have incorporated significant technological improvements in flight training devices, including visuals that allow expanded use of FTDs for *ab initio* training. Use of this new technology represents a cultural shift in the existing model of flight training which is more dependent on in-aircraft instruction. Today's devices are sufficiently advanced such that instructors can program a range of possible scenarios a student or pilot might encounter in the air. However, there are three main barriers to increased use of flight training devices, including:

1. a regulatory environment that limits allowable credits,
2. lack of harmonization of FTD standards, and
3. high cost of purchase and operation of simulators.

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CHAPTER 1: INTRODUCTION

The current study was commissioned and completed in the context of a recovering economic climate, which was preceded by massive declines in aviation activity due to the global economic recession. The aviation industry has historically followed similar cycles — rises and falls — as the economy at large. While the past few years have been difficult ones for the aviation industry, Transport Canada and IATA are predicting improvements in the outlook for the industry in 2010. This bodes well for Canada's commercial aviation sector, as passenger and cargo traffic is expected to increase in response to a strengthened economy.

The pace of technological change is ever more rapid and changes to the industry's regulatory framework are on-going; new licensing concepts such as the Multi-crew Pilot Licence and Frozen Air Transport Pilot Licences are coming to the fore. Operators are transitioning from a compliance model to a safety risk management model with Transport Canada's movement to Safety Management Systems[4]. The changes taking place in the aviation industry call for critical thinking, new approaches, and new skills and competencies for the pilots that will fly the aircraft of tomorrow.

Training institutions and operators alike have had to re-invent and often modify how they train their pilots in order to keep pace with the changing technologies in aircraft. The increasing sophistication of flight training devices (FTDs) allows pilot candidates to experience scenarios in risk free environments. For example, in an FTD, student pilots can be instructed to fly at unusual attitude, which would be considered dangerous and not feasible to test during actual flight. Though the use of more sophisticated devices by airlines is not new, the trend in general aviation training is toward increased use of FTDs for all aspects of *ab initio* training. Many FTUs have now purchased FTDs for *ab initio* and advanced training.

The ratio of Canadian to non-Canadian pilots trained in Canada has significantly changed over the past five years. The number of international pilots trained in Canada has been rising sharply since 2005, from 149 licences issued to non-Canadians in 2005 to 346 in 2008 — an increase of 132% over three years. This suggests that the capacity to train more Canadian pilots exists but is not necessarily being used. This trend points to the fact that the Canadian training system is valued internationally, and that said, the current study data shows that there are many areas where continued change and improvement is called for in the Canadian aviation community. The 2001 and 2003 studies found that there were disconnects between the skill sets employers are looking for, and the skill sets possessed by applicants. The current study explores the extent to which this disconnect remains, and explores useful models and methods for bridging this gap.

1.1   Sponsors of the Research

The Canadian Aviation Maintenance Council (CAMC) in partnership with the Air Transport Association of Canada (ATAC), with funding provided by the Government of Canada, commissioned the *2010 Human Resource Study of the Commercial Pilot in Canada*, Engaging R.A. Malatest & Associates to conduct the research, analyze the data and write the report. Independent consultant Lawrence Dupuis assisted with the interviews, and

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[4] For instance, prior to SMS, there were separate systems for Air Operators and Aviation Maintenance Organizations

Joan Williams contributed to developing the survey instruments and editing the report. This human-resource study was overseen by a multi-stakeholder committee comprising representatives of the Helicopter Association of Canada, aviation operators, government departments, labour associations, and training organizations.

1.2   Structure of the Current Report

The current report is structured as follows:
- ➢ Chapter 2 highlights the main objectives of the study and the methodology used to conduct the research

- ➢ Chapter 3 is an overview of the National Occupational Classification (NOC) 2271 — flight pilots, flight engineers, and instructors. It highlights some of the shortcomings of the current NOC description. An overview of the typical career paths of pilots and related issues is presented for consideration.

- ➢ Chapter 4 provides a brief overview of the aviation industry.

- ➢ Chapter 5 assesses supply and demand for commercial pilots in the next two and five years.

- ➢ Chapter 6 examines the extent to which youth consider becoming a commercial pilot a viable career option, and reasons that pilot candidates do not complete training or do not pursue a career as a commercial pilot after graduation.

- ➢ Chapter 7 highlights pilot knowledge, skills, and attitudes that operators seek in applicants, those skills that are considered deficient in applicants, and screening procedures used by operators and FTUs in selecting candidates and students.

- ➢ Chapter 8 identifies some of the challenges in the Canadian flight training community in light of some of the skills sought by operators identified in Chapter 7 and the barriers to using formal curricula. The chapter also discusses recurrent and type training and the need to develop enriched training standards.

- ➢ Chapter 9 outlines the introduction of safety management systems, the extent to which SMS is currently being taught by FTUs, and operators opinions regarding the impact that SMS has had on pilots.

- ➢ Chapter 10 highlights some of the trends in pilot training, and does so partly in the context of initiatives underway in the areas of licensing and regulation.

- ➢ Chapter 11 presents industry interest in developing National Occupational Standards for professional pilots and flight instructors.

- ➢ Chapter 12 is the summary and conclusions from the research.

- ➢ Chapter 13 presents recommendations arising from the current study.

CHAPTER 2: OBJECTIVES AND METHODOLOGY

2.1   Objectives of the Current Study

This study is designed to:
1) characterize the supply/demand picture for pilots, and describe the common perception of aviation as a career;
2) identify the emerging skills, knowledge and competencies that will be key if Canada is to maintain a viable, safe, and competitive aviation industry; and
3) review the capacity of Canadian flight training units to deliver the skill sets needed for the pilot workforce of the future.

2.2   Methodology

The *2010 Human Resource Study of the Commercial Pilot in Canada* was based on extensive research and consultation. The various activities completed as part of this study are described below:

2.2.1 Survey of Operators and Flight Training Units

A survey of air service operators employing commercial pilots was conducted as part of this study. Respondents were sent the survey attached to an invitation email. Operators employing one to three pilots were only asked to provide information about the number of pilots employed, as these organizations were thought to consist to a great extent of owner-operated single or two-person operations. As a result, questions about staff turnover and other human-resource issues were not thought to be as relevant to this segment of the industry.

Of the 598 fixed-wing operators in the sample, 247 (41%) returned either the full or short questionnaire. Among the 207 helicopter operators in the sample, 34% completed either a full or short survey. In total, 10,109 fixed-wing pilots were represented, accounting for 49% of pilots with a Commercial Pilot Licence (CPL) or Airline Transport Pilot Licence (ATPL). The 920 helicopter pilots who returned surveys represent 22% of the total 4,230 CPL or ATPL helicopter licences in Canada.

A survey of flight training units was also conducted. Among the fixed-wing FTUs in the sample, 32% completed the survey. Among helicopter FTUs in the sample, 35% completed the survey. However, it should be noted that 35% of the helicopter training community represents only 13 organizations. In total, 472 fixed-wing and 178 helicopter instructors are represented by organizations completing the survey.

According to the 2006 Census, there were 14,575 Canadians employed as pilots or flight instructors or flight engineers. In total, 11,534 pilots and flight instructors are accounted for in the current study, which represents almost 80% of the total accounted for in the 2006 Census. Shown in Table 2-1 are the sample size, completions, valid response rate and percentage of representation of each survey component.

		Table 2-1 Survey Participation Rates					

Respondent Group	Valid Sample	Completions		Response Rate	Number of Pilots or Flight Instructors Represented		Percentage of Representation
		Full	Short*		Survey	Licences in Force	
Fixed-wing	**758**	**169**	**129**				
Operator	598	118	129	41%	10,109	20,368	49%
Flight Training Unit	160	51	n/a	32%	472	1,878	25%
Helicopters	**244**	**44**	**39**				
Operator	207	31	39	34%	920	4,230	22%
Flight Training Unit	37	13	n/a	35%	33	178	19%
TOTAL	**1,002**	**213**	**168**	**38%**	**11,534**	**26,654**	**43%**

*One to three pilots in the organization — full survey was not requested of these organizations

High survey participation rates shown in the table above demonstrate that the results of the current study can be viewed with a high level of confidence, given the response rates for the operator survey, and more importantly, the proportion of commercial pilots represented by survey respondents.

It should be noted that while Transport Canada reports 1,878 fixed-wing and 178 helicopter instructor licence ratings in force in Canada, not all persons holding these licences are employed by flight training units. Particularly in the fixed-wing segment of the industry, flight instructors frequently go on to other jobs after holding a flight instructor position and retain the currency of their flight instructor ratings.[5]

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[5] A Class I rating is valid for four years

Survey completions for the operator survey by type of operation and by region are illustrated below.

Table 2-2 Survey Participation Rates by Respondent Group — Operators Only				
Respondent Group	**Fixed-wing**		**Helicopters**	
	Valid Sample	**Completions**	**Valid Sample**	**Completions**
Type of Operation	**598**	**247**	**207**	**70**
Airline	39	17	1	1
Commuter	67	26	10	2
Air Taxi	346	137	186	62
Aerial Work	144	65	10	5
Unknown/ missing	2	2	0	0
Region	**598**	**247**	**207**	**70**
British Columbia	100	46	89	30
Alberta	69	30	42	12
Prairies	122	54	8	2
Ontario	161	60	29	9
Quebec	71	24	23	12
Atlantic	30	9	4	1
Territories	32	11	12	4
Unknown/ missing	13	13	0	0

2.2.2 Key Informant Interviews

Thirty-two industry representatives, experts and other individuals with knowledge about current and future trends affecting the pilot profession were interviewed. Thirteen pilots/student pilots were also consulted. The list of individuals who participated in this study is presented in Appendix A, and the interview and focus-group guides are provided in Appendix B.

2.2.3 Secondary Research

Secondary research included a review of published and online information about the pilot profession, as well as data from Transport Canada concerning the number of operators and pilot licences in Canada, Statistics Canada data concerning the number of Canadians employed as pilots, and the proceedings of the 2009 World Aviation Training Symposium in Orlando, Florida.

2.3   Study Limitations

This report relies upon primary research as well as the use of published secondary data sources. The use of these "multiple lines of evidence" helps ensure that the report and recommendations reflect the input of industry stakeholders, as well as published research on the pilot profession. However, in reviewing the information presented in this report, it is important to recognize the limitations of the study, including:

➢ Qualitative information quoted in the report is not necessarily representative, but is introduced into the report where appropriate to highlight specific examples of identified issues. Survey data is used where available to substantiate conclusions made in the current report.

➢ Specific questions, particularly with respect to projecting the number of pilots required in the future, proved to be difficult for respondents. During focus group sessions, operators and flight training units stated that the volatility in the industry and the economy made it difficult to identify future staffing requirements. As a result, in developing supply-demand models, Transport Canada passenger-kilometre forecasts have been incorporated, and adjusted for historical rates of growth in the number of pilots.[6]

➢ Small sample sizes among some sub-groups made it difficult to reach general conclusions about the industry as a whole. In particular, caution is advised for any conclusions drawn from the helicopter FTU survey, which had only 13 completions.

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[6] Using the Canadian Census count of the number of Canadians employed in NOC 2271

CHAPTER 3: PROFILE OF THE OCCUPATION AND CAREER PATHS

This section provides an overview of the pilot occupation. It includes the definition of Human Resource and Skills Development Canada's (HRSDC) National Occupational Classification (NOC) for NOC 2271 — pilots, flight engineers, and flight instructors — as well as a discussion of the limitations of the current NOC given the different types of air service operations and jobs commercial pilots have. Finally, there is a discussion of the typical career path of the commercial pilot, and the associated challenges.

3.1   National Occupational Classification Description and Duties

According to HRSDC, NOCs are important for employers, employees, and industry alike. HRSDC explains some of the uses of NOCs as follows:

> *"Whether you are an economist analyzing labour market data for a specific occupation or an employment counselor helping someone determine what type of training to take, occupational descriptions help us understand an occupation using a standardized language."* [7]

3.1.1 NOC 2271 Description and General Duties

NOC 2271 currently offers the industry and the public, including employment and guidance counsellors, the following description of the occupation of commercial pilots. [8]

> *"Pilots fly fixed-wing aircraft and helicopters to provide air transportation and other services. Flight engineers (second officers) monitor the functioning of aircraft during flight and may assist in flying aircraft. Flying instructors teach flying techniques and procedures to student and licenced pilots. Air pilots, flight engineers and flight instructors are employed by airline and air freight companies, flying schools, the armed forces and by other public- and private-sector aircraft operators."*

The description goes on to list a total of 61 titles, including captain – air transport, check pilot, chief flying instructor, chief pilot, co-pilot, flight engineer, helicopter pilot, military pilot, pilot instructor, second officer – air transport, and test pilot. See the HRSDC web site for the complete list. [9]

General duties included in the description of NOC 2271 are as follows[10]:

Pilots perform some or all of the following duties:
- Fly fixed-wing aircraft or helicopters to transport passengers and freight;
- Provide services such as search and rescue, aerial surveying or spraying and crop dusting;
- Direct activities of aircraft crew during flight, as captain of aircraft;

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[7] http://www5.hrsdc.gc.ca/NOC/English/NOC/2006/Tutorial.aspx#14
[8] HRSDC web site, accessed July 09, 2009
http://www5.hrsdc.gc.ca/NOC/English/NOC/2006/ProfileQuickSearch.aspx?val=2&val1=2271&val65=flight+instructor
[9] Ibid. For a complete list of titles
[10] HRSDC web site, accessed July 09, 2009 ibid

- Co-pilot aircraft and perform captain's duties if required, as first officer;
- Test new aircraft to evaluate aircraft performance;
- Train pilots to use new equipment, or prepare them for examination to re-validate or upgrade existing licences.

Flight Engineers (second officers) perform some or all of the following duties:
- Monitor operation of engines, fuel consumption and functioning of aircraft systems during flight;
- Assist captain and first officer in operation of aircraft as second officer.

Flight Instructors perform some or all of the following duties:
- Instruct student pilots in procedures and techniques of flying aircraft and in ground-school subjects such as navigation, radio procedures and flying regulations;
- Train licenced pilots for additional certification.

3.1.2 Limitations of current NOC descriptions

Reiterated in some interviews and focus groups, the job description of a commercial pilot encompasses more than just the technical requirements of operating an aircraft. The NOC description provided by HRSDC is, therefore, limited in the following ways:

1) **The description of tasks of a commercial pilot is abstract, and does not encompass the many technical tasks carried out during before and after flight.** Web sites such as Career Cruising provide the public and employment or guidance counsellors with more of the flavour of the technical tasks executed by commercial pilots: "during pre-flight preparations, a pilot checks the status of a number of factors...[including] weather conditions..., creating a fuel plan, conducting a walk-around inspection of the aircrafts, and checking the mechanical condition of the aircraft"[11]. While in the air, the pilot is responsible for ongoing monitoring of the instruments in the cockpit, modifying the flight path if necessary, and communicating with crew and passengers. Once back on the ground, the pilot "secures the aircraft, completes the required paperwork, alerts mechanics to any problems..., and informs other pilots of the weather conditions on the flight route".[12]

> According to one pilot surveyed, "aviation is definitely a good place to be a perfectionist, since you'll always learn, need practice, or push your limits (physically, psychologically and mentally). Add to that the fact that all the conditions evolve continuously (weather, traffic, new technology), it's very interesting to try to be at the tip of the spear."

2) **The NOC descriptions do not include the non-technical skills required of commercial pilots**, including Crew Resource Management (CRM), Pilot Decision Making (PDM) Situational Awareness (SA), Threat and Error Management (TEM), Communication, Teamwork and Leadership Skills.

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[11] www.careercruising.com
[12] Ibid.

3) **The NOC descriptions do not convey the differences in commercial pilot operating environments** such as flying in uncontrolled airspace, busy urban environments, or on international, national or local flights.

4) **The NOC descriptions do not differentiate between fixed-wing and helicopter pilots.** There are a number of distinctions between the operating environments of fixed-wing and helicopter pilots. The NOC classification does not go into the variety of helicopter operating environments and tasks unique to that sector. Many helicopter assignments will place considerable onus on the pilot to make on-the-spot decisions. Pilots encounter situations that are frequently new, unpredictable, and remote from any outside support, accurate weather reporting, or infrastructure, in contrast to many fixed-wing jobs where scheduled charter and airline services involve pre-determined routes and destination airports. Helicopter assignments below illustrate the point:

- Working for mining companies, oil companies, or logging companies either transporting crew workers or cargo in and out of remote sites;
- Providing heavy-lift support in roles such as heli-logging, aerial construction or carrying heavy materials in and out of camps;
- Providing Medevac services directly to a hospital's landing pad or in to and out of unimproved landing areas or scene-calls;
- Flying over land for hydro line or pipeline survey or construction;
- Slinging or long-lining in remote areas;
- Heli-Skiing;
- Helicopter Operations in support of fire-fighting;
- Heli-Seismic Operations;
- Aerial Survey Operations;
- Flying over water for offshore oil rig support[13].

These environments are discussed further in sub-section 3.2.

Findings
There is a lack of the detailed descriptions of commercial pilot occupations that could provide guidance to the public and to employment and guidance counsellors for assisting those considering a commercial pilot career.

Lack of these descriptions is an obstacle to identifying skill sets for the various kinds of commercial pilot jobs and operating environments.

3.2   Types of Air Service Operations Included in the Study

The main employers of commercial pilots in Canada are the major airlines (operators pursuant to CAR 705), commuter airlines (operators pursuant to CAR 704), air taxi (operators pursuant to CAR 703), aerial services (operators pursuant to CAR 702), and flight training units (operators pursuant to CAR 406). Military and defence aircraft

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[13] Career Cruising web site, http://www.careercruising.com/Careers/JobDetails.aspx?LoginID=e008f615-8c75-40be-8c91-794028c1565a-&OccNumber=214&field=JobDesc , accessed September 9, 2009

operations also employ commercial pilots, as do private businesses. Private business operations are classified under CAR 604. An overview of the categories or types of air service operations in Canada is provided in this section.

A number of operators hold more than one type of operating certificate, especially where 406, 702 and 703 operations are concerned. Such pilots may be employed in more than one type of activity. Because of this overlap, the industry does not have a reliable method of counting actual numbers of commercial pilots employed in each sector.

This section provides an overview of the categories or types of air service operations in Canada that are included in the current study. Information on numbers of operating certificates in each category was supplied by Transport Canada.

705 Airline Operations

According to Transport Canada, there are 38 operations classified as 705 Airline Operations, a category that includes aircraft with a Maximum Certificated Takeoff Weight (MCTOW) of more than 8,618 kg (19,000 pounds) or for which a Canadian type certificate has been issued authorizing the transport of 20 or more passengers; and a helicopter that has a seating configuration, excluding pilot seats, of 20 or more.[14] Readers are reminded that the certificate allows the operator to operate an aircraft of this size. It does not mean that the operator only operates aircraft of this size.

704 Commuter Operations

There are 76 operations classified as 704 Commuter Operations, a category that includes air transport service, and aerial work involving sightseeing operations in aircraft with a seating configuration of 10-19 seats excluding pilot seats.[15]

703 Air Taxi and Aerial Operations

There are 551 operations classified as 703 Air Taxi Operations, a category that includes air transport service and aerial work in single engine aircraft and multi engine aircraft with nine or fewer seats, excluding pilot seats; and multi-engine helicopters certified for operation by one pilot and operated under VFR.[16]

This segment of the industry consists of specialty aerial services such as agricultural, firefighting, air ambulance, aerial photography, as well as air taxi, and cargo operations. Air taxi operators may be engaged in one or more of a variety of operations such as scheduled air services, air courier operations, heli-skiing, some aspects of heli-logging, fire suppression activities, and sightseeing. The vast majority of the helicopter operators (23) responding to the survey fell into the air taxi category. Air Taxi operators are classified under CAR 703 operator licence, and Aerial operators are classified under CAR 702.

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[14] http://www.tc.gc.ca/CivilAviation/RegServ/affairs/cars/PART7/705.htm
[15] http://www.tc.gc.ca/civilaviation/regserv/affairs/cars/part7/subpart4.htm
[16] http://www.tc.gc.ca/civilaviation/regserv/affairs/cars/part7/703.htm#703_01

702 Aerial Work Operations

This segment of the industry consists of specialty aerial services such as agricultural, firefighting, air ambulance, aerial photography. There are currently 170 operations classified as 702 Operators. Operation of an aeroplane or helicopter in aerial work involves:

> *(a)* the carriage on board of persons other than flight crew members;
>
> *(b)* the carriage of helicopter Class B, C or D external loads;
>
> *(c)* the towing of objects; or
>
> *(d)* the dispersal of products.

Aerial work operators may also be involved in more than one operation type, including some air taxi services.

406 Flight Training

Flight training units are classified under CAR 406 regulation. As of 2009 there were 207 certified flight training units (FTUs) in Canada.

The survey shows that colleges have a greater number of students in a structured program on average (55) compared to private training providers (15). Private training institutions account for 1,286 of the 1,730 student pilots[17] reported in the FTU survey (74%). Helicopter FTUs reported 153 student pilots, with 108 in a structured program.

604 Operators *(Private Aircraft Operators)*

There is a large fleet of privately owned aircraft in Canada that are used in support of business such as the energy sector, or the financial sector. Subparts of CAR 604 applies to the private operation of Canadian aircraft that are used for the transport of passengers where the aircraft is a turbine-powered, pressurized airplane, or is a large airplane (5700 kg).

Though not included in the sample of operators provided by Transport Canada to be surveyed, members of this group were included in the interviews and focus groups as part of the research completed for the project.

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[17] Modular and structured programs

3.3 Typical Career Path of Commercial Pilots and Issues for Consideration

Given the variety of air operations, there is also a wide variety of careers within the pilot occupation. This section describes some of the jobs, career types, and career paths available to commercial pilots in Canada.

Fixed-Wing Pilot Career Path
A review of the document Professional Pilot Career Info Guide[18], written more than six years ago, shows that notwithstanding cyclical variances, fixed-wing careers still typically follow the ladder approach.[19] However, if the Multi-crew Pilot Licence (MPL) is accepted in North America it has the potential to provide an alternative training method to traditional career path of pilots. The MPL is a cadet program sponsored by an airline using Standard Operating Procedures (SOP's) providing student pilots a direct path from flight school to the right seat of a major airline. The acceptance of the MPL provides an opportunity for the Canadian flight training industry to provide the types of courses and programs they develop and deliver to support initial phases of the MPL. In addition, there is an opportunity to develop a hybrid training program as an alternative to the MPL, which would support candidates headed to regional or feeder airline pilot positions in Canada.

1) The MPL will look more attractive to potential students than the traditional route as it puts candidates into the right seat of a major airline in under two years' flying transport category heavy aircraft. They would do so by entering the MPL program and graduating from the MPL program straight into the right seat of an airliner rather than starting out their pilot careers as flight instructors. This could effectively reduce the pool of potential flight instructors joining the Canadian *ab initio* flight training industry. It should be noted that one criterion for the MPL is that the airline agrees to be a training partner, thereby effectively accepting the student prior to training.

2) Teaching in some phases of the MPL will require experience and skill sets not currently possessed by flight instructors. As Transport Canada states in its *Multi-crew Pilot Licence Training Program Guide*, Transport Canada, Version 2, November 2009, p. 12:

> *"To effectively deliver MPL training the instructor must demonstrate competency in several areas. Ideally these competencies should be present in all flight instructors regardless of airframe or the licence/endorsement being trained towards. Regrettably, they are not. Because MPL training represents a 'gold standard' of truly integrated training that virtually spans a life cycle of training requirements, MPL instructor competency requirements will demand additional training"[20]*

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[18] http://www.atac.ca/en/learn_to_fly/pilot_career_brochure.html
[19] For example, a pilot who wishes to work for the airlines first builds up hours as an instructor, or a bush pilot, and in air taxi or charter operations. Though at present there is no indication that Canada will follow suit, recently passed legislation in the United States requires First Officers to hold an ATPL before being hired. This is a significant departure from the current practice and one that could substantially increase the cost of becoming a co-pilot.
[20] http://www.tc.gc.ca/civilaviation/general/mpl/pdf/rdims-4838800-v11-multi-crew_pilot_licence_training_program_guide.pdf

See Subsection 427.66(5) of the Transport Canada document, which mandates specific competency and experience requirements for MPL instructors.

3) In theory, not all components of training for the Canadian MPL need to be done on Canadian soil. However, Transport Canada does require that three of the four phases of the first MPL beta test occur in Canada, and that a significant amount of investment in the program be on Canadian soil. Transport Canada will not approve the delivery of the Canadian MPL unless it is in Canada's and the public's interest, and if it brings "enduring benefits to Canadians. This can take the form of locating a substantial amount of the training here, and bringing investment and jobs to Canadians".[21]

For several reasons, acceptance of the MPL also presents the option for an alternate means of training for the flight training industry using an Approved Training Organization. Refer to Chapter 10 for an indepth discussion of the MPL and Approved Training Organizations.

Changes in Flight Instructor Career Opportunities

A number of participants commented that a major long-term problem for the industry is the high turnover rate of instructors. As they accumulate experience and hours, instructors transition to flight operations. In addition, one respondent stated that most FTUs have a hard time keeping their Class 2 and 3 instructors. According to one participant from a large college, since it has in the past been difficult to retain qualified instructors, wages have increased to the extent that it is becoming a more viable career in and of itself. Another college respondent reported facing such a shortage that the college had to pay for some of its graduates to obtain their instructor rating and hired those graduates for the summer to train students.

Except in college programs where instructors are on salary, most flight instructors are paid on an hourly basis. A rise in the number of structured group programs offered, including integrated programs, has prompted a rise in the number of salaried positions for flight instructors.

A move toward a more structured and integrated program could result in a more attractive career as a flight instructor, as it increasingly becomes a salaried position. One industry expert in the pilot community commented that a problem in the industry is that instructor ratings do not actually give the instructor the knowledge or skills to teach. This expert believes that a move toward more structured programs could actually produce better quality instructors who are better equipped to teach. One possible explanation for this could be that the instructors would be more likely to seek out teaching as a career, and remain with it long term, rather than simply using it as a stepping stone to becoming a pilot.

In the survey of FTUs, there were 40 fixed-wing and 13 helicopter FTUs that reported having students in a structured program, compared to 32 and 11, respectively, reporting students in modular programs (17 fixed-wing and six helicopter FTUs reported having

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[21] In correspondence with a representative from Transport Canada

both structured and modular programs). Two fixed-wing survey respondents reported offering the Transport Canada Integrated Commercial program.

Helicopter Pilot Career Path

There are significant differences between career trajectories of fixed-wing pilots compared to helicopter pilots. That said, the key features of the helicopter pilot career path remain unchanged since the 2001 and 2003 human-resource studies on the commercial pilot in Canada.

1) Most helicopter pilots first acquire their aeroplane licences, and then convert them to helicopter licences.

2) The challenge for many helicopter pilots remains that of gaining experience and securing their first job. Most helicopter pilots graduate from their training with fewer than 300 hours, which makes them ineligible to obtain an instructor's licence, as they lack the hours and the experience required to instruct. Many operators stipulate that their pilots have to have a minimum number of hours as required by their clients. In this context, many helicopter pilots are faced with the real challenge of gaining enough hours and experience both to instruct and secure their first job. This is discussed further in Chapter 4, Section 4.6.

3) Employment as a helicopter flight instructor is generally not available to recently-licenced pilots (unlike fixed-wing). Helicopter flight instructors typically require a significant amount of industry experience prior to becoming instructors.

Findings:

When the MPL becomes widely available in Canada, it has the potential to change the career path of pilots into first officer positions. However, the Multi-crew Pilot Licence must be accepted by the air operators in Canada as a Cadet Program, as it is tailored to the Standard Operating Procedures and type of aircraft operated by the airline.

Instructors may see a change in the number of available positions and increased pay rates, associated with MPL programs and integrated programs as they increase in popularity. Professionalizing the instructor occupation will make flight instruction a more attractive and viable career choice, and will have the added benefit of increasing the quality of instruction.

Helicopter pilots continue to face the challenge of acquiring enough hours to qualify for a first job in commercial operations or flight instructing.

CHAPTER 4: INDUSTRY OVERVIEW

Overall, the air transportation industry accounts for $56.8 billion of the national gross domestic product, and represents about 4.6% of the Canadian economy.[22] While in 2009 there was a dramatic downturn in the aviation industry, long-term estimates for passenger and cargo traffic, according to both Transport Canada and the International Air Transport Association (IATA), are significantly more positive. Both passenger and freight traffic declined throughout 2009, with estimated net losses of US $9.4 billion in 2009.[23] IATA anticipates that the international airline industry will start to recover in 2010; despite expects losses of US $2.8 billion for that year. Asia-Pacific and Latin American carriers are expected to lead the recovery, while European and North American carriers are expected to post the largest losses in 2010.

The performance of the aviation industry follows a pattern similar to the overall economic performance of the country. Therefore, global and national economic performance, and forecasts of their future performance, can be considered relatively reliable economic indicators for the future of the industry. The following table presents the actual and forecast overall Gross Domestic Product (GDP) for the country. As can be seen, 2008 and 2009 are presented as the bleakest years; however, the forecast looks somewhat more positive for 2010 and 2011.

Table 4-1
OVERALL Real GDP Growth (actual and forecast)

	Actual			Forecast		
	2006	2007	2008	2009	2010	2011
% Change in real GDP as of June 2009	3.1	2.7	0.4	-2.5	2.7	3.0

Source: Statistics Canada / Haver Analytics, Forecasts by TD Economics as of December 2009, available at http://www.td.com/economics/qef/prov0709.pdf, accessed February 12, 2010

The contribution of the air transportation industry to the country's overall GDP has followed a similar pattern. In 2008, the industry accounted for almost 5% of the country's real GDP. Its contribution in 2009 is expected to drop to 3.5%, but by 2010 it is anticipated to increase marginally. These figures suggest that while the industry is currently in an economic slump (which mirrors the country's and the world's overall economic performance), a slow but steady recovery in 2010 is expected.

Consumer confidence has declined in response to the country's economic downturn. According to the Conference Board of Canada's Consumer Confidence Index, confidence fell from 95.3 in January 2008 to 70.2 in January 2009.[24] The decline in consumer confidence impacts all sectors of the economy, including business travel, tourism, and air cargo shipments.

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[22] Statistics Canada / Haver Analytics, Forecasts by TD Economics, available at
http://www.td.com/economics/qef/indaug09.pdf, accessed September 15, 2009
[23] http://www.iata.org/pressroom/pr/Pages/2010-03-11-01.aspx
[24] Transport Canada Aviation Forecasts 2008-2022, September 2009

In addition, consumers' Personal Real Disposable Income (PRDI) is affected by the global economic slowdown. In 2008 PRDI/capita was 1.0%, and it is expected to decline further to 0.2% in 2009. However, a slight rebound is projected (1.3%) in 2010. Transport Canada's latest forecast is that between 2012 and 2022, PRDI/cap will average a 1.0% growth annually.

4.1   Passenger Transportation

International airline passenger transportation volumes have declined globally throughout 2009.[25] The December 2009 press release issued by the IATA announced a global financial forecast predicting airline losses totaling US$11 billion in 2009 — worse than the previously projected US$9 billion loss. If correct, that would represent a US$80 billion (15%) loss to the global industry compared to 2008 levels.[26] However, the more recent March 2010 IATA press release is predicting that 2009 losses will in fact be back around the US$9.4 billion range, resulting in part from increased traffic in the latter part of the year. The main factors driving the losses are declining demand, declines in yield, and increased fuel costs. Cutthroat competition and competitive pricing have also been cited as contributing factors. According to the IATA, passenger demand declined by 2.9% in 2009, but it is expected to grow by 5.6% in 2010 — an improvement on the previous December 2009 forecast of a 4.5% growth. In addition, previous December forecasts predicted a global loss of US $5.6 billion for 2010. This figure has been revised, and is now predicted to be US $2.8 billion.[27]

In Canada, the situation reflects the global trend. The country's largest air carrier, Air Canada, reported on November 6, 2009, that the company continues to be adversely impacted by continued weak economic conditions, which have precipitated diminished passenger and cargo revenues. The report revealed a substantial decrease in operating income, which stood at $68M in the third quarter, compared with $112M in the corresponding period the previous year (2008). During this 12-month period between the third quarter of 2008 and the third quarter of 2009, overall passenger revenues fell by 13% compared with 2008.[28]

Two common measures of passenger traffic are: a) the number of enplaned and deplaned revenue passengers; and, b) revenue passenger kilometres. According to the latest Transport Canada estimates, the total number of enplaned and deplaned passengers is expected to grow at an average rate of 2.9% per year between 2008 and 2022. The growth in passenger kilometre rates is expected to be slightly higher, at an annual average of 3.6% between 2008 and 2022. The following table presents the estimated growth rates for both total number of airline passengers and passenger kilometres over the specified period of time.

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[25] IATA web site http://www.iata.org/NR/rdonlyres/DA8ACB38-676F-4DB1-A2AC-F5BCEF74CB2C/0/Industry_Outlook_Dec09.pdf
[26] http://www.aviation.ca/content/view/7899/117/
[27] http://www.iata.org/pressroom/pr/Pages/2010-03-11-01.aspx
[28] "Air Canada reports Substantial Decline In Revenues As Weak Economic Conditions Continue to Impact Performance", Friday, November 06, 2009, available at http://www.proactiveinvestors.com/companies/news/2929/air-canada-reports-substantial-decline-in-revenues-as-weak-economic-conditions-continue-to-impact-performance-2929.html

Table 4-2
Average Annual Forecast Growth Rate in Passenger Traffic — All Reporting Airports
(Major, regional/local and charter carriers)

Year	Domestic		Transborder		International		Total	
	Enplaned/ Deplaned Passengers	Passenger Kilometres	Enplaned/ Deplaned Passengers	Passenger Kilometres	Enplaned/ Deplaned Passengers	Passenger Kilometres	Enplaned/ Deplaned Passengers	Passenger Kilometres
1993-2008	3.7%	4.4%	3.1%	3.6%	5.7%	5.4%%	3.9%	4.8%
2008-2012	1.0%	1.1%	0.6%	0.9%	3.7%	3.7%	1.4%	2.5%
2008-2017	2.3%	2.3%	3.0%	3.2%	4.4%	4.4%	2.8%	3.6%
2008-2022	2.3%	2.3%	3.3%	3.4%	4.3%	4.3%	2.9%	3.6%

Source: Transport Canada "Aviation Forecasts 2008-2022" September 2009

4.2 Air Cargo

According to IATA's latest estimates, air cargo for the industry at large is expected to grow by 12% in 2010, following an 11% decline in 2009.[29] At present, cargo demand is rising faster than world trade, as the economy rebounds and businesses replenish their depleted inventory. However, it is expected that once these inventories are rebuilt, growth in cargo shipments will level off and reflect current world trade trends.[30]

Canada's major airports remain committed to expanding their air cargo business, and to establish themselves as desirable places to conduct business. Rated in the top 30 airports worldwide for cargo activity[31], Toronto's Pearson International Airport processes more than 45% of Canada's air cargo and $31.7 billion of goods per year, and moves more than 500,000 tonnes of cargo annually. The Greater Toronto Airports Authority (GTAA) reduced cargo landing fees at Toronto's Pearson International Airport by 25% in January 2009. The GTAA believes that reducing cargo landing fees will enhance the economic competitiveness of the Greater Toronto Area, and will encourage cargo shippers and carriers to use air transportation rather than road transportation. The fee reduction initiative includes further provisions to encourage air carriers to modernize their fleets to quieter and more fuel-efficient aircraft.[32]

Closer to Asia than any other major North American airport, Vancouver's YVR is one of the largest North American hubs for traffic in the Asia-Pacific region. The Canadian Government has identified YVR and other Canadian airports as a key player in the Asia Pacific Gateway and Corridor Initiative.

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[29] http://www.iata.org/pressroom/pr/Pages/2010-03-11-01.aspx
[30] http://www.iata.org/pressroom/pr/2009-01-29-01.htm
[31] GTAA, http://www.gtaa.com/en/business_at_pearson/cargo_services/
[32] Airports Council International "Airport News", available at http://aci-na.org/index/todaynews_0619a, accessed September 14, 2009

Transport Canada also forecasts the growth of air freight/cargo transportation by Canadian carriers. Given that the growth in Canada's air cargo industry historically has been strongly linked to the country's economic growth (measured by GDP), Transport Canada uses this relationship as its underlying assumption for developing its forecasts.[33] Presented below are the actual and forecast average annual growth rates for air cargo traffic between 1993 and 2022.

Table 4-3
Average Annual Forecast Growth Rate in Air Cargo Traffic — All Reporting Airports
(Major, regional/local and charter carriers)

Year	Domestic	Transborder	International	Total
1993-2008	3.5%	9.6%	4.0%	4.9%
2008-2012	1.7%	1.9%	2.4%	2.0%
2008-2017	3.4%	4.5%	4.7%	4.1%
2008-2022	3.4%	4.6%	4.8%	4.2%

Source: Transport Canada "Aviation Forecasts 2008-2022" September 2009

As shown in the table above, according to Transport Canada, air cargo traffic is projected to grow on average by 4.2% per year between 2008 and 2022.

Finding:
Canada's GDP has declined markedly since the economic slowdown, contributing to decreased consumer confidence and in PRDI/capita. Similarly, passenger traffic and cargo traffic have also been affected. However, by most estimates, the country's economy is expected to recover. Long-term forecasts of passenger and freight traffic suggest that industry growth rates will be between 3% and 5% per year, thus increasing the demand to expand fleets and hire additional flight crews to support the predicted growth.

4.3   Helicopter Industry

Little information is available about the expected or predicted economic changes in the helicopter industry. Inferences can be made by looking at the number of helicopters on order, but caution must be used as orders are not necessarily reliable indicators since some may be replacements to an aging fleet rather than expansion of the fleet. It is fair, however, to speculate that if a company is ordering more helicopters, they will need to hire pilots to fly these helicopters.

According to a March 2009 article in the *Financial Post*, the future for helicopter manufacturers has been turned upside-down with the collapse of the global economy.[34] In 2008, orders for new helicopters were reaching record highs. Reasons included military requirements in both Afghanistan and Iraq, growth in travel and tourism, and oil and gas exploration companies moving into increasingly remote areas in response to

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[33] Transport Canada "Aviation Forecasts 2008-2022", September 2009.
[34] National Post, March 20, 2009 "Choppy Outlook for Global Helicopter Industry" available at http://www.financialpost.com/story.html?id=1411118, accessed September 21, 2009

record-high commodity prices. Today, the demand for new helicopters has declined dramatically. According to Honeywell International, although the demand for military helicopters will keep the market somewhat buoyant, demand for helicopters for the civilian sector is expected to be flat through 2013. This comes after three consecutive years of unprecedented growth.[35] In its most recent forecast, Honeywell noted that due to the uncertainty of the global economy, the timing of a recovery is unknown, and may take several years to resolve.

Helicopter manufacturers such as EADS N.V's Eurocopter and Sikorsky Commercial reduced their delivery forecasts, and have acknowledged that some of their backlog orders have been either cancelled or deferred. In March 2009, Bell Helicopters Textron Canada announced it expected to deliver 180 helicopters for the year, which is seven more than the previous year, but the company acknowledged that overall orders had diminished, creating a great deal of uncertainty for the industry.[36] In February 2009, Rolls-Royce PLC boosted its 10-year forecast by 5% to 9,000 deliveries of helicopters for the civilian sector, based on a full recovery by 2013", and said it further expects "...*more than 15,000 deliveries, valued at more than $130-billion, worldwide over the next decade*". [37]

In February 2010, the president of Rolls-Royce's reiterated at the 2010 Heli-Expo that the company is expecting a near-term recovery of the civil helicopter market and long-term growth over the next 10 years. His updated projections include expected deliveries of more than 16,400 units over the next decade — 10,300 civil units valued at $38 billion and 6,100 military units valued at $108 billion. Roberts attributes the company's projected growth both to an expanding market and to the need to replace helicopters that are between 30 and 50 years old.[38]

Finding:
The expected recovery and growth in the demand for helicopters by the civilian sector in 2010 could prompt increased demand for experienced pilots to fly the helicopters.

4.4   Northern Operations

Many northern air-service operators routinely operate in the most remote areas of the country, where they face unique challenges and opportunities.[39] Economic growth in the north has increased the region's dependence on transportation and, more specifically, on air transportation. In Canada's north, there are few seasonal and fewer permanent roads linking communities. Aviation is the only source of year-round access for most communities and mine sites in the region.

Today, Canada's north has 48 certified airports, 73 aerodromes, and two international airports, both of which have regular non-stop flights from Europe. The region also has

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[35] Ibid.
[36] Ibid.
[37] Ibid.
[38] http://www.shephard.co.uk/news/rotorhub-com/heli-expo-2010-rolls-royce-forecasts-growth-in-civil-helicopter-market/5579/
[39] Transport Canada "Aviation Safety Letter", Issue 3, 2009

its own transport association — the Northern Air Transport Association (NATA)[40]. Transport Canada in the Prairie and in the Northern Region lists 17 operators regulated pursuant to CAR 705, all of which provide north/south service. Three of these operators in fact provide service to the north with aircraft capable of carrying more than 100 passengers each.[41]

Growing interest in Arctic sovereignty, natural-resource exploration and development (gold, diamonds, oil and gas) and construction of the Mackenzie Oil and Gas Pipeline has affected demand for air transportation in recent years.[42] It is expected that demand for aviation in the North will continue to increase, given the recent political interest and the vast natural resources in the area. Currently, there are four diamond mines in operation in the Arctic, producing one-third of the world's top gem-quality diamonds, with an additional five mines under construction. Furthermore, recent estimates show that oil and gas reserves in the Arctic rival those of the entire Middle East.

As economic growth and development continue in the region, so too will the requirement for increased air transportation — both passenger and freight. As the need grows, air carriers and operators will recruit greater numbers of professional pilots to their airlines and to the routes that service the North.

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[40] Ibid.
[41] Though the remaining 14 operators are CAR 705 certified, they do not necessarily provide service to the north with their aircraft of this size.
[42] Ibid.

CHAPTER 5: THE SUPPLY AND DEMAND FOR PILOTS

As with most occupations, the supply-demand curves for pilots are seldom, if ever, aligned. New entrants typically lag behind the demand due to the length of pilot training required. Over the years, periods of surpluses and shortages have been commonplace. Often the situation is mixed, with shortages in some sectors and surpluses elsewhere.

The recent economic downturn has affected the demand side for aviation services and, consequently, the number of pilots needed. In addition, shifting patterns in the supply of available pilots, though less volatile, is equally significant. According to the International Civil Aviation Organization (ICAO) estimates, aviation worldwide will require 207,600 new pilots by 2018, and 352,900 by 2026, with Asia-Pacific and the Middle East Regions leading the growth in demand. These figures are based on a survey conducted by the IATA Training and Qualifications Initiative. Though the projections were made in 2007 prior to the 2008 financial collapse, many experts maintain that there is a serious global pilot shortage looming in the near future and an international coordinated effort must be put forth to ensure that enough commercial pilots are trained and qualified to fly safely.

In a recent article published by the Associated Press, entitled, "Future Pilots May Not Be Up To Snuff"[43], the US National Transportation Safety Board was cautioned that not only is there predicted to be a shortage in the supply of pilots in the United States, but that the pilots of the future will be less experienced and less ethical. According to the article, in the U.S. there are currently approximately 54,000 pilots working for major airlines, another 19,000 for regional airlines, and an additional 2,500 available for hire. Recent estimates in the States are that airlines will need to hire about 42,090 pilots over the next decade to replace retirees and to keep up with domestic industry growth. Two key challenges in the States to meet demand include, fewer military pilots seeking jobs with airlines, and fewer college students pursing a career in aviation due to perceived poor industry economics and increasing competition from private corporations.

According to Dr. Thomas Carney, Chair of the Next Generation Aviation Professionals (NGAP) Task Force, Boeing projects that, in the Asia-Pacific region, air travel will grow at an average annual rate of 6.5% over the next 20 years. China alone is expected to triple its fleet to 4,610 airplanes by 2028 to meet demand, and subsequently to increase its number of professional pilots. According to the ICAO, Chinese pilots-in-training already currently occupy a large number of seats in global training institutions. Canadian flight training centres continue to admit a high percentage of international students — likely a reflection of the increasing demand for pilots by China, India and other countries. And while a number of flight training units have scaled back or gone out of business, likely due to financial pressures, inability to replace aging fleets and increased regulatory requirements on business aspects of the operation, the remaining Canadian flight schools continue to update their fleets and simulators with the latest technology, developing capacity to supply Canada and the international community with the training need for the next generation of professional pilots.

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[43] http://www.npr.org/templates/story/story.php?storyId=126898497

5.1 Supply

Number of Pilots in Canada

As of December 2008, there were a total of 24,598 in force commercial pilot licences held in Canada. [44] The following graph illustrates the number of in-force pilot licences as of December 2008 by licence type.

<div style="border:1px solid; background:#8B1A1A; color:white; text-align:center; font-weight:bold;">
CHART 5-1
NUMBER OF COMMERCIAL/ATPL PILOT LICENCES IN FORCE IN 2008
BY LICENCE TYPE
</div>
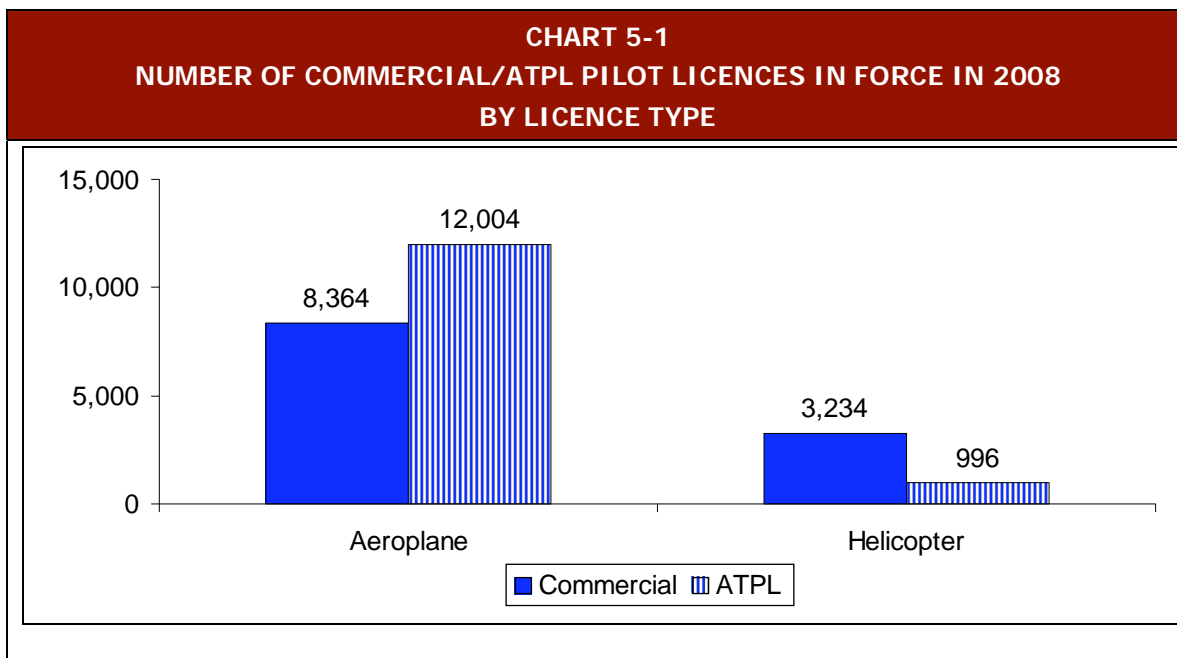
Source: Transport Canada

The number of licences, even commercial licences, does not necessarily reflect the number of pilots available to the aviation industry. Some portion of the active licences will represent pilots working in other industries or pilots not actively flying. As a result, it is useful to compare the data from Transport Canada to that from Statistics Canada showing the number of people in Canada reporting that they are employed as commercial pilots. According to the 2006 Census, there were 14,575 Canadians working in NOC 2271 — air pilots, flight engineers, and flight instructors. Not surprisingly, the majority of employees (11,935) in NOC 2271 work in the air transportation industry. The second most common industry is Support Activities for Transportation (655), followed by Educational Services (500), which are likely flight training units (FTUs).

According to Transport Canada, there were 1,113 commercial fixed-wing and 646 ATPL fixed-wing licences issued in 2008. Further, there were 838 commercial helicopter and 86 ATPL helicopter licences issued in 2008. There was a substantial drop in the number of licences issued in 2005 and 2006, with the total number of licences falling to 1,665 in 2005 compared to 1,819 in 2003. However, in 2007 and 2008 there was an increase in the number of commercial licences issued.

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[44] Transport Canada web site, accessed July 9, 2009
http://www.tc.gc.ca/civilaviation/general/personnel/stats/stats007_pg2.htm

**CHART 5-2
LICENCES ISSUED BETWEEN 2003 AND 2008, BY LICENCE TYPE**
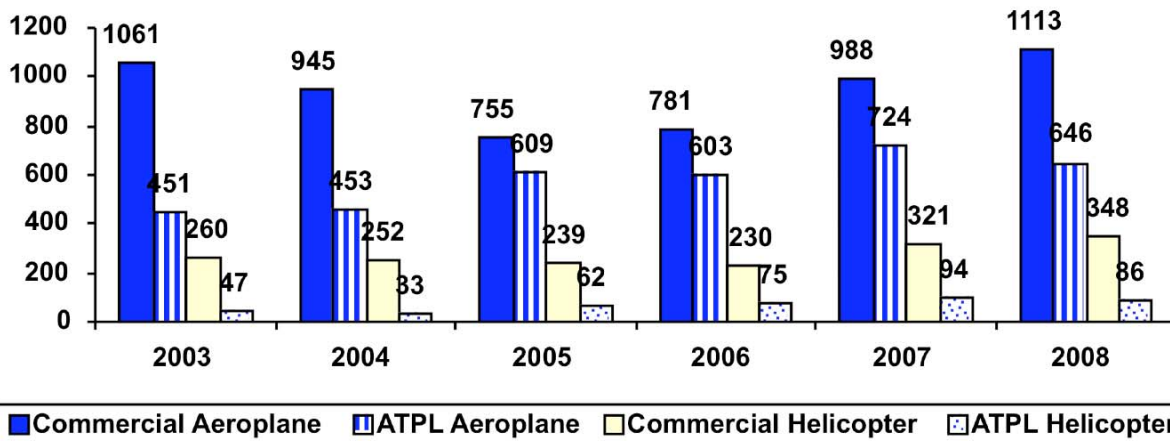
Source: Transport Canada

NOTE: All ATPL licence holders are required to have previously held a commercial licence.

The number of international students trained in Canada has increased rapidly in recent years. In total, 149 commercial fixed-wing licences were issued to international students in 2005. This number has risen to 346 in 2008, which means that the share of licences issued to foreign students has increased from 19.7% in 2005 to 31.1% in 2008. International students should be removed from the total supply of Canadian pilots available to Canadian operators, as these students often return to their native countries or move to other countries to pursue their aviation careers.

According to Transport Canada, in 2008, 46% of foreign students were from India, 33% from China, 15% from France, and 3%, respectively, from the UK and the United States. As one respondent noted, Canadian schools have a sound reputation internationally and have the equipment, expertise, geography and weather to produce highly competent pilots, which has attracted the attention of international airlines and students. But according to another interviewee from the flight training community, if Canada does not remain at the forefront of training with its training devices, simulators and methodology, the foreign student market is likely to decline in the coming years as other countries develop their own capacity to train pilots.

According to information provided by Transport Canada, approximately 767 of the fixed-wing commercial licences and 234 helicopter commercial licences were issued to Canadians in 2008.[45]

The following graph details the trend in the number of commercial aeroplane licences issued to Canadians between 2001 and 2008. Since 2005, the proportion of licences issued to Canadians has declined from over 80% to just under 69%, whereas the total number of licences issued to Canadians over this same period increased from 606 to 767.

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[45] initial issuance of licences as opposed to re-issuing to people who already held the licence

CHART 5-3
COMMERCIAL AEROPLANE LICENCES ISSUED TO CANADIANS BETWEEN 2001-2008

Year	Commercial Licenses Issued to Canadians
2001	812
2002	766
2003	696
2004	673
2005	606
2006	608
2007	694
2008	767
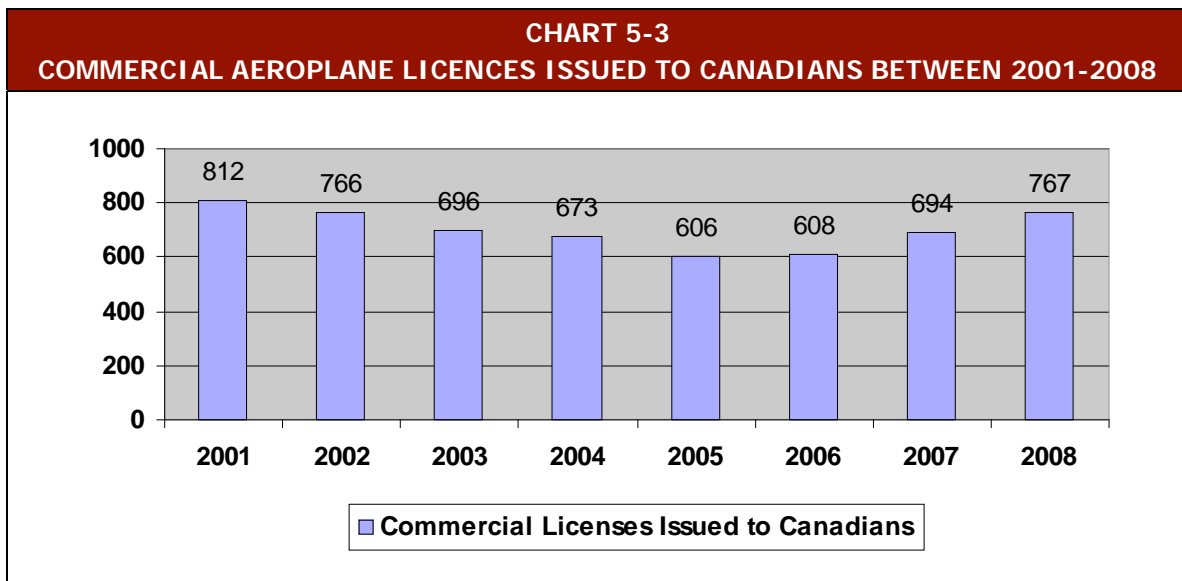
Source: Transport Canada

Another point for consideration is that not all graduates from pilot training pursue a career as a commercial pilot. Although this information is not formally tracked by FTUs, respondents were asked about the percentage of Canadian graduates from their organization/institution that go on to become commercial pilots as a career. FTUs reported that 71% of Canadian graduates become commercial pilots. However, these data should be considered with caution since the responses are based on respondent perception rather than actual figures. Nonetheless, there were some slight differences in the responses given by private training organizations and colleges. Colleges reported a higher percentage of Canadian students becoming commercial pilots (75%) compared with private training organizations (68%). It should be noted that only six of the 42 respondents were classified as colleges, and none of these was a helicopter FTU.[46]

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[46] n=26 private fixed wing FTUs; n=6 college FTUs; n=10 private helicopter FTUs

CHART 5-4
PERCENTAGE OF STUDENTS ISSUED A COMMERCIAL LICENCE
WHO INTEND TO MAKE AVIATION A CAREER, BY INSTITUTION TYPE
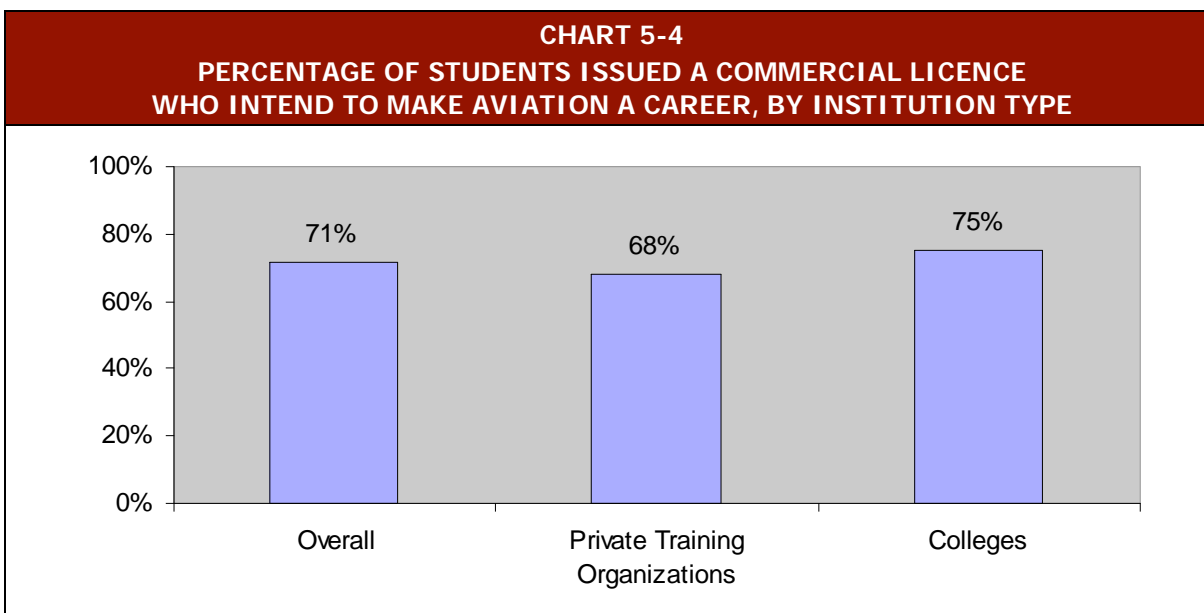
Source: Flight Training Unit Survey (question E4) "Based on your experience interacting with your training organization's recent students, what percentage of Canadian individuals obtaining a commercial pilot licence go on to become a commercial pilot as a career?" n=32 Fixed-wing, n=10 helicopter

Immigration continues to play a key role in the country's labour force, as a number of industries rely heavily on immigration to fill labour shortages and to meet demand for skilled labour. As illustrated in the table below, compared with the national averages across all occupational groups, immigrants comprise a smaller proportion of employees in NOC 2271. While immigrants account for 21% of the labour force across all occupations, they only account for 14% of the labour force in NOC 2271.

Table 5-1
Immigrant Status of Employees in NOC 2271

	MALE		FEMALE		TOTAL (NOC 2271)		TOTAL (All Occupations)
Non-immigrants	11,740	86%	795	93%	12,535	86%	78%
Immigrants	1,960	14%	55	6%	2,020	14%	21%
Before 1991	1,400	10%	30	4%	1,435	10%	11%
1991 to 2000	360	3%	20	2%	380	3%	6%
1991 to 1995	190	1%	10	1%	195	1%	3%
1996 to 2000	175	1%	10	1%	185	1%	3%
2001 to 2006	195	1%	10	1%	200	1%	3%
Non-permanent residents	20	0%	0	0%	25	0%	1%
TOTAL	13,725	100%	855	100%	14,575	100%	100%

Source: Statistics Canada, 2006 Census of Population, Statistics Canada catalogue no. 97-564-XCB2006005.

Discussed in more detail in the next section, the main challenge in the helicopter sector in Canada is that newly trained pilots do not have sufficient flying time to meet the minimum requirements set by clients. This has resulted in a number of operators being forced to look beyond Canadian borders to hire helicopter pilots. According to survey results, helicopter operators reported that typically, 7% of their new hires come from foreign operators. In contrast, fixed-wing operators reported that only about 1.2% of new hires come from foreign operators.

Some operators have obtained approval from Citizenship and Immigration Canada to hire foreign pilots by securing a Labour Market Opinion (LMO) identifying a need for the foreign worker because there are no qualified Canadians available to fill the job. According to the Immigration and Refugee Protection Regulations, an LMO, which is provided by the Department of Human Resources Development, is based on the following factors:[47]

(a) whether the employment of the foreign national is likely to result in direct job creation or job retention for Canadian citizens or permanent residents;

(b) whether the employment of the foreign national is likely to result in the creation or transfer of skills and knowledge for the benefit of Canadian citizens or permanent residents;

(c) whether the employment of the foreign national is likely to fill a labour shortage;

(d) whether the wages offered to the foreign national are consistent with the prevailing wage rate for the occupation and whether the working conditions meet generally accepted Canadian standards;

(e) whether the employer has made, or has agreed to make, reasonable efforts to hire or train Canadian citizens or permanent residents; and

(f) whether the employment of the foreign national is likely to adversely affect the settlement of any labour dispute in progress or the employment of any person involved in the dispute.

However, according to one respondent's interpretation, the operator simply has to demonstrate that a Canadian pilot with the required ratings cannot be found.

Findings:
Almost one-third of fixed-wing and helicopter commercial pilots licences issued in 2008 were to international students. In 2008, the share of Canadian pilot licences issued to international students jumped from 19.7% in 2005 to 31.1% of all Canadian commercial licences issued.

Not all Canadians who obtain a commercial pilot licence become professional pilots. Flight training units estimated that 71% of Canadians who obtain a CPL go on to become professional pilots. One caveat is that since many FTUs do not formally track this information, their estimates are hypothetical.

Helicopter operators reported that typically 7% of their new hires come from foreign operators, compared with just over 1% of new hires to fixed-wing operations.

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[47] http://laws.justice.gc.ca/en/ShowDoc/cr/SOR-2002-227/bo-ga:l_11::bo-ga:l_12//en?page=6&isPrinting=false&noCookie

5.2   Helicopter Pilots — Supply Considerations

The main challenge among helicopter operators and pilots alike is how to bridge the gap between the many pilots who have low flying hours with client demand for pilots with high flying hours. According to the author of an article written for Heli-College Canada Training Inc., the dilemma in the helicopter industry, which has only really developed in the last three years, is that many customers/clients, in a desire for increased safety and efficiency, require that their helicopter crews have a very high 'minimum experience' — generally in the range of 1,000 hours as a Pilot In Command (PIC).[48] This puts a significant amount of pressure on operators and pilots alike. In response, a few companies and organizations have convinced some government agencies to consider allowing "lower numbers such as 600 hours PIC, 100 on type,

> According to one operator: "I'm finding there is a huge disconnect between *ab initio* training and the industry. We have to put 15 to 20 hours into students just to get them to an operational level for what we do. The people we fly for are setting standards that are so high — we've got pilots that can't fly for certain companies that require 2,000 hours. We have difficulty even placing 500- or 600-hour pilots and being able to bill their time."
> - Focus Group Participant (helicopter operator)

and where applicable, an 'approved' mountain course"[49], which may help bridge the gap. Anecdotally, one industry expert commented that some helicopter training companies are now hiring their own graduates in the charter branch of their company, or are developing relationships with other charter operators to hire their recent graduates.

While it has always been difficult for a pilot to secure the first job, in the current environment, it has become harder for operators to hire low-time pilots. This has led to a loss of trained helicopter pilots to the industry. According to the president of the Helicopter Association of Canada, the attrition rate of students either not completing their training or in leaving the industry after graduation is frequently due to the cost of training and the frustration of getting a first job. "*There are jobs available for qualified pilots, but those coming out of flight school with, say, typically 100 hours of flight time, really means they have not been exposed to a lot of the specialized flying missions that they may be called upon to complete as a working commercial helicopter pilot.*"[50]

As pilots with higher time either retire or move onto different careers, operators will need to consider creative ways of retaining their younger, lower-hour pilots, and providing them with the opportunities to build up their hours.[51] This is at the heart of the dilemma: How do you bring new pilots up to the level of experience needed to be really productive?

There are two main options that have been proposed to address this "gap": accreditation and mentoring programs.

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[48] Heli College Canada Training Inc. "Bridging the Gap... Helping Low time pilots enter the industry" available at http://www.heli-college.com/ar+ticles/art5.htm
[49] Ibid.
[50] Ibid.
[51] Ibid.

Accreditation

According to Gavin Miller, in his article entitled "HAC: The Move to Best Practices"[52], the helicopter industry would benefit considerably from developing a program geared toward industry best practices and accreditation. Miller states that industry would benefit greatly, both in terms of safety and efficiency, from developing, following, and auditing its own rules. In a presentation called "The Future of Best Practices in the Canadian Helicopter Industry" made at the 2009 HAC convention, president and CEO of HAC, Fred Jones, conveyed to the audience the importance for HAC to create its own best practices and voluntary member accreditation program. Though it would come at some cost, Miller argues that both HAC and the HAI (Helicopter Association International) would be the best vehicles for educating customers about efforts to improve safety.

Miller suggests that it is ultimately the customer's decision to support the design, development and implementation of such a program, as it is customer demand that will drive operators to implement best practices and/or accreditation programs. As Miller states, "*If accreditation for HAC/HAI best practices is offered, then the customer base should be encouraged to use operators who have it*". [53] This will, in turn, encourage more operators to get accredited. Focusing more on operator accreditation rather than exclusively on pilot hours of experience could result in safer standards and practices across the board.

The International Association of Oil and Gas Producers (OGP) appears to be leading the way in setting minimum standards for pilots and aircraft used for working in the industry. In its June 2008 Aircraft Management Guidelines report[54], the OGP outlines several best practices and safety standards that could be adopted by helicopter operators to help improve both safety and the skill of pilots. The OPG recognizes that different aviation authorities can only outline minimum requirements, and that "*the ultimate responsibility for safety in the air lies with the aircraft operator*". [55] There is no single template that would fit all operators. Thus, the purpose of the OGP guidelines is to help those who are responsible for managing aviation (either at the operation level or policy level) to better "*plan, develop and control, safely and efficiently, air transport operations that are best suited to their needs*". [56]

One focus group, which included helicopter operators, explored the idea of a carding system: "*In the United States, the forestry industry cards its pilots, say, for forest fires. If you have a certain amount of training and [can] demonstrate this... [you've] got a great chance at getting a job*". According to another helicopter operator, "*It would increase transferability and mobility of that carding system, it would be national recognition. It would mean that we're all on the same page with respect to the competency end result.*"

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[52] Vertical Article, "HAC: The Move to Best Practices", April 5, 2009, available at
http://www.av-basesystems.com/downloads/press/VerticalArticle.pdf
[53] Vertical Article, "HAC: The Move to Best Practices", April 5, 2009, available at
http://www.av-basesystems.com/downloads/press/VerticalArticle.pdf
[54] International Association of Oil and Gas Producers, Aircraft Management Guidelines Report, June 2008,
available at http://www.ogp.org.uk/pubs/390.pdf
[55] Ibid.
[56] International Association of Oil and Gas Producers, Aircraft Management Guidelines Report, June 2008,
available at http://www.ogp.org.uk/pubs/390.pdf

In Canada, the Pilot Qualification Working Group, a sub-committee of HAC, was formed to address HAC members' concern that the minimum number of hours required by clients does not accurately measure a pilot's ability or skill, thus making it difficult for new competent pilots to gain entrance into specialty operations such as forestry wildfire.[57] Though in earlier years, a working group met to determine the minimum fixed hours required to assess the competency of pilots, today's operators and clients agree that the criteria need to be refined to better reflect pilots' abilities according to current wildfire operations requirements.

The working group identified the following eight key skills and developed Industry Best Practices for both training to the skill and operating in the circumstance:
1. General Wildfire Operations Knowledge
2. Mountain Flying
3. External Load — Short Line (horizontal reference), Long Line (vertical reference), Precision Load Placement, Water Bucketing / Tanking
4. Class D External Loads
5. Aerial Ignition Device (AID) and Drip Torching
6. Hover Exit
7. Confined Area Operations
8. Low Visibility Flight

Clients will be required to identify which skills they need of pilots to complete the flight operation, and the operator must be able to prove to the client that their pilots have the identified skills.

Mentoring Programs
The Helicopter Association of Canada (HAC) has proposed a mentoring program wherein newer pilots accompany more experienced pilots on the job. Ten of 13 helicopter FTUs reported that there was a need in the industry for a formal mentoring program for recent graduates. However, currently, there is little use of mentoring programs or of partnerships between FTUs and operators. Only three of 13 helicopter flight training units reported having a formal mentoring program for graduates with operators. However, six helicopter FTUs had a hiring relationship with one or more commercial helicopter charter operators.

Findings:
Due to increasing requests from clients for 'minimum experience' for helicopter pilots — generally in the range of 1,000 hours as a pilot in command — it has become increasingly difficult for helicopter pilots to secure a first job.

Accreditation and mentoring programs have been suggested strategies to address this human-resource challenge.

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[57] http://www.h-a-c.ca/PQWG-Pilot_Competencies_for_Helicopter_Wildfire_Operations.pdf

5.3   Demand

As with most sectors' employee base in the country, the increasing likelihood of retirements among fixed-wing and helicopter pilots is expected to affect the overall demand for pilots as employers will need to fill these vacancies.

Among Western developed countries, as in most sectors and industries, Robert Donald, Executive Director of CAMC, said, "There are simply not enough people in the pipeline coming up to replace retirees... And in aviation, that trend is even more pronounced than in other sectors given the very significant growth of the worldwide industry".[58]

Presented in the following table are the projected figures for global pilot and training demand, according to IATA ITQI Report, 2009:

Table 5-2
Projected Global Pilot and Training Demand

PILOT AND TRAINING DEMAND	2018	2026
Total pilots needed to fly new aircraft	193,100	350,200
New pilots for additional aircraft	135,000	227,500
New pilots needed to fill the fluctuation and retirement gap	72,600	125,400
Total new pilots (additional aircraft and fluctuations)	207,600	352,900
Total new pilots needing transition training on replacement aircraft	57,930	122,700

Source: IATA ITQI Report, 2009; reproduced from ICAO Journal, issue 06-2009, pp. 8.

One respondent felt that the economic recovery will prompt a pilot shortage, not only nationally but also globally. Until recently, China and India have tended to hire their pilots from within. However, the current rate of growth of the aviation market in these countries has resulted in somewhat more relaxed hiring policies; thus opening the door to international pilots. In addition, according to this participant, operators in Asian and Middle Eastern countries may be in a position to offer attractive salary and benefit packages, which could act as an incentive for many Western trained pilots to choose to work abroad. Nonetheless, the growth in international demand for pilots can be considered an opportunity for many Canadian would-be pilots. According to survey results, 4.1% of fixed-wing pilots and 10.8% of helicopter pilots who resigned in the last two years from Canadian operations left for an overseas offer.

One interviewee reported that as the market for pilots becomes increasingly global, there will be a need for an international harmonization initiative for pilot training. Similarly, another participant posited that given the global nature of the industry, there should be an agreed upon "universal pilot licence".

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[58] ICAO Journal, issue 06-2009, pp7.

Operators were asked about the expected retirement rates at their company in the next two years and five years. Both helicopter and fixed-wing respondents estimated that approximately 6% of their current pilot employee base would retire in the next two years (between 2009 and 2011). The retirement rates increase dramatically when predicted over five years. Fixed-wing and helicopter operators estimate that approximately 15% and 17%, respectively, of their current pilots will retire between 2009 and 2014. Their responses are illustrated in Table 5-3 below.

Table 5-3
Estimated Pilot Retirement Rates

Operator Type	# of Companies Responding	# of Full Time and Part Time Pilots	Estimated # to Retire in 2 years (cumulative)	% of Current Pilots	Estimated # to Retire in 5 years (cumulative)	% of Current Pilots
Helicopter	32	710	45	6.3%	119	16.7%
Fixed-wing	61	6,768	385	5.7%	991	14.6%

Source: Operator Survey, QB1: How many pilots do you currently employ? QB5: How many pilots do you expect will retire in the next 2 and 5 years?

NOTE: only those companies who provided data for QB5 were included

One issue for consideration is that Air Canada's pilots are currently required to retire at the age of 60. However, the airline and its pilots' union may be required to change the age of retirement to 65. This could affect the estimated number of retirements in the next two and five years.

In addition to retirements, operators further expect that they expect the total number of pilots they employ to either increase or stay the same in the next two and five years. In total, 31.1% of fixed-wing and 41.9% of helicopter operators expect that in the next two years the number of pilots they employ will increase, and 49.5% and 64.5% expect that in the next five years the number of pilots they employ will increase, over and above replacing retirements.

Findings:
The looming retirements coupled with projected growth in the Asian markets have many experts predicting significant pilot shortages in the coming years — both on the global scale. According to survey respondents, 4% of voluntary separations among fixed-wing pilots and almost 11% among helicopter pilots were attributed to pilots accepting jobs overseas.

Almost 17% of helicopter and 15% of fixed-wing pilots are expected to retire in the next five years. In addition, more than one-half of all operators project that the number of pilots they employ will increase in the next five years, over and above replacing retirements.

5.4   Current Capacity to Meet Demand

The number of new pilot licences issued each year must cover increases in demand for pilots, retirements of existing pilots and pilots leaving the industry.

Number of Flight Training Units in Canada

According to Transport Canada, there are 39 helicopter training schools and 168 aeroplane training schools across the country.[59] Transport Canada further reports that there are five flight training units offering the fixed-wing ATPL integrated course, seven that offer the CPL(A) integrated course, and nine that offer the CPL(A)/IR integrated course[60].

However, the number of flight training centres has diminished since 2001. According to the *2001 Human Resource Study of Commercial Pilots*, there were 287 flight training units in Canada at the time.[61] Today, there are only 207, and industry experts expect that the number of FTUs offering commercial pilot licences will continue to decline. According to one participant, there are several reasons for this: 1) Transport Canada's mandate to have an SMS (Safety Management System) in place in 2010 for schools offering commercial pilot training will involve substantial cost to implement; 2) In Ontario, all FTUs that want to offer the commercial licence and flight instructor rating must be registered with the province (which costs money); and, 3) Many FTUs, especially the smaller, non-college affiliated ones, have aging infrastructure (aircraft and training devices) and will be unable or unwilling to make the capital investment required to offer the quality of training programs that will be increasingly needed.

As reported by several participants, more schools, particularly smaller ones, will continue to close. According to these individuals, the end result will be that remaining smaller schools will likely focus on private licences, recreational flying, and basic commercial and instructor training. The larger schools, however, will grow in size and their focus will be on training commercial pilots, and addressing the skills gap between today's minimum standards adhered to by training programs and the skills required by commercial operators. Fewer schools means that regional limitations will restrict access to training for potential student pilots, which could increase the cost of training for those students who are required to relocate to pursue their commercial pilot training.

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[59] Transport Canada http://wwwapps.tc.gc.ca/Saf-Sec-Sur/2/FTAE-FVEA/Resul.aspx?l=E&st=1&sc=&rg=%%&pv=%%&at=%%&ct=H, accessed August 19, 2009
[60] Transport Canada http://wwwapps.tc.gc.ca/Saf-Sec-Sur/2/FTAE-FVEA/Index.aspx?l=E
[61] ATAC "2001 Human Resource Study of Commercial Pilots in Canada".

Number of Instructor Ratings in Force

The number of instructor ratings can also provide insight into the current capacity to meet the demand for trained and qualified pilots. However, it should be noted that one of the key challenges in assessing the number of instructors is that while an individual has an instructor rating, it cannot be assumed that person will instruct professionally as a career. Further discussion of the need to identify the parameters of what constitutes a professional instructor can be found in Chapter 11. Albeit that the figures for the number of in force instructor ratings is fluid and that there remains some question as to the extent to which those with the ratings are actually instructing, the figures provide an idea of the number of instructors who could potentially be accessed. The following table presents a breakdown of the total instructor ratings held in force by class and licence type, as of December 2008.

Table 5-4
Instructor Ratings (in force) as of December 2008

Type of Licence	Class				Total
	1	2	3	4	
Aeroplane	455	323	732	368	1,878
Helicopter	91	21	43	23	178

Source: Transport Canada, http://www.tc.gc.ca/civilaviation/general/personnel/stats/stats007.htm#instructor

According to one respondent, Canada's flight training community has the capacity to train the number of pilots needed domestically. However, if Canadian flight schools are not successful in attracting domestic students and mainly enroll foreign students, operators may be increasingly consigned to fill their pilot positions with foreign pilots, many of whom may be willing to work for low starting salaries, which could act as a further incentive for operators to hire foreign pilots. In addition, according to an interviewee, it would be relatively easy for operators to hire foreign pilots trained in Canada, as they are trained to the Canadian standard and would have already cleared all the security checks.

As reported above, flight schools appear to be admitting larger numbers of foreign students, as demonstrated by the 31% of pilot licences issued to foreign students in 2008. Survey findings show that 17% of fixed-wing commercial pilot students and 12% of helicopter pilot students are foreign. By institution type, 3% of students in college-based programs and 18% in private programs are foreign. The challenge, therefore, is how to best attract domestic students to the pilot career. One possibility to increase the number of domestic student pilots in Canada is to focus on the female population. In Canada, the number of professional female pilots is reported to be less than 6%, according to the most recent 2006 Census data. This is discussed in detail in Chapter 6.

Findings:
The number of flight training units has decreased by 28% since 2001. According to Transport Canada the number of FTUs decreased from 287 in 2001 to 207 in 2008. SMS requirements, provincial regulations, and increased costs to update technology and infrastructure have been partially credited as contributing to the decline in FTU numbers. The number of FTUs is expected to decline even further as smaller training facilities close or get out of the business of professional pilot training. However, larger training facilities, which have economies of scale, could potentially increase in size, potentially offsetting the loss of smaller training units and increasing or even increasing the total number of seats available for professional pilot training.

While there are more than 2,000 instructor ratings in force, the actual number of instructors teaching professionally is fluid and not known. This affects the extent to which capacity to meet demand can be assessed. Nonetheless, it is perceived that Canadian FTUs have the capacity to meet the demand in numbers, but unless they are able to attract more domestic students, operators may be consigned to hire more foreign pilots than the currently reported 1% among fixed-wing and 7% among helicopter pilot new hires. At present, according to survey results, 17% of fixed-wing pilot students and 12% of helicopter pilot students are international.

5.5   Estimates of Future Demand

The information presented in this section was used to estimate the expected change in staffing requirements for commercial pilots. Staff turnover (retirements and voluntary separations) and the anticipated number of pilots needed in 2011 and 2014 are examined in the following sections.

The potential supply-demand gap for pilots is based on the following assumptions:

Supply: Identification of the number of new licences issued. Due to the difficulty in estimating future changes in the number of new pilot licences, a "steady-state" is assumed based on the number of estimated new Canadian commercial pilots in 2008.

Demand: Demand considerations include new hires required to fill replacement positions (retirement, pilots leaving the industry/voluntary separation) as well as new hires required to meet increased demand. Published estimates of growth in the industry are used for the current model.

Given the limits on the ability to estimate future supply and demand, two alternative growth scenarios are projected. The considerations pertaining to each growth scenario are detailed below.

Low-Growth Scenario

➢ no increase in the demand for pilots due to poor industry growth.

➢ estimates of retirement patterns based on employer estimates of actual retirements (fixed-wing — 5.7% by 2011 and 14.6% by 2014; helicopter — 6.3% by 2011 and 16.7% by 2014).

➢ voluntary separation rate, calculated based on employer estimates of the number of resigning pilots exiting the industry (fixed-wing — 2.6%/year; helicopter — 1.9%/year).

➢ number of new Canadian pilots available to the industry per year is estimated to be the number of CPL issued to Canadians in 2008, less FTU estimates of the number of pilots who obtain their CPL for personal reasons but elect not to enter the industry. It should be noted that as FTUs do not formally track former students after they obtain their licence, these estimates should be viewed with some caution.

High-Growth Scenario

➢ demand for pilots increases by 2.3% annually (see next section Method for Calculating the High Growth Scenario for rationale).

➢ retirement patterns based on employer estimates of actual retirements (fixed-wing — 5.7% by 2011 and 14.6% by 2014; helicopter — 6.3% by 2011 and 16.7% by 2014).

➢ voluntary separation rate, calculated based on employer estimates of the number of resigning pilots leaving the industry (fixed-wing — 2.6%/year; helicopter — 1.9%/year).

➢ number of new Canadian pilots available to the industry per year is estimated to be the number of CPL issued to Canadians in 2008, less FTU estimates of the number of pilots who obtain a CPL for personal reasons and don't enter the industry.

Method for Calculating the High-Growth Scenario

1) Published growth rates for the industry were used — specifically passenger kilometres — as employers had difficulties estimating the change in the number of pilots expected to be employed in the future,

2) The Transport Canada estimate of the change in the number of passenger kilometres was compared to the change in the number of Canadians employed as pilots, according to the Canadian Census, to determine the relationship between passenger kilometres and growth in demand for pilots.

3) According to the Canadian Census, there was an increase in the number of pilots employed in 1996 from 11,215 to 14,475 in 2006, which represents an annual growth rate of 3.0%[62]. Transport Canada's average annual forecast growth rates were reviewed from 1993 to 2007 (growth rate for passenger kilometres of

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[62] http://www.statcan.gc.ca/c1996-r1996/mar17-17mar/occupation-profession/t1/4130329-eng.htm

5.0%). Therefore, growth in the number of pilots is expected to be 60% of the growth in passenger kilometres.

4) For 2007 to 2016, 3.9% annual growth in passenger kilometres is projected by Transport Canada. This equates to a 2.3% annual growth rate in the number of pilots needed in the Canadian workforce.[63]

The projected supply-demand gap for the pilot profession for 2011 and 2014, for both a low-growth and high-growth scenario is highlighted in Table 5-5.

Table 5-5
Estimated Supply and Demand Gap —
Low- and High-Growth Scenario Commercial Pilots

Group/Period	Low Growth Estimate		High Growth Estimate	
	2011	2014	2011	2014
Total Pilot Workforce[1]				
Fixed-wing	12,060	12,060	12,621	13,512
Helicopter	2,515	2,515	2,632	2,818
Total	14,575	14,575	15,253	16,330
Estimated Demand				
Fixed-wing	657	676	986	1,076
Helicopter	127	135	195	217
Total	784	811	1,181	1,293
Estimated Supply[2]				
Fixed-wing	547	547	547	547
Helicopter	247	247	247	247
Total	794	794	794	794
Supply-Demand Gap[3] (per year)				
Fixed-wing	110	128	439	529
Helicopter	(120)	(112)	(52)	(30)
Total	(10)	(16)	378	499

[1] Total estimated workforce, based on the number of pilots reported in the 2006 Census. The distribution of helicopter versus fixed-wing pilots is estimated based on the relative distribution of licences.
[2] Based on number of licences issued in 2008 to Canadians (pilots) and in total (instructors)
[3] Difference between estimated demand and current education supply capacity. Numbers in rounded brackets indicate an anticipated surplus.

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[63] More recent Transport Canada data projects a 3.6% growth rate in passenger kilometres, which would yield a 2.2% annual growth rate in the number of pilots needed. With these new figures, the calculations were re-run and yielded very little difference (between 3 and 19 pilots, depending on the growth scenario and pilot type).

The supply-demand analysis is based on the following assumptions for both growth scenarios:

➢ the number of new pilots available to the industry is assumed to be constant (number of new CPL Canadian licence holders estimated to become career pilots[64]); and

➢ the percentage of pilots leaving the profession is assumed to be similar to the current rate. If more pilots are enticed to remain in the industry, a higher number of pilots will be available to the industry without the need for additional recruitment.

With respect to the projected shortage of pilots, it is worth noting that according to the latest census figures, only 5.8% of employees working in NOC 2271 were female. Transport Canada also publishes data on the number of licences in force by gender. In December 2008, 5.2% of the commercial and airline transport pilot (ATP) licences in force were held by women. Broken out by licence type, 5.8% of fixed-wing commercial and ATP licences were held by women, with a higher percentage being commercial licences (6.9%) than ATP licences (4.6%). These figures are markedly lower in the helicopter sector. Only 3.6% of all commercial and ATP licences in force were held by women, with 3.9% being commercial and 2.4% being ATP licences.

Findings:
Based on the low-growth analysis, there will be a small gap (fewer than 150) for fixed-wing pilots. Under the high-growth scenario, there is expected to be a sizeable gap of more than 500 pilots by 2014. The current model assumes that the number of new pilots available to the industry remains constant from 2008. If more pilots are retained in the industry as compared to 2008 or, if more pilots are convinced to become career rather than recreational pilots, the projected gap will diminish.

As for helicopter pilots, a small surplus in the number of pilots is expected. However, the discrepancy between actual and required experience will continue, until strategies are implemented to mitigate this gap.

Further research and analysis into the gendered nature of the commercial pilot career needs to be done in order to determine how gender affects an individual's likelihood of pursuing this career. An examination of registration, drop-out rates, and completion rates by gender, as well as an analysis of the proportion of women who pursue a commercial pilot career after completing their training, would be relevant lines of analysis.

In the meantime, CAMC should continue its efforts to attract youth to the industry, with particular effort toward a strategy to attract more women to a career as a pilot.
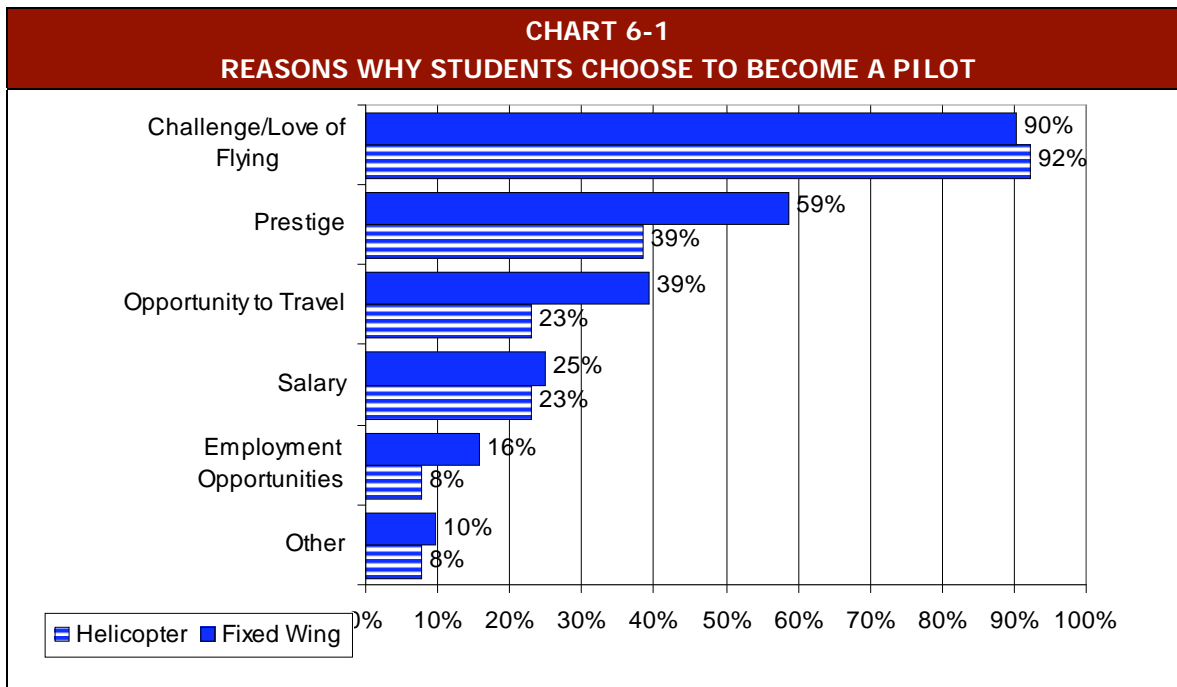
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[64] based on FTU estimates of the number of new licencees that become a pilot as a career

CHAPTER 6: ATTRACTING YOUTH TO CAREERS AS PILOTS

It was noted in the previous chapter that there is a projected shortage of fixed-wing pilots choosing aviation as a career in the next two and five years, assuming that the same number of Canadians decide to become career pilots as did in 2008. And, while FTUs might have the capacity to train the required number of Canadian students, the trend has been an increase in the number of foreign compared to Canadian students. Thus, the industry will only be successful in supplying the required number of Canadian pilots to operators, providing there are sufficient applicants, graduates and licencees opting for a commercial pilot career. As a result, it is important to consider the extent to which youth view commercial piloting as a positive career choice and the reasons that pilot candidates discontinue their training.

6.1   Perception of the Career

FTUs were asked what they believe attracts students to the pilot career, based on their experience interacting with students. The most commonly cited reason was the challenge/love of flying, followed by prestige and the opportunity to travel. Interestingly, only 25% of fixed-wing and 23% of helicopter FTUs cited salary, and 16% and 8% respectively cited employment opportunities. These same reasons, however, were also cited for discontinuing commercial pilot training.

CHART 6-1
REASONS WHY STUDENTS CHOOSE TO BECOME A PILOT

Reason	Helicopter	Fixed Wing
Challenge/Love of Flying	92%	90%
Prestige	39%	59%
Opportunity to Travel	23%	39%
Salary	23%	25%
Employment Opportunities	8%	16%
Other	8%	10%

Source: Flight Training Unit Survey (question E2) "Based on your experience interacting with students, what attracts students to a career as a pilot? Select all that apply" n=51 Fixed-wing, n=13 Helicopter

Note: Responses may add to more than 100% as multiple responses were allowed.

The top reason students choose to become a pilot remains largely unchanged from year to year. As reported in both the 2001 and the 2003 commercial pilot studies, the challenge/love of flying remains the primary reason that students pursue a career as a pilot. Anecdotally, pilots themselves note that the single most important factor determining whether or not someone actually pursues piloting as a professional career is the extent to which that person truly loves to fly. One pilot summarized the love of flying as follows, "*For as long as I (or my parents) can remember, I've always wanted to be a pilot. I never, either facing challenges or during school, thought of another career than the one of a pilot.... The main 'reasons' (for I believe there's nothing reasonable with such strong passion) were the very pleasure of flying, the idea of pushing myself to my limits and then some, and the beauty of a jetfighter, in its design and technicality. As I grew older, things like patriotism or the notion of using a skill to accomplish a mission, confirmed me in my goal.*"

Notwithstanding the allure of a professional flying career, more needs to be done to attract youth to the field. A survey of high schools in Vancouver suggested that there was little interest among today's youth in becoming a commercial pilot.[65] Although "commercial pilot" was rated higher than other professions in terms of prestige, when considering pay, benefits, and job security, "commercial pilot" as a profession was not better perceived than the average profession. Also, career advisors interviewed at flight training units expressed the view that guidance counsellors and students were uninformed about aviation as a potential career opportunity. HR specialists have identified that in order to engage the imagination of young people in an industry, outreach has to take place in elementary school by the age of 11.

According to one flight training college, students "*are troubled by some of the cut-back news in the industry today, especially when they look at the investment required to become a commercial pilot and contrast that with the typical starting salary. It's not uncommon for a student, (outside of a college-based program), to spend $70,000-$100,000 to acquire his or her flying credentials only to face a starting salary of $20,000.*" According to one focus group participant, "*When we go into schools to talk to youth, they say, "why would I want to be a pilot? If you look at a pilot today, no offense, but it's the same as driving a city bus.*"

Students' view of the career pilot is echoed, particularly, in new pilots' conflicting perceptions of their own profession. Pilots reported that the best features of the profession, including the adventure, people in the field, varied experiences, ongoing education and testing, and travel opportunities Quarrelled with the reported worst part of the profession, including "*salary, job security, mentality towards new pilots (the attitude is "you're lucky we hired you at all") and living conditions.*" One online source advising would-be pilots suggested that they would likely end up "*...making next to nothing (like $25K a year, maybe, and building time... You'll constantly keep an overnight bag packed and travel with it, because you may get called at any time to show up and fly to wherever someone wants to go.*" [66]

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[65] Survey completed by a key informant
[66] Would being an airline pilot a good career choice for me?
http://answers.yahoo.com/question/index?qid=20090831103719AADPZzS

These sentiments are echoed in the experiences of new pilots who report experiencing personal and/or business financial pressures on the job. One pilot stated, "*For the first year, first officers or co-pilots start at $9 an hour.*" Personal financial pressure is often caused by debt from flight training school and paying dues in the trenches in the beginning of a pilot's career. New pilots sometimes need to take on a secondary job to support themselves. These general sentiments are reflected in the interviews conducted with pilots.

Finding:
According to flight training units and pilots consulted as part of this study, the best features of being a commercial pilot are the opportunity and challenge of flying, while the drawbacks of the profession are salary and job security.

6.2   Marketing of the Career Pilot Profession

Availability of career path information
A further barrier to attracting youth to a career as a pilot is the lack of information about the profession. As noted above, career advisors at flight training units felt that guidance counsellors and students were uninformed about aviation as a career opportunity.

A review of FTU web sites shows that the extent they provide career path information (as distinguished from program information) varies greatly in depth and completeness. Information is also available through informal means such as peer-to-peer research or employer/industry web sites. Web sites of flight training schools may have links to industry association web sites to encourage prospective students to explore options. However, according to guidance counsellors interviewed, there is concern that students may not be obtaining professional or well-researched advice prior to entering training programs.

At present, no single aviation group has a systematic approach to setting standards for what should be included in career path information, preparing it, updating and disseminating it. In particular, there is no systematic approach to advising career counsellors as to what career path information is available and where to find it.

Some individual associations within the industry have tried to address this. In 2004, members of the ATAC Marketing Work Group volunteered to prepare a brochure on the ATAC web site "Professional Career Info Guide", available to anyone, member or not, on the ATAC web site's home page. However, the brochure has never been updated. Although much of the information remains relevant, the brochure should reflect current demand, salary, hiring practices and trends.

A January 2010 supplement to *Wings* magazine offered a glimpse of airline pilot qualifications but did not describe any other qualifications for the commercial pilot occupation .[67]

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[67] www.careersinaviation.ca

There was general consensus among the pilots interviewed that in-house guidance counsellors (in FTUs and in secondary schools) are not well enough equipped to provide information on aviation careers to students. Information is often supplied through passive methods, such as brochures and pamphlets, instead of active advising. Flight training school personnel usually have to go directly to the schools to distribute information and inform students of available opportunities.

According to guidance counsellors and flight instructors, there is a need to promote aviation careers not only in the traditional way, but through new, innovative methods. Guidance counsellors suggested that advertising about career pilots needs to come into the 21st century, and go where the students are — online and at social networking sites. Instead, the aviation industry tends to rely too much on career fairs and information sessions. It was suggested by guidance counsellors that the industry go beyond this traditional method and investigate implementing interactive web sessions with pilots through live chat or video conferencing via social networking sites. Students almost exclusively do their research online, and yet one flight training school stated, *"...we don't advertise [using] computers [internet] at all because there's very little return on it."*

Guidance counsellors interviewed reported minimal interest in, or even awareness among, the student population in pursuing careers in aviation.[68] Although many possible reasons were suggested for the lack of student interest, one key reason is that the more urban the school, the greater the number and more varied the type of programs. High school career information days also promote a wide range of career possibilities, which compete with aviation as a choice.

Availability of program and standards information

For students, advisors, parents, career counsellors, and funding bodies, there are issues associated with choosing the right FTU from professional and business practice considerations. Apart from Transport Canada requirements, there is no nationally agreed-upon standard or source that applicants can use to assess the quality and professionalism of a given FTU's training program. Community colleges and universities have their own internal requirements, but these are not standardized across Canada and do not apply to private FTUs.

The Professional Careers Catalogue available on the ATAC web site, mentioned in the previous section, lists training organizations that incorporate some or all of the technical and non-technical "soft" skills that employers indicated they wanted in the HRSDC 2001 study[69]. It also indicates what other training the organizations offer, and whether or not they have a selection process, a refund policy and a dispute-resolution process.

In the years since the Professional Careers Catalogue was written, some organizations have ceased to exist and others have altered their focus and/or upgraded the content of their programs. The catalogue needs updating in virtually all areas, including the list of organizations, current programs, and current business practices.

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[68] One informant contacted her colleagues in a Vancouver school district and the response was "hardly anyone contacts us (guidance counsellors) to inquire about aviation careers."
[69] Technical skills include Cockpit Management Systems, Flight Management Systems, Terrain Collision Avoidance Systems, Ground Proximity Warning System, Glass Cockpit Familiarization, and Computerized Cockpit Familiarization. Non-technical skills include Crew Resource Management, Pilot Decision Making, Interpersonal Skills, Team Member Skills, Organization Skills, Customer Skills, and Problem Solving Skills

While some work has been done by the ATAC Professional Standards Committee to develop standards, at present, this work reaches only those FTUs that are members of ATAC. Other aviation organizations in Canada appear not to have access to adequate resources to assume the sole responsibility for developing national standards for all FTUs.

Some provincial authorities, including British Columbia's and Ontario's, have imposed consumer protection in the form of business practice standards on FTUs, but the lack of standardization of requirements across the country makes it difficult for applicants, their families and advisors to compare programs in different provinces. The *Wings* magazine "Careers in Aviation 2010" supplement mentioned previously offered some information about a limited selection of flight schools across Canada.

Private- and public-sector funders experience similar difficulties in understanding career paths and assessing program standards. Banks and government funders cannot turn to a standard reference to determine applicant eligibility for funding for one licence or rating combination over another, nor can they find a standard length of classroom semester programs.

Findings:
Applicants have insufficient information on career paths and few tools to compare the professionalism of programs and adequacy of business standards when attempting to choose the right FTU for training.

Available information about FTUs is often outdated and incomplete .

Guidance counsellors expressed the view that there is an opportunity for the aviation industry to market the career of pilot more actively, using interactive web sessions, which are more popular with youth than a traditional job fair.

6.3 Obstacles to Becoming a Pilot

There are significant challenges to graduation among youth who undertake the training to become a professional pilot. According to responses by 34 FTUs, an average of 22.3% of fixed-wing students and 9.1% of helicopter students do not complete their program. Reviewing results by institution type (private training units and colleges), more notable differences emerge. The proportion of students attending colleges who do not complete their training program is reported to be 12.5%, compared to 17.5% at private training units. One caveat associated with this finding is that many flight schools do not track this information systematically. In fact, 45% of flight training units do not track the rate at which students do not complete flight training programs. Nonetheless, the drop out rate among private training units is reportedly higher than among colleges.

Respondents to the FTU survey were asked to identify the top three reasons that students do not complete pilot training. The most commonly cited reason among fixed-wing and helicopter FTUs was financing, followed by low pay structure (for fixed-wing FTUs) and the difficulty of program (for helicopter FTUs). "Few job prospects" was the third most commonly cited reason.

CHART 6-2
TOP REASONS PILOTS DO NOT FINISH TRAINING

Reason	Fixed Wing	Helicopter
Financing	92%	91%
Low Pay Structure for Pilots	57%	46%
Few Job Prospects	43%	46%
Difficulty of Program	35%	55%
Job Security	24%	0%
Length of Training	14%	9%
Attracted to Jobs in Other Sectors	14%	18%
Other	10%	18%

Legend: ⬜ Helicopter ⬛ Fixed Wing
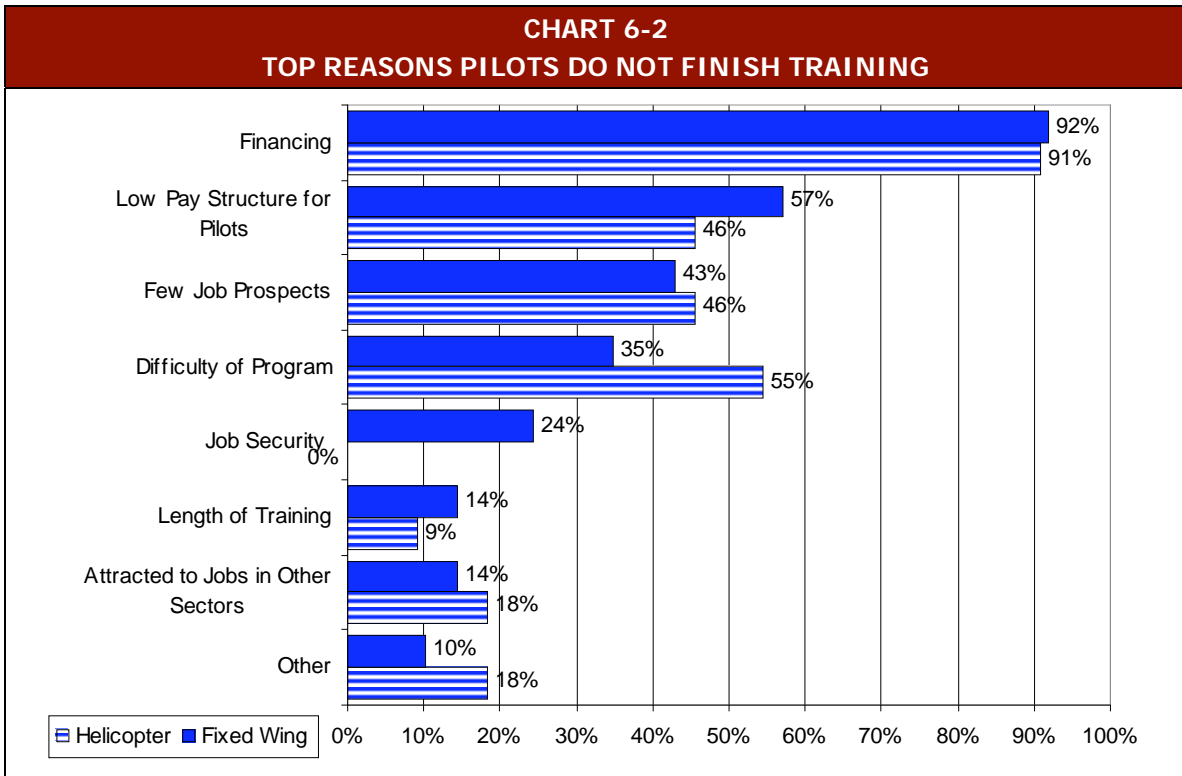
Source: Flight Training Unit Survey (question E1) "Based on your experience interacting with recent students, please indicate the top three reasons that student do not complete their pilot training. Indicate the top reason with a 1, the second with a 2, and the third with a 3", n=49 Fixed-wing, n=11 Helicopter

Note: percentages are based on number of respondents who cited the reason in the top three

In comparing private and college training institution results, there are minor differences. Though both reported financing as the top reason for non-completion of training, private institutions cited low pay as the second most common reason, followed by few job prospects. Difficulty of the program was the fourth most common reason noted by private institutions, whereas it was the second most common reason cited by colleges.

Financing and Cost of Training

It is not surprising that financing and the cost of training were considered significant barriers to becoming a commercial pilot, given that it can cost as much as $70,000; and, in Canada, there is minimal funding or financial assistance available to students who wish to obtain a pilot licence. Generally speaking, Canada Student Loans are available only to students who are pursuing a post-secondary degree or diploma, or certification program that runs for at least 12 weeks in a 15-week period. [70]

Some schools that are recognized by a province may have agreements with the province's student loan program whereby students at the school can access provincial funds to help pay for their flight training. For example, in British Columbia, students attending an organization that is accredited through PCTIA (Private Career Training Institutions Agency of BC) may be eligible for funding through the Student Aid BC Program. Similarly in Manitoba, students might be eligible for some funding through the province's student financial aid program. However, as with most other eligibility requirements, students must be enrolled full time, at the post-secondary level in a program being at least 12 weeks in duration over a 15 week period, and leading to a certification, degree, or diploma through a designated training institution.

The total fund to which students in flight training programs have access varies from province to province, depending on the rules and regulations of the student loan program.

Further, rules governing tax deduction of flight training expenses varies. As of 2008, Canada Customs and Revenue Agency stated that a student is only eligible to claim flight training hours if the student is taking flying lessons in order to become a commercial pilot or a flight instructor. The allowable tax deductions are as follows:

➢ For a Private Pilot's Licence the minimum dual and solo-flying requirements are currently 45 hours. Any combination of dual and solo hours is acceptable to a maximum of 45 hours total.
➢ For a Commercial Pilot's Licence, a total of 35 dual and 30 additional solo hours may be claimed.
➢ Fees for ground school and flight simulator are eligible for the tuition tax credit.
➢ Costs incurred by a student in flying a personal aircraft while taking a course at a flight training school or club are not eligible.
➢ No credit may be taken for time building or hours in excess of the Transport Canada minimums.

Students enrolled full-time in a recognized integrated program, however, are eligible to claim the entire cost of their program.

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[70] Canada Student Loans web site, http://www.canlearn.ca/eng/main/designated/ldi.shtml
However, each province has its own rules and regulations about what funding is available to students wishing to pursue a commercial pilot licence. Additionally, a number of flight training schools themselves have options for student financing that is available through the school itself.

According to interviews with guidance counsellors, private sources of funding such as bank loans, RESPs (Registered Education Savings Programs) and parental support are common. Unlike many colleges and universities, flight training schools rarely offer scholarships or bursaries, and government student loans have limited application to commercial pilot training.

Cost is a key consideration for prospective students when deciding which flight school to attend and what type of commercial pilot career to pursue.[71] It can also impact whether or not the student takes a professional program that is more structured and intense or takes a modular program that is "pay as you go" and for which there is no time frame for program completion.

Secondary research also reveals that training bonds are common practice among many operators, and can in certain cases act as a disincentive or even barrier for prospective pilots. There are different types of training bonds but, in essence, they are designed to ensure that the employer gets a return on the investment made in training, Without some form of assurance that the employee will remain with the employer for a specified time after receiving the training, employers may be reluctant to pay for such training. In October 2005, the Air Line Pilots Association (ALPA) submitted a report to the Federal Labour Standards Review Commission recommending that changes be made to the Canadian Labour Code, *Part III.* In this report, ALPA presented a number of issues related to training bonds. The full report can be found on the Human Resources and Skills Development Canada (HRSDC) web site.[72] The Federal Labour Standards Review Commission produced a discussion paper with recommendations for how best to deal with this issue. The following recommendations were made by the Commission in order to better regulate the issuing of training bonds in the aviation industry[73]:

- The amount of the bond should not exceed the cost of the training program;

- The value of the training bond should be reduced at fixed intervals as the employee works off his or her obligations during the post-training period;

- The employer should not be entitled to terminate the employment relationship except for just cause as long as the training bond remains in force;

- The training bond should be cancelled and the employee relieved of his or her liability if the employment relationship is terminated or suspended for any reason other than the employee's decision to resign;

- The training bond should not become payable if the employer has become insolvent or is in breach of its obligations under the contract of employment during the agreed post-training period; and

- The training bond should be of a fixed duration, to be established by regulation.

As noted above, the issue of training bonds is complex and still under discussion.

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[71] According to a flight advising representative, training to be a fixed wing pilot would be cheaper than helicopter pilot training because helicopters are more expensive to rent. Being a bush pilot would require float rating and other specialized training on top of the commercial pilot licence so it would be more expensive.

[72] http://hwww.hrsdc.gc.ca/eng/labour/employment_standards/fls/submissions/formal_briefs/brief11.shtml

[73] http://www.rhdcc-hrsdc.gc.ca/eng/labour/employment_standards/fls/discussion_paper/page14.shtml

Finding:
The most common reason that students drop out of flight training is the lack of financing, according to FTUs. Limits on students' ability to obtain student loans and/or to claim flight training expenses as a tax deduction for pilot training make it more difficult for students to finance their training.

Some training bonds can be a barrier to pilots if they do not have the financial means to post the bond. Likewise, if employers are to be encouraged to invest in training of pilots, they need some form of assurance the pilot will not leave as soon as the training is complete.

CAMC should undertake further research on developing tools to address this issue.

Information about Career Opportunities

One way to improve the odds of securing that critical first assignment as a professional pilot may be for flight training units to assist students in their job search. The survey of FTUs shows that few schools provide job placement services. This finding suggests that there is room for improved relationships between FTUs and employers to help students find employment.

The most common information available to students through the FTUs is information about the career paths of commercial pilots, followed by information about the career paths of flight instructors. Only 33% of fixed-wing FTUs reported providing their students with information on how to secure a first job. The information provided by FTUs is outlined in Chart 6-3.

CHART 6-3
CAREER INFORMATION AVAILABLE TO PILOT CANDIDATES
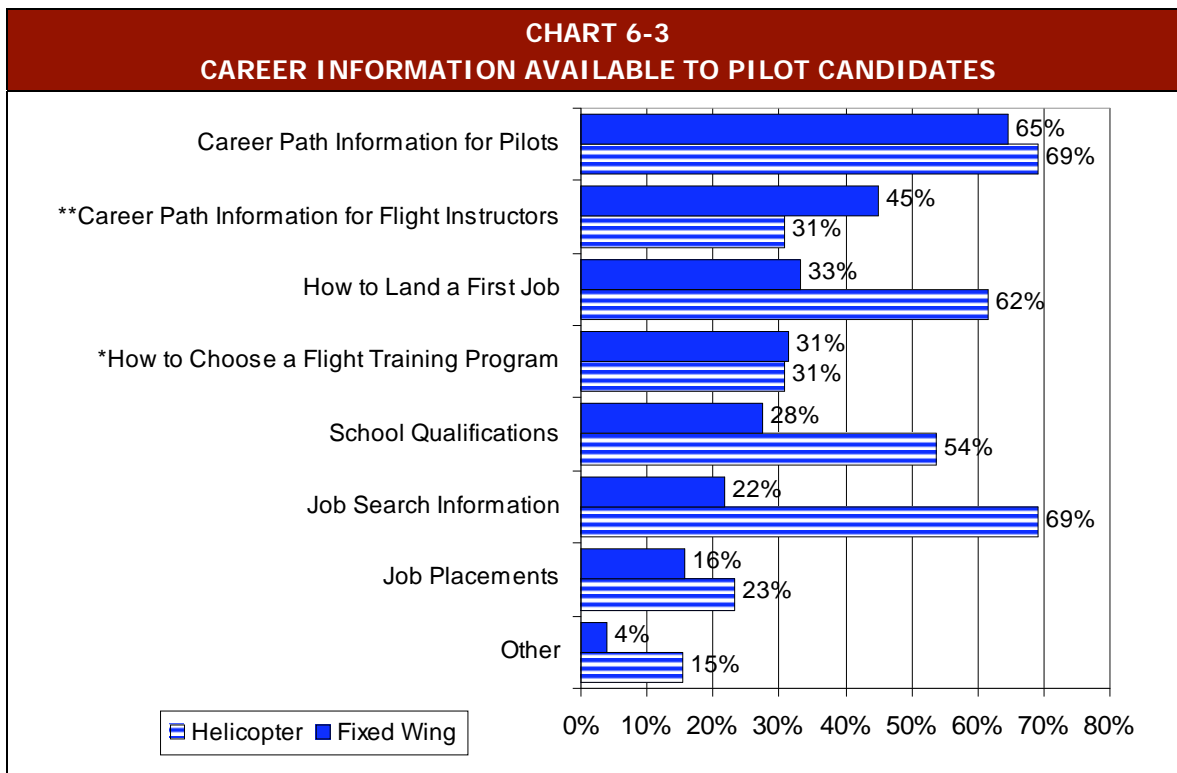
Source: Flight Training Unit Survey (question E3) "What types of informational resources are available at your training organization to prospective commercial pilots candidates? Select all that apply" n=51 Fixed-wing, n=13 Helicopter

NOTE: only those FTUs that offer training for flight instructors were included in the percentage of "Career Path Information for Flight Instructors".

* According to survey respondents, 30% of private training units and 43% of colleges provide information on how to choose a program.

** Of the 49 FTUs that reported offering flight instructor training (rating courses), 24 (49%) reported that they provide career path information for flight instructors. The percentages in the graph are inclusive of all FTUs.

Finding:

Poor job prospects was among the top three reasons that students said they do not complete flight training. Better relationships with employers, to help training organizations find employment for their students, would likely assist in this area.

CHAPTER 7: KNOWLEDGE, SKILLS AND ATTITUDES

Simply holding a commercial pilot licence says little about one's readiness to assume command of a complex aircraft. As a result, while a "head count" of licence holders may indicate a surplus of pilots in some regions or sectors of the industry, a count on the basis of experience and skill sets required may reveal shortages. The number of *qualified and proficient* pilots is, however, difficult to quantify.

Currently there is no industry standard to assess qualifications over and above licences, ratings held, and hours flown, although efforts have been made in recent years to do so. The ATAC Professional Standards Working Group created a document establishing the desired learning outcomes for professional pilot programs. The (American) Professional Aviation Board of Certification (PABC) has attempted, for some years, to set out professional qualifications that would allow employers to assess pilots, and for pilots to self-assess their own readiness for employment.[74] Continuing to build on these efforts requires resources and a coordinated effort to put them to best use.

According to the PABC, student pilots today are not getting the necessary crew-coordination training (the interplay with all players supporting and operating a flight in a multi-crew environment). This industry expert commented that time/work load management, problem solving, risk management, safety management, threat and error management and crew resource management, are the types of skills that are deficient in new applicants. Moreover, there is little testing in these areas, according to this individual.

The skills operators require of their pilots and the skills found deficient in new applicants are identified in this section of the report. Also included is a discussion of the process used by both employers and FTUs to screen applicants.

7.1   Skills Sought by Employers and Identified Skill Gaps

7.1.1   Technical Skills

Transport Canada has set minimum licensing hours in line with current ICAO standards for all pilot licences. Transport Canada also establishes competency standards for the flight exercises tested to obtain licences. Finally, it sets guidelines for the knowledge that must be covered in basic private and commercial ground schools. The discussion that follows addresses skills, knowledge, and attitudes sought by operators in pilot applicants, above and beyond the minimum set by Transport Canada.

Key technical skills employers seek in applicants are identified in Chart 7-1.[75] With the exception of navigation and meteorology, none of the skills listed is part of the licence curricula. Even in the areas of navigation and meteorology, focus groups confirm that employers are actually referring to more enriched knowledge than is required by the Transport Canada regulatory standard. Transport Canada's standard is the minimum standard. Generally, industry trains to a higher standard.

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[74] More information about the PABC mission and efforts can be found on their web site at http://pabc.aero/PABC%20Web site/Pages/About%20PABC/About.index.html
[75] It should be noted that there is an assumption that basic flying skills are considered adequate among applicants.

CHART 7-1
TECHNICAL SKILLS SOUGHT BY OPERATORS

■ Fixed Wing
▤ Helicopter

Skill	Fixed Wing	Helicopter
Navigation	65%	77%
Meteorology	64%	80%
GPS	56%	53%
De-icing/surface contamination	51%	50%
Aerodynamics	48%	50%
SMS	47%	53%
Crew resource management	45%	57%
Knowledge of workplace hazardous materials	33%	47%
Upset recovery skills	28%	20%
Avoidance of deviation and incursions	26%	20%
Threat and error management	25%	33%
Line oriented flight training	25%	
Flight management systems	22%	20%
Computerized cockpit familiarization	18%	13%
Glass cockpit familiarization	17%	7%
Ground proximity warning systems	17%	10%
Terrain collision avoidance	16%	10%
Other Technical	16%	27%

Source: Operator Survey (question D1) "What KSAs do you look for when you hire pilots?" n=109 fixed wing, n=31 helicopter

According to fixed-wing operators, the top five technical skills required by operators when hiring a new pilot are: navigation, meteorology, GPS, de-icing/surface decontamination, and aerodynamics. Among helicopter operators, the most important technical skills selected were meteorology and navigation.

Summarized below in Table 7-1 are the top five technical skills sought by operators when hiring new pilots, by operator classification.

TABLE 7-1 TECHNICAL SKILLS SOUGHT BY OPERATORS	
Primary Operation Type	**Top 5 Technical Skills Sought**
CAR 705 operators (n=15)	- GPS, Crew resource management, SMS (60%) - Navigation (47%), - De-icing, Preparation for operating in high level airspace (40%)
CAR 704 operators (n=21)	- Crew resource management (76%) - GPS (71%) - De-icing; Meteorology, Navigation (67%)
CAR 703 operators (n=49)	- Navigation (76%) - Meteorology (73%) - GPS (55%) - Aerodynamics (53%) - De-icing (51%)
CAR 702 operators (n=22)	- Meteorology (68%) - Navigation (59%) - GPS; De-icing, Aerodynamics (45%)

Source: Fixed Wing Operator Survey Transport Canada classification.

Also explored in the survey was the extent to which the technical skills sought in applicants were deficient. *Only employers who looked for a particular skill were included in the analysis of deficiencies.* The list of competencies is presented in order of importance to operators. Operators appear to indicate that knowledge of navigation is adequate among applicants, with only 8% of fixed-wing and helicopter operators indicating that this skill was deficient. However, 17% of fixed-wing operators who sought meteorology as a skill felt that applicants were deficient, and 29% of those who cited SMS as a sought skill felt that applicants were deficient in this area. It should be noted that there is currently no requirement for FTUs to teach SMS or to include SMS in their curriculum.

While only 23% of fixed-wing and helicopter respondents reported that they prefer that applicants have knowledge of flight management systems, 37% and 27% of these operators, respectively, felt that applicants were deficient in this skill. Similarly, while 20% of fixed-wing and 16% of helicopter respondents reported that threat and error management (TEM) is a sought skill, 37% and 29%, respectively, felt that applicants were deficient in this area. Upset recovery training is a higher priority as a result of the Colgan Air accident that took place in Buffalo, NY, on February 12, 2009.

CHART 7-2
TECHNICAL SKILLS DEFICIENT IN APPLICANTS
IN ORDER OF TECHNICAL IMPORTANCE
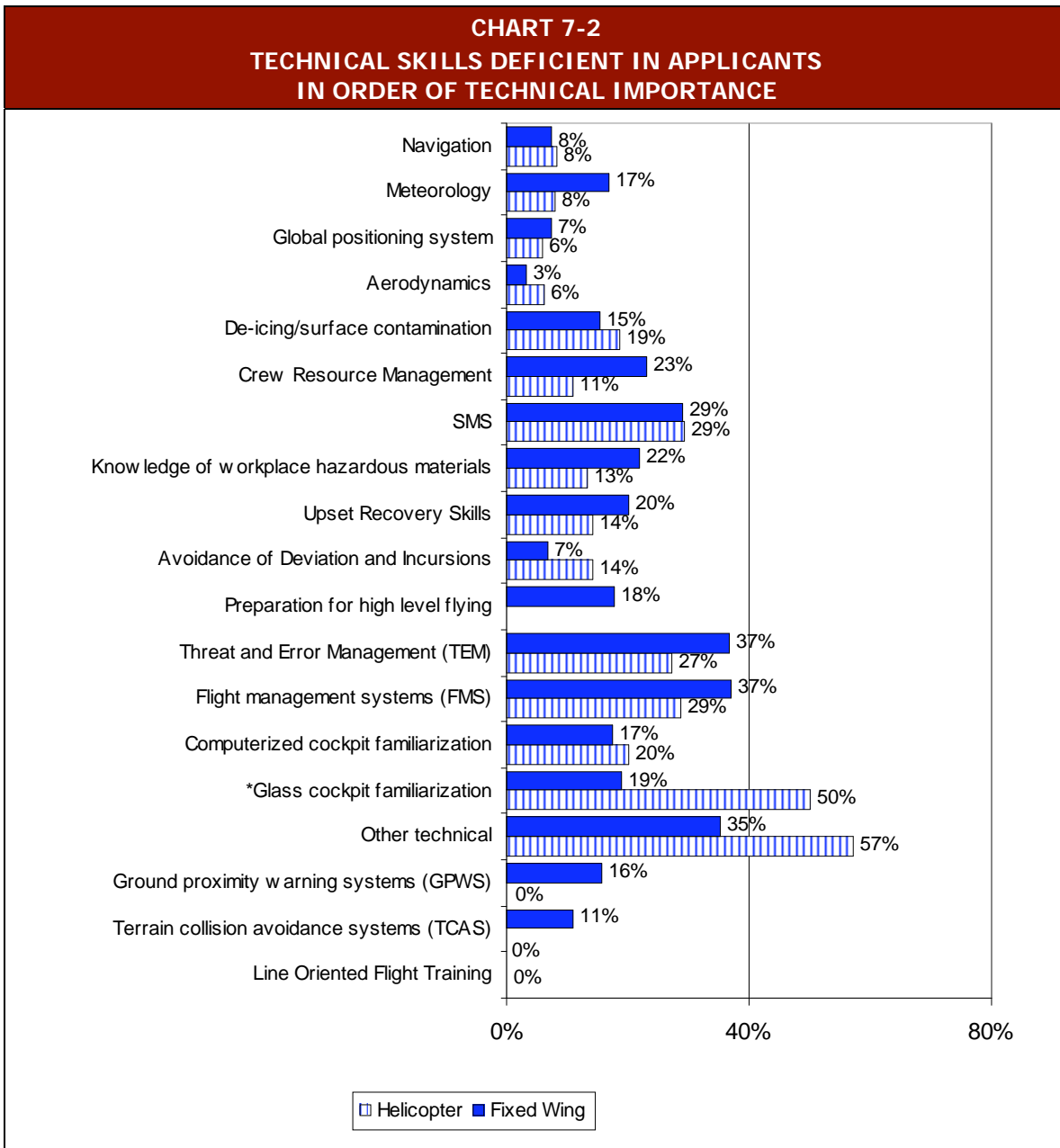
Source: Operator Survey (Question D1) "Are there any KSAs that you find are deficient in resumes or new recruits?"
n=110 Fixed Wing, n=31 Helicopter

Note: percentages are based on respondents who cited the technical skill as required; they are not based on all respondents.

*Readers are cautioned that while half of helicopter operators who noted that glass cockpit familiarization is a sought skill and reported applicants were deficient in this skill, only 7% of all helicopter operators reported it is sought.

A relatively high proportion of operators noted that applicants were deficient in an "Other technical" skill. Readers are reminded, however, that this represents six out of 17 fixed-wing operators and four out of seven helicopter operators, who affirmed they looked for an 'other' technical skill, including type training (water, aerial, other), knowledge of regulations and consequences, aerial specific work, and instrument flying rules (IFR)

training among fixed-wing, and judgment (though this is a non-technical skill), mountain training, and resource management knowledge among helicopter operators.

Another concern identified by some operators in interviews and focus groups was that training programs seem to be built on the assumption that fixed-wing pilots will always be flying by IFR in controlled airspace. One operator stated that he sees a real lack of "*understanding of the air space. It seems that the whole IFR system training is done in the context of controlled air space.*"

This issue was particularly salient to Northern operators. Some Northern operators have older aircraft that may not be equipped to fly IFR, and/or their operations require that the pilot have an understanding of the rules for flying in uncontrolled airspace. According to one Northern operator, "*...pilots coming into this environment don't seem to understand when they need a clearance and when they do not.*" Another focus group participant said, in relation to technical skills deficiencies, that, "*People who come out of training, they are being trained on instruments, but they need to get their head out of the cockpit and look out the window... We're still 80% VFR (Visual Flight Rules).*"

Findings:
Navigation, meteorology, GPS, aerodynamics, de-icing/surface contamination, CRM (crew resource management), and SMS were the skills most commonly sought by employers in new applicants. With respect to applicants' knowledge of technical skills, employers felt that navigation, GPS, and aerodynamics were at a suitable level in new applicants, with fewer than 8% reporting applicants deficient in this area.

Among employers who sought knowledge of meteorology in applicants, 17% of fixed-wing operators felt that this skill was deficient among new applicants.

Among employers who sought knowledge of de-icing and surface contamination in a new applicant, 15% of fixed-wing and 19% of helicopter operators felt that new applicants were deficient in these areas.

Twenty-three per cent (23%) of fixed-wing and 11% of helicopter operators felt that new applicants were deficient in CRM.

Twenty-nine per cent (29%) of both fixed-wing and helicopter operators felt that new applicants were deficient in SMS[76].

Particularly for many northern operators, not enough emphasis is put on VFR training compared with IFR training.

7.1.2 Non-Technical Skills

The non-technical skills appear to be universally important to operators, as evidenced by the percentage of respondents who cited they sought each non-technical skill. In particular, communication, pilot decision-making and teamwork were the three most commonly cited skills sought by operators, followed by situational awareness and English language proficiency.

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[76] Safety Management Systems/Safety Operating Systems.
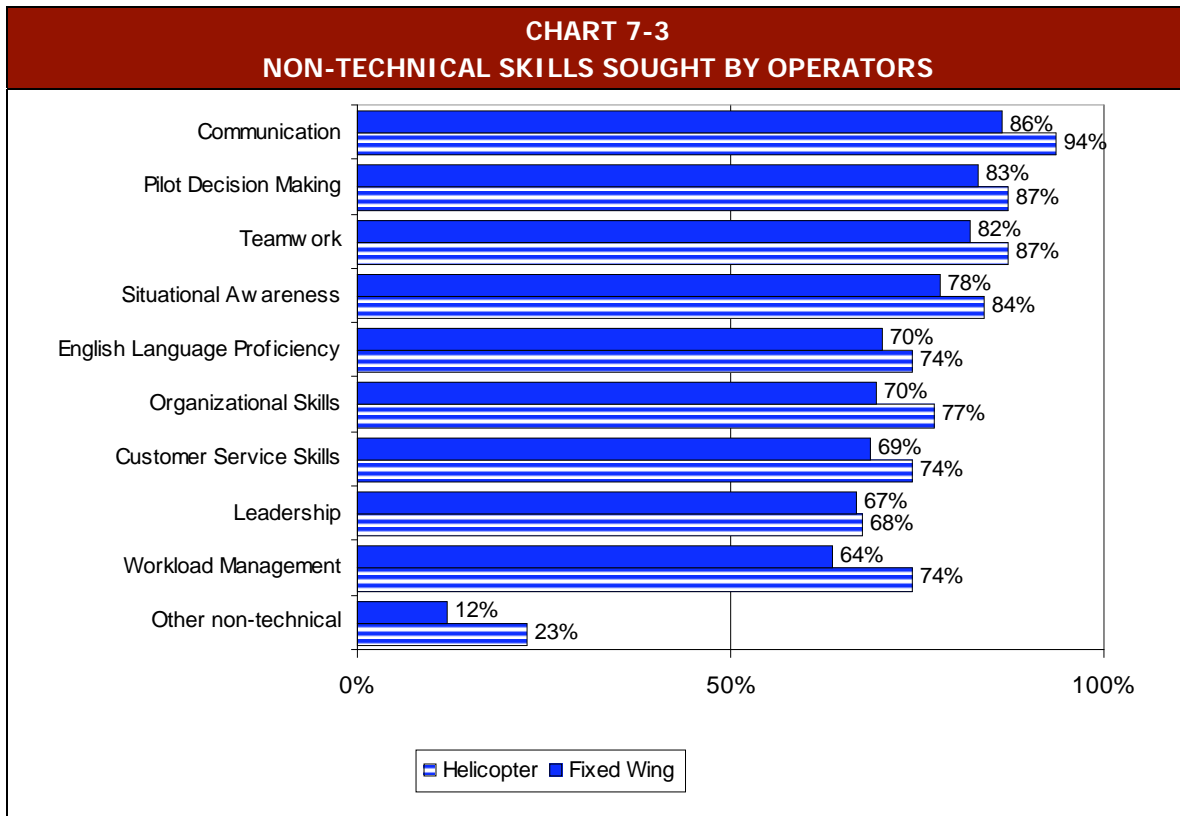
CHART 7-3
NON-TECHNICAL SKILLS SOUGHT BY OPERATORS

Skill	Helicopter	Fixed Wing
Communication	94%	86%
Pilot Decision Making	87%	83%
Teamwork	87%	82%
Situational Awareness	84%	78%
English Language Proficiency	74%	70%
Organizational Skills	77%	70%
Customer Service Skills	74%	69%
Leadership	68%	67%
Workload Management	74%	64%
Other non-technical	23%	12%

Source: Operator Survey (question D1) "What KSAs do you look for when you hire pilots?" n=109 fixed wing, n=30 helicopter
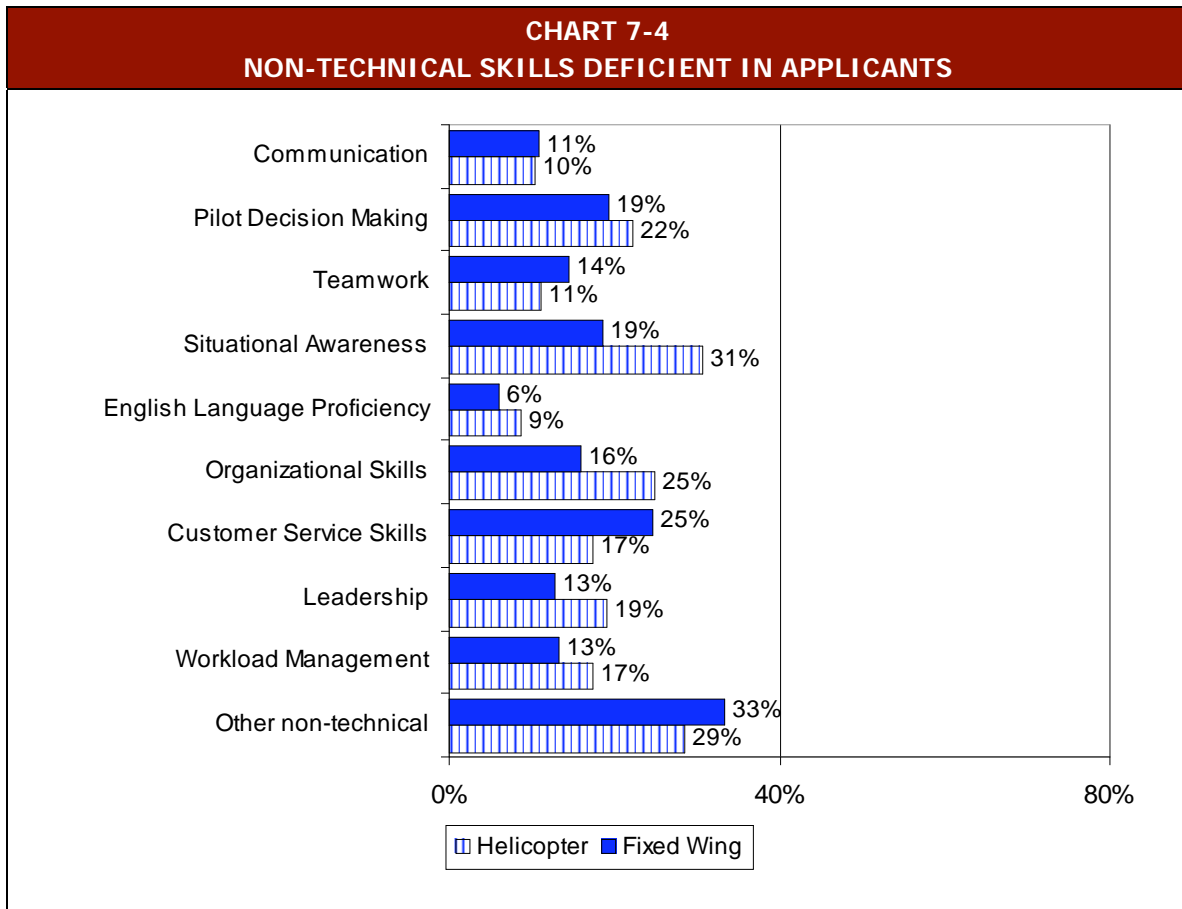
The largest percentage of operators reported skills gaps in the areas of pilot decision-making, customer service and organizational skills. The percentage of operators reporting deficiencies in pilot decision-making has declined: 38% judged this skill as deficient in new pilots in 2001 versus 19% of fixed-wing and 22% of helicopter operators in 2010. Similar percentages of pilots were reported as deficient in customer service skills in 2001 as that in 2010. While these two areas continue to be two of the most commonly mentioned areas of deficiency, the percentage of operators that report applicants as deficient has declined since 2001. See Chart 7-4 for details on the percentages of operators who reported deficiencies in key non-technical skills.

According to the current survey findings, situational awareness was the most reported non-technical skill sought in which new applicants are reportedly deficient — 19% of fixed-wing and 31% of helicopter operators. Though not included as an option in the survey, attitude was mentioned by a number of operators, both during focus groups and in one-on-one interviews as an important determinant when hiring a new pilot.

| CHART 7-4 |
| NON-TECHNICAL SKILLS DEFICIENT IN APPLICANTS |

Communication: 11% (Fixed Wing), 10% (Helicopter)
Pilot Decision Making: 19% (Fixed Wing), 22% (Helicopter)
Teamwork: 14% (Fixed Wing), 11% (Helicopter)
Situational Awareness: 19% (Fixed Wing), 31% (Helicopter)
English Language Proficiency: 6% (Fixed Wing), 9% (Helicopter)
Organizational Skills: 16% (Fixed Wing), 25% (Helicopter)
Customer Service Skills: 25% (Fixed Wing), 17% (Helicopter)
Leadership: 13% (Fixed Wing), 19% (Helicopter)
Workload Management: 13% (Fixed Wing), 17% (Helicopter)
Other non-technical: 33% (Fixed Wing), 29% (Helicopter)

☐ Helicopter ■ Fixed Wing

Source: Operator Survey (question D1) "What KSAs are applicants deficient in?" n=109 fixed wing, n=30 helicopter

Other non-technical skills operators noted as deficient in applicants included common sense, ability to do paperwork, good work ethic and humility. Again, readers are reminded that the percentages are only based on those who reported seeking the skill in applicants.[77]

One operator suggested that because some smaller schools generate the most revenue when the student is flying, less emphasis is afforded to courses that do not generate much money, such as courses that focus on non-technical skills (e.g. leadership, teamwork, organizational skills). Other operators suggested that some of these skills simply cannot be taught in school.

Based on the current research, training resources for non-technical skills need to be available in the schools. Most flight schools, however, cannot afford and/or don't know how to develop such resources. The reasons for this are investigated more fully in Chapter 8.

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[77] 4 out of 12 fixed wing and 2 out of 7 helicopter operators

Findings:

One of the recommendations in the *2001 Human Resource Study of the Commercial Pilot in Canada* was for an emphasis on a wider range of skills, including non-technical human skills (recommendation 27). Despite this recommendation, FTUs have not, as yet, developed enough programs, with sufficient content, related to non-technical skills.

Though the percentage of operators indicating that non-technical skills are deficient among pilots has declined since 2001, employers surveyed in the 2009 study indicated that there are still skill deficiencies in such areas as pilot decision making, situational awareness, organizational skills and customer service skills.

7.2   Screening Prospective Student Pilots and Pilot Applicants

Although the terms "screening" and "selection" are often interchanged, it is helpful to distinguish the terms when discussing screening and selection for aviation. According to one industry expert in aviation screening and selection, the distinctions are as follows:

> "*A screening system usually serves to eliminate applicants who do not meet the minimum qualifications specified by the carrier and normally precedes the selection system. An applicant must complete the screening process successfully before beginning the selection process. For example, assume an air carrier indicates that an applicant must have 1200 total hours to be considered. Despite this specification, some pilots with less than 1200 hours apply. The screening system identifies these individuals immediately and eliminates them from further consideration.*"[78]

This section of the report discusses the use of screening and selection by FTUs and by operators, beginning with FTUs.

FTU Student Screening and Selection

Language proficiency was reported most frequently by FTU survey respondents as a criterion for admission. Two FTU guidance counsellors commented that in their organizations, language screening was conducted fairly informally and was concerned primarily with basic comprehension.

The recent ICAO requirement for demonstrated English language proficiency prior to obtaining a licence is influencing the way FTUs approach language proficiency. Some schools now use this test as part of the admission procedure.

Ability to pay for training was mentioned by about one-quarter of FTUs. One respondent remarked that during the applicant interview the cost of the program is reviewed to make sure the student has the financial means to pay for training. Only about 13% of FTUs reported conducting reference checks.

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[78] http://www.damosaviation.com/faq-1.htm

Interviews with FTU guidance counsellors revealed that, in some cases, language, attitude and personality were further assessed when applicants were interviewed for admission.

Chart 7-5 shows the percentage of FTUs using the given screening and selection criteria.

CHART 7-5
SELECTION CRITERIA FOR STUDENTS
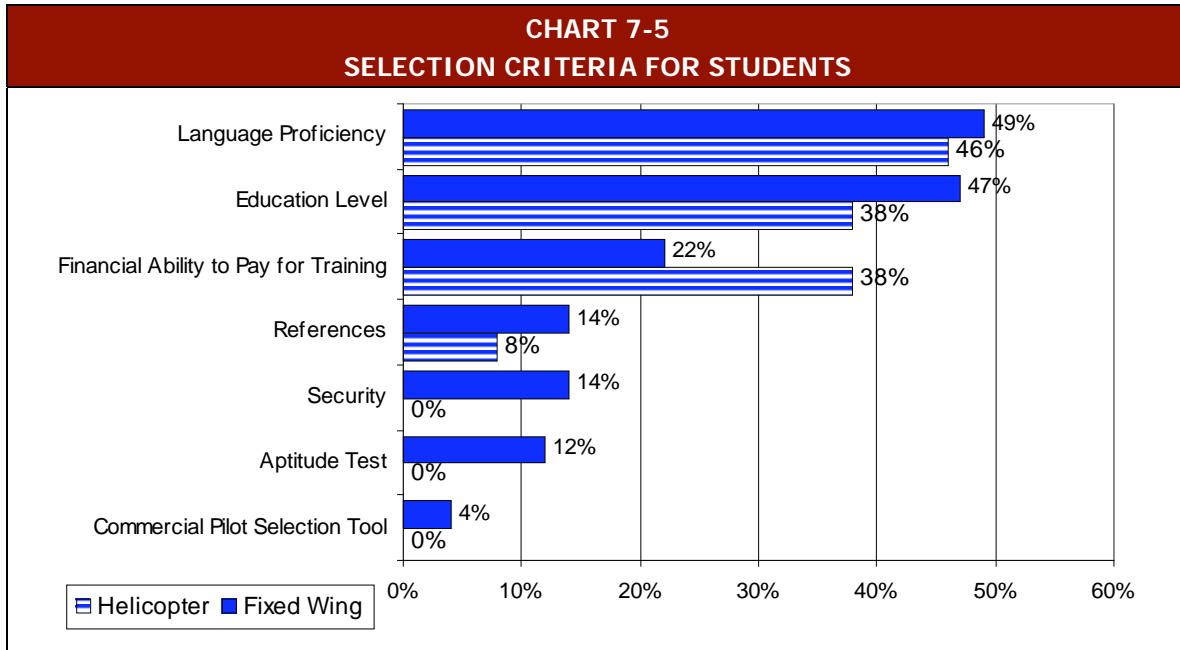
Source: Flight Training Unit Survey (question A5) "Does your training organization use any of the following standardized or formal student selection procedures?" n=51 Fixed Wing, n=13 Helicopter

Emphasis on criteria differs between colleges and private training organizations. The difference is not significant for language proficiency, with 49% of private FTUs and 43% of colleges reporting that they screen for language proficiency. However, 86% of colleges require minimum formal education compared to just 40% of private FTUs. Twenty-six per cent (26%) of private FTUs indicated the ability to pay was a requirement compared to 14% of colleges. Fewer than 20% of reporting private FTUs and no reporting colleges cited using aptitude tests, reference checks, or security checks.

The issues of screening and selection are acquiring higher importance in the flight training community. When asked if there should be greater screening and selection of potential students, 40% of reporting FTUs said "yes". Aptitude testing was the most common type of selection procedure mentioned.

The ATAC Flight Training Committee has introduced regular information sessions on selection and screening over the past two years, and several ATAC FTUs are experimenting with COMPASS[79] and other aptitude tests.

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[79] A computer-based aptitude test developed by EPST and used in many countries.
See http://www.epst.com/com/compass.htm

Operator Pilot Screening and Selection

Operators were also asked about the screening and selection criteria used when hiring new pilots. Forty-two per cent (42%) of fixed-wing and 45% of helicopter operators reported language proficiency as a key screening criterion, followed by 40% and 45% respectively requiring clean security checks.
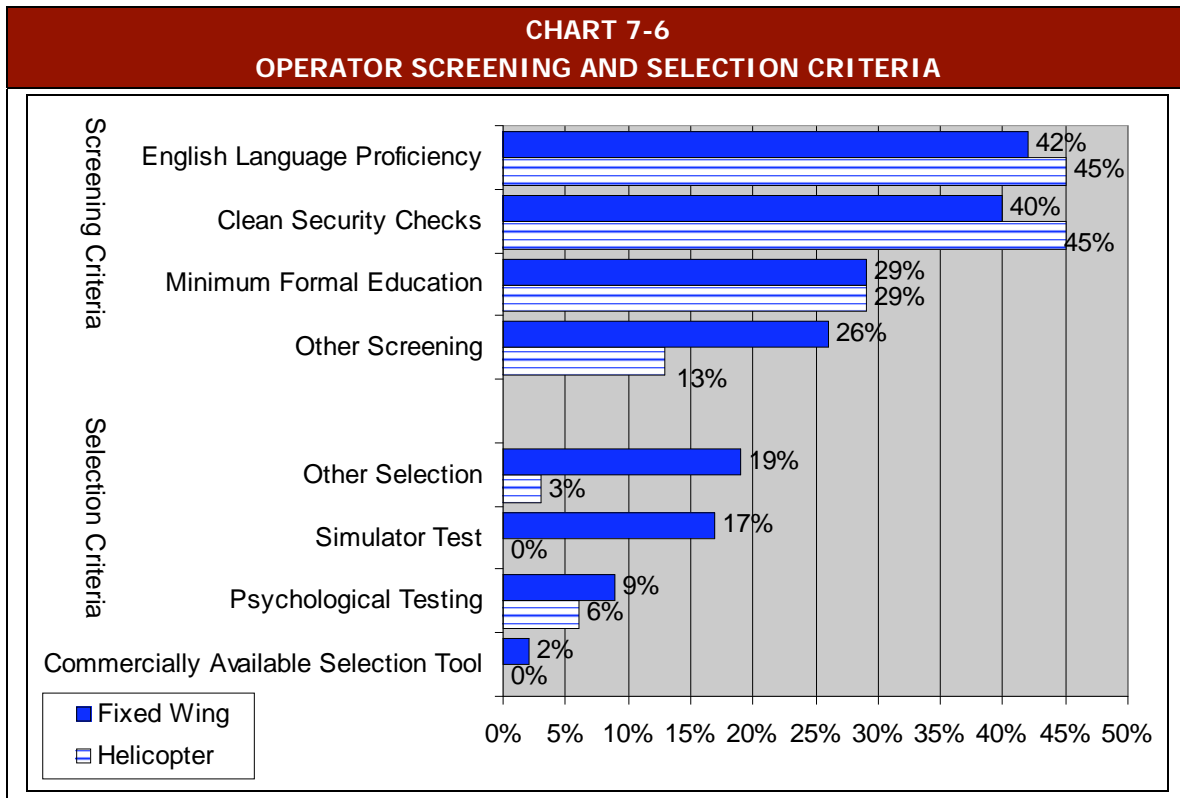
CHART 7-6
OPERATOR SCREENING AND SELECTION CRITERIA

Source: Operator Survey (Question D2) "Does your organization use any of the following screening or selection criteria for new pilots? Check all that apply", n=110 Fixed Wing, n=31 Helicopter

In the "Other" category for screening criteria, operators cited conducting reference checks and interviews, screening for attitude (honesty, professionalism, common sense), prior experience and passing medical screening.

The "Other" category for selection criteria included oral exams, flight tests, references/recommendations and interviews/resumes.

Where the work environment includes two-crew cockpits, employers want to ensure that the candidate can work well with other people. During three of the six focus groups, operators mentioned the importance of selecting pilots who could get along well with other staff. For instance, one northern operator in eastern Canada stated that, *"[Pilots] stay in the staff house for about two weeks with the others. That is why we look at the personality just as much as we look at the training and hours. Because if the person can fit well in the staff house it will make all the difference."*

According to many participants interviewed, to be successful as a pilot, an individual needs to be flexible, adaptable, personable, a good decision maker and resourceful. One operator remarked that an ideal candidate is, "*Somebody with a good personality, you're spending a lot of time together so it's important that you're easy to get along with. It's important to have good listening skills as well.*"

Findings:
English language proficiency was the top criteria among FTUs and operators when screening prospective students and applicant pilots. Among FTUs, colleges more frequently required a minimum formal education, and private schools more frequently reviewed the financial ability of a student to pay for training.

Screening and selection is acquiring more importance in the flight training sector.

During interviews and focus groups, operators emphasized the importance of finding a person who fits with the culture of the organization and gets along with other employees. Pilots interviewed indicated that to be successful in this field, an individual needs to be flexible, adaptable, personable, a good decision maker and resourceful.

CHAPTER 8: CHALLENGES TO FLIGHT TRAINING PROGRAMS

This section provides a discussion of the training gaps and challenges currently experienced by FTUs.

8.1   Deficiencies of Formal Curricula

As discussed in the previous chapter, operators reported a number of skill deficiencies in applicants. Flight training units were asked if they had a formal train-the-trainer curriculum to teach pilots the same skills. Fixed-wing FTUs reported relatively low incidence of formal curricula when compared with the relative importance placed on these skills by operators.

At most, one-third of training organizations had a specific curriculum to teach topics itemized in Chart 8-1. The most common formal train-the-trainer curricula were for GPS, de-icing/surface decontamination, and aerodynamics, followed by meteorology and knowledge of workplace hazardous materials[80].

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[80] Readers are reminded that the data for helicopter FTUs is based only on 13 respondents, which could in part account for the differences in percentage between fixed-wing and helicopter FTUs training curricula.
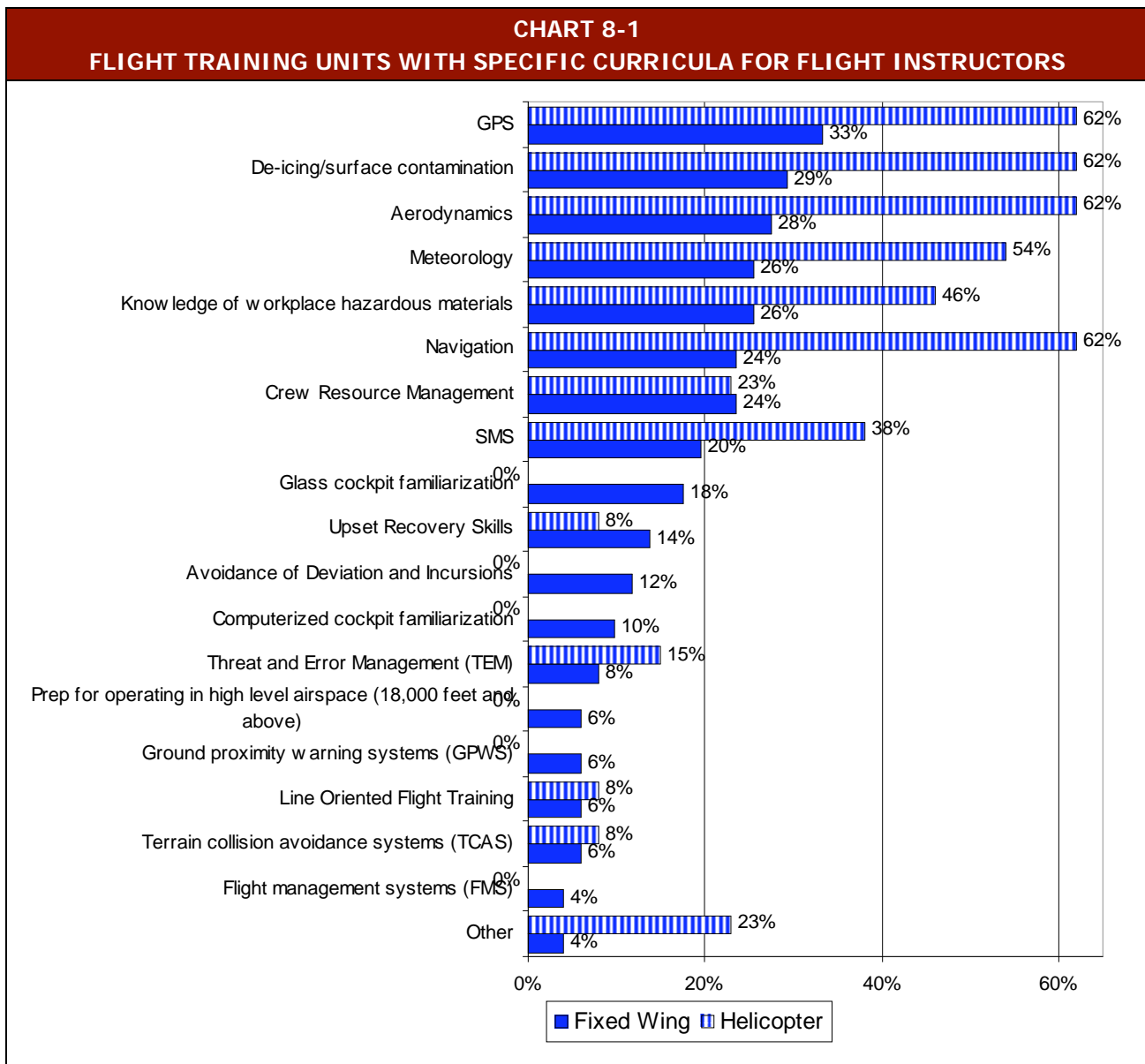
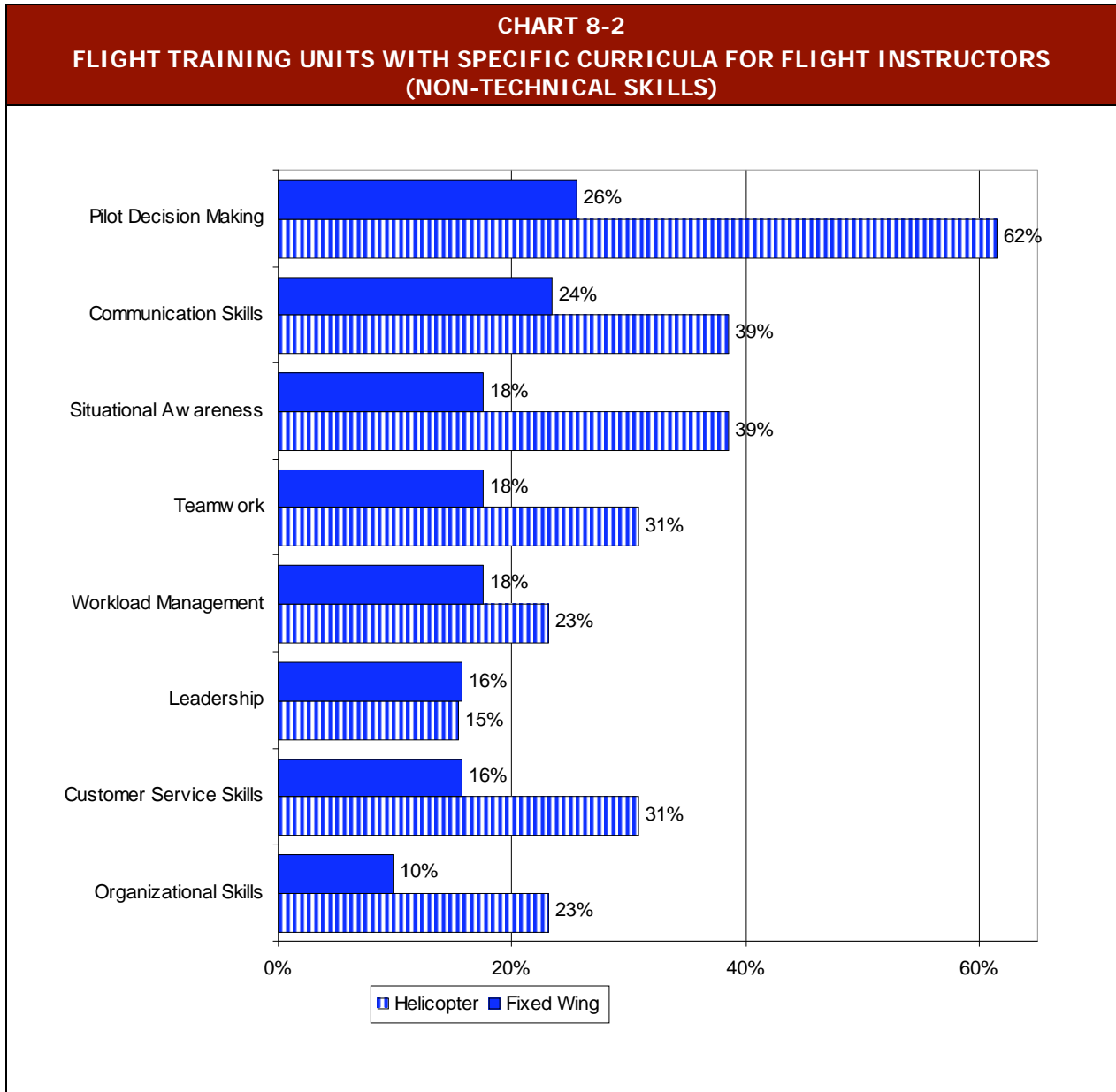| CHART 8-1 |
| :---: |
| **FLIGHT TRAINING UNITS WITH SPECIFIC CURRICULA FOR FLIGHT INSTRUCTORS** |

Source: Flight Training Unit Survey (question D3a) "Does your organization have a formal train-the-trainer curriculum to assist flight instructors to teach pilots in the following areas?" n=51 fixed wing, n=13 helicopter

Focus group participants also discussed whether standardized, generic training programs could be developed in areas such as surface contamination training or dangerous goods training. The pros and cons were elaborated. According to several participants, "*It's really expected that each operator should teach these things within the context of their operation. In point of fact, everyone's surface contamination program or dangerous goods training program will be distinct and will require some individual training approach.*" However, several operators suggested that there could be an expansion of what was included in *ab initio* training. For instance, one operator indicated that topics such as CRM are somewhat generic and to that end may be at least partly suitable for a standardized training program. However, as one instructor from a college reported,

"There is no curriculum, no guidance material, that says: 'here is how you should teach CRM on a simulator'."

Flight training units were also asked if they had formal train-the-trainer curricula for flight instructors to teach non-technical skills.

CHART 8-2
FLIGHT TRAINING UNITS WITH SPECIFIC CURRICULA FOR FLIGHT INSTRUCTORS (NON-TECHNICAL SKILLS)

| Skill	Helicopter	Fixed Wing
Pilot Decision Making	62%	26%
Communication Skills	39%	24%
Situational Awareness	39%	18%
Teamwork	31%	18%
Workload Management	23%	18%
Leadership	15%	16%
Customer Service Skills	31%	16%
Organizational Skills	23%	10%

Legend: ▥ Helicopter ■ Fixed Wing

Source: Flight Training Unit Survey (question D3a) "Does your organization have a formal train-the-trainer curriculum to assist flight instructors to teach pilots in the following areas?" n=51 fixed wing, n=13 helicopter

The survey data suggest that helicopter FTUs are more likely to have formal train-the-trainer curricula for non-technical skills than are fixed-wing FTUs but readers are reminded that the helicopter data are based on only 13 responses. Regardless, the top three non-technical skills for which FTUs reported having formal train-the-trainer curricula were pilot decision making, communication skills, and situational awareness. These three non-technical skills were cited in the top four non-technical skills that operators sought in new applicants. However, the percentage of FTUs that have these formal train-the-trainer curricula is low relative to the importance that operators put on them. For instance, where 83% of fixed-wing operators noted they sought pilot decision making skills in new applicants, only 26% of fixed-wing FTUs have a train-the-trainer curriculum to teach this skill. Similarly, where 86% and 78% of fixed-wing operators sought communication skills and situation awareness skills respectively, only 24% and 18% of FTUs have train-the-trainer curricula in these areas.

8.2   Commercial Pilot Skill Sets and Employer Needs: Beyond Transport Canada's Minimum Requirements

More than half of FTUs report incorporating more than Transport Canada's minimum requirements for training flight instructors in their Flight Instructor Rating curriculum (66%). Of those who indicated that they do so, the two most commonly offered elements were additional adult learning and training specific to designing lesson plans for and exercises in the simulator.

CHART 8-3
DO FLIGHT TRAINING UNITS INCORPORATE MORE THAN TRANSPORT CANADA REQUIREMENTS IN THEIR INSTRUCTOR RATING CURRICULUM?
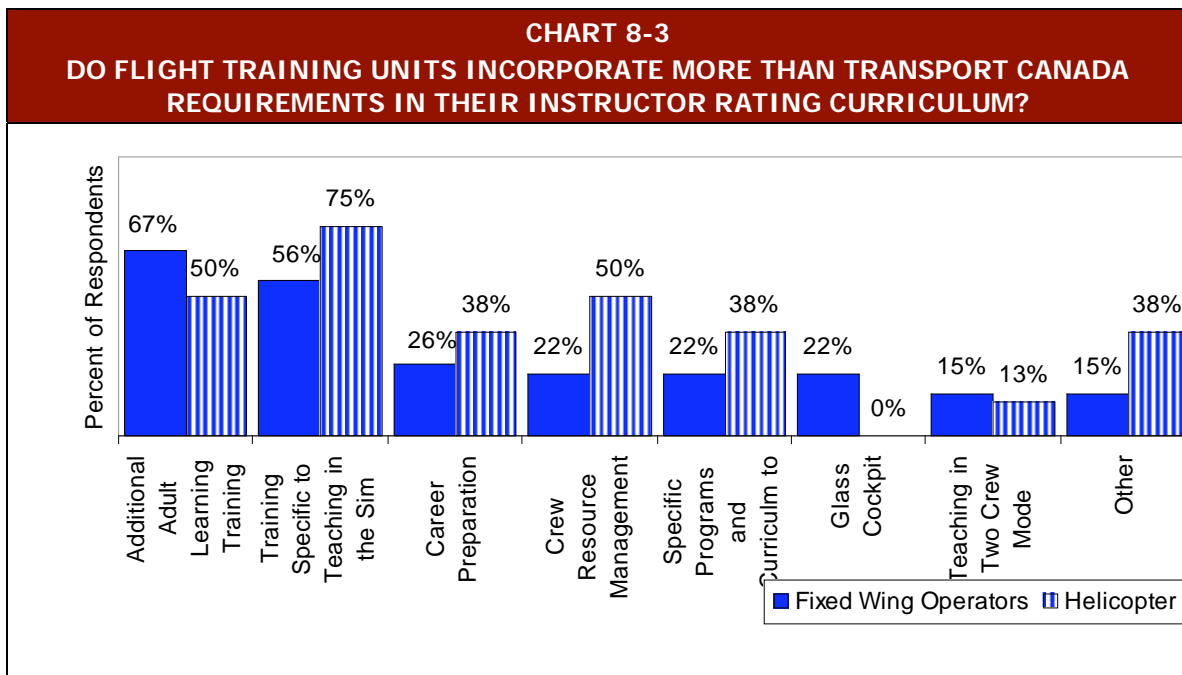
Source: Flight Training Unit Survey (question D2) "Does your organization incorporate more than basic Transport Canada requirements in the training curriculum? If yes, please specify which additional elements are incorporated in your CLASS 4 Flight Instructor rating curriculum" n=41 Fixed Wing (n=27 yes), n=10 Helicopter (n=8 yes).

Although a number of flight training units do incorporate more than the minimum require-ments of Transport Canada in their instructor rating curriculum, focus group research indicated that on the whole, flight schools train to the Transport Canada licencing standard. Several participants in the focus groups emphasized that there has been a tendency to train for passing the exam rather than for achieving a higher level of competence or skill.

The 2001 and 2003 studies found that there were gaps between the skill sets employers seek and the skill sets possessed by applicants.

Survey findings detailed above highlight that this disconnect persists, though there are some useful models and practices aimed at bridging this gap. Airline web sites offer some guidance to their prerequisites for pilot applicants, and some colleges and private flight training units have Advisory Councils or informal consultations with industry to solicit industry advice on their training programs. ATAC flight schools in Canada also hold panels from time to time, inviting employers to advise them on the skill sets they are looking for.

Several of these best practices have been showcased in presentations at ATAC meetings over the past two years. The flight training industry as a whole could benefit from the compilation and publication of best practices, as this would help to develop the enriched content that meets employer needs.

Findings:
More than half the flight training units reported including more enriched training than Transport Canada minimum requirements in their instructor initial or recurrent training curricula.

Only one-third of fixed-wing training organizations had a specific curriculum for instructors to teach the topics and skills that operators seek in new applicants.

Fixed-wing focus group participants indicated that teaching to the Transport Canada licensing standard does not properly equip students whose goal is to function in a multi-crew, line-oriented setting that reflects the reality of airline flying.

The flight training industry could benefit from careful identification of elements that are generic to programs such as surface contamination training, dangerous goods, and others, and for which standardized programs could be developed and shared nationally.

8.3   Barriers to Using Formal Curricula

Given the low frequency with which FTUs reported having formal train-the-trainer curricula, it is important to identify barriers faced by the training community to developing formal curricula in the above-mentioned areas. The most common barrier was a lack of resource materials, with 43% of all (fixed-wing and helicopter) respondents citing this. Lack of funds and lack of qualified instructors followed at 35% and 26% respectively among fixed-wing, and 15% and 8% among helicopter FTUs.

CHART 8-4
BARRIERS TO DEVELOPING FORMAL CURRICULA
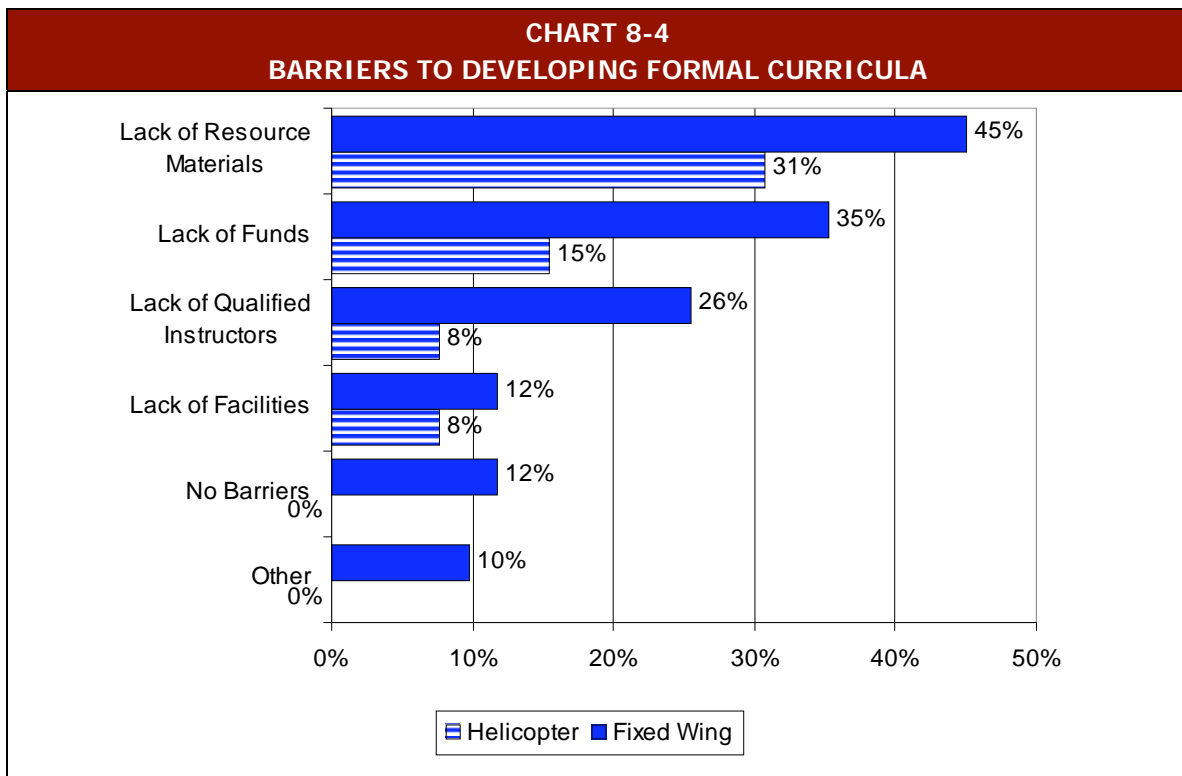
Source: Flight Training Unit Survey (question D3a/b) "Please specify what barriers you face to using a formal curriculum"
n=51 Fixed Wing, n=5 Helicopter.

Focus group research underscored the importance of the cost of providing enhancements to current training programs. Flight training organizations worried that any additions to their programs, besides those designed to meet the licensing requirements, would result in an increase in the cost and difficulty of training programs, possibly leading to lower student enrolment. According to one training organization: "*It has become too expensive for the average student to get into a career in flying, particularly given little or no access to government loans.*" One focus group participant mused about whether a requirement for enhanced qualification guidelines would be an impediment to recruiting.

When asked about their desire to receive additional resources, 95% of fixed-wing and 90% of helicopter FTUs reported that they would be interested in receiving a compilation of resources to train the trainer.

Findings:
The most common barriers cited to developing formal curricula were lack of resource materials, lack of funding, and lack of qualified instructors.

Not surprisingly, flight training schools were interested in receiving a compilation of train-the-trainer resources.

Some elements of soft skill (non-technical skill) training must be carried out by the operator in order to fit specific needs.

8.4 urrent, Type and Conversion Training

Over 90% of operators surveyed indicated that it can cost up to $50,000 to prepare a newly hired pilot for active flying duty in their operations. According to focus group participants, the cost of training a new pilot was seen as higher for smaller operators. Smaller operators in focus groups described the challenge of investing money training a new pilot only to have them leave for another operator shortly thereafter. This is seen as a definite strain on operators - especially smaller ones where it tends to happen the most.

CHART 8-5
WHERE DO PILOTS RECEIVE TRAINING
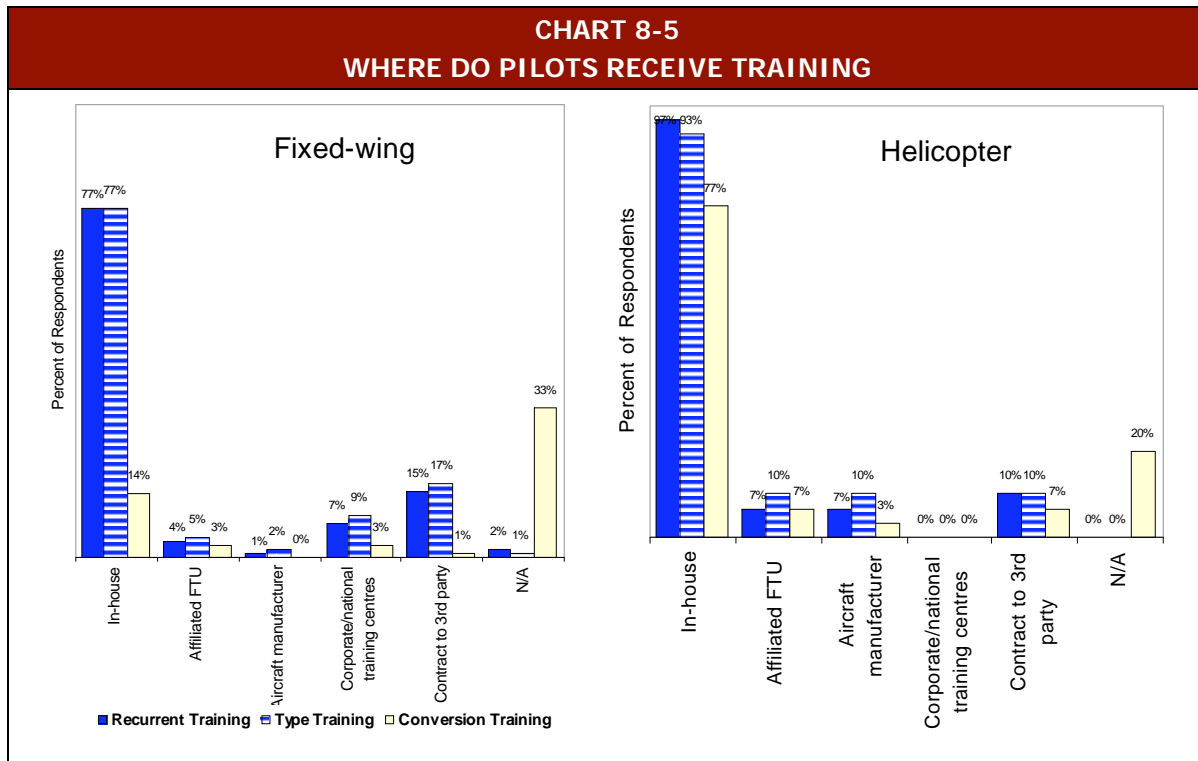
Source: Operator Survey (question C1) "Where do your pilots receive their training? Check all that apply" n=109 (fixed wing) n=30 (helicopter)

Despite the fact that a higher number of helicopter than fixed-wing operators indicated that they provided in-house training, according to helicopter industry representatives, offering structured training programs can be more difficult for these operators. A reason offered for the higher rates of in-house training among helicopter operators is that operators tend to be far apart geographically and often not located close to a training school. However, conducting in-house training can be a particular challenge for helicopter operators because many of them are extremely busy during the summer months and do not have the time or the resources to devote to a structured training program for new hires.

Finding:
Helicopter operators were more likely to report in-house training as well as training affiliated with a flight training unit compared to fixed-wing operators. However, logistical and geographic distance problems can make it difficult to offer this training.

8.5   Developing Enriched Training Standards

Focus group discussions revealed an interest in establishing national standards for enriched training, and an interest in methods for accrediting the training as well as providing students with certificates testifying to their competence. As one helicopter-industry focus-group participant noted: "*For instance, if an instructor was certified through HAI and HAC to teach a certain skill, then the student could get [recognition] that's good across the country.*"

Survey data supported focus group observations on the desirability of national enriched training standards. Almost 85% of fixed-wing and 83% of helicopter operators agreed or strongly agreed that FTUs should adopt a national training standard for their professional programs.

Survey data also supported establishment of a committee to develop standards. Of the 85% and 83% noted above, the largest portion (37% of fixed-wing and 50% of helicopter) felt that the development of these standards should be a joint committee effort led by industry, training organizations, and the regulator. An additional 29% of fixed-wing and 33% of helicopter operators felt that industry alone should take the lead, and 23% of fixed-wing and 13% of helicopter operators felt that training organizations should take the lead.

CHART 8-6
WHO SHOULD LEAD THE DEVELOPMENT OF NATIONAL TRAINING STANDARDS?
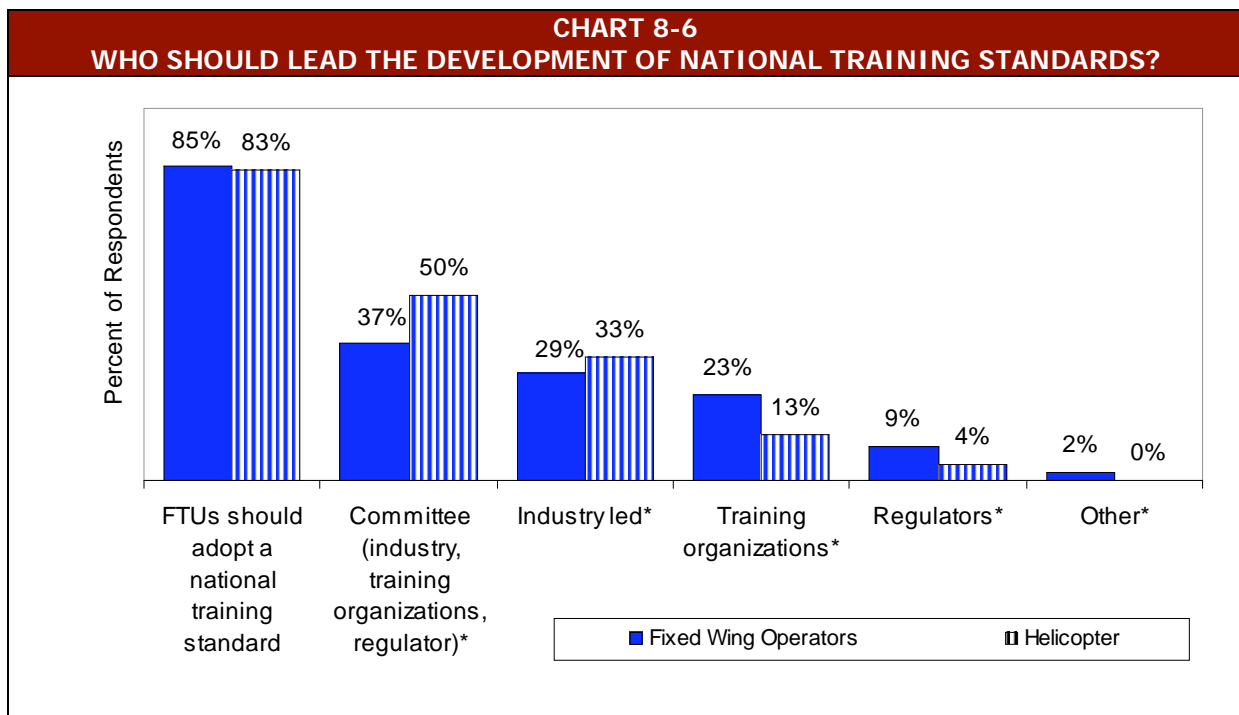
Source: Operator Survey (question C2) "Do you agree that flight training units should adopt national agreed-upon training standards for their professional training programs? Who do you feel should lead the development of these standards?" n=103 fixed wing (n=87 who agree or strongly agree and provided an answer), n=30 helicopter (n=25 who agree or strongly agree and provided an answer)

Note: percentages are based only on those who agree or strongly agree that FTUs should adopt national training standards.

Asked whether they would be interested in participating in the development of a national curriculum, 52% of fixed-wing operators (n=100) and 62% of helicopter operators (n=29) said yes. Flight training units also showed strong interest in participating in the development of a national curriculum. Overall, 73% fixed-wing and 80% of helicopter FTUs said they would be interested in participating in the development of a national curriculum relating to the knowledge, skills, and attitudes required of pilots.

Interviews with industry experts and stakeholders revealed that there is strong support both in the flight training community and among industry groups for a standardization and accreditation of FTUs. According to one expert in the flight training community, this would help guarantee the quality of pilots coming out of training. Another mentioned that accreditation and standardization would be good so long as airlines participate, and hire pilots coming out of these programs. Operators would help identify the skill, experience, and knowledge that new hires are required to have, and programs would be accredited if they met the identified standards for training. In such cases, operators would be expected to hire students graduating from accredited programs, even if they don't have 1,000 hours of flight experience. According to this individual, there would be a real advantage for operators to know when they are taking someone directly from school who has the kind of training and skills they desire.

However, as mentioned by another interviewee from the flight training community, accreditation and standardization would need to be a national initiative rather than provincial, so as to ensure that different provinces do not have different requirements.

A possible model for establishing an accreditation system has been developed by the Canadian Aviation Maintenance Council (CAMC). CAMC has designed and established an accreditation system for aviation maintenance programs. Accreditation systems effectively encourage organizations to conform to the requirements established in an occupation's National Training Standard (Instructor Guide/Curriculum).[81]

Standards are developed in consultation with industry stakeholders (employers, employees, educators, and unions), and, in the case of CAMC, through its National Standing Trade Advisory Committees (NSTACs). Together they define the skills and knowledge required of a certified technician in order to perform effectively in a particular occupation.[82]

CAMC's accreditation process measures the extent to which a training organization's program meets or exceeds the requirements specified in the CAMC Instructor Guide for that discipline. Training programs are audited every three years to maintain accredited status.

An ATAC Professional Pilot Committee recently developed standards and learning outcomes for post-secondary institutions offering professional pilot training programs. It was hoped that this work would be used to help the public determine whether a given training program was held to a sufficiently high standard. To date it has not been published or made accessible to the public.

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[81] National occupational standards are discussed in Chapter 10.
[82] Canadian Aviation Maintenance Council http://www.camc.ca/en/118.html

Findings:
A majority of operators and more than 70% of FTUs expressed interest in developing national standards for enriched training of new pilots. Findings were mixed about who should be involved in a committee to develop the standards, with the highest percentage of respondents favouring a working group that included operators, flight schools and the regulator.

During the course of this study, various stakeholders voiced their support for the possible establishment of an accreditation process that would validate training content and provide certification to pilots undertaking validated training.

CAMC has a model that could be applied to the flight training sector of aviation.

CHAPTER 9: SAFETY MANAGEMENT IN THE INDUSTRY

In 2003, Transport Canada began the implementation of a Safety Management System (SMS) for all operators, aimed at improving safety through "*pro-active management rather than reactive compliance with regulatory requirements*".[83] Transport Canada has noted that, by 2010, SMS will become an international requirement, and that Canada is leading the way by imposing a requirement on CAR 702, 703 and 704 certificate holders to start implementing these systems early in 2011. CAR 705 operators are already well advanced in their implementation of SMS.

SMS differs from traditional approaches to safety in that it focuses more on the "*nature of organizational accidents and how they occur*".[84] Traditional safety systems were managed at the certificate level — for instance, there were separate systems for Air Operators and Aviation Maintenance Organization — whereas SMS consider the entire organization as a whole, and how particular functions interrelate.[85] Organizations are responsible for developing documents containing all safety management system processes, and for developing a process for making personnel aware of their reporting responsibilities. They must also conduct periodic reviews or audits of the safety management system, and reviews or audits of findings identified within the safety management system. [86]

One of the key factors to successful implementation of SMS is encouraging and fostering a corporate culture in which individuals contribute to, and are responsible for, safety, and in which the reporting of incidents involving safety is actively supported and encouraged. The SMS implemented in the air transportation industry in Canada states that "*Effective safety management requires a free exchange of safety information within an organization and between the organization and its safety partners. This applies both to actual incidents and accidents occurring within the organization, and to any hazards, accident precursors, and systemic vulnerabilities that may be identified.*"[87] Fostering this type of culture is essential to improving safety within an organization because it does not penalize the individuals who make the errors, and provides positive confirmation to staff that reports are taken seriously.[88]

SMS will affect pilots and operators in a fundamental way. The development of an effective safety culture is predicated on a relationship of trust between the organization, the employee, the regulator and the industry overall.[89] Culture change takes time, and within Canada it has taken time to develop the infrastructure at the regulatory level to encourage organizations to implement the `programs necessary for cultural change.

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[83] Transport Canada http://www.tc.gc.ca/civilaviation/directives/dir31rev2.htm , accessed August 17, 2009.
[84] Transport Canada http://www.tc.gc.ca/civilaviation/sms/faq/regulations/q2.htm, accessed August 17, 2009.
[85] Ibid.
[86] Transport Canada http://www.tc.gc.ca/civilaviation/sms/basic.htm, accessed August 17, 2009.
[87] Transport Canada http://www.tc.gc.ca/civilaviation/sms/faq/components/q1.htm, accessed August 17, 2009.
[88] Ibid.
[89] Transport Canada http://www.tc.gc.ca/civilaviation/sms/faq/international/q2.htm, accessed August 17, 2009.

Helicopter Safety Regulations in Canada

The helicopter sector of the industry appears to be moving in the same direction as the airplane sector in terms of having safety monitoring and regulation responsibility transferred to industry itself. According to the Helicopter Association of Canada, assistance is needed for operators to implement the SMS. In particular, operators and flight schools need assistance to understand the concepts and methods for changing the culture.

9.1   Training for Safety Management

As discussed in Section 7.1, 47% of fixed-wing and 53% of helicopter operators reported that they look for knowledge of SMS in applicants, but 29% of those who sought the skill in applicants feel that applicants are deficient in this area. Some operators interviewed suggested that pilots emerging from training programs have yet to demonstrate understanding of SMS. One operator was concerned about not "*yet having seen a pilot come along that knows anything substantial about SMS*". It was pointed out in focus groups that not all schools have a good grasp of SMS at this point. One operator suggested that it might be an area for schools to get into as a "win-win" situation. It was suggested that *"If [training organizations] develop courses and expertise on it, they might find a market with operators as well as offering it to their students."*

As reported in section 8.1, 20% of fixed-wing and 38% of helicopter FTUs have a formal train-the-trainer curriculum for teaching SMS to student pilots. FTUs were asked whether they either currently teach, or are planning to teach, their commercial pilots the basics of designing and implementing an SMS program. It should be noted that many FTUs have not started to teach SMS since they are not yet required to implement SMS themselves.[90] The challenges in using formal curricula discussed earlier in Section 8.3 (i.e.\ lack of resources, funds, and instructors) are also reflected in the responses to SMS training.

Respondents to the FTU survey were asked whether they currently do or plan to teach SMS to their student pilots. Less than half of all respondents (48%) responded in the affirmative, with fixed-wing FTUs being more likely to do so than helicopter FTUs (52% compared to 33%).

According to Transport Canada, FTUs will be required to implement SMS themselves by January 2012.

Finding:
Fewer than half of flight training units plan to, or currently teach SMS design likely because they are not yet required to do so. Nor are they required yet to implement SMS in their own daily flight operations.

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[90] Other reasons for not yet implementing or teaching SMS might include cost and limited interest or desire to do so.

9.2   Impact of SMS on Operators

Respondents to the operator survey were asked about the impact that SMS has had on the daily work environment of their pilots. In total, there were 80 operators (fixed-wing and helicopter) who provided answers. Of all comments by respondents, the largest portion (39% of fixed-wing and helicopter operators) reported that there was little impact. A further 8% of fixed-wing and 12% of helicopter operators reported that the question was not applicable, possibly because there was no SMS in place at their operation.

Among operators, 61% of respondents indicated that SMS has had a positive impact on their operation. Given that SMS is a relatively new concept, and has not yet been implemented by all operators in the country (only CAR 705 operators are currently required to have SMS), the largest proportion of operators surveyed reported that, to date, SMS has had little impact on their organization. According to Transport Canada, CAR 705 operators have been implementing SMS since May 31, 2005. CAR 704 and 703 operators will be required to do so by January 2011, and CAR 702 operators by January 2012.
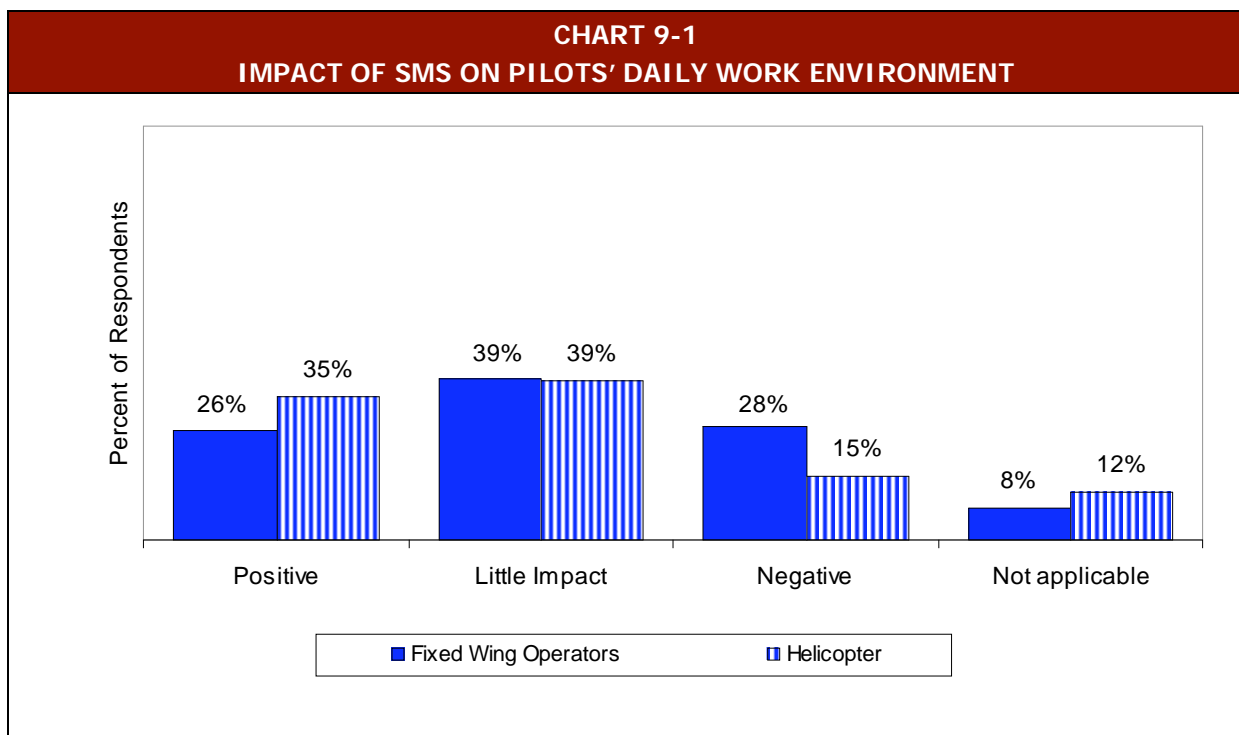
CHART 9-1
IMPACT OF SMS ON PILOTS' DAILY WORK ENVIRONMENT

Source: Operator Survey (Q. E3) "What has been the impact of SMS on the daily work environment of your pilots?" n=80 Fixed Wing, n=26 Helicopter

More detailed analysis of operator comments on the effects of SMS is presented in Table 9-1. In total, 35% of helicopter and 26% of fixed-wing operators reported that the impact was either generally positive, or else specifically positive in terms of increased safety, awareness, reporting, etc. As one operator commented, the impact has been "*Generally positive. Crews are provided a structured and defined reporting and response system. Issues have been identified and resolved through the SMS*".

Almost 28% of fixed-wing operators and more than 15% of helicopter operators reported that the impacts were negative, with most of these operators specifying that it made more work for pilots. One operator commented that SMS has resulted in "*Increase in workload and increased stress level. Small aerial application organizations such as ours have only been negatively affected by SMS*". The increased work load and stress levels described by operators are predominantly attributed to the start-up phases of a new SMS.

Table 9-1 Analysis of Operator Comments on the Effects of SMS				
Theme of Comment	**Number Reporting (Fixed Wing)**	**Percentage of Respondents (Fixed Wing)**	**Number Reporting (Helicopter)**	**Percentage of Respondents (Helicopter)**
Negative				
General negative	5	6.3%	2	7.7%
More work	17	21.3%	2	7.7%
Little Impact				
Little impact yet/too early to gauge	31	38.8%	10	38.5%
Not Applicable				
Not applicable/not implemented	6	7.5%	3	11.5%
Positive				
General positive	10	12.5%	3	11.5%
Improved Safety/reporting/ tracking/mitigation	11	13.8%	6	23.1%

Source: Operator Survey (Q. E3) "What has been the impact of SMS on the daily work environment of your pilots?" n=80 Fixed Wing, n=26 Helicopter

Analysis of the comments of fixed-wing operators by operator type reveals that 705 operators report a more positive impact of SMS than do the other three operator types. Overall, 67% of 705 operators reported that SMS was either generally positive or that it improved safety/reporting/tracking/mitigation, compared with 29% of 704 operators, 23% of 703 operators, and 9% of 702 operators. This suggests that while it might take some time before SMS implementation has an effect on operational safety, the effects are regarded as positive.

One pilot commented that SMS is a great idea but, at this time, it is really only applicable to 705 operators, and even when it is required for other operators and flight training units, it will likely not be as "imposing" as for the 705 operators. He further commented that, at the end of the day, if an operator does not have the right safety culture, SMS will not in itself be effective. This idea was echoed by a Transport Canada representative, who noted that, to function properly, SMS will require a supportive culture of safety throughout an organization. There needs to be a conscious mindset that safety matters, and there needs to be an environment that encourages suggestions for improvement.

The Transport Canada representative further commented that while it is advantageous to introduce elements of SMS in the training of pilots, the adoption of a safety culture will be best obtained through an environment that fosters safety through all levels of operation. The individual also mentioned that Transport Canada believes that in order to have an effective SMS, an operator must first have a quality assurance system in place.

However, according to an interviewee from the flight training community, there are two key challenges operators face when implementing an SMS in their organization: 1) Many simply do not know how to do it. They do not have the means or expertise in their organization to develop the SMS, and it is not something that can be "purchased off the shelf"; and 2) with the exception of major operators, there is little or no knowledge of how to conduct an investigation of an incident, prepare a report, decide on corrective action, and monitor the outcomes. Operators simply do not have the people (resources or knowledge) to do this.

While the Transport Canada representative reported that SMS training for new pilots would be advantageous, it would appear that it is in fact necessary, as training new pilots today requires more emphasis on investigation, report writing, etc. These new pilots will be the ones who have the skill and ability to undertake the tasks required.

Findings:
The majority of fixed-wing CAR 705 operators (67%) reported that SMS has had a positive impact on the daily work environment of their pilots. Across all operator classifications however, 26% of fixed-wing and 35% of helicopter operators feel that SMS has had a positive impact on their organization. Most operators reported that SMS has had little/no impact, or was not applicable, either because it's too early to gauge or because it had not yet been implemented.

Transport Canada, operators, and the flight training community need to work together to ensure that SMS in the aviation industry is relevant, achievable, and effective, for all CAR operator classifications: 604, 702, 703, 704, 705, and 406.

CHAPTER 10: INNOVATION IN TRAINING

Canada's flight training community has excelled in pilot training and Canadian pilots have a first rate reputation. If the training community is to continue its accomplishments into the 21st century, the status quo will no longer suffice. The increasing pace of regulatory and technological change requires an equally fast-paced renewal of aviation training protocols.

There is international consensus that traditional training approaches need to be refreshed and re-invented to meet the pilot needs of the present and the future. The future of flight training is in competency-based training, as new technologies and evolving airspace systems have outpaced current training approaches. Advances in aircraft technology and flight data tracking allow real life situations to be used for designing training. However, many commercial pilot training organizations have limited their programs to meet minimum ICAO and Transport Canada licensing requirements. Trainers still need to base business and curriculum decisions on the fact that simulator and other flight training device (FTD) credits for licensing are limited.

There are numerous opportunities to be explored and implemented across all pilot training programs that can lead to enhanced aviation safety and pilot knowledge, skills, and abilities. According to an article in Flight Global, a review of the most recent aviation accidents suggest that the causes were not so much attributable to lack of skill in operating the aircraft, but rather a lack of appropriate decision making ability and situational awareness.[91]

The following section highlights some of the recent shifts in the approach taken to training pilots, to ensure they have not only the hours required, but more importantly the knowledge and ability to react appropriately according to the circumstance. It begins with a discussion of the Multi-crew Pilot Licence and the move toward competency based training using scenario-based training programs and an evidence-based approach to training design. It then moves on to discuss the current approach to licensing. It discusses Approved Training Organizations (ATOs) as structures that allow more competency-based training, and increased use of simulation and flight training devices.

10.1   Multi-Crew Pilot Licence

In response to growing demand in the European aviation training community, the Multi-crew Pilot Licence (MPL) was established and approved by the ICAO in order to create a more effective training system for pilots who want to fly large commercial aircraft. A number of training organizations expressed the further view that modern training techniques, such as the use of flight training devices, need to be recognized within the ICAO licensing structure.[92] As a result, the ICAO Air Navigation Commission formed a Flight Crew Licensing and Training Panel to review the current licensing requirements and shortcomings, and to explore options and opportunities. Among the recommendations made by the panel were for wider use of simulation, the determination of more-relevant training standards, and the creation of a new licensing

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[91] http://www.flightglobal.com/articles/2009/07/21/329784/comment-pilot-training-is-the-key-to-recovering-airline.html
[92] ICAO web site, http://www.icao.int/icao/en/trivia/peltrgFAQ.htm#31, accessed September 4, 2009

structure. The competency-based concept and the MPL were both outcomes of the panel's discussions.[93]

Currently, MPL programs are being developed and delivered in Canada and around the globe. In fact, Transport Canada has developed the regulatory framework for the MPL, and Europe has already implemented its MPL regulatory framework. The Australian Civil Aviation Safety Authority has already drafted amendments to its regulations to cater to the implementation of the new MPL. In China, the General Administration of Civil Aviation is also in the process of amending its regulations in order to implement the new program, as are a number of other countries around the world.[94]

The MPL is an example of the shift away from the prescriptive hours-based model used by Canada and elsewhere for years. While there are some prescriptive elements to the MPL, the ATOs will have considerable latitude to devise their own training methodologies. ATOs will teach to the standard operating procedures for the sponsoring airline and to the aircraft type flown by the air operator. Their obligation will be centred more on achieving the required outcomes. How they implement the training is up to the training organization, not the regulator. As a result, organizations will need training on how to work within a Quality Management System as opposed to a prescriptive environment.

Canada's Approach
Holding a Canadian MPL will signify that the bearer has successfully undergone a "*Transport Canada (TC) authorized MPL flight-training program and has demonstrated the Skill, Knowledge and Attitudinal (KSA) competencies to perform the duties of a co-pilot of a multi-engine, turbine-powered, pressurized aeroplane, which is certified to be operated by two or more pilots, flown under either Visual Flight Rules (VFR) or Instrument Flight Rules (IFR) conditions*".[95] The training unit must partner with an air carrier and train to the operating procedures and aircraft type of the air carrier. The air carrier can employ the MPL pilot as a first officer, a second officer, or a cruise relief pilot.[96] MPL holders who wish to seek pilot-in-command privileges are required to acquire one of the traditional Canadian licences and desired ratings.

Gaining an MPL requires completion of a continuous 4-phased training course designed specifically for the ab-initio candidate. The syllabus is designed in such a way that students are required to consistently achieve benchmark levels of skills, knowledge, and attitudinal competencies. A key element to the MPL training is that trainees demonstrate the "*continuous development of desirable behaviours and management skills through the adaptation of the principles taught in Crew Resource Management* and *Threat and Error Management training*".[97]

Transport Canada will continue to engage principal stakeholders in the development of the MPL regulatory environment. The MPL advisory board of Canada is reviewing data

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[93] Ibid.
[94] IACO Journal, volume 62, number3, 2007, available at http://www.icao.int/icao/en/jr/2007/6203_en.pdf
[95] Transport Canada web site, http://www.tc.gc.ca/civilaviation/general/MPL/more.htm, accessed September 4, 2009
[96] Ibid.
[97] Ibid.

and reports on MPL activity on an ongoing basis, and it is making recommendations on how to implement improvements to the existing TC MPL policies. [98]

The MPL has not yet been taken up by the airline community in Canada. No fixed-wing operators surveyed reported that they were considering implementing the MPL. There is also some lack of knowledge of the concept. However, according to focus group participants, this is due to the fact that Canadian operators currently have access to an adequate supply of pilots to meet demand, and have yet to experience the projected shortage of pilots. Only when the supply of pilots in Canada declines due to attrition, growth of the industry, and increased fleet size, will the MPL likely gain in popularity among the operator community.

When airlines operating the relevant category of aircraft (CAR 705 operators) were asked about their familiarity with the MPL, 13% were unsure, and 27% were unfamiliar with the MPL. Forty-seven per cent were somewhat familiar with the MPL, and only 13% were very familiar with the MPL.

| CHART 10-1 |
| HOW FAMILIAR IS YOUR ORGANIZATION WITH THE MPL? (AIRLINES ONLY - 705) |
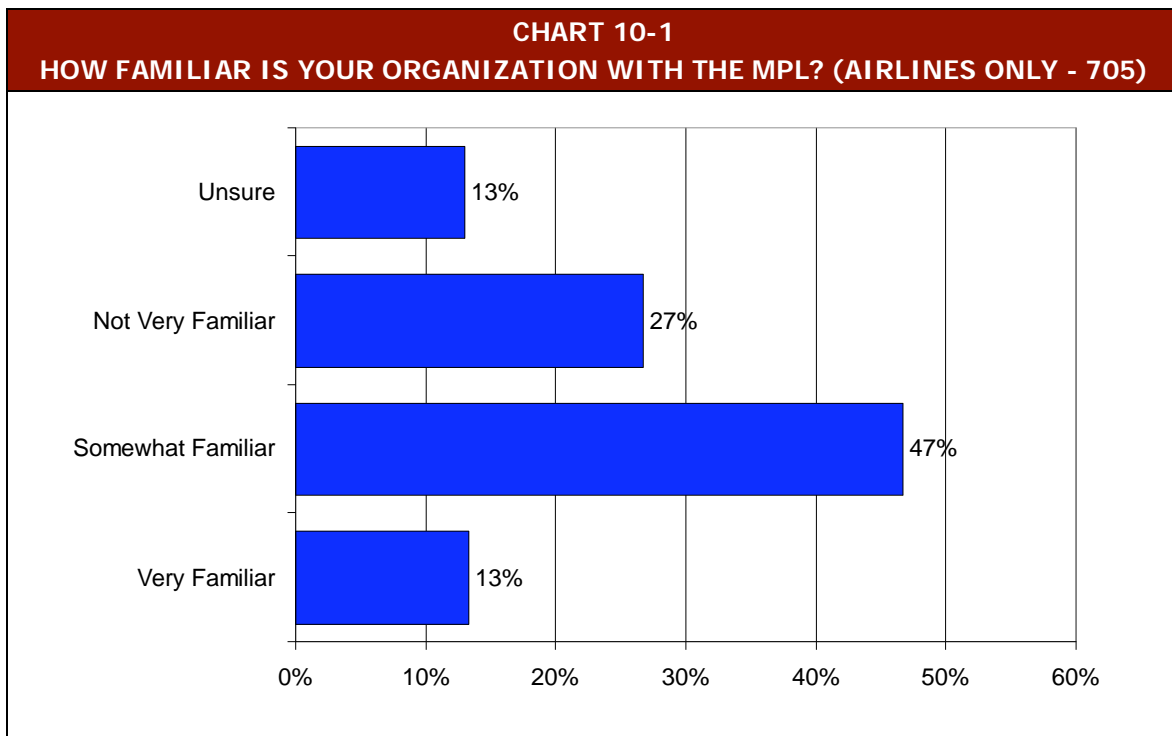
Source: Operator Survey (E1) "How familiar is your organization with the Multi-crew Pilot Licence (MPL)? " 705 operators only, n=15

According to one operator, there is currently a low level of interest among Canadian operators. But, once the concept is better defined and understood, and when the country reaches a shortage of available pilots with 3,000 to 5,000 hours of flight experience, interest among operators will likely increase. When airlines have to start considering hiring pilots with only 1,000 hours, there will be an increased vested interest in competency of training and the MPL. Another operator echoed the sentiment that there is little interest in the MPL in the domestic market, mostly because it trains a person for the right seat of

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[98] Ibid.

one particular aircraft and in that sense it is limited in its application, and it is too expensive for the average student. Many international students who are taking the MPL route are either sponsored by an airline or else by their government. In Canada, no such support exists to date.

> **Findings**:
> Interest in the MPL among Canadian operators is low at present. It follows that the level of familiarity with the MPL is low, both among operators and FTUs. Of the 16 CAR 705 operators surveyed, none reported that their organization was considering implementing the MPL.
>
> Industry experts report that the reason for current lack of interest is that Canadian operators have yet to experience a serious pilot shortage, and so they do not yet see the benefit of the MPL. Among flight training units, the challenge with the MPL is developing an ATO construct to deliver a program that is limited in its applicability, with a cost to students that is not prohibitive. Both operators and governments will need to support the MPL construct both financially and in practice.

10.2   Scenario and Evidence-Based Training

Scenario-Based Training
Scenario-based training is becoming more widespread in general aviation. Though it is not new to airlines, it is a new approach for many FTUs. Scenario-based training is an approach that incorporates risk management, aeronautical decision-making, situational awareness, and single-pilot resource management together, rather than treating each as separate from the other.

The US Federal Aviation Administration (FAA) has been involved in developing scenario-based training for general aviation through its FITS (FAA/Industry Training Standards) program. The FAA describes this approach as offering "a new training paradigm".[99] In Canada, a number of flight training units have started to integrate scenario-based training into their programs. Research currently under way at Seneca College should result in expansion of materials available to flight training units for conducting scenario-based training.

Evidence-Based Training
Among the tasks the IATA Training and Qualification Initiative (IQTI) has set for itself is work on competency-based training. A sub-set of this task is focusing on instructor qualifications and the need to update training programs.

Evidence-based training is one of the tools used to shape training programs that are underpinned by actual events occurring in today's context. In its Spring 2009 Report, IATA explores the benefits of evidence-based training.[100] It notes that, for decades, the content of training programs for flight crew has not changed to match the development

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[99] FAA Aviation News, General Aviation Special Edition, July/August 2004, pg 7.
http://www.faa.gov/news/aviation_news/2004/media/julyAug2004.pdf
[100] http://www.iata.org/NR/rdonlyres/6CBC71E3-2287-40AC-A3C7-
7D712247A2C7/0/ITQIReport_Spring09_v12_20090423.pdf

of aircraft design and reliability. Training programs are still based on dated regulatory prescriptions and events that are no longer likely to occur in today's aircraft, given their new designs. The ICAO standard for collecting and analyzing flight data can provide industry with a wealth of safety, accident, and incident information from Fight Data Monitoring systems and incident reports. Analysis of the data can help guide training of flight crew "by weighing risks and looking at those situations, which are more likely to happen".[101]

IATA's aim is to identify and train crew for the real skills required, through the use of evidence presented in real-life scenarios. This work is focused largely at the airline level. However, as a philosophy, it can be adapted for use in flight training units. Implementation would require the systematic collection of data on which to base training programs.

Evidence-based training could help FTUs design and tailor their programs to meet the real life risks and scenarios that a pilot can face. Accident and incident reports, in addition to flight data collection can provide excellent evidence-based examples for training institutions to design more efficient and safety driven training.[102]

However, there are some limitations to evidence-based training as a curriculum design methodology. It is based on collection of data from very sophisticated airline systems, data that are not available to the industry at large. Airline and operator information given to Transport Canada is confidential and can therefore not be shared with industry at large. The most realistic approach may be for organizations to share their "evidence" and experiences with the industry at large through a national third party body such as CAMC.

Finding:
The FITS program in the USA is advancing the cause of scenario-based training for general aviation. Research from Seneca College should result in more curriculum materials becoming available to flight training units for conducting scenario-based training.

A significant barrier to the effective use of evidence in making decisions when designing and implementing courses of study is the availability of accident and incident reports at an industry level, with confidentiality requirements being a key obstacle to sharing. The industry currently lacks a method for sharing this information. Canada should establish a national, voluntary, non-punitive reporting system.

10.3   Regulation and Licensing, and ATOs

In its 2009 Spring/Summer newsletter, CAE notes that historically, the regulatory environment for pilots has been based on the number of hours flown.[103] In recent years however, a shift to competency-based training has been promoted as a more appropriate training approach than the hours-based approach. While regulatory licensing

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[101] IATA Training and Qualification Initiative, Report 2009 — Spring Edition, P.30.
[102] IATA Training and Qualification Initiative, Report 2009 –Spring Edition. P.30
[103] "Civil Simulation and Training News". Issue no. 20, Spring/Summer 2009.
Available at http://www.cae.com/en/sim.products/_pdf/Newsletter20.pdf, accessed September 9, 2009.

standards remain hours-based, competency-based training is being combined and integrated into traditional programs in order to enhance Canadian training programs. It is being incorporated as a best practice in order to make training more effective. For example, the Transport Canada Integrated Courses for the commercial, IFR, and ATP licences use a combined hours and competency based approach. The new MPL described above, is almost entirely competency-based. An individual who has obtained an MPL has "*demonstrated the competencies to perform the duties of a co-pilot of multi-engine, turbine-powered, transport category aeroplane certificated to be operated by two or more pilots*". [104]

According to Transport Canada, regulatory changes have been introduced to "*open new pathways for pilot training that will bring innovative, competency-based methods to bear on global pilot training needs, pathways that will break down the barriers to using sophisticated flight simulation tools.*" To this end, Transport Canada is introducing a new, competency-based regulatory framework that will establish protocol, requirements, and operational latitudes for Approved Training Organizations (ATOs).

Training organizations that meet the criteria will be accredited as an Approved Training Organization (ATO). Rather than requiring potential ATOs to achieve only minimum targets and prescribing methods by which to achieve these targets, the approach proposed by Transport Canada is to create performance-based rules that focus more on attaining desired outcomes rather than exclusively on quantitative (hours) targets.
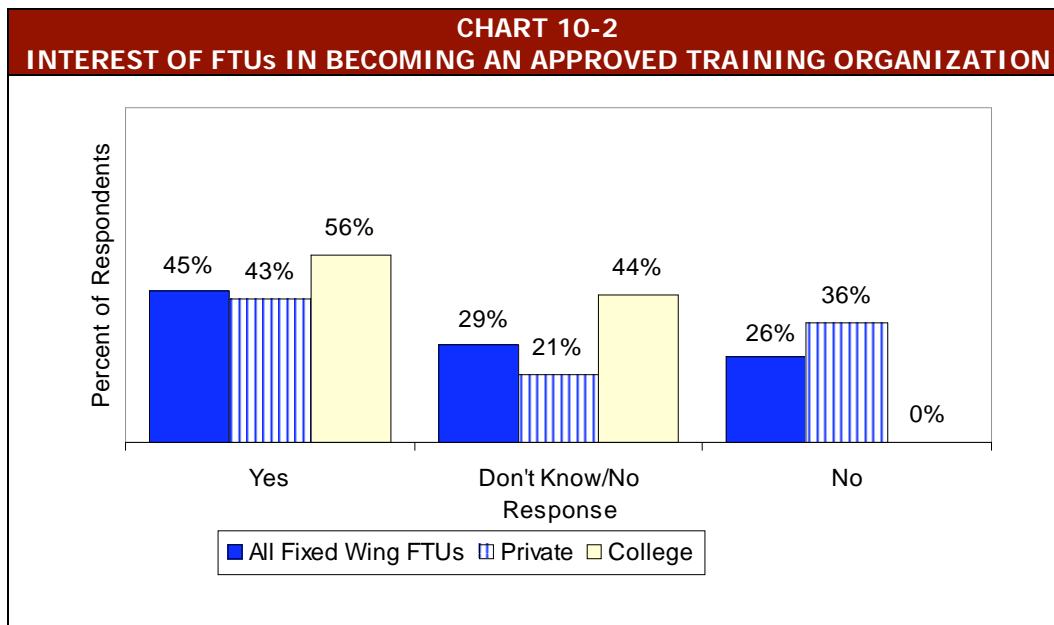
Transport Canada is in the process of designing this performance-based model, setting the parameters and requirements for becoming an ATO. Under the ATO model, while the ICAO sets out international standards that prescribe how licences are trained for, an ATO will be able to apply for "alternative means of compliance." For example, ATOs may wish to use more simulation than is currently allowed for credit in the traditional program. An ATO wishing to do that would apply for approval, and go through a proof of concept process, in which it must prove that the alternative training method is at least as good as the one it would replace.

Currently, in Canada there is one ATO in a beta test mode (Moncton Flight College), with the authority to deliver the first MPL on Canadian soil. CAE has just partnered with Air Asia to train students for the MPL. The blended training program integrates theoretical knowledge, simulation-based training, and aircraft training throughout the curriculum. There are four phases of MPL training: the first two are Core and Basic. These will be completed at Moncton Flight College. The Intermediate and Advanced phases will be completed by CAE in Dallas and Toronto..[105]

The current research indicates a moderate level of interest by fixed-wing FTUs in becoming an ATO. Of the 51 fixed-wing FTUs surveyed, 23 (45%) reported that they intend to become an ATO, 15 reported they did not, and the remaining 13 either did not know or did not respond to the question.

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[104] Transport Canada http://www.tc.gc.ca/civilaviation/imsdoc/imsdocuments/reg/pdf/reg-407-001.pdf, pg. 3.
[105] http://www.cae.com/news/details.ashx?lng=English&location= InvestorsNR&showEvents=False&count=0&id=986&year=2010

CHART 10-2
INTEREST OF FTUs IN BECOMING AN APPROVED TRAINING ORGANIZATION

Source: Fixed Wing FTU Survey (question G3. Do you intend to become an Approved Training Organization?" n=51

To take full advantage of becoming an ATO, FTUs will have to design and validate new methods of training, or incorporate methods designed and validated by others. Some of this "applied research" is currently underway.

Finding:
Forty-five per cent of flight training organizations expressed interest in becoming an approved training organization (ATO). This interest is higher among colleges (56%) than among private training organizations (43%).

10.4 Simulators and Flight Training Devices (FTDs)

Use of Flight Training Devices and Simulators

Focus group participants were asked their opinion on increasing the recognition of FTD and simulator hours. In one focus group in particular, participants were unanimous that FTDs and simulators are incredibly beneficial in training. As one participant said about training for GPS, "there is no point wasting time in the aircraft... It creates more capacity, and it takes pressure off your regular assets". According to another participant, many of the main skill and knowledge areas required in training "are all topics that can be taught well in a simulator". Simulators are also considered effective for practising emergency and cockpit procedures, since it is possible to simulate an engine shut-down or malfunction. In addition, it is widely believed that the use of simulators reduces the cost of flight training.

Other benefits identified in using FTDs and simulators for training include:

- ability to freeze the picture and let the student discuss the situation with the instructor, then unfreeze and restart where the exercise left off;

- ability to progress in training when weather might otherwise restrict flying;

- ability to maintain training during long stretches of bad weather;

- ability to extend a fleet's engine and airframe life, as hours are moved to the simulator;

- ability to remove apprehension and fear by showing manoeuvers (such as stall, incipient spin) in the simulator before demonstrating them in an aircraft,

- ability to train at any time of day or night even with Private Pilot students who otherwise are mostly restricted to day flying, and

- a minimal carbon footprint compared to that of an aircraft.

Particularly with more complex simulators, participants firmly believed that hours should be recognized. There are simulators being built that are VFR specific, and there is a market for these. However, regulations have not kept pace with technological advancements. This is true for both fixed-wing and helicopter simulators.

Seneca College has recently been funded by the Natural Sciences and Engineering Research Council of Canada (NSERC) to complete research that would justify the increased use of simulation in-flight training. Its research is building on the extensive pilot task analysis carried out by the RAeS's International Working Groups to reclassify simulators.[106] It is hoped that this research will assist the training community, particularly those FTUs that intend to become an Approved Training Organization, to offer increased training in an FTD.

Operators were asked about the impact that FTDs have had on the quality of new pilots. Overall, the largest portion of respondents reported a positive effect, the second largest portion noted that they had no ability to judge or had no opinion.

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[106] Groups spearheaded by the Royal Aeronautical Society

CHART 10-3
IMPACT OF FTDs AS A SUBSTITUTE FOR FLYING HOURS
**ON THE QUALITY OF NEW PILOTS**
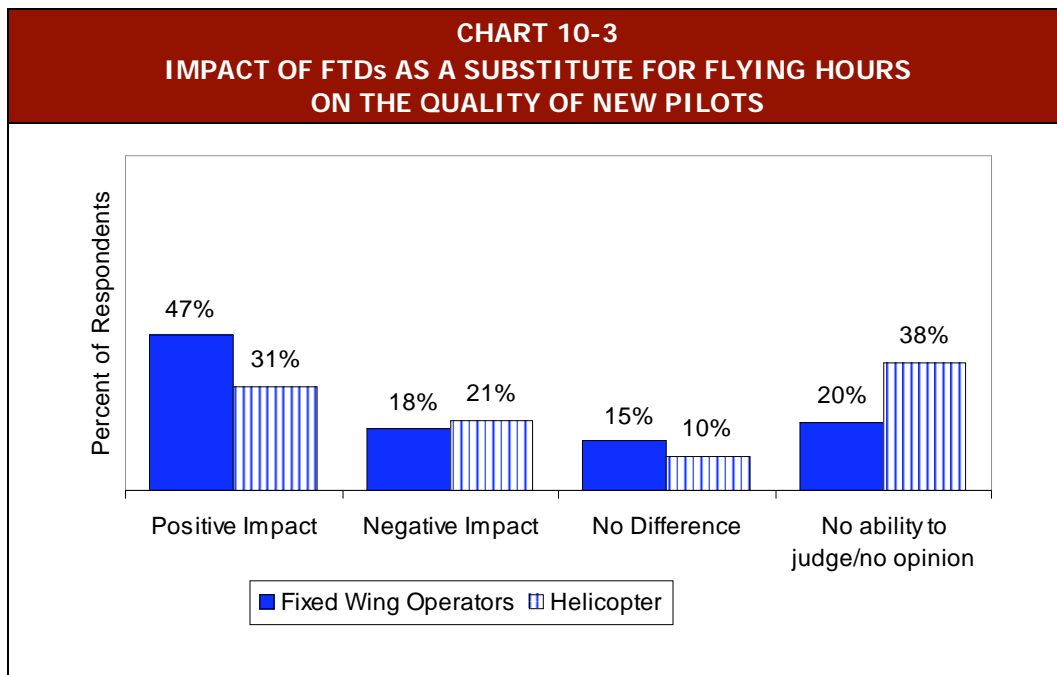
Source: Operator Survey (question E4 fixed wing, E3 helicopter) "Do you believe that the growing use of Flight Training Devices in flight training as a substitute for flying hours has a positive or negative impact on the quality of pilots?" n=103 fixed wing, n=29 helicopter

Flight Training Units were asked about the types of equipment they have at their training organization, if they have access to FTDs, and if they use FTDs for specific training. The majority of fixed-wing (76%) and helicopter (77%) FTUs have access to an FTD. Chart 10-4 highlights the types of simulators or FTDs that FTUs use for training.

As suggested in Chart 10-3 above, fixed-wing FTUs are more likely than helicopter FTUs to use FTDs in training. It is, therefore, not surprising that 64% of fixed-wing FTUs have a written curriculum for all simulator lessons, compared with only 30% of helicopter FTUs.

CHART 10-4
TYPES OF TRAINING DONE USING SIMULATORS OR FTDs
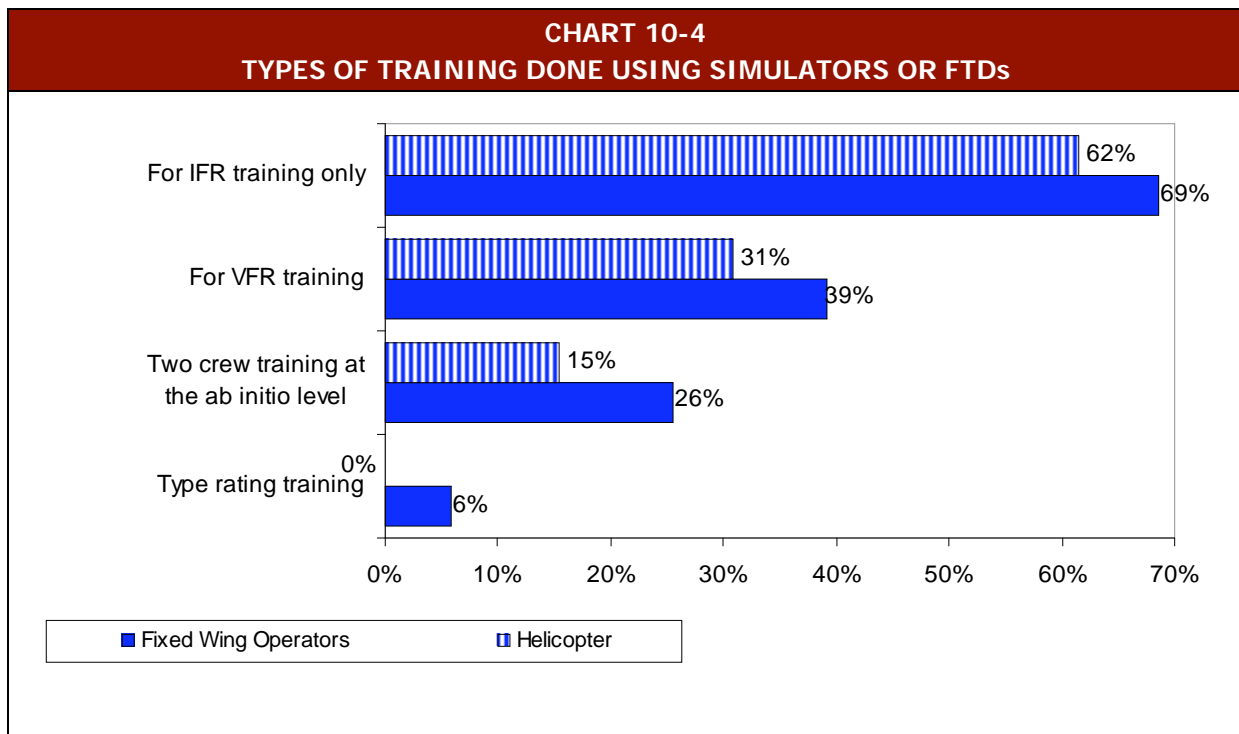
Source: FTU Survey (Question F3): "How does your organization use simulators or FTDs for training?", n=51 Fixed Wing, n=13 Helicopter, multiple responses were allowed.

According to the Helicopter Association of Canada, many helicopter operators use desktop simulators but they are not very suitable for VFR training. However, the industry will soon be launching a new generation of simulators for VFR helicopter training, which may enable greater utilization of low-time pilots. Fewer helicopter operators (31%) reported a positive impact of simulators and FTDs in flight training than fixed-wing operators (47%). In contrast, a greater number of helicopter operators indicated they had no ability to judge the effect of simulators (35% compared to 20% of fixed-wing operators), suggesting that they have less familiarity with the use of simulators in helicopter pilot training.

Barriers to the Use of FTDs

Despite the benefits of using simulation in training, there are a number of notable barriers: the licensing regulation structure, the harmonized classification of simulators and FTDs, and the cost of the devices.

Licensing Regulatory Structure

The largest barrier to FTUs adopting FTD technology is the current pilot licensing regulatory structure. At present, Transport Canada has specified the following allowances for the use of simulators and simulator hours for licensing[107]:

- For an airplane ATPL, of the total 250 Pilot in Command (PIC) hours required, a maximum of 25 hours can be in a simulator.
- For a helicopter ATPL, of the total 30 hours of instrument training, a maximum of 10 hours can be in a simulator.
- For an airplane CPL, of the 20 required instrument training hours, a maximum of 10 can be in an approved aeroplane simulator or flight training device.
- For a helicopter CPL, of the 10 instrument hours a maximum of five hours may be conducted in an approved helicopter simulator or FTD.

These regulations are reportedly based on a framework established when simulation technology was in its infancy.[108] One suggestion that came forward in two of the five focus groups was a desire for greater recognition of simulator and FTD time in Transport Canada regulations. According to Transport Canada, flight training units may use a greater amount of simulator time in training if they are willing to become an ATO. This option, while promising, is just becoming available in Canada. Increased recognition of simulator time in training does not need to be predicated exclusively on the training organization being an ATO. Other ways of increasing recognition of simulator training time might include recognizing hours of training, based on classification of the FTD and recognition of hours for simulator instructors.

Greater recognition of simulator time — especially the new generation of more effective devices — could be one avenue industry can use to bridge the "experience gap" among helicopter pilots discussed earlier in Section 5.2.

Harmonization of FTD Classification

Another barrier to the increased use of FTDs is the harmonization of the qualification of FTDs. At present, flight simulators and training devices are required to be certified by the National Regulator prior to being used to credit training time. The current standard, referred to in the ICAO Manual of Criteria for the Qualification of Flight Simulators, was issued in 1995, and was only applied to the highest-level simulators. Fixed-wing and helicopter technology has developed and improved since this standard was implemented, and simulators have become far more advanced and sophisticated in order to reflect these technological advances. Regrettably, the standard for certification has not kept pace with these advancements. Furthermore, regulators around the world have different standards for certification, particularly for simulators and devices that are not at the highest technological level. In order to address these issues, industry stakeholders have asked that there be a world standard established for classifying flight

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[107] Transport Canada http://www.tc.gc.ca/civilaviation/publications/tp14371/lra/3-0.htm#3-2-5
[108] Seneca College NSERC proposal

simulators and FTDs. The global standard would be based on analysis of data from pilot training, testing and checking tasks which pilots are required to perform to achieve various pilot licences and ratings.

Following a conference held by the Royal Aeronautical Society (RAeS) in November 2005, where it was highlighted that there was no internationally accepted standard for the classification and qualification of civil flight simulation training devices (FSTDs), the RAeS initiated the establishment of two industry-wide International Working Groups (IWG) on FSTDs — one for airplanes and the other for helicopters. The focus of both IWGs has been the need for international harmonization for the qualification of FSTDs and the development of a new system of classification, based on the pilot training, testing and checking tasks to be performed in the various pilot licences and ratings.[109]

High Cost of FTDs and Simulators
Another barrier to the use of simulators for flight training units is cost. More and more technology and capability is being put into the simulators and FTDs today, such that their prices may become unaffordable for independent flight schools. Currently, in seeking a bank loan to finance a FTD, banks look at a 5-year pay back which means the schools must have a return on investment within a 5-year period. For smaller schools, student volume makes this difficult. One challenge for the industry is to find ways of working with FTUs to afford new FTD technology. One FTD provider suggested the possibility of partnership arrangements to help provide financing for FTDs. One provider suggested that greater recognition is needed of the value of training in a simulator. The cost of FTD training ranges depending on the type of FTD used. According to one provider, if the cost of an FTD is $50 or $60 per hour not including the cost of an instructor, "*that's financially viable if your FTD costs only about $100,000. But for more expensive simulators, the return on investment is too low.*" This FTD provider suggested that if a good simulator is about three to five times more efficient than training in an aircraft, then the cost to use such simulators should be much higher and more in line with the cost of training in an aircraft.

Findings:
A majority of operators with an opinion stated that FTDs had a positive impact on the quality of pilot training, and focus group research indicated a desire for greater recognition of FTD time in Transport Canada regulations.

There are notable benefits to increasing the use of FTD and simulators in training:
a) student pilots can experience recreated situations and scenarios they might not otherwise be able to train for b) it reduces the cost of training to students, and
c) it reduces the carbon footprint of training in-air. Participants noted that a large portion of the recurrent training can be done using simulators and FTDs, particularly with more advanced, level 5 simulators.

There are three main barriers to greater use of FTDs in training: a) the current pilot licensing regulatory structure that limits allowable credits; b) lack of harmonization for the qualification of FTDs; and c) cost.

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[109] CEA "Civil Simulation and Training News". Issue no. 20, Spring/Summer 2009. Available at http://www.cae.com/en/sim.products/_pdf/Newsletter20.pdf , accessed September 9, 2009.

CHAPTER 11: NATIONAL OCCUPATIONAL STANDARDS

National Occupational Standards (NOSs) are an essential tool for, among other things, helping individuals better understand the skills they need to succeed in their job and career. They are defined as follows:

"An Occupational Standard (OS) identifies the tasks performed in a particular occupation and describes the knowledge and skills required to perform these tasks competently." [110]

The standards themselves are developed by employers and employees working together with a Standards Development Committee composed of subject-matter experts. The committee develops a draft occupational analysis, which is validated nationally, and becomes an occupational standard once it is endorsed by industry. HRSDC contributes to the development of occupational standards through its funding of sector councils.

Occupational standards could be used to assist training organizations prepare their student pilots for the realities of the job market, and advise them accordingly. Occupational standards could be used by training organizations to inform students about the skills necessary for the job, and the attitudes required for success. Students could then better assess whether a pilot career would be a good choice for them.

> **What are the benefits of National Occupational Standards?**
>
> **Industry:**
> - recruit, develop and maintain a skilled workforce;
> - ensure that occupational requirements are equitable;
> - increase competitiveness and productivity;
> - facilitate mobility of labour within Canada;
> - identify and communicate human resources and training needs;
> - create instructional programs;
> - upgrade employee skills;
> - design assessment and evaluation guidelines;
> - develop accreditation/ certification process; and
> - enhance corporate image.
>
> **Employers:**
> - increase productivity;
> - improve quality of goods and services;
> - reduce costs for recruitment by facilitating the selection of new employees;
> - provide a means for better human resources planning; and
> - help effective skills upgrading.
>
> **Employees:**
> - identify skills and knowledge needed for occupations;
> - provide a reference to assess ability and training needs;
> - identify and support clear career paths;
> - provide guidelines for certification/accreditation;
> - increase mobility within Canadian industries; AND
> - act as a benchmark for rewarding experience, knowledge and competence.

Operators were asked if they felt that national occupational standards for professional pilots are important, and how they believed employers might benefit from the standards. Many fixed-wing and helicopter operators said that they were either unsure or had no opinion (47.5%). Of those fixed-wing operators with an opinion, 65% believed that indeed it was important for the industry. Of the 30 helicopter operators, 11 did not have an opinion about national occupational standards. Of those 19 operators that did have an opinion, 15 (79%) believed it was important, and only four believed it was not important.

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[110] http://www.camc.ca/en/Occupational_Standards_29/items/National_Occupational_Standards_31.html

The following chart illustrates the percentage of respondents who identified reasons as important for developing NOCs. The largest percentage of respondents (62% of fixed-wing and 47% of helicopter operators) reported that standards would help define and maintain employee skills sets. Forty-three per cent (43%) of fixed-wing and 30% helicopter operators indicated that occupational standards would enhance the corporate image by adhering to national standards, and 40% and 33% respectively believed it would assist in identifying training needs.

CHART 11-1
SHOULD NATIONAL STANDARDS BE DEVELOPED FOR PROFESSIONAL PILOTS?
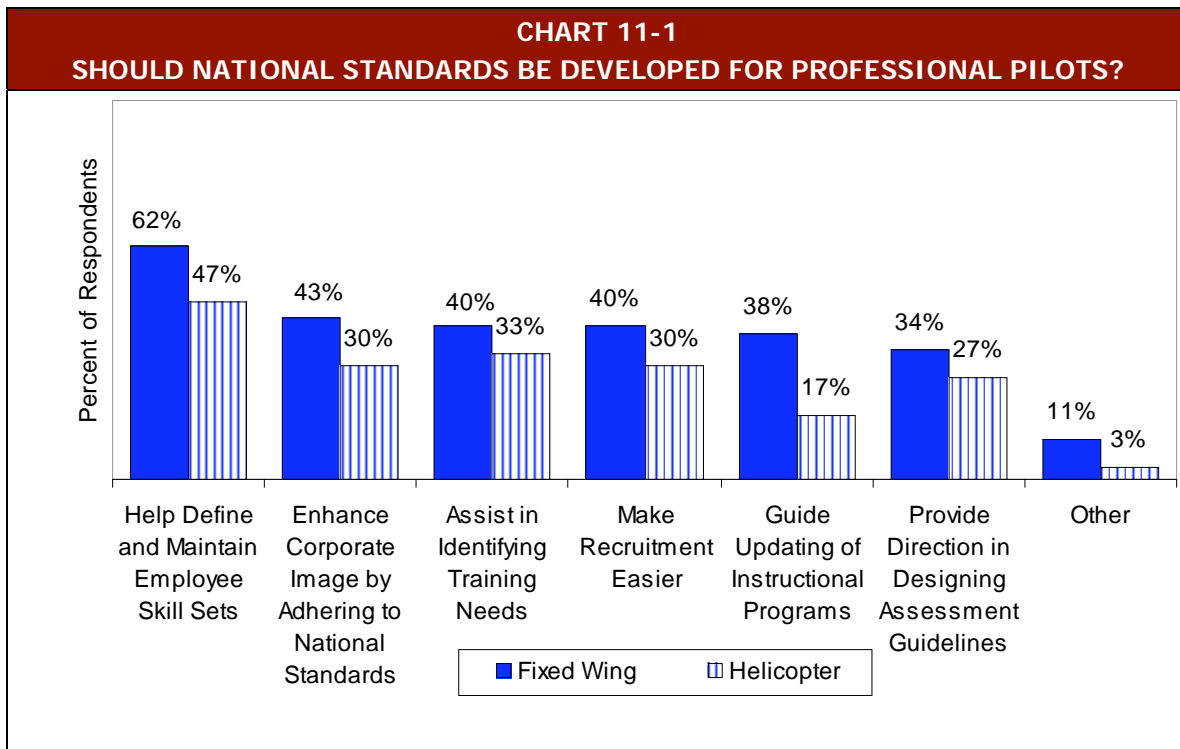
Source: Operator Survey (question D6) "Is the development of clearly defined National Occupational Standards for professional pilots important for the aviation/helicopter industry? If yes, how might employers benefit from such standards" n=98 fixed wing (n=34 for responses to benefits), n=29 helicopter (n=15 with responses to benefits)

The survey responses indicate industry interest in setting occupational standards. The associated work of defining skill sets for pilots has already been given impetus by the Royal Aeronautical Society International Working Groups. In preparation for reclassifying simulators, they broke down pilot tasks. This work will be useful in helping to identify national training standards for pilots in commercial operations. However, no parallel work has been done to date to identify flight instructor tasks.

Creating national occupational standards for flight instructors could allow for a count of flight instructors currently working in Canada through a pilot certification program. More importantly though, it would assist in increasing the professionalism of the occupation by establishing industry standards for skills, knowledge, competencies, training, and experience, in turn leading to better instruction, and better trained pilots, which could ultimately lead to safer operations.

At present, flight instructors are included in National Occupational Classification 2271, which also includes pilots and flight engineers. However, the job of an instructor is very different from that of other commercial pilots. While the basic pilot skill set to meet commercial pilot standards is the same, there are specific skill sets and areas of experience and expertise that an instructor must possess, and that a flight instructor National Occupational Standard should encompass.

Instructors need teaching and training skills to instruct in classrooms, conduct individual briefings, teach in aircraft, and to design lesson plans for FTD training. dditionally, study participants noted that flight instructors frequently double as career counsellors, providing students information on aviation career paths. In particular, instructors who have come to flight training after working in commercial aviation are a valuable career path resource for students.

Focus groups across the country also contributed opinions concerning the occupation of flight instructor. There was some discussion among industry representatives about the desirability of having more individuals make their career as instructors. One advantage cited by an FTD manufacturer to professionalizing flight instruction as an occupation is that there would be a higher level of familiarity with the course curriculum and simulator, making training more effective.

Flight Training Organizations surveyed were asked what features were most important in a flight instructor. FTUs most commonly emphasized people and teaching skills as well as a good work ethic, and understanding of aviation. One flight instructor emphasized these characteristics: "Aviation knowledge and teaching methods. Very good flight skills, negotiation, presentation, and life skills. Patience and an interest in helping others."

Anecdotally, research tells us that professionalizing the occupation has been a topic of discussion within the industry for some time. However, issues associated with professionalizing the flight instructor occupation continue to need more systematic attention. One issue is identifying the criteria for classifying an instructor as "professional".

Many instructors, particularly fixed-wing, use instruction as a stepping stone to gain flying hours in order to get a job as a pilot in a commercial operation. According to some operators and FTUs, these individuals should not be considered 'professional instructors'. Rather they suggest that professional instructors should be defined as individuals who are compensated to instruct, who instruct for the majority of their flying time, and who define their career as that of instructing rather than as working for an airline.

The second issue, which follows from the first, is that this definition focuses solely on whether the instructor is dedicated to teaching full-time; it does not address the issue of whether the quality of instruction offered is professional, regardless of whether it is offered by a full-time, temporary or part-time instructor.

Determining the professional quality of instruction is a third issue. At present, the most available measure is the ability to pass the Transport Canada tests for the various classes of Flight Instructor Rating.

There has been little change over the past 20 years to the regulatory standards for becoming a flight instructor. During this time, there have been significant advances in aircraft, flight training devices, computer-based technology, and the tools and

approaches flight instructors use to train pilots. However, neither the regulator, the flight training industry, nor FTD manufacturers have as yet been successful in developing user friendly resources and guidelines for making most effective use of these tools.

A fourth and closely connected issue is that, as noted above, there are no separate national occupational standards for flight instructors. A task analysis of this occupation has yet to be carried out by the industry at large.

Findings:
The aviation industry has a high level of interest in developing national occupational standards for pilots. Development of national occupations standards can build on the work already done by RAeS's International Working Groups in delineating pilot tasks.

Industry lacks a parallel analysis of flight instructor tasks, a separate National Occupational Classification for flight instructors, and train-the-trainer resources that keep up with advances in the technology and tools used to instruct.

CHAPTER 12: SUMMARY AND CONCLUSIONS

The summary and conclusions of the *2010 Human Resource Study of the Commercial Pilot in Canada* are drawn from the analysis of both the primary and secondary data collected.

Three overarching themes emerged from the study: the supply and demand gap for commercial pilots; human-resource challenges for operators and FTUs; and developments in flight training and their implications for industry.

Supply and Demand

According to global estimates, the demand for commercial pilots is expected to increase markedly in the coming years, as the Asian markets expand, the global and domestic economies begin to recover, and as retirement rates reflect the current demographic profiles — i.e., an ageing workforce. Canadian flight training units stand to benefit from the sharp rise in expected demand. The ICAO reports that foreign pilots-in-training, particularly from China, already currently occupy a large number of seats in global training institutions. Canadian flight training centres continue to admit a high percentage of international students. According to Transport Canada, approximately 31% of licences issued in 2008 were issued to international students. In addition, FTUs reported that 16% of their students were foreign, with India and China accounting for almost 80% of all foreign students. These students will likely return to their native countries to pursue their careers. However, though the number of FTUs in Canada has decreased since 2001, the larger FTUs remaining operational are expanding their capacity to train student pilots; both for the domestic and international markets. Increased investment in Canadian fleets and simulators has come primarily from international business, which sees Canada as a country with sufficient capacity and skill to train pilots to an international standard. Nonetheless, Canadian companies also need to take the initiative to ensure their equipment is reflective of current technological advancements, and that Canadian FTUs, operators, and the regulator work together to establish professional standards that can be used not only in Canada but also as a benchmark for the international community.

Though Canadian FTUs might have the capacity to effectively train pilots to a standard for both the domestic and international markets, the challenge domestically remains attracting potential students into a career as a commercial pilot, as training can be expensive and the perception among many is that the investment is not worth the time or effort.

Based on figures reported by Transport Canada and by operators, a domestic supply and demand gap in the number of fixed-wing pilots is estimated to be between 110 and 439 in 2011 and between 128 and 529 in 2014. The estimates for helicopter pilots reveal moderate surpluses of between 52 and 120 in 2011, and 30 and 112 in 2014. However, while the numbers indicate a surplus of helicopter pilots, the helicopter sector on the whole faces a shortage of pilots with enough experience and flying hours to meet the minimum requirements set out by most clients.

The increased global demand for pilots will likely lead to an increase in the international flow of pilots and pilot training, thus calling for greater harmonized international training

standards and certifications. A recently formed international working group has been formed called the International Association of Flight Training Professional (IAFTP) to facilitate an effective global understanding of pilot training and licencing practices from the perspective of the flight training professional. The goal of the IAFTP is to provide a credible, independent, international, non-profit clearing house for pilot training best practices.

A concerted international collaborative effort will be required to ensure that pilots are trained to the standard and competency required by today's operators — domestically and internationally. It is incumbent on industry and the regulator to ensure that there are sufficient resources allocated to this effort, and that Canadian FTUs are well equipped to provide pilots-in-training with the skills, knowledge and attitude required by operators. FTUs have the seating capacity to meet the demand for domestic pilots as well as for supplementing the global pilot training base.

Human-Resource Challenges

This study revealed that there are a number of human-resource issues faced by the industry. Operators and FTUs have a symbiotic relationship in addressing human-resource challenges. While FTUs and operators have slightly different human-resource needs, they are dependent on each other to ensure these needs are met.

The main human-resource challenge for operators is finding pilots who possess the skills — both technical and non-technical — and the experience that operators require, rather than simply finding applicants. Among FTUs, the main human-resource challenge is retaining instructors after they have obtained sufficient hours to secure a position as a pilot.

Operators identified the specific skills they seek in new pilot applicants, and the skills they find deficient among applicants. FTUs identified specific skills for which they have formal train-the-trainer curricula. The operator and FTU surveys indicate that there are several skills (identified as deficient in applicants) that a certain percentage of operators seek, and for which a smaller percentage of FTUs have formal train-the-trainer curricula:

- de-icing and surface contamination
  (50% of operators seek the skill / 36% of FTUs have a curriculum);

- SMS and crew resource management
  (48% of operators seek each of these skills / 23% of FTUs have a curriculum);

- threat and error management
  (27% of operators seek the skill / 9% of FTUs have a curriculum); and

- flight management systems
  (22% of operators seek the skill / 3% of FTUs have a curriculum).

FTUs also reported challenges associated with developing new curricula. Lack of resources, limited funds and availability of qualified instructors were the top three reasons cited for not developing formal curricula.

Operators must take these barriers into consideration in assisting FTUs to meet their pilot training needs.

One of the key human-resource challenges faced by FTUs is retaining qualified instructors. This challenge is a reality for fixed-wing and helicopter FTUs alike — though for slightly different reasons. In the fixed-wing sector, pilots often use flight instruction as a stepping stone to fly the required number of hours to obtain employment with an airline, or even with an air taxi or other smaller operation. This makes it difficult for FTUs to retain experienced instructors who can teach the skills required by operators. Industry must focus on evaluating piloting skills using a competency-based model, and move away from the traditional hours-based model. In addition, instructors historically have been paid on an hourly basis, at relatively low wages, preventing flight instruction being considered a viable career choice.

The helicopter sector's human-resource challenge is recruiting experienced instructors. Helicopter instructors are required to have significant experience and flying hours — more than they have when they first graduate from training — before they are allowed to instruct. In addition, many clients require that pilots hired for a given contract have a minimum number of flying hours. The challenge for recent graduates is that they cannot initially secure a job as they have insufficient hours to either instruct <u>or</u> to fly commercially.

Another human-resource consideration is that there is a paucity of current, accurate and updated information about pilot career and pilot training. The current NOC for pilots is outdated and does not reflect the realities of today's pilot duties and tasks. Up to date and accurate NOCs are necessary for employers, employees and industry alike. According to HRSDC, "The NOC is a standard that classifies and describes the occupations in the Canadian economy. It is a foundation for labour market statistics and career information. The NOC must be revised periodically to reflect developments in technology…"[111] and other changes or modifications to the occupational duties and skills requirements.

Currently, insufficient and outdated resources are made available to potential students and guidance counsellors regarding becoming a career pilot. Updated information about school programs that provide the required training, typical associated costs and funding available, and salary and job-opportunity expectations should be made available.

Finally, notwithstanding that most pilots choose to pursue pilot training and become pilots for the love and challenge of flying, efforts need to be made both in recruiting students to flight training schools and in facilitating program completion. Today's youth are accustomed to retrieving information online, and expect that the information they require will be easily accessible, accurate, and "user friendly." According to focus group and interview findings, the industry (flight training units, operators, and the regulator alike) would benefit from using more interactive approaches to recruiting and advertising the career of commercial pilot. For instance, using web-based media, rather than job fairs, would provide a much wider reach to potential student pilots.

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[111] http://www5.hrsdc.gc.ca/noc/english/noc/2006/AboutNOC.aspx

According to survey findings, the main reasons that students drop out of training relate to finances and job opportunities. For most would-be pilots, the cost of completing commercial pilot training and getting a commercial pilot licence is prohibitive. According to our research, such training can cost upwards of $70,000. Compounding this is the fact that there is little funding or government assistance available to students enrolled in pilot training, beyond the funding for classroom courses. The high cost of training to be a pilot or instructor is associated with the cost of the required flying time rather than classroom hours. Increased recognition by the regulator of simulator time will assist in reducing some of the costs associated with actual flying time, while providing an enriched learning experience.

Training

Flight training units and operators need to work together to ensure pilots graduating from flight schools are well equipped with the appropriate skills, knowledge and attitudes to be an effective pilot — whether as the co-pilot of a transport plane, or as the pilot of an air taxi, float plane or helicopter.

Developing national training standards was supported by operators and FTUs, with both reporting willingness to help develop these standards. Though still in development, and not yet fully adopted in Canada, the MPL will require FTUs and operators to work together, in conjunction with the regulator, to identify the core training outcomes and competencies required of potential MPL graduates. The MPL is a competency-based approach to training, which is gaining in popularity among FTUs as an effective way to teach, rather than using a standard based exclusively on the number of hours flown. Scenario-based training is an example of a competency-based approach that has been used by operators for some time, but is still relatively new among FTUs. This is because Transport Canada still uses the hours-flown approach as the basis for granting licences and ratings.

One of the key steps involved in moving from an hours-based approach to a competency-based approach is establishing qualification standards for becoming an Approved Training Organization (ATO), in addition to identifying and allowing FTUs to use alternative means of compliance when becoming an ATO.

There is a recent trend among industry members to push for increased use of FTDs and simulators, and for more recognition by Transport Canada of th hours spent training in such devices. The issue of increased recognition of FTD hours in obtaining a commercial pilot licence is of great interest. Seneca College has received funding from NSERC to conduct research focused on justifying the increased use of FTDs and simulators in flight training.

One aspect for consideration related to the increased use of FTD and simulators is to harmonize and standardize the classification of such devices. It must be recognized that these units have undergone significant technological improvements, and are now highly sophisticated devices capable of recreating a number of real-life situations that pilots might not otherwise be able to experience or train for safely.

CHAPTER 13: RECOMMENDATIONS

Recommendations based on the research completed for this study (*2010 Human Resource Study of the Commercial Pilot in Canada*) are listed below.

1) ***Research from this study underscores the continued need for an aviation national working body comprising industry stakeholders, including operators, training organizations, industry associations, and the regulator. One option would be to house this working body within the sector council (CAMC).***

Discussion:
This recommendation was also made in both the 2001 and 2003 reports. A national body continues to be seen as necessary. This body would work on other topics related to commercial pilots in Canada arising from findings of this report. The recurrence of this recommendation indicates that industry continues to believe that such a group would be advantageous to the industry at large.

Standing committees and/or working groups of the sector council should be established as required. The proposed agenda activities set out below, are drawn from the findings in this report:

➢ Guide the development of national occupational standards
➢ Identify specific employer skill set requirements for each job type
➢ Oversee the establishment and dissemination of enriched national training standards so that trainers can match their training programs with employer skill set requirements
➢ Collect and disseminate training best practices
➢ Develop strategies for more access to private-sector and other student-loan funding
➢ Provide a repository for train-the-trainer resources
➢ Work to create structural relationships between employers and flight schools to ensure that graduates have well laid out career paths
➢ Work to promote the aviation career to prospective new pilots and youth

2) ***Enriched national training standards, exceeding regulatory guidelines, should be established. Required guidelines include those relevant to the specific flying environments, and tasks and skills for the different commercial pilot jobs.***

Discussion:
More than 80% of operators expressed a need for more comprehensive training standards. These enriched standards need to reflect the very different environments in which pilots fly, as well as the different skill sets needed for instructors (versus pilots), and fixed-wing versus helicopter pilots.

Because the guidelines recommended are separate from and, in fact, exceed regulatory requirements, Transport Canada can assume a consultative role in the development, but will not need to regulate them. Instead, the largest group of operators believed that

development of training standards should be led by a joint committee of industry, operators, training organizations, and industry associations, with input from the regulator.

The enriched training standard may lead to an accreditation system in which FTUs that provide enhanced curricula would be recognized in the industry as meeting an industry-set standard. This would help students decide which programs to take, and operators to choose which newly licenced pilots to hire.

The Canadian Aviation Maintenance Council (CAMC) has designed and established an accreditation system for other aviation and aerospace training programs, to help them conform to the requirements established in the occupation's National Training Standard (Instructor Guide/Curriculum). Standards for the professional pilots would be developed in consultation with industry stakeholders (employers, employees and educators). This would prompt industry to raise the standards of the training provided.

3)   *Develop train-the-trainer resources and best practices information available to the training industry at minimal cost.*

Discussion:
Currently flight instructor refresher workshops are the only flight training focused on professional development for flight instructors. However, these workshops are limited in space and available only to instructors needing to renew a rating.

Furthermore, the training community indicated that it lacks both the training resources and the financial ability to develop such resources. Therefore, this report suggests that innovative ways to communicate best practices inexpensively should be developed.

4)   *Increased SMS training should be incorporated into curricula in order to provide commercial operators with applicants trained in SMS.*

Discussion:
The current study identified that less than one-half of FTUs surveyed (48%) either teach or are planning to teach SMS. Currently, SMS training is not a requirement for FTUs. Given that SMS is a requirement today for 705 commercial operations and will likely be required in the future for all other commercial operations (except 406), it is desirable that pilots learn the concepts and culture of a Safety Management System during pilot training. Pilots will then be able to carry the culture into their workplaces when they graduate. This will assist operators by helping them integrate the culture changes required by SMS.

5)   ***Explore and share innovative private-sector financial support options for pilot training. This objective should form part of the agenda of the national working group/sector council.***

Discussion:
Becoming a commercial pilot can cost upwards of $70,000. According to Flight Training Units, lack of funding is the most frequently cited reason that students discontinue training.

At present, there are restrictions on students' ability to obtain government student loans or tax deductions for pilot training. Income tax deduction of training costs is limited to course requirements, and typically results in students being able to claim only slightly more than one-half of the cost of the aircraft training portion of the private and commercial licences.

Further, there are challenges associated with obtaining funding for students pursuing aviation as a career There are a few examples of flight schools offering flexible payment plans for students, or student financing through the school itself. One such example is Grondair in Quebec. Grondair will provide financing of up to $40,000 for students who are enrolled full-time and who are Canadian citizens or landed immigrants. During the course of training, recipients pay only the interest on the loan. Upon completion of the program, repayment can be made over a period of five years, with the first payment due six months after the completion of the program. [112]

The industry as a whole, however, needs to examine the availability of financing available to students undertaking flight training.

6)   ***Develop national occupational standards for the various "specialties" within the occupation of commercial pilot, including flight instructor.***

Discussion:
National Occupational Standards should be developed as a further means of recognizing and establishing the essence of the profession of pilot. There are several reasons that occupational standards are of benefit, not only to the pilots themselves but also to employers and industry as a whole.

1)   They would form the basis for developing national training guidelines. The standards should be updated periodically as advancements and changes are made to technology and training.

2)   Occupational standards would help training organizations prepare student pilots for the specialties within the commercial pilot job market . The results from interviews with training institutions reveal that very few guidance counsellors actually have information about the pilot career.

3)   Establishing occupational standards that can be easily referenced by training organizations would be helpful in informing students of the necessary skills for the job, and attitudes required to be successful.

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[112] Grondair, http://www.grondair.qc.ca/financemeng.htm

Occupational standards for instructors are equally important. At present flight instructors are included in the National Occupational Classification 2271, which includes pilots and flight engineers. However, the job of an instructor is much different from that of a pilot; and, while the basic skill set required might be similar, there are different areas of experience and expertise that an instructor must possess. Furthermore, establishing occupational standards for instructors would help in identifying instructors as an occupation unto itself, rather than the current assumption that instructors are simply "getting their hours" to become full-time pilots. Recognizing instructors as a profession could increase the quality of training.

The task analysis of flight instructing involved in creating a National Occupation Standard will also assist the Seneca NSERC Research project to produce valuable guidelines for teaching effectively in FTDs. (See Recommendation 9.)

7) ***Invest in follow-up efforts to determine the number of active flight instructors.***

Discussion:
The current study used an innovative method to estimate the supply and demand for commercial pilots in Canada. Both Statistics Canada and Transport Canada data were used to estimate the number of helicopter and fixed-wing pilots in Canada. However, a lack of data made it difficult to estimate the number of flight instructors in Canada. The ability to quantify the number of instructors is key, given the importance of this profession to the aviation industry in providing the next generation of pilots. This "quantification" could be completed using a short follow-up to the current study:

8) ***Explore mechanisms such as increased use of simulators as a substitute for air time; implement an accreditation system and mentoring program.***

Discussion:
Although research suggests that there are, in theory, enough helicopter pilots being trained to fill the demand, these newly trained pilots do not have an adequate number of flying hours to meet the minimum requirements set out by most companies. Helicopter pilots with more than 500 or 600 hours cannot find jobs, and operators cannot find pilots with sufficient hours to fly their aircraft.

The introduction of a formal mentoring program was recommended by most helicopter FTUs, which cited a need for such a program for recent graduates.

9) ***When setting the agenda for work on National Occupational Standards, make the identification and analysis of the tasks involved in flight instruction a priority. Completion of this work would allow the Seneca NSERC Research Project to initiate research on teaching efficiently in FTDs.***

Discussion:
Seneca NSERC research is currently focused on identifying the best ways to use FTDs for *ab initio* training. In the near future, researchers hope to identify ways for flight

instructors to use FTDs even more effectively. A completed analysis of instructing tasks would provide the background work for the research team to initiate research on effective FTD teaching techniques.

10) *Identify the pros and cons for an individual FTU to become an Approved Training Organization (ATO).*

At present, the licensing standard is primarily based on hours flown rather than on competency, and standards differ from one country to the next. However, Transport Canada is in the midst of introducing competency-based approaches to the training of pilots. To this end, Transport Canada is introducing a new competency-based regulatory framework for training organizations to become Approved Training Organizations. ATOs will have regulatory permission to substitute competency-based training standards for hours-based training standards.

In 2009, the ATAC Flight Training Committee heard a presentation from Moncton Flight College (MFC) on the steps required to become an ATO. The presentation indicated that the workload was heavy, requiring full-time staff resources over a number of months. However, informal comments from Transport Canada suggest that the scale of work may vary from one FTU to another, and may be lighter than what was experienced at MFC.

Given that work on the regulatory framework for ATOs is under way, the time is right for the flight training industry to become informed about the pros and cons of adopting this new regulatory framework and the adaptations to business models it would require.

11) *Create structural relationships between flight schools and employers*

Discussion:
Structural relationships can be built in different ways, as demonstrated by the three suggestions below:

1. Create a program modeled on the MPL to serve regional airlines. Regional airlines could partner with flight schools to build an appropriate training program for their operating environment. The program should have the current required hours standard built into itbut could be enriched and targeted to meet the needs of operators.

2. Create an advanced training certificate program recognized by industry, demonstrating that certificate holders are competent in the generic enriched training needs common to all, or most, two-crew commercial operators (SOPs, CRM, etc.).

3. Create a series of modules in partnership with employers that would be specialized, advanced training, for students pursuing the various "specialties" of the commercial pilot occupation. Bush pilot (float) training is an example of this kind of specialized module, as is flight instructing. Some other suggested modules include:
    ➢ Training to work in a small charter operation flying in controlled airspace
    ➢ Training to work in a small charter operation flying in uncontrolled airspace
    ➢ Training to work in an air taxi operation flying in controlled airspace
    ➢ Training to work in an air taxi operation flying in uncontrolled airspace

➢ Turbine ground school
➢ Jet transition training — it is offered now in some places but should be routinely available across the country
➢ Heli-Seismic Operations
➢ Mining, Oil and Gas, and Utility Operations

The recommendations presented above are intended to provide guidance for meeting the current and future needs of both the flight training community and the operator community. They are meant to present a way forward in the context of growing demand for pilots (domestically and globally), shifting needs and priorities among operators (in terms of skills, knowledge and attitudes required of pilots), emerging technologies (such as more sophisticated FTDs), and changes in regulatory and licencing approaches (such as the advent of ATO, the MPL, and the move toward more competency-based training).

Appendix A: List of Participants

<div style="background-color:#8B0000; color:white; font-weight:bold; padding:4px;">Focus Group Participants</div>

Air Canada, Mike Rados; Air Canada Pilots Association, Murtaza Mohamedbhai; Air Canada Pilots Association, Captain Barry F. Wiszniowski; Air Georgian , Dan Bockner; Air Inuit (Training Coordinator), Dave Minty; Air Line Pilots Association, International, Air Canada Jazz MEC Training Committee, Eric Fraenkel-Gaffré; Air Richelieu, Thierry Dugrippe; Air Transport Association of Canada , Wayne Gouveia; Alta Flights (Charters) Inc., Bob Lamoureux; Aviation Advantage, Robert Seaman; Beyond Risk Mangement, Elaine Parker; British Columbia Helicopters, Sancho Gelb; British Columbia Institute of Technology, Cheryl Cahill; Calm Air International, Craig Hoffman; Calm Air International, Ryan Mitchell; CAMC, Glenn Priestley; Canadian North Airlines, Chris Drossos; Cargair Ltée/Max Aviation Inc., Richard Laporte; Conair Group Inc., Ray Horton; CQFA, Jacques Monast; Fast Air Executive Services, Dennis Lyons; First Nations Transportation, Robert Dearden; First Nations Transportation, Allan Gawryluk; FlightPath International , Jonathan Kordich; Glacier Air, Francois Leh & Colette Morin; Harv's Air , Adam Penner; Helijet International Inc., Chris Todd; Highland Helicopters Inc., Terri Jonesand and Ken Birss; Independent , Jason Ford; Jamieson Collins, Execaire; Jazz Air, Murray Munro; Jazz Air LP, Mike Lohmann; KD Air Corporation, Lars Banke; Keewatin Air, Bill Strom; Kelowna Flightcraft, Mike Coulthard; Keystone Air Services, Ed Ratzlaff; Laurentide Aviation, Terry McConnon; Manitoba Aviation Council, Judy Saxby; Mitchinson Air Services & Saskatchewan Aviation Council, Janet Keim; Mount Royal College Aviation, Deanna Wiebe; Mount Royal College Aviation, Mark Benson; Nolinor Aviation, Reinaldo Caceres; Pacific Flying Club, Patricia Kennedy' Partner Jet , Ted Tofflemire; Perimeter Airlines, Trevor Ryder; Porter Airlines, Debra Newman; Prism Helicopters , Dan Wiebe; Pro IFR, Mark Stierli; Resource Helicopters, Robert Munro; Seneca College, Dominic Totino; Sky Wings Aviation Academy, Dennis Cooper; Southern Skies Aviation, Mark Holmes; Sunwest Aviation Ltd., Kim Mowat; Sunwest Aviation Ltd., David Griffiths; Sunwing Airlines, Ron Henry; Sunwing Airlines, Slawco Borys; Super T Aviation, Teri Super; Training Coordinator, Bill Zuk; Waterloo Flying Club , Bob Conners; Waterloo Flying Club , Matthew Shaken; WestJet, Paul Ysselmuiden' WestJet Airlines, Katie Childerhouse; Wetaskiwin Air Services Ltd, Ron Vanden Dungen; and Winnipeg Aviation, Dan Reeves.

<div style="background-color:#8B0000; color:white; font-weight:bold; padding:4px;">Interviewees</div>

Airco, Ed Schlemko; Airline Pilots Association, Nick Ci Cintio; ALSIM, Jean-Paul Monnin; Alteon Flight Training, Paul Woessner Jr.; Brampton Flight Centre, Jon Isaac; CAE Global Academy, Jon Adams; Canadian Education and Research Institute for Counselling, Carole Macfarlane; Cargo Jet, George Sugar; Civil Aviation Training Magazine, Chris Lehman; COPA, Kevin Psutka; DND, Marie E. Norris; First Air, Mark Gallant; GrondAir, M. Gaston Grondin; Harvsair, Adam Penner; Hélibellule Inc, Valérie Delorme; Helicopter Association of Canada, Fred L. Jones; Kenn Borek Air, Rod Stuart; Moncton Flight College Inc., Mike Doiron; National Helicopters, Dan Munro; Orca Airways, Caroline Kolasa; Pacific Flying Club, Patricia Kennedy; Porter Air, James Morrison; Professional Aviation Board of Certification, Peter Wolfe; Selkirk Remote Sensing, James Nienaber; Seneca College, Dominic Totino; Seneca College, Gary Anderson; Southern Skies Aviation Ltd., Mark Holmes; Sunwest Aviation, Simon Hurek; Transport Canada, Jacqueline Booth; and Transport Canada, Jim Dow.

Survey Respondent Organizations

Flight Training Units

Academie de L'Aviation de Mascouches Inc., Aero Academy Inc., Aero Plus La Baie, Algonquin College, Institute of Aviation Studies, Aviation D.M. Inc., Battleford's Airspray, Border City Aviation Ltd., Brandon Flying Club, British Columbia Helicopters Ltd., Candian Fligth Academy Inc., Capital Airways Inc., Chapman Aviation Ltd., Coastal Pacific Aviation Ltd., Confederation College of Applied Arts & Technology, Cooking Lake Aviation Academy Inc., CPAQ Aero, Decouvairte Aviation Inc., E & B Helicopters, Eid Air Aviation Inc., Excel Flight Training Incorporated, E-Z Air Helicopter Training, Ferrari Flight Training, First Nations Technical Institute, Future Air, Grand Falls Aviation Services Ltd., Great Lakes Helicopter Corp., Huron Flight Centre Inc., Langley Flying School Inc., Laurentide Aviation, LR Helicopters Inc., Maylan Flight Academy, McMurray Aviation, Millennium Aviation Ltd., Mitchinson Flying Services Limited, Morgan Air Services Co. Ltd., Mount Royal College, Mount Royal College, Mountain View Helicopters, National Helicopters Inc., Orizon Aviation Quebec Inc., Ottawa Flying Club, Pacific Flying Club, Pacific Sky Aviation Inc., Pilot Ventures Ltd., Premier Helicopter Training Centre Ltd., Quebec Helicopteres Inc., Rockcliffe Flying Club, Rotorworks Inc., Saskatchewan Institute of Applied Science and Technology, Sea Land Air Management Ltd., Selkirk College Professional Aviation, Seneca College of Applied Arts and Technology, Sky Wings Aviation, Southern Interior Flight Centre, Springbank Air Training College Ltd., Super T Aviation Academy, The Ottawa Flying Club, The Prairie Bible Institute, Toronto Airways Ltd., Victoria Flying Club, VIH Helicopters Ltd., Wetaskiwin Air Services Ltd., Windsor Flying Club Inc., Zimmer Air Services Ltd.

Helicopter Operators

2146075 Ontario Limited, Aberdeen Helicopters Ltd., Advantage Helicopters Inc., Ahlstrom Air Ltd., Airspan Helicopters Ltd., Arduini Helicopters Ltd., Arrow Helicopters Inc. , Aviation Peak Inc., Bailey Helicopters Ltd., Bi-Air Application Services Ltd., Black Hawk Helicopters Inc., British Columbia Helicopters Ltd., Bruce Peninsula Helicopters Ltd., Buchanan & Son Aviation Ltd., Caledon Helicopters Limited, Capital Helicopters Inc., Central Helicopters Inc., Dam Helicopters Inc., Discover Helicopters Ltd., Eclipse Helicopters Ltd., Far West Helicopters Ltd., G.D.G. Aviation Inc., Great Slave Helicopters Ltd., Guardian Helicopters Inc., Heli Dynamics Ltd., Heli-Boreal Inc., Helico Service Inc., Hélicoptères Piékouagami Inc., Heli-Excel Inc., Helifor Industries Limited, Heli-Horizon Inc., Heli-Inter Inc., Helijet International Inc., Heliops Alberta Ltd., Helipsair Inc., Highland Helicopters Ltd., Horizon Helicopters Ltd., Hunter Helicopters Inc., J.B. Air Inc., Kananaskis Mountain Helicopters Ltd., KAP Central Helicopters Ltd., Koptair, L R Helicopters Inc., London Air Services Limited, Marlin Helicopters Inc., National Helicopters Inc., Northern Air Support Ltd., Nunavik Rotors Inc., Pacific Air Crane Ltd., Pacific Rim Helicopters Ltd., Pacific Western Helicopters Ltd., Peak Helicopters Ltd., Peregrine Helicopters, Pine Tree Helicopters Ltd., Prism Helicopters Ltd., Province of Ontario, Ministry of Natural Resources, Quebec Helicopteres Inc., Sander Geophysics Ltd., Selkirk Mountain Helicopters Ltd., Sequoia Helicopters Ltd., Sierra Helicopters Ltd., Silver Helicopters Ltd., Slave Lake Helicopters Ltd., Stars Aviation Canada Inc., Taiga Air Services Ltd., Thunderbird Helilog Ltd., Transwest Air, Universal Helicopters Newfoundland, Wisk-Air Limited, Zimmer Air Services.

Fixed-Wing Operators
1396832 Alberta Ltd., 578471 B.C. LTD., A-1 Custom Applicators Ltd., Aberson Flying Services, AC Jazz, Airline Pilots Association Int'l, Accurage Air Ltd., Aero Plus La Baie, Agate Enterprises Ltd., Air Canada, Air Canada, Air Canada Pilots Association, Air Inuit Ltd., Air Ivanhose Limited, Air Optima, Air Spray Ltd., Airco Aircraft Charters Ltd., Alberta Citylink, Algonquin Airline Inc., All Precision AG Services, Alta Flights (Charters) Inc. , Amber Airways Inc., Amik Aviation Ltd., Anderson Air Ltd., Anderson Aviation Ltd., Ara Lake Campe Limited, Atlantic Charters, Avcom, Aviation 2000 Inc., Aviation Commercial Aviation, Aviation Mauricie, B.C. Yukon Air Services Ltd., Babin Air Ltd., Battleford's Airspray , Bearskin Lake Air Services Ltd., Bella Coola Air Ltd., Beyond Risk Management Ltd. , Blackbird Aviation Limited, Bombardier Inc., Bonnyville Air Services Ltd., Border City Aviation Ltd. , C. Morin Aviation ((BC) Inc., Camrose Flight Center , Canadian Institute of Aviation Technology, Canadian North , Can-Ag Airways Ltd., Cargojet Airways Ltd., Cariboo Air Ltd., Centraero Aviation Ltd., Central Ag-Air Limited, Clarenville Aviation Limited, Classic Aircraft Co. Ltd., Clearwater Airways, Clearwater Aviation Service, Cloud 9 Airspray Ltd., Cochrane Air Services, Court Air Services, Courtesy Air, CPAQ.AÉRO , Cranberry Air, Creeway Aviation, Crown Jewel Aviation Inc., D.B. Air , Dale Kane Aerial Ltd., Davidson Aero-Spray Ltd., Dax Air Enterprises Ltd., Decair, Decouvairte Aviation Inc., Delco Aviation Ltee, DND - 2 Canadian Division , Douglas Air, Down to Earth Enterprises Ltd., Dymond Lake Air Services, E.J. Aviation Ltd., Early Bird Air Ltd., Eastern Air Services Incorporated , Ecole de Parachutisme Horizon Inc., Ecole de Parachutisme Voltige Inc., Elmhirst Vacation Air Ltd., Enerjet, Expressair, Farm Air Services, Fast Air Ltd., FD Air Ltd., Ferrari Flight Training , Flanagan Enterprises Inc., Fly on AG Services, Fly'n Ads, Forde Lake Air Services Ltd., Fox Aviation, Fugro Aviation Canada Limited, G-Air Services, Gananoque Sport Parachuting Centre, Geffair Canada Inc, Geodesy Remote Sensing Ltd., Georgian Bay Airways Ltd., Goldak Airborne Surveys, Gouvernment du Quebec, Grand Bend Sport Parachuting Centre, Grass River Lodge Ltd., Great Circle Airways, Great River Aviation Ltd., Harbour Air Ltd., Harv's Air Service Ltd., Hawkair Aviation Services Ltd., Hoarfrost River Huskies Ltd., Horne Air Ltd., Hughes Air Corp., Huron Air and Outfitters Incorporated, Hydravion Aventure, I.D. Air Corporation, Ignace Airways Ltd., Infinity Flight Services Ltd. , Integra Ops Ltd., Island Coastal Aviation, J & J Air Ltd. , Jackson Air Services Ltd., Jazz Air , Jazz Air , Jetpro Consultants Ltd., Jim's Flying Service Limited, Jon Sarver, Jonair Ltd., K.B.W Aviation Ltd., Kabeelo Airways Ltd., Kasba Air Service, Kechika Valley Air Ltd., Kelowna Flightcraft Air Charter Ltd., Kevin Hruska, Keystone Air Service Ltd., Konopelky Air Service, Labrador-Grenfell Regional Health Authority , Lac Lacroix Quetico Air Services Limited, Lac Seul Airways Ltd., Lake Central Airways Ltd., Lakes District Air Services Ltd., Landa Aviation, Lauzon Aviation Co. Limited, Ledair Inc., Liard Inc., M H A Enterprises Ltd., MacKenzie Mountain Aviation Corp., Maritime Air Charter Limited, McGavock Lake Air Service Inc., Melaire Ltd., Mitchinson Flying Services Limited, Morningstar Air Express Inc. , Morningstar Partners Ltd. , N.A. Holdings Ltd., NAV Canada, Nechako Aviation Ltd., Nolinor Aviation, Nor-Alta Aviation Leasing Inc., North Country Air Service Inc., North of Sixty Flying Services Inc., North Pacific Seaplanes Ltd., North West Geomatics Ltd., Northwest Flying Inc., Northwestern Air Lease Ltd., Oopik Aviation Inc., Optimair Ltd. , ORCA Airways Ltd., Osnaburgh Airways Limited, Osprey Wings Ltd., Owen Sound Flight Services Inc., Parachutisme Adrenaline Inc., Partner Jet Inc., Pascan Aviation Inc., Pat Bay Air Ltd., Pavillon du lac Berthelot Inc., Pelican Narrows Aire Services Ltd., Pembina Air 1999 Ltd. , Perimeter Aviation Ltd., Phoenix Air Spray Ltd., Plumridge Air, Prairie Aerial Applicators Ltd., President Air Charter, Presidio Aerial Inc., Priebe Air Ltd.,

Principal Air Ltd., Publicity Aero-Gramme Inc., Ram Head Outfitters Ltd., Red Sucker Lake Air Services Ltd., Reliance Airways Ltd. , Reynolds Outfitting Ltd., Ross Air Service, Rusty Myers Flying Service Limited, Sabourin Lake Lodge Limited, Salt Spring Island Air Ltd., Saltwater West Enterprises Ltd., Saskatchewan Air Ambulance, Scott Airsprays Ltd., Seair Seaplanes Ltd., Selkirk Air, Shoel Lake Aviation Ltd., Simpson Air Limited, Sky Dive Air Power Inc., Sky Tractor Ltd., Skydive Toronto Inc., Snake Falls Camp and Airways, South Nahanni Airways, Southern Skies Aviation Ltd., Southwestern Ontario Organization of Parachutists, Stanton Air Charters, Stone Mountain Safaris Ltd., Sunwest Aviation , Sunwest Aviation , Sunwing Airlines Inc., Ten-ee-ah Aviation, Terraquest Ltd., Thompson Agriculture Aviation Ltd., Thunder Airlines Limited, Timber Wolf Air, Top Aces Inc., Tsayta Aviation Ltd., Tudhope Airways Ltd., Verbisky Enterprises Ltd., Villers Air Services Ltd., Virden Aviation, W.D. McIntosh Land Surveying Ltd., Wayne's Aviation Salvage & Parts, Welland Aeor Center, West Central Air Ltd., West Coast Air Ltd., West Jet , West Wind Aviation Limited Partnership, Westcoast Wild Adventures Ltd., Western AG-Air Ltd., Westman Aerial Spraying Ltd., White River Air, Windsor Flying Club Inc. , Wolverine Air Ltd.

Appendix B: Interview and Focus Group Guides

Interview Guide — Commercial Pilots

SECTION A: COMMERCIAL PILOTS

Interview Topics

The reality of commercial pilot jobs
Definition of a commercial pilot
Clear descriptions of the various types (subsets) of commercial pilot jobs
Work environment and pay scales for each type

A1.   Please describe for me the characteristics of your current work environment in terms of the following features:

a)   Rewards of the job, including wages and benefits as well as less financial benefits
b)   Effect of schedule whether 10 days a month, daily, seasonal
c)   Nutrition available while working,
d)   Financial pressures
e)   Type of airspace (e.g., flown in controlled, uncontrolled, high level, low level)
f)   Security and border crossings
g)   Extent of workload given number of take offs and landings, and assistance from cockpit
h)   Constant on call in some jobs
i)   Ability to fly low level and carry out other jobs such as map reading, traffic broadcasting
j)   Effect of unionized or un-unionized environment
k)   Working in a large company vs. small and medium companies
l)   Respondent's overall assessment of work environment

A2.   What are desirable personal characteristics for a pilot?

If not mentioned, prompt:

Decision making skills

Problem solving

Attitude

Team player

Conscientious

Organized

Able to deal with public

Level of management and supervisory skill necessary

Ability and skills to function independently (corporate flight department and night cargo for example)

Deal with public

Deal with high-powered demanding customers

Deal with many different types and age groups of learners

Ability to stay at arms length from operators (Transport Canada), etc.

Interview Guide — Guidance Counsellors and Flight Training Career Advisement Representatives

A1.   What is your role with your organization?

A2.   Do you think most guidance counsellors and students are familiar with aviation as a potential career opportunity? What is the perception of the profession of an airline pilot?

A3.   Overall, how would you say that the profession of an airline pilot compares to other professions requiring a similar level of training in the following areas:

	Pilot profession is <u>better than</u> other careers	Pilot profession is <u>worse than</u> other careers	Pilot profession is <u>the same as</u> other careers	Don't know / No opinion
a) Prestige	❍	❍	❍	❍
b) Pay and Benefits	❍	❍	❍	❍
c) Job security	❍	❍	❍	❍
d) Overall working conditions	❍	❍	❍	❍

A4. In your opinion, what knowledge, skills and attitudes does an ideal pilot possess?

A5. In your opinion, how does the average person define the career of a commercial pilot?

A6. What do you know about the different types of pilot jobs (such as airline pilots, charter pilots, bush pilots, helicopter pilots, etc.)?

A7. What could be done to better promote the career of a commercial pilot?

SECTION B: CAREER COUNSELLOR AT A FLIGHT TRAINING UNIT

B1. In your opinion, how available is career counselling information about pilots in the aviation industry (to students of a flight training unit)?

B2. What do you think employers expect of pilots in the following areas:

a) education level

b) psychological characteristics

c) personal characteristics

b) psycho-motor skills

B3. Does your training organization use any of the following standardized or formal student selection procedures? Does your organization check for:

○ Education level

○ Assessment of the financial ability of the student to pay for training

○ Aptitude test to assess suitability for a pilot career

○ Commercially available pilot selection tool

○ Language proficiency

○ References

○ Security screening

   Other (please specify)

B4. Are there any screening requirements that should be added or removed from flight training unit requirements?

○   Yes   ○   No

If yes, please specify:

B5. To your knowledge, do employers use any of the following screening or selection criteria (either directly or indirectly through a partner or service provider) for new pilots?

	SCREENING
○	Clean security check / no criminal convictions
○	English language proficiency
○	Minimum Formal Education
○	Other (please specify: _____)
	SELECTION
○	Psychological testing
○	Sim checks (simulator)
○	Commercially available selection tool (personality test)
○	**Other** (please specify: _____)

B6. What student financial assistance is available to pilot students?

B7. To what extent are costs to become a trained commercial pilot comparable between different flight training units? What accounts for any differences in costs between programs? What challenges do students face in comparing programs to decide which program they wish to take?

B8. What might be the reasons that students choose to take an Integrated versus an in-house professional pilot program, versus a modular program (where a student might take one course at a time)?

B9. To what extent are the following types of first jobs available for new pilots:
   a)   Commercial multi IFR graduate
   b)   Float plane instructor graduate
   c)   Float rating graduate
   d)   Commercial VFR only graduate

B10. How available is the following career information material (resource materials about the career)?
   a)   Availability of literature and pamphlets at flight schools
   b)   Industry-wide sources of counselling and information
   c)   Availability of information on central web sites such as ATAC's (Air Transport Association of Canada)
   d)   Availability to guidance counsellors to students

**Focus Group Guide — Air Transport Operators / Flight Training Units (FTUs)
Moderator Guide**

INTRODUCTION
> ➢ Introductions

MODERATOR GUIDE

1. Have you been experiencing any difficulty in obtaining pilots with the skill set, attitude and experience needed by your organization? If so, would you say it has become more difficult in recent years? Do you expect it to become more or less difficult in the future?

2. FLIGHT TRAINING OPERATOR-ORIENTED: What factors do you think cause individuals to decide to take up training as a commercial pilot?

3. Overall, do you feel the number and/or the quality of candidates considering a career in flying has: a) been falling off; b) remained rather constant over the years; c) has been showing an increase?

4. Can you offer any suggestions or recommendations that might alleviate some of the problem?

5. Do you expect the number of pilots needed by your organization will remain more or less the same, increase or decrease in the next 12 months? In the next 5 years? If changes are indicated, probe the severity and the causes.

6. Beyond your organization... From your perspective, do you anticipate that the demand for pilots in Canada will change significantly in the years ahead? In which direction? To what extent?

7. Given all of the changes taking place in your industry including a) expanding markets in India, China, the Middle East and South America; b) the industry's financial difficulties these days, closures consolidations; c) projections for long range growth, do you anticipate that the demand for pilots world-wide will increase marginally? Will skyrocket?

8. What level of interest is there in FTUs adopting national agreed-upon standards for their professional programs? Interest in having some kind of seal of approval from the aviation industry apart from certification by TC and any provincial ones such as Private Career Colleges?

9. What topics affecting your operations would you like to see this study focus on? What kind of information, insight or recommendation would you like to see come from this study? What would be most helpful to you and your organization?"