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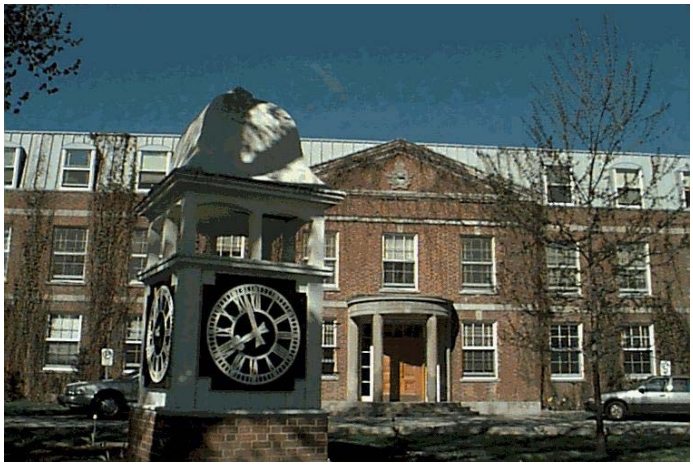

MANAGING THE PILOT OCCUPATION: A WICKED PROBLEM?

LCol D.K. Turenne

JCSP 41

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By LCol D.K. Turenne

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Abstract

The RCAF pilot occupation has some unique characteristics that differentiate it from other occupations. These characteristics have contributed to many of the challenges experienced over the past 25 years with managing the pilot occupation. Despite continuous efforts to address occupational structure and career management issues the pilot occupation has experienced persistent manning shortfalls. This study examines the nature of the problems plaguing the pilot officer occupation to determine whether a re-framing of the problem type as a wicked problem is appropriate and brings a new approach to resolving the issues of the occupation.

This study examines the history and scope of the problems of the pilot occupation using a theoretical approach to military human resources management that takes into account the unique constraints associated with sustaining the manning levels of the pilot occupation. In doing so, it addresses the organizational and individual aspects of managing pilot careers and how they flow in, through and out of the Royal Canadian Air Force.

Finally, this study concludes with a characterization of the problems associated with managing the pilot occupation and proposes an approach that will be bring new perspectives and new methods of resolving long standing issues.

INTRODUCTION

In 1971 Retired Colonel William Stewart described the seemingly contradictory objectives that air forces have been facing for decades:

> One is the need to conserve money in the training of pilots which suggest the desirability of retaining pilots in the Service in the cockpit. The other is the need to take into the officer corps a sufficiently large group of pilots to provide a suitable base for the selection, over time and through the promotion system, of experienced and talented leaders. The latter consideration suggests the desirability of a liberal production of pilot trainees, since selectivity exercised on a large entering population would presumably enhance the quality of those retained.[1]

The nature of the pilot occupation generates a requirement for constant recruitment and training of new pilots to ensure the occupation remains manned to the desired level, with an appropriate mix of experience and opportunities to progress to the most senior rank levels. The long duration and high cost of pilot training creates a systemic capacity limitation to training the right numbers of experienced pilots for the Air Force. The limitations of this system must be understood by those who develop and implement the career management functions as they are inextricably linked.[2]

In the Royal Canadian Air Force (RCAF), aircrew[3] comprises 25% of air force personnel.[4] With a regular force Preferred Manning Level (PML) of 1639, and an

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[1] William Stewart, *Pilot Management Policy and Pilot Training Rates,* (Santa Monica: RAND, 1971), 2-3.

[2] William Taylor et al., *Absorbing Air Force Fighter Pilots: Parameters, Problems and Policy Options* (Santa Monica, RAND, 2002), 26.

[3] The officer aircrew occupations includes pilots, air combat systems officer, and aerospace controllers.

additional 189 reserve force pilot positions filled,[5] the pilot occupation is the largest officer occupation and second largest occupation overall in the RCAF. This creates a need for continuous recruitment and production to meet the demands of attrition but also accommodate rank progression.

The production system has an explicit albeit complex goal:

> … to ensure that the trained effective strength (TES) of each military occupation is equal to its assigned PML. The process involves a deliberate determination, by occupation, of the number of new individuals who must be sought, selected and trained, considering such variables as the expected attrition rates, the current and forecast ability to train and absorb, as well as the long range impact to the overall profile of the occupations with a view to remaining as close as possible to the stable profile by year-of-service.[6]

Despite trying to achieve this aim, the pilot occupation has been persistently undermanned for the better part of the past two decades. This issue has been characterized as a "long-standing problem without an apparent solution."[7] The trained effective strength (TES) of the pilot occupation has been manned at 200-250 personnel below the preferred manning level (PML), for much of the past two decades.[8] As of

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[4] Department of National Defence, *B-GA-407-001/FP-001 Air Force Personnel Doctrine* (n.p.: DND Canada, 2010), 2-4. RCAF aircrew is comprised of Non-Commissioned Members (NCM's) and Officers. The officer aircrew occupations includes pilots, air combat systems officer (ACSO), and aerospace controllers.

[5] Department of National Defence, , *Record of Discussion of the Annual Military Occupation Review (AMOR) Pilot MOSID 00183 05 December 2013* (Ottawa: D Air Pers Strat 5, 14 February 2014), F1-2

[6] Department of National Defence, *B-GA-407-001/FP-001 Air Force Personnel Doctrine* (Ottawa: DND Canada, 2010), 5-4.

[7] Chief Review Services, "Evaluation of Air Force Training and Readiness Part 1 – Air Force Initial Occupational Training", November 2012, accessed 14 Feb 2015, http://www.crs-csex.forces.gc.ca/reports-rapports/2012/187p0940-eng.aspx

December 2013 the pilot occupation was manned at 86.6% of its PML and is not forecast to recover to full PML until 2019.[9] The origins of the PML problems date back to the mid 1990's downsizing of the Canadian Forces. They have been exacerbated by periods of high attrition combined with "bottlenecks" in the training system that caused pilot production targets to be missed by 25% over a ten year period.[10] However, the problems with manning the occupation extend beyond the training system. Problems with general occupation management ranging from establishing and meeting recruiting targets, career management challenges and rising costs have contributed to the challenges associated with maintaining a healthy status in the pilot occupation.

The TES-PML measure is the primary metric of occupational health and has thus been a focal point for the real-time management of the pilot occupation. The only truly successful measure to close this gap has been by reducing the PML; likewise, increases to the PML have been a contributing source to the persistent manning shortfall. The persistence of this issues and inability to materially improve the situation leads to the research questions of this paper. This first question is: what is the history and scope of the problems afflicting the pilot occupation? Secondly, given the variety of issues, how do

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[8] The PML is defined as the total authorized strength for each occupation and rank level. Military members enter the TES once they reach the Occupational Functional Point (OFP) – the point at which they are considered a trained resource and can be posted to their first functional establishment positions. The following colour code indicates the status of an occupation if it has or is forecasted to have a variance between the Trained Effective Strength (TES) and the PML within the next two years: RED (CRITICAL) - More than 10% below PML; AMBER (CAUTION) - Between 5% and 10% below PML; and GREEN (OK) - None of the above characteristics. There was a brief period of from 2004-2006 when pilot manning levels were considered healthy. Otherwise it has been yellow (2003/04, and 2006) or red (1997-2003 and 2007-2015).

[9] DND, *Record of Discussion of the AMOR Pilot MOSID 00183 05 December 2013*,…F1.

[10] Chief Review Services, "Evaluation of Air Force Training and Readiness Part 1.

we classify this problem, and what does that tell us about solving it? The last question is: what are the theoretical approaches that apply to this problem? The theoretical approaches to this problem come from human resource management and the specific literature that has been dedicated to the challenges with managing air force pilot manning levels.

The study of pilot training and manning levels has been going on for decades and therefore there is an existing body of literature that deals with military aircrew manning issues. One category of research comes from national audits of Canadian, British, American and Australian military pilot training.[11] These audits have typically focused on evaluating the performance of their training systems and addressing problems associated with the costs of production and attrition. More formal research has been conducted by Research AN Development (RAND) Corporation for the United States military. In 1969 RAND conducted an extensive study of USAF pilot training flows and costing. In 1971 retired Colonel William Stewart investigated the link between pilot job rotation rates and the cost of pilot training.[12] In response to significant fighter pilot shortages in the United

[11] Australian National Audit Office. *Report no. 47: Developing Air Forces Combat Aircrew*. (Canberra, ACT: Government of Australia Department of Defence, 2004).;Ministry of Defence, "Training New Pilots*" Report by the Comptroller and Auditor General* (London: The Stationary Office, 2000);. United States General Accounting Office. "Military Personnel - Actions Needed to Better Define Pilot Requirements and Promote Retention," *Report to the Chairman and Ranking Minority Member, Subcommittee on Military Personnel, Committee on Armed Services, House of Representatives.* (Washington D.C.: U.S Government Printing Office, 1999),; Chief Review Services, *Evaluation of Air Force Training and Readiness Part 1 – Air Force Initial Occupational Training*, http://www.crs-csex.forces.gc.ca/reports-rapports/2012/187p0940-eng.aspx ed., Vol. 2015 (Ottawa, ON: Department of National Defence, 2012).

[12] Stewart, *Pilot Management Policy and Pilot Training Rates*

States Air Force William Taylor and James Bigelow began publishing a series of dynamic simulation modelling based research regarding the management of aircrew, to address problems with USAF pilot manning levels.[13] This principles and lessons brought forth in this work have been assimilated into USAF Air Force policy.[14] Broader research has also been conducted by Henry Thie and Margaret Harrell regarding officer career management and development structures which also pertains to jobs rotation and rank progression dynamics within the military which form a part of these issues.[15]

The literature on problems has generally classified problems into three or four basic problem types that are best represented on a spectrum.[16] These categories are often defined by whether or not the problem and its cause and consequences are known, whether the solution is known. Simple problems are well-defined with a bounded solution space that will produce a right answer.[17] They might be quite complex however, these problems lend themselves to analysis through traditional linear processes to produce clear, verifiable solutions. [18] In a complex problem "the problem is known but

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[13] Taylor et al., *Absorbing Air Force Fighter Pilots*; W. Taylor, J. Bigelow and J. Ausink, *Fighter Drawdown Dynamics: Effects on Aircrew Inventories* (Santa Monica, CA: Rand Corporation, 2009); W. Taylor, C. Moore and R. C. Roll, *The Air Force Pilot Shortage: A Crisis for Operational Units?* (Santa Monica, CA: RAND, 2000), 24.

[14] United States Air Force, *Air Force Instruction 11-412 Aircrew Management* (n.p.:Department of the Air Force, 2009), 5.

[15] Harry Thie and Roger Brown, *Future Career Management Systems for U.S. Military Officers* (Santa Monica: RAND ,1994).

[16] Ackoff used three categories: Messes, Problems and Puzzles. Perrow labelled his categories Type I through III. Mascarenhas used Simple Problems, Complex Problems, Pseudo-problems, and Wicked Problems.

[17] O. A. J. Mascarenhas, *Business Transformation Strategies: The Strategic Leader as Innovation Manager*Sage Publications, 2011)., 220.

[18] *Ibid.,220-221.*

the solution is not. Alternatively, there could be multiple solutions."[19] Frequently, complex problems involve multiple stakeholders that will need to agree upon a goal which may transform the problem into a simple problem and generate partial solutions.[20] Ill structured problems exist where "there is a lack of agreement on solutions and solution paths, as well as a high degree of uncertainty about answers to problems. These are problems for which the existing and desired states are unclear and the method of getting to the desired state is unknown."[21] These types of problems have also been labeled as messes, which Ackoff describes as "a system of problems" and states that "the solution can seldom be obtained independently solving each of the problems of which it is composed."[22]

The concept of wicked problems emerged in 1973 as "a new class of problems arising from extreme degrees of uncertainty, risk, and social complexity."[23] These are problems where "both the problem and the solutions are not known."[24] Wicked problems share the properties of ill-structured problems, along with others to complicate the solution process.[25] The problem is so complex that there is no definitive statement to

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[19] *Ibid.*, 221

[20] *Ibid*.

[21] K. Becker, "Wicked ID: Conceptual Framework for Considering Instructional Design as a Wicked Problem." *Canadian Journal of Learning and Technology* 33 (1), Winter (2007), http://www.cjlt.ca/index.php/cjlt/article/view/23/21.

[22] Ackoff, *Re-Designing the Future,*…22.

[23] Mascarenhas, *Business Transformation Strategies,*...222.

[24] *Ibid*.

[25] Becker, *Wicked ID.*

it; in fact, there is a broad disagreement of what the problem is its nature, goals and consequences. Since the stakeholders cannot agree on the problem definition, they will not agree on the path towards its solution. Wicked problems seem insoluble due to many moving targets including changing problem statements, constraints, and stakeholders with increasing goals. They are often associated with strong moral, political and professional issues.[26]

Rittel and Webber specified ten characteristics of wicked problems which included an inability to define the problem, an inherent uniqueness to the problem, innumerable solutions and in inability to verify any solution, irrevocable consequences to solutions. Furthermore, there is no end to working towards it, as every wicked problem is likely the symptom of another wicked problem. Wicked problems are typically described by examples of national or world scale such as global warming, global poverty, global crime, global disease, third world hunger, pollution, and overpopulation. However, a problem need not possess all the characteristics in order to be wicked.[27] Nor is national or global scale a criterion for a wicked problem:

> The key characteristic of all wicked problems is that they are social in domain; they involve people, multiple stakeholders, personal goals and objectives that may be mutually conflicting, and they always involve improving some aspect of the environment in which people live and work.[28]

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[26] Mascarenhas, *Business Transformation Strategies…*, 224.

[27] Jeff Conklin, "Wicked Problems and Social Complexity," in *Dialogue Mapping: Building Shared Understanding of Wicked Problems.*(n.p.Wiley, 2006), 10.

[28] Mascarenhas, *Business Transformation Strategies,…228.* These are the top four from a 2008 survey, where 1500 executives were asked to identify the wickedest problems plaguing their companies today.

As a result, wicked problems are also commonly found in the business domain in the form of balancing long-term and short-term demands; Predicting returns on innovative concepts; Innovating at the increasing speed of change- organizational agility; Winning the war by world-class talent.[29]

While some problems are clearly wicked, others problems will have elements that are rather simple, or complex problems may have a tame element. Conklin states "it's not binary – most problems have degrees of wickedness."[30]

The problems associated with the management of the pilot occupation are clearly not simple problems. The pilot occupation is managed through a system of systems, with multiple stakeholders that extend beyond the pilot occupation. The long standing nature of the problem suggests that there are no clear answers to resolving the issues. This study suggests that the ability to address organizational desires and individual desires within the inherent constraints of the system is a *wicked* military human resources problem which lends itself unique problem resolution methods.

This study is presented in two distinct sections: A review of the theoretical concepts; and a description of the problem space and recommended approaches for its management. The theoretical review begins in Chapter One with the concepts of careers and human resource management from both the organizational and individual perspectives. Chapter Two introduces the military officer career management function which serves as the mechanisms by which militaries implement their human resource management policy. Chapter Three provides a description of the concepts of aircrew

[29] Marty Neumeier, *The Designful Company* (Berkeley: New Riders, 2009), 2.

[30] Conklin, *Wicked Problems and Social Complexity,…* 10.

management that form the constraints on pilot production and sustainment of manning levels. The second section begins in Chapter Four describing the history and scope of the problems afflicting the pilot occupation from an organizational perspective, while Chapter Five provides of a description of the individual perspective of a pilot's career paths. The last section characterizes the problems, and argues that the approach to solving wicked problems will help to ease the problems associated with managing the pilot occupation.

CHAPTER ONE

HUMAN RESOURCE MANAGEMENT CONCEPTS

Members of the Canadian military, despite being a volunteer force, are required to forgo certain rights and freedoms that civilian employees would not have to accept. This requires unique attitudes and skill sets that normally cannot be trained or developed external to the military and makes military careers different from civilian careers.

As a result of the unique demands placed on military members and their families, the Human Resource (HR) functions of the organization must be expanded to address additional support services such as family support, health care and spiritual services.[31] The unique attributes of military service obligations, combined with a need to consider the impact of military service on families expands the scope of military Human Resource Management (HRM), making it quite complex.

There is a limited body of literature specific to military HRM. The fact that the majority of HRM literature is focused on private sector civilian organizations has perhaps coloured the view of civilian HRM practices in the Canadian Armed Forces (CAF).[32] Military Personnel Management doctrine expresses the CAF view of HRM as follows:

> In the CF, personnel management is about **people** – people who impact and are impacted by the 'fog and friction of war'. The military context provides clear distinctions among HR/HRM, personnel management and military personnel management, not only in the focus, approach and purpose of the system, but also, at the system's very foundation. Sailors, soldiers, airmen and airwomen are not human capital, not some faceless mass to be managed as assets, renewable or not, hired, fired and forgotten

[31] Okros, *"Becoming an Employer of Choice: Human Resource Challenges with DND and the CF" in The Public Management of Defence in Canada*, ed. Stone (Toronto: Breakout, 2009), 145.

[32] *Ibid* ,… 141.

> once they 'walk out the gate'. Rather, they are the heart and soul of the military mission.[33]

The reality is these debates on the meaning and significance of HRM are not limited to the military context. These debates exist within the broader HRM literature as well. While definitions of HRM vary, it can be considered an evolution of the concept of personnel management which dates back to the late 19th century.[34] HRM however, has a qualitative difference in that it is incorporated into strategic planning and that it emphasizes the importance of transformational leadership.[35] As a result, HRM incorporates the concepts of the art and science of management practice applied to people, with their abilities, talents, attitudes, and complex behavioral attributes, as a resource with a cost and value to the organization. As Bratton and Gold have put it, "In theory, the management of people is no different from the management of other resources. In practice, what makes it different is the nature of the resource, people."[36]

From the emphasis on different elements listed above – humans, resource and management, a 'hard' version and 'soft' version of HRM has emerged. The 'soft' version of HRM places emphasis on the value and potential of *human resources* and importance of generating employee commitment through communication, motivation and leadership practice. The 'hard' versions of HRM emphasize the *resource management* side: "the calculative, quantitative and strategic management aspects of managing the

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[33] Department of National Defence, *B-GL-005-100/FP-001 Military Personnel Management* (Ottawa: DND Canada, 2008), 1-3

[34] John Bratton and Jeffrey Gold, *Human Resource Management: Theory and Practice*, 2nd ed. (Mahwah, New Jersey: Macmillan Press Ltd, 1999), 6.

[35] *Ibid.,* 25.

[36] *Ibid., 11.*

workforce in a 'rational' way, much like any other economic factor."[37]This version is concerned with having "the right quantity of people in the right place at the right time who can be utilized in the most cost effective manner."[38] The 'hard' and 'soft' models often exist in tension with one another depending on the situational factors available at the time.[39]

HRM as a practice must address the jobs to be done, the people with the skills to do the work, and the enabling structures such as policies and processes that define how the system will function.[40] How an HRM system is defined and designed is dependent on the unique attributes and needs of the organization it serves. In this context HRM can be described as a body of knowledge and set of practices to work in the following five functional areas: staffing, to include resource planning, job analysis, recruitment and selection; design and administration of the performance appraisal and rewards system; employee development; employee maintenance consisting of health, safety and welfare policies; and employee relations, such as labour or union and management negotiations.[41] However, the concepts related to HRM practice differ from the conceptual models of HRM.

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[37] *Ibid.*, 17. and John Storey, *New Perspectives on Human Resource Management* (London: Routledge, 1989).

[38] Bratton and Gold, *Human Resource Management: Theory and Practice*,… 173.

[39] *Ibid.*, 174.

[40] Okros, *Becoming an Employer of Choice*,…141-193.

[41] Bratton and Gold, *Human Resource Management: Theory and Practice*,… 14.
These functions have also been described by Okros as Jobs, People, Careers, Sustainment and Conduct. Okros, *Becoming an Employer of Choice*,…142.

Several models have been developed to describe HRM and differentiate it from personnel management. These models link organizational strategy to human resources management, taking into consideration the internal and external factors affecting the organization.

John Story presented an HRM model based on the interaction of four elements: the strategic nature and integration of HRM decisions; the belief that employees can provide a competitive advantage and therefore employee selection and commitment are central to HR practices; the involvement of line managers in HRM as a daily activity; and that managing organizational culture is more important than HR procedures. Therefore, the key HR levers must be integrated to ensure effective employee management.[42]

A prominent U.S. model developed by Harvard professor Michael Beer, the Harvard Model of HRM (Fig 1), illustrates the influences of stakeholder interests and situational factors on HRM policy choices, which subsequently influence HR outcomes. This model integrates the concepts of strategic integration and feedback mechanisms of human resource policy and practice into the model. Beer *et al.* present HR policies consisting of employee influence, work systems, reward systems and human resource flows. The integration of these policies will deliver long term consequences that will feed back into the system to influence the stakeholder perceptions which in turn influence future HRM policy choices. Of particular importance to this discussion is the policies

[42] *Ibid.*, 132.

related to HR flows. These policies determine how individuals are moved in, through and out of an organization.[43]

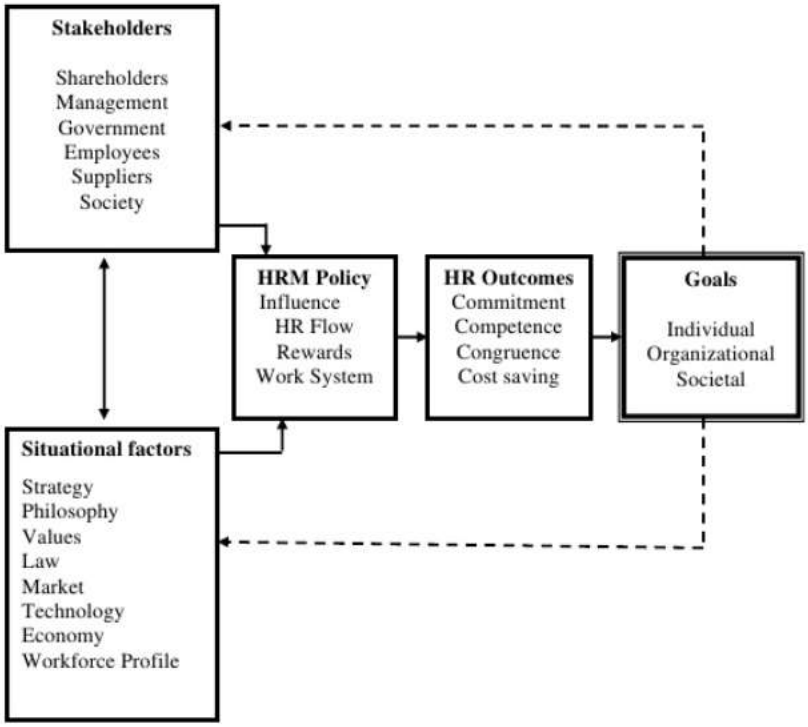

Figure 1.1-The Harvard HRM Model,

Source: Beer et al, Managing Human Assets, 16.

Beer *et al.*'s model also provides a framework for assessing the effectiveness of HR policies through consideration of four HR outcomes: high commitment, high competence, cost effectiveness and higher congruence. High commitment is born out of mutual trust. When it is fostered, employees are more willing to be responsive to changing organizational needs that will affect their work practices and requirements. Likewise, it enables management to be more responsive to employee's concerns as

[43] Michael Beer, Bert Spector, Paul Lawrence, D. Quinn Mills and Richard Walton, *Managing Human Assets* (New York: The Free Press, 1984), 15-18.

stakeholders. High competence provides the organization flexibility and versatility to adapt to changing requirements. It is fostered through promoting a continuous learning and self-development environment. Cost effectiveness means that the organization's HR policies should ensure costs are kept to an acceptable level, generally considered on a comparative basis, and that major workforce related adjustments are avoided.[44] Higher congruence refers to the extent that HR policies will generate a higher coincidence of interest amongst the relevant stakeholders, including management and the employees. These four criteria while generic can be used to assess decisions related to the HR functions in an organization. Properly integrated, the outcomes of the HR functions should satisfy the goals of the organization, individual and society.[45]

This model provides a useful basis for discussion of military HRM because it does not assume organizational objectives such as profit. Rather it focuses on the interaction of stakeholders, strategic orientation and feedback.

The HRM systems of all organizations, including militaries, will address the HRM functions to the degree necessary given their unique characteristics. Considering public, private and military organizations have fundamental differences, the discharge of the HRM functions will be accomplished differently, making certain private sector best practices inappropriate for military organizations and vice versa.

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[44] The Forces Reduction Program of the 1990's that reduced the size of the CAF by approximately one third is an example of a large workforce adjustment.

[45] Beer et al., *Managing Human Assets*,… 36.

Organizational career planning and management (CPM) have long been an essential component of HRM.[46] For the organization, career management is "essentially the operational mechanism for implementing human resource policy."[47] Inherent in the discussion of career management is the concept of a career. However, HRM models have been criticized for not adequately addressing the effect of individuals and groups on the way HRM is practiced, stating "Individuals and groups of employees do not always perceive things in the same way that managers do, and even if this is the case they may choose not to comply with management intentions."[48] The way in which one views their career and how it should be managed has implications for an organization's HRM strategy and practices.

The Three Perspectives of Career Management

The literature generally describes careers as either traditional careers or non-traditional or "new" careers. Traditional careers have their origins in the 1950s when a career was viewed "as a pattern of work preparation and experience for people in the professional fields (e.g., doctor, law) and implied a race to the top of that field."[49] At that time there was consensus that by joining a large organization and demonstrating hard work and loyalty, one would be rewarded with job security, good compensation and the

[46] Yehuda Baruch, "Career Development in Organizations and Beyond: Balancing Traditional and Contemporary Viewpoints," *Human Resource Management Review*, no. 16 (2006), 130.

[47] Chris L. Denko, "An Inquiry into the Relationship between Pilot Retention and Canadian Forces Career Management Practices" (Masters, Royal Roads University, 2005), 125.

[48] John Martin, *Key Concepts in Human Resource Management* (London: Sage, 2010), 131.

[49] Frieda Reitman and Joy Schneer, "Enabling the New Careers of the 21st Century," *Organization Management Journal* Vol 5, 1 (2008), 17.

opportunity and gain higher levels of status and income through climbing the corporate ladder. This concept of stable, linear employment within a single organization constituted the 'ideal' career. Typically it was reserved for men, whom were often supported by a spousal homemaker.[50]

By the end of the 1980s the definition of a career had evolved to be broader and more inclusive, described as "the evolving sequence of a person's work experience over time."[51] The evolution of how careers were perceived was influenced by three factors: the increase of women in the work force, which changed household dynamics creating a need for balancing dual-career households; changing societal values which lead employees to define success based on psychological vice objective measures; and a series of widespread organizational restructuring and subsequent job loss that ultimately violated the implicit psychological contract[52] that provided job security and advancement in exchange for hard work and loyalty.[53] According to Yehuda Baruch, "Individuals discovered they had a variety of career goals, career anchors, and perspectives of what do they mean by career success."[54] Work ceased to be the most important aspect of life, and people began making choices that satisfied more of their life's needs.

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[50] *Ibid.,* 18-19.

[51] M. B. Arthur, D. T. Hall and B. S. Lawrence, "Generating New Directions in Career Theory: The Case for a Transdisciplinary Approach," in *Handbook of Career Theory*, eds. M. B. Arthur, D. T. Hall and B. S. Lawrence (Cambridge: Cambridge University Press, 1989), 8.

[52] D. M. Rousseau, *Psychological Contracts in Organizations* (Thousand Oaks, CA: Sage, 1995), 9.

[53] Reitman and Schneer, *Enabling the New Careers of the 21st Century*,…19. A psychological contract is characterized as a set of "individual beliefs, shaped by the organization, regarding terms of an exchange agreement between individuals and their organizations.

The outcome of these changes was a search for alternative, non-traditional careers, which was described as being "dynamic and transitional in multiple organizations and occupations."[55] While the traditional career was directed by the organization, these alternative careers became directed by the individual. These careers were described as 'boundaryless' by Micheal Arthur and Denise Rouseau, where employees move across organizations, functional areas, occupations and industries. Another concept, the Protean career, was put forth by Douglas Hall and is one "based on self-direction in the pursuit of psychological success in one's work" described by a "lifelong series of experiences, skills, learnings, transitions and identity changes"[56] where "career and life success are defined by the individual."[57] As a result of the changes to the work environment, and employees' responses, careers today have been characterized as turbulent and transactional with decreased employee loyalty. Lateral career moves and interruptions in employment seem more frequent and the onus of career management is now said to have shifted primarily to the individual.

Baruch contends that while both traditional careers - characterized by predictability, security and linear progression, and contemporary multi-directional,

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[54] Baruch, *Career Development in Organizations and Beyond*,…125. Edgar Schein described a career anchor as "that one element in a person's self-concept that he or she will not give up, even in the face of difficult choices". He argues that as experience accumulates, preferences and strengths begin to emerge, and "only when […] confronted with difficult choices does a person begin to decide what is really important to him or her". He identified eight anchors: Technical Expertise, Managerial, Autonomy/Independence, Security/Stability, Entrepreneurial/Creativity, Service/Dedication to Cause, Pure Challenge, and Lifestyle.

[55] Reitman and Schneer, *Enabling the New Careers of the 21st Century*,…19.

[56] Douglas Hall, *Careers in and Out of Organizations* (Thousand Oaks, CA: Sage Publications Inc., 2012), 23.

[57] Baruch, *Career Development in Organizations and Beyond*,…129.

unpredictable, and vulnerable careers - exist in today's career landscape, these represent extremes of which "neither truly captures the true nature of today's career realities."[58] While the industrial revolution gave the power of managing careers to the organization, trends over the past few decades have shifted it more towards an individual perspective. This evolution of careers perspectives and how they should be managed have evolved over time and must be taken into consideration if the organizations policies are to be effective. As such, career management must consider three perspectives: the organizational, individual and societal.

Although the career environment has shifted towards one of more individualistic career management, due to the inability of the organization to offer job security and career development to all but a select group of employees, all three perspectives have important roles to play. The balanced perspective focuses on the relationship between the individual and the organization to manage his or her career.[59] Decisions made regarding career management must also be made within the constraints of society.[60]

Societal Perspective

The Societal perspective ensures that organizations outcomes and procedures comply with societal values, public policy and legal and regulatory frameworks, and the impact of external institutions.[61] As a government organization, a nation's military must

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[58] Baruch, *Career Development in Organizations and Beyond*,…125.

[59] *Ibid.,*129.

[60] Beer et al., *Managing Human Assets* ,…73.

[61] *Ibid., 70.*

not only comply with the core social values of the government, but that of the general society from which they draw their employees. Its policies must consider the societal expectations for the conduct of its members as a professional body, as well as reflect the societal values.[62] External institutions, such as universities, impact organizations through the programs the manner in which they educate individuals and socialize them to career paths and opportunities. Organizations should also consider that their HR polices have the potential to impact broader society.[63] Nevertheless, organizations have more direct influence in the shaping the organizational and individual perspectives.

Organizational Perspective

The organizational perspective addresses the purpose for which the organization exists. It is comprised of the organizations mandates, objectives and plans as well as the HR policies put into place to affect those outcomes. The commonly stated purpose of career management is to get the right people into the right places at the right time. This requires a balance between placing people with the necessary skills in jobs that need to be done in the short term, and ensuring the development of personnel for future needs to ensure the long time viability and success of the organization.[64] Central to these requirements is managing the flow of personnel in, through and out of the organization.

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[62] Okros, *Becoming an Employer of Choice,…*146.

[63] Beer et al., *Managing Human Assets*,…72.

[64] Zella King, *Career Management: A Guide* (London: Chartered Institute of Personnel and Development, 2004), 7.

According to Beer *et al*, the organizations policies for managing the flow of personnel will implicitly shape the culture of the organization. An organization's human resources flow policies should lead to the following outcomes: availability of the right number of personnel with the needed mix of competencies in the short and long term; development of people needed to staff the organization in the future; employee perception of opportunity for advancement and development consistent with their needs; employee perception of relative security from termination due to factors beyond their control; employee perception that selection, placement, promotion, and termination decisions are fair; and the lowest possible payroll and people-processing costs possible to meet the objectives.[65] This view incorporates the importance of the individual perception of the practices that are in place, and their fairness in their application.

There are a number of career planning and management practices (Table 1.2) that are applied within a framework of policies to achieve the objectives of the organization. These practices may be internally integrated in the way they relate to each other. For example, job rotation is normally related to employee development. The practice of employee development should serve the organization in some deliberate way i.e. to enhance performance, or prepare for future challenges. In other words, they are a means to serve the ends sought by the organization. This is referred to as external integration.[66]

[65] Beer et al., *Managing Human Assets* ,… 73.

[66] Baruch, *Career Development in Organizations and Beyond,…131*.

Determining which tools to use is less a matter of best practice, and more of design to satisfy the needs of the particular organization and its strategy.[67]

Job postings	Formal education/tuition reimbursement
Performance appraisal for career planning	Counseling by managers
Lateral moves/job rotations	Counselling by HR
Pre-retirement programs	Succession planning
Common career paths	Dual ladder
Career booklets/ pamphlets	Written individual career plans
Career workshops	Assessment center
Peer appraisal	Upward appraisal
Appraisal committees	Training programs for managers
Orientation/Induction programs	Special needs (high flyers)
Special needs (dual career couples)	Diversity management
Expatriation/Repatriation	

Table 1.2 - Organizational career planning and management practices.
Source: Baruch, *Career Development in Organizations*, 131.

Public service and military organizations are typical examples of traditionally oriented organizations. The requirement to enter at the bottom and develop unique skillsets within the organization contributes to long employment durations. Vertical progression through the ranks is not guaranteed, but its pursuit is encouraged and it is

[67] *Ibid., 130.;* King, *Career Management: A Guide* (London: Chartered Institute of Personnel and Development, 2004), 7.

seen as a sign of success; it is therefore rewarded with increased compensation, and status. Long service is rewarded with a generous pension that has all but disappeared in the corporate sector.

In the CAF, the organizational perspective requires acceptance of the traditional career, because long service is required to generate economic return for the high cost of training to progress individuals to the institutional level of leadership. This career path depends on a high degree of loyalty and mobility, and is well supported by the traditional family concept due to the personnel sacrifices required. Thus career management practices are directed by the organization in a patriarchal fashion and are applied more or less equally to a broad spectrum of military occupations. This model of career management has changed little in western militaries in the past 60 years despite a general evolution of careers in broader society.

Individual Perspective

The individual career perspective considers factors pertaining to the manner in which an employer takes care of its employees, and how the organization develops them according to their personal competencies, objectives and life/career plans. The opportunities an organization provides for an individual to use and develop their personal competencies will shape how one's career develops, influencing their career satisfaction.[68] The employer must uphold certain moral and legal obligations to ensure employee commitment and motivation. These include the expectations derived from

[68] Beer et al., *Managing Human Assets* ,…68.

implicit social and psychological contracts between the employer and employee.[69] The psychological contract is generally held between the employer and employee, while the social contract, especially in the case of the military, extends to include the well-being of a serving members family. These are two-way, evolving, perception based contracts, that if violated can result in emotional and intense reactions from employees.[70] While the employers' implicit and explicit obligations to employees are more or less universal, an individual's career perspectives are uniquely influenced by their own career interests and life plans.

Career priorities depend on an individual's interests, values, background, age, family situation, financial commitments, lifestyle and future life plans. [71] Furthermore, career aims and aspirations will change over time.[72] These factors are broadly captured in two important theories regarding careers; Donald Super's Ages and Stages theory of careers, and Edgar Schein's Career Anchor's theory. Super's theory suggested that career stages follow a life course approach consisting of four stages: Exploration, during the teens and early twenties where individuals begin preparation for a career; Establishment, from the mid-twenties to mid to late thirties, where a person finds employment and works to be a successful contributor to an organization; Maintenance, occurring from the late thirties to mid-forties, where an individual maximizes their capabilities and may become a mentor to others; and disengagement where the individual

[69] Okros, *Becoming an Employer of Choice,…*146.

[70] United States, *A New Social Compact: A Reciprocal Partnership between the Department of Defense, Service Members and Families.* (Washington, D.C.: Department of Defense, 2001), B-8.

[71] King, *Career Management: A Guide,…* 6.

[72] Baruch, *Career Development in Organizations and Beyond,…*134.

may leave the organization to find fulfillment outside of a career.[73] The maintenance stage has also been referred to as the middle career stage, where some people will grow in their careers, while others will reach a plateau.[74]

In his later work, Super retained his approach of "career stages as clusters of distinctive attitudes, motivations, and behaviors that arise in sequence over development".[75] However, he disassociated the stages to chronological age, and developed a recycling phase in which individuals may change career paths.[76] Daniel Levinson built upon Super's work to develop the concept of stability and transitions through adulthood. He observed transitions that "involve a reassessment of the life structure with a special focus on work and family"[77] that occur around age 30 and lasting into the mid to late 30's, at age 40 lasting to 45, and at age 50 to 55.

Edgar Schein's theory suggests that an individual's career identity is formed by responding to three categories of questions pertaining to talents: i.e., What are my talents and abilities? What motivates me as it pertains to work? And what values do I use to judge my actions? [78] He states that as individuals enter the work force they experience a "reality shock" when there are inconsistencies between how they imagined themselves in

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[73] Madeline Crocitto, "Middle Career Stage," in *Encyclopedia of Career Development*, eds. Jeffrey Greenhaus and Gerard Callanan (Thousand Oaks, CA: Sage Publications, 2006), 499.

[74] *Ibid.*

[75] Smart and Candida Peterson, "Super's Career Stages and the Decision to Change Careers" *Journal of Vocational Behavior* 51, no. 3 (November, 1997), 358.

[76] *Ibid.*

[77] Crocitto, *Middle Career Stage*,…499.

[78] Daniel Feldman and Mark Bolino, "Careers within Careers: Reconceptualizing the Nature of Career Anchors and their Consequences," *Human Resource Management Review* 6, no. 2 (1996), 96.

their career and what they actually experience. As experience is gained they begin to develop a better sense of their preferences, strengths and weaknesses. Ultimately an individual's true values will emerge when confronted with a difficult choice such as a promotion, a firing, a move (geographical or functional).[79] As such, that "one element in a person's self-concept that he or she will not give up, even in the face of difficult choices," is what Schein calls a career anchor.[80] He suggests there are eight career anchors consisting of Technical Expertise, Managerial, Autonomy/Independence, Security/Stability, Entrepreneurial/Creativity, Service/Dedication to Cause, Pure Challenge, and Lifestyle. Schein insisted an individual has only one true career anchor even though more than one anchor may be satisfied by a given job. However, others have evolved his concept to propose the possibility of two or more career anchors.[81]

Individuals also engage in career self-management as a means exercise agency in the course of their career and life to achieve their desired outcomes. Career self-management activities include positioning behavior, influence behavior and boundary management. Positioning behavior refers to an individual's willingness to initiate job moves, seek education and training, and actively develop their personal network. Influence behavior relates to the extent an individual engages in self-promotion, ingratiation and expressing their desires to those who may influence their career. Lastly,

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[79] Edgar Schein, "Career Anchors Revisited: Implications for Career Development in the 21st Century," *The Academy of Management Executive* 10, no. 4 (November, 1996), 81.

[80] Edgar Schein, *Career Anchors: Discovering Your Real Values* (San Francisco: Pfeiffer Wiley, 1990). 18.

[81] Feldman and Bolino, *Careers within Careers,…* 99.

boundary management refers to how the individual separates work and non-work roles.[82] These activities are influenced by an individual's career anchors, desire for control over career outcomes, and self-efficacy.

These theories have interesting implications for military careers. Due to the fact that employees enter the military untrained, thus they do not actually know what their chosen occupation will bring. A pilot who enters through a subsidized education stream could have six to eight years of service, comprised entirely of training and education, prior to their first actual day on the job. Thus, he or she could serve ten or more years before having garnered enough experience to start formulating a concept of their career. Secondly, there is a natural link between age and total years of service, primarily due to recruiting of young adults.[83] Therefore, an individual will be entering the middle career stage at the same time they have entered key productive years to both payback the high level of initial training investment, and begin entering into the next phase of career development required for continued progression. Furthermore, they influence how an individual engages with the military career management system to achieve their desired outcomes.

There is debate regarding to whom (if anyone) does a career belong?[84] The traditional career approach suggests that it is the organization's responsibility to manage

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[82] Zella King, "Career self-management: Its nature, causes and consequences", *Journal of Vocational Behavior* 65 (2004), 113, 119-121.

[83] It is recognized that there have been trends or recruiting older adults than has typically been the case in the past due to the requirements for officers to have an undergraduate degree, and limited capacity to recruit to subsidized or deferred university education plans.

[84] John Martin, *Key Concepts in Human Resource Management*,…43.

an individual's career. The extent to which an individual complies with these plans depends on their own perspectives of their career. An individual who does not have a career plan may simply acquiesce to the organization's plan. Otherwise, individuals will make continual assessments of the fit between the organization's plans, and their own. If there is a perceived match between the two plans then this can result in increased commitment and satisfaction on the part of the individual. If there is a discrepancy, then the individual will begin to consider alternatives to resolve the discrepancy.[85]

Yehuda Baruch recommends a developmental approach to career management that considers the implications of an increasing prominence of the individual perspective to career management and the organizational imperative to ensure the right people are placed in the right jobs at the right time. She states that organizations need to move away from the traditional command and control approach and become 'supportive and developmental, 'stating "the organization is the enabler of successful careers, not the commander who moves the chess pieces across the board."[86] The fact of the matter is that "organizations do not own their employees, thus career management is a risk management process, whereby organizations invest in their people, but the people are free to leave upon their will."[87] Considering the high cost and time requirements to train replacement pilots, this is at the heart of the issues with pilot career management.

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[85] Cherlyn Skromme Grandrose and James Portwood, Matching individual career plans and organizational career management" *Academy of Management Journal*, Vol 30, no.4 (1987), 701,704.

[86] Baruch, *Career Development in Organizations and Beyond*,…130

[87] Baruch, *Career Development in Organizations and Beyond*,…132.

Therefore the RCAF HRM strategy must take into account all three perspectives of career management when defining officer career management policy and practices.

CHAPTER TWO

MILITARY OFFICER CAREER MANAGEMENT MODEL

Military and civilian organization use similar HRM concepts, such as the concept of human resources flow, and similar HRM practices, such as performance appraisals. However, the HRM functions that define the military career systems and career management differ from the private sector. In the mid-1990s Harry Thie *et al* of Rand Corporation conducted an extensive study of future officer career management systems for the United States military to develop a general personnel management model. Their model, Their model identified six basic functions for a military career management system for officers.[88] These functions do not form the career management system, but are representative of Beer *et al.'s* HR flows in, through and out of the military. Policy decisions are made related to each of these functions to the framework that career management must be conducted within, and thus represent lever for creating different outcomes for different classes of occupations. [89]

They identify four skill groups: line, specialist, support and professional. Line skills are uniquely military, especially for those directly involved in combat operations. Line officers tend to spend the majority of the early years of their career involved in purely military skills. Specialist skills are also military skills that rely upon recurring assignments and utilization due to their advanced educational requirements, long training periods and high costs or experience. Support skills are found in the logistics trades; they

[88] Harry Thie and Roger Brown, *Future Career Management Systems for U.S. Military Officers* (Santa Monica: RAND, 1994), 72. Their work drew from public, private and military organizations to create a general model of an officer career management system.

[89] *Ibid.*

are white collar skills that support the function of the military and are enhanced by general military knowledge and experience. Professional skills are found in civilian professions such as doctors, and lawyers. This group requires a lesser degree of military knowledge and experience is required to complement their professional background.[90] . This chapter will provide a description of their model followed by an explanation of how RCAF pilots flow through the career system and the resulting career paths.

The first function is to enter people into the system via recruitment and hiring. In a closed system, individuals enter at the bottom of the organization into a community that requires "commitment, adherence to a code of law and ethics and knowledge and skill expertise acquired only by long education and experience."[91] A closed system provides strong support for maintaining the knowledge and culture of the organization. In an open system, individuals are recruited based on their experience and credentials and enter the system along different points of the career path. Individuals may rise through their career by transitioning between organizations and entering at progressively higher levels.[92]

The second function is to develop organizational knowledge and skills, abilities and attitudes that are desired by the organization, typically conducted through attendance at a military college, or through basic officer training, followed by the initial occupational training.[93] Following initial occupational qualification, the developing function continues

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[90] *Ibid.,9.* These are observation based skill groups, not skill groups formally recognized by any particular military. In their earlier work, they had identified two additional skill groups: acquisition, and technical. Technical skills are narrow and are generally reserved for non-commissioned members.

[91] *Ibid.*

[92] *Ibid.*

[93] The initial part of this process can also begin prior to entry through cadet programs and employment in the reserve force.

to provide "values, leadership techniques and skills for use in the organization. Therefore this function determines what types and how much training and education is required, and how posting assignments contribute to the officer development process.[94] Sanu Kainikara the developmental process is on of developing professional mastery. It begins with technical mastery in one's own occupation as the building block. An individual then proceeds through successive stages of professional mastery at the service, joint and military strategic and national security levels. Thus the development function spans the initial occupational qualification as well as the development throughout ones career with the presumption of vertical progression.[95]

In a vertical structure, development is equated with vertical progression. Therefore this function must also address plateaued employees. This refers to a plateau as the point at which the further promotion is unlikely. Plateaus can arise for many different reasons. As a result, plateaued employees can fall into two different categories: solid citizens, or deadwood. Solid citizens do satisfactory work but are not perceived as having the potential for promotion. Deadwood, on the other hand, does not perform satisfactorily.[96] Plateaus can create problems of motivation, as well as career path block of others due to limited space in the vertical progression stream, therefore organization must find ways to address the issue.[97] Organizations can deal with plateauing by varying

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[94] Ibid., 85

[95] Sanu Kainikara, "Professional Mastery and Air Power Education," *RCAF Journal* 3, no. 4 (Fall, 2014), 49-50.

[96] Steven Applebaum and Dvorah Finestone, "Revisiting career plateauing: Same old problems – Avant-garde solutions", *Journal of Managerial Psychology, 9,5 (1994),12.*

[97] Thie, et al, Future Career Management Systems…, 85.; Jeff Tasseron, "Military Manning and the Revolution in Social Affairs." *Canadian Military Journal* 2, no3, (Autumn 2001), 55.

duties, providing lateral moves, cross-training to new skills to keep the officer engaged, encouraging release, or not offering continuation contracts, depending on the employee in question.[98] These developing and plateauing aspects are very closely related to the assignment function.

The third function is to assign personnel throughout the organization. Job assignments can be considered to be "developing" jobs or "using" jobs. Margaret Harrell, et al. classify developing jobs as those that "confers knowledge, skills, and personal growth that are put to use in… [using jobs.]" While using jobs put to use the existing competencies. They note that almost all jobs have a using aspect and therefore what distinguishes the two is the amount of contribution to preparing the incumbent for higher level positions. Due to the link to the development function, using jobs are often found at the end of a career.[99] The type and purpose of a job (using or developing) should also be a factor in determining the duration of the assignment.[100] Career paths will emerge based on the series of using and developing jobs an individual passes through over time and can intentionally be designed to lead to one or more aspired-to positions.[101] As a result, the assignment function contributes to the promotion function.

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[98] Thie et al., Future Career Management Systems,…, 85.

[99] Margaret Harrell, Harry Thie, Perter Schirmer, Kevin Brancato, Aligning the Stars: Improvements to General and Flag Officer Mangement. (Santa Monica, CA: RAND, 2004), 15-16.

[100] Ibid., 17-19.

[101] Donald Jarrell, *Human Resource Planning* (Englewood, NJ, Prentice-Hall, 1993), 140-41. Jarrell chooses to define a career path one that "leads to one or more target positions to which the employee aspires."

The fourth function determines when and how individuals will be promoted within the organization. There are different constructs consisting of combinations of qualification, seniority and performance are used to determine promotion eligibility. Promotions can be considered automatic unless specifically denied or in some cases they can require an officer to apply for promotion.[102] Promotions, and therefore rank are linked to jobs in different ways. In *Rank-in-job* systems, an individual's status is based on the position. Whereas a *rank-in-person* system assigns the rank to the individual, then the individual is reassigned if required to an appropriate position for the rank. Most militaries will use rank-in-person systems in which rank promotions are generally accompanied by increased responsibility and compensation.[103]

The fifth function is the exit function which determines how people will leave the organization. Organizations may be structured such that people may stay in the organization as long as they want and leave at their own discretion (natural attrition). The organization may influence individuals decisions based on incentives or lack thereof to remaining with the organization. In a forced attrition system, the decision to separate the individual rests with the organization based on the organizational objectives. The mechanisms of forced attrition in the military may be determined by a number of differing factors such as age, health and fitness, or contract completion. [104]

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[102] Thie, et al, Future Career Management Systems,…298. In Norway officers must apply for all promotions to Major and above.

[103] *Ibid*., 89-92.

[104] *Ibid.*, 95.

The sixth function is the exercise of quality control throughout the system and therefore spans all functions to a degree. It begins at entry with screening of new recruits for suitability, and through training and development phases with the use of course reports and performance appraisals. It also determines selection for professional development, certain assignments and promotion.[105]

The philosophy and objectives of the organization should dictate the choices pertaining to each of the functions. These objectives could include a desire to control upward movement, a strong organizational culture, stable workforce, adaptability to change or combinations of these and more objectives. Based on choices about entry and attrition they identified four officer career flow structures consisting of up and out- the system currently used in the United States Armed Services whereby entry is at the beginning of the career path and failure to progress in grade will result in termination; up and stay, whereby entry is at the beginning of the career path and the individual may remain for a full career regardless of promotion progress; in and out or lateral entry where there are multiple entry and exit points for new and experienced individuals; and mixed systems whereby combinations of these features may be used in for different occupations and career points to meet different organizational needs.[106]

The policies established for each function shape the officer career construct for the individual and the organization. These functions fall in the human resources flow category of HR policies on the Harvard HRM model. This model also offers a different perspective on measuring the effectiveness of the HR functions by considering cost,

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[105] *Ibid.,* 73.

[106] *Ibid., 76-82.*

commitment, competence and congruence, and demonstrating the feedback loops to the organization, society and the individual. The next chapter turns to pilot specific criteria that is essential to incorporate into the decisions pertaining to human resource flows and the career management functions.

CHAPTER THREE

PRINCIPLES OF DEVELOPING AND ABSORBING AIRCREW[107]

The previous chapter provided an overview of the concepts of HRM, careers and career management that inform the development of a military career management system. The HR policies that are established govern the careers of all military members, including pilots; however they may be tailored to achieve specific outcomes for specific groups. The air force pilot occupation has unique characteristics that should be considered in the development of these HR policies.

The closed, vertical nature of the pilot occupation generates a requirement for constant recruitment and training of new pilots to ensure the occupation remains manned to the desired level with an appropriate mix of experience and opportunities to progress to the most senior rank levels. The long duration and high cost of pilot training creates a systemic capacity limitation to training the right numbers of experienced pilots for the Air Force. The limitations of this system must be understood by those who develop and implement the career management functions as they are inextricably linked.[108]

This chapter draws extensively for on the research and aircrew management policy of the United States Air Force (USAF). There is one main reason for this: the sheer size of the USAF means that the expenditures on pilot training for many decades have been immense. For instance, in 1969 alone the USAF spent $2 billion a year on

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[107] The term aircrew is used here to remain consistent with the source material. In the USAF, Aircrew management policy encompasses all aircrew. Due to the scope of the study, and for the purposes of this chapter *aircrew* is used interchangeably with *pilots*.

[108] W. Taylor et al., *Absorbing Air Force Fighter Pilots,…*26.

pilot training. This constituted approximately one-third of their total manpower training costs for approximately 2.5% of their personnel. The management of the pilot resource was therefore an issue of national importance.[109] Since that time, there has been extensive research and modelling of the pilot career system through Research ANd Development (RAND) Corporation and Project Air Force. This is not to suggest that the USAF has always done a good job at managing pilot inventories; indeed, they have been plagued with many of the same struggles as the RCAF, albeit on a grander scale. However, these struggles have provided valuable lessons from which other air forces can learn. These lessons have been captured in their Air Force Instruction policy documents and draw directly from the research conducted at RAND.

Canada's allies have experienced similar challenges with pilot management. Many of them have applied similar concepts, based on their unique circumstances, to their pilot career management practices. It is not the practices of pilot career management that are the focus of this chapter, but the principles and concepts of managing the aircrew to maintain the desired number of pilots, pilot experience, squadron experience levels, and absorption capacity. This is referred to as aircrew management.[110]

[109] Stewart, *Pilot Management Policy and Pilot Training Rates,*…1.

[110] This has also been referred to as Force Management.

Aircrew Management

William Taylor of RAND has stated the purpose of aircrew management is "to develop and sustain adequate inventories of officers with the operational skills and experience levels to meet air force requirements."[111] The USAF has expanded this definition to "meet near-term, operational requirements while building leaders for tomorrow thereby ensuring a healthy aircrew force (i.e., combat ready and sustainable) to effectively support current and future air force missions."[112] This basic definition could apply to any air force that also draws its senior leadership from the pilot officer cadre.

The pilot occupation system has been characterized as system operating in a "delicate equilibrium with a large inertia due to the lengthy training and upgrade process."[113] The system is affected by numerous external and internal factors that are inextricable linked. Careful management and understanding of the dynamics and complexities of the system are essential to ensuring it is maintained in balance.

New pilots are recruited into the system and must undergo a series of training lasting several years prior to being assigned to their first operational squadron where they undergo further training and gain experience. As pilots increase their experience and gain qualifications, they increase their employability. To maintain the pilot occupation manning levels in a steady-state balance, the supply of new pilots must equal the demand

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[111] W. Taylor, J. Bigelow and J. Ausink, *Fighter Drawdown Dynamics: Effects on Aircrew Inventories* (Santa Monica, CA: Rand Corporation, 2009), 5.

[112] United States Air Force, *Air Force Instruction 11-412* ,…5.

[113] Rene Seguin, *PARSim, A Simulation Model of the Royal Canadian Air Force (RCAF) Pilot Occupation: An Assessment of the Pilot Occupation Sustainability Under High Student Production and Reduced Flying Rates* (Ottawa, ON: DRDC CORA, n.d.), 2.

generated by the loss of experienced pilots in the system. Clearly, the role of the training system is to train newly recruited pilots to "wings" standard, and then qualify them to operate the specific aircraft on which they will be employed.[114]

Operational squadrons, however, have two important roles to play: they must be capable of absorbing new, inexperienced pilots, while continuing to train and execute the operational missions that are assigned to those squadrons. There are significant negative impacts that will occur should too many or too few new pilots be assigned to the operational squadrons. If too many pilots are assigned, the experience level of the squadron will decrease, driving down the readiness levels (or combat capability) of the squadron and further reducing the ability to absorb new pilots. If too few pilots are assigned to the squadron, the overall pilot manning levels will not be sustainable. Therefore, it is critical to determine the correct number of pilots that should be assigned to each operational unit to ensure the long-term health of the pilot occupation and the readiness levels of the units.[115]

The problem is that newly trained pilots are of very limited utility upon arrival at their operational unit. The air force requirements are for *experienced pilots* both at operational units and as instructors in training units, and in key staff and leadership positions. Furthermore, due to obligatory service requirements, attrition is almost exclusively from the pool of experience cadre of pilots. It is the absorption process at the operational squadrons that generates experienced pilots. However, experienced pilots are required at the operational squadrons to generate absorption capacity. It follows then that

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[114] Taylor *et al*. *Absorbing Air Force Fighter Pilots,…*22-23.

[115] United States Air Force, *Air Force Instruction 11-412,…*21.

the key determinant for establishing new pilot production levels is the absorption capacity of *operational units.*[116] This interaction of experience levels impacting absorption capacity is an essential component of the pilot occupation system. Therefore, to fully define and comprehend the elements and interaction of the pilot occupation system, it is important that the managers of the system understand what is meant by absorption and absorption capacity and have precise definitions of an "experienced pilot" and "squadron experience level" to manage the system appropriately to achieve the Air Force's objectives.

Experienced Pilot Criteria

Experience is defined as "the knowledge or skill acquired by a period of practical experience of something, especially that gained in a particular profession."[117] Pilot experience generally refers to "the accumulated wisdom attendant on involvement in flight activities."[118] A pilot's flying skills and abilities is evaluated based on a number of criteria including training, qualifications, currency, proficiency and experience. Completion of mandated training programs is normally pre-requisites for pilot qualifications. Generally speaking, air transportation employers associate pilot experience with specified degrees of past flight activity, and in this regard, they often require of employees a certain number of flight hours, specific ratings or qualifications,

[116] *Ibid.*

[117] Oxford Dictionary, Definition of experience

[118] Bill Bell, Charles Robertson and Gregory Wagner, "Aviation Safety as a Function of Pilot Experience: Rationale Or Rationalization?" *Journal of Aviation / Aerospace Education & Research* 5, no. 3 (Spring, 1995), 1.

and exposure to a variety of aircraft types. This pre-employment criterion assumes that one who meets these requirements will exhibit more knowledge in the field, make sounder safety judgments, and engender greater confidence in the public mind than less experienced pilots. In addition, it is considered that these individuals are "more easily trained and involve fewer costs to the company."[119]

In order to maintain a qualification and prevent skill-fade pilots must remain 'current' through regularly completing certain activities such as takeoffs and landing. Proficiency is measured through routine pilot evaluations, either airborne or in an approved simulator. Typically, a pilot's experience level is related in terms of total flight hours, aircraft types flown and qualifications. For civilian pilots, hours based requirements define when a pilot is eligible for an Airline Transport Pilot Licence. Total flying hours and types of aircraft flown define a pilot's eligibility for employment on more complex aircraft types.[120]

Flight safety studies of civilian general aviation pilots have found correlations between pilot experience, measured in flight hours and accident rates. Training, such as an instrument flight rating, significantly impacts the predictive models relating pilot flight hours to flight safety occurrence rates; however, the link is still clear. A similar link has

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[119] *Ibid.*

[120] 1500 total flight hours are required to be qualify for Transport Canada Airline Transport Pilot Licence, and the US and United States Federal Aviation Administration (FAA) equivalent. In response to recent aviation safety incidents has increased the training and experience requirements to mandate 10 hours of simulation, and 1000 hours of experience as a co-pilot in air carriers operations prior to being eligible to act as an aircraft captain in air carrier operations. Federal Aviation Administration, "FAA Boosts Aviation Safety with New Pilot Qualification Standards" last modified 10 July 2013, https://www.faa.gov/news/press_releases/news_story.cfm?newsId=14838.

been found in studies of pilot experience and military aviation combat performance.[121] The USAF and United States Navy (USN) learned the consequences of sending inexperienced pilots to combat during the Vietnam War, where they found a direct correlation between pilot experience and combat aircraft losses. As experience level of fighter pilots dropped, the loss rates increased. The Vietnam War is an illustrative example:

> When the U.S. bombing of North Vietnam started in 1965, the average fighter pilot had over 500 hours of flying experience in his aircraft. However, as these experienced fighter pilots finished their tours of duty, inexperienced pilots replaced them. By 1968 the experience level was less than 250 hours. In 1966 pilots were lost to enemy action at the rate of 0.25 aircraft per month, yet by 1968 they were lost at 4.5 per month. On the other hand, the Navy, which had no such policies, rotated their experienced pilots continuously through the combat zone and maintained a steady loss rate.[122]

The fact that more losses were being attributed to inexperience than enemy fire resulted in a training revolution in the United States that had wide reaching influences to how U.S. allies trained their pilots. The training systems, and exercises in place today, such as Exercise Maple Flag, which originated in the post-Vietnam War era, were designed to provide the right experiences for junior aircrew prior to sending them to combat.[123]

While the examples above indicate that the precise numbers of flight hours that are used to define experience is important, it must be recognized that how experience is

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[121] William Knecht, *Predicting Accident Rates from General Aviation Pilot Total Flight Hours* (Oklahoma City: Federal Aviation Administration, 2015), 8.

[122] C. R. Anderegg, *Hotel Sierra: Flying Air Force Fighters in the Decade After Vietnam* (Washington, D.C.: Air Force History and Museums Program: United States Air Force, 2001), 14.

[123] Department of National Defence, Exercise Maple Flag, Last modified 27 May 2014, http://www.rcaf-arc.forces.gc.ca/en/4-wing/maple-flag.page.

defined represents a level of ambition, and risk tolerance for Air Force leadership. When it comes to managing aircrew, it is not the parameters of how experience is defined that matter as much as actually defining what constitutes an experienced pilot that is important. This is because it becomes a determinant of the absorption level, and therefore sustainability of producing pilots of a given experience level to be employed across the air force.[124]

Given this relationship to absorption, an experienced pilot has been defined as one who has completed the absorption process and may be assigned to more advanced positions.[125] Specifically defining when a pilot has reached that point can be measured in qualitative terms or quantitative terms, and often both are used albeit not for the same purposes. Pilot flying hours is the most common quantitative term, usually defined in terms of total flying time, and total time on aircraft type. Other quantitative measures include the number of flying years, combat hours, sorties, or flying tours.[126] These latter elements are often used to add a qualitative description to a flying hour total.
Not every flight hour is equal when it comes to building flight experience. Stewart noted that:

> The calendar time to bring the [newly qualified pilot] to the fully combat-qualified level is in part a function of the flying hours per month and in part a function of the kind of flying the pilot does, whether a complex task in which responsibility is shared with others, a simple non-shared task, or a complex non-shared task.[127]

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[124] United States Air Force, *Air Force Instruction 11-412,…* 25.

[125] Taylor *et al*., *Absorbing Air Force Fighter Pilots,*…52.

[126] A flying tour refers to an individual posting to a flying position on a flying squadron. A ground tour refers to a posting to a non-flying staff position. Tours normally last 2-4 years, depending on a variety of factors and policies.

For junior pilots, these qualitative differences can emerge based on the number of years flying. This is a representation of experience gained in different seasonal weather conditions and participation in major annual training events which varies the complex of tasks to which they are exposed

Experience can also be determined in terms of qualifications, such as flight lead, aircraft captain, and instructor pilot or standards officer. In many cases there are minimum flight hour requirements to be eligible to commence flight lead upgrades; therefore, there is a qualitative flying hours component embedded in their qualification-based definition. These qualifications are also important to experience levels because a flight lead or aircraft captain may be able to supervise a wingman or co-pilot on an operational mission, but not be qualified provide instructional training for junior pilots.[128]

The USAF has comprehensive definitions of when a pilot will become experienced and differentiates between experience levels for personnel management and for operational readiness purposes. For personnel management purposes, an hours-based metric is used to determine pilot assignments to maintain adequate experience levels on squadrons and wings.[129] For operational purposes, the term experienced refers to pilots who have or are ready to upgrade to a flight leadership position.[130] The USAF provides

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[127] Stewart, *Pilot Management Policy and Pilot Training Rates*,…2.

[128] In the USAF, these requirements are specific in the applicable Air Force Instructions for each airframe.

[129] For example an F-16 fighter pilot, this is 500 flight hours, or 400 flight hours and 100 simulator hours on the aircraft type. United States Air Force, *Air Force Instruction 11-2F-16V1* (n.p., Department of the Air Force, 11 August 2011), 10.

[130] United States Air Force, *Air Force Instruction 11-412,…*25.

specifications for prior qualified pilots to account for pilots who have been posted to non-flying positions and will be returning to a flying position on the same aircraft or have been previously experienced a different aircraft type. It is expected that these pilots will attain 'experienced status' faster than a newly graduated pilot.

Experience Level and Squadron Health

The experience level is a ratio of experienced to inexperienced pilots on a unit. This is an extremely important parameter for an operational flying squadron because it is a determinant of the squadron capability level, since generally when experience increases, combat capability increases, and it determines the quantity and quality of training for a given availability of flying hours.[131]

New pilots require more training to maintain and grow their skillset than experienced pilots.[132] Considering new pilots (wingman, and co-pilots) must generally fly under supervision, the ratio of experienced pilots to inexperienced pilots impacts the distribution of available flying hours for new pilots and thus the rate at which they will become experienced. Therefore, experience level "governs how the available training sorties can be distributed among pilots."[133]

The desired experience level refers to the proportion of positions that must be filled by an experienced pilot for the squadron to meet its mandate.[134] Since operational

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[131] Taylor *et al*., *Absorbing Air Force Fighter Pilots*,…54. For a more comprehensive discussion of readiness levels vs. proficiency see Laura Geis and Alan Brown, Correlating Training Effort and Tactical Proficiency, Center for Naval Analysis.; Taylor *et al, The Air Force Pilot Shortage*,…19-20.

[132] Taylor *et al*., *Absorbing Air Force Fighter Pilots*,…54.

[133] *Ibid.*

[134] Taylor et al., *Absorbing Air Force Fighter Pilots*,… 54.

squadron manning levels are constrained, each new pilot entering the squadron causes an experienced pilot to be re-assigned out of the squadron to another flying position or staff position. This trade of an experienced pilot for a new, inexperienced pilot decreases the overall squadron capability as a result of an uneven tradeoff. In studies of USAF fighter squadrons, Taylor *et al.* found that squadrons required experience levels of 60 percent in order to distribute training sorties uniformly among the pilots in the unit. If less than half of the pilots are experienced, they will fly a disproportionate amount of the available flight hours in order to supervise the inexperienced pilots.[135]

For example, if there is only one experienced pilot for every two inexperienced pilots, the experienced pilot will fly twice the rate as the inexperienced pilots in order to provide supervision, creating an environment where the rich get richer, and the inexperienced take longer to develop. Even in an environment where flying hours are unconstrained, the availability of pilots to supervise the inexperienced pilots becomes the limiting factor.[136]

Indicators of squadron health are more comprehensive than experience level, and can include factors such as manning levels, flying hours available to maintain currency and proficiency, sufficient numbers of personnel with high level qualifications, such as instrument check pilots, instructor pilots, and standards officers. These qualifications are important to experience levels because a flight lead or aircraft captain may be able to

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[135] *Ibid.*

[136] Taylor *et al.* *The Air Force Pilot Shortage,…* 24.

supervise a wingman or co-pilot on an operational mission, but not be qualified to conduct upgrade training for junior pilots.

Absorption

A mistake can be made to assume that the assignment of an inexperienced pilot to a squadron means that pilot has been absorbed. This, however, is false. Absorption is the process of developing an inexperienced pilot into and experienced pilot. Absorption can be considered a form of apprenticeship, with an explicit goal of producing an experienced, fully employable pilot.[137] Since the air force demand is predominantly for experienced pilots, the end of the absorption process can be considered the end of the pilot supply chain that produces those pilots to fill that demand. Absorption capacity refers to the number of new pilots that can be accepted into a squadron and developed in a timely manner while still maintaining the objective parameters of experience level and squadron health described above.[138]

There are several factors that affect the ability to absorb new pilots into operational squadrons. These include the combat readiness parameters (expressed by the health of squadrons as defined by the mix of experience levels), the operational tempo of the squadrons, and the amount of available flying and simulator hours available to the squadrons, including that available for dedicated training purposes, the number of flying

[137] A fully employable pilot may be employed in staff or advanced flying positions, such as instructor pilot positions. This is different from a fully qualified pilot.

[138] United States Air Force, *Air Force Instruction 11-412*,… 62.

positions at operational squadrons open to inexperienced pilots,[139] and assignment duration.[140] The amount of flying available is in turn affected by the number of aircraft, maintenance performance and budgetary decisions. Combined, these factors will influence the time it takes a pilot to become experienced. The objective of reducing this time has long been sought.

In his 1971 RAND study on pilot career management options, USAF Col (ret) W.A. Stewart, commented:

> Pilots now graduate from UPT [undergraduate pilot training] with 188-208 hours in the air. In a normal operational career, they add about 250 hours a year to their flight logs. Except for instructors and operational pilots in Vietnam, who build up time at accelerated rates, the normal pattern brings the pilot to 1200 hours of flying experience at the end of his fourth year after completion of UPT. Important research remains to be done to find a training methodology that would accelerate and compress this process, possibly by substituting hours in presumably low-cost simulators or other training devices for high-cost flying hours in actual aircraft. Alternatively, allowing pilots with low total experience to fly more per year could enhance force effectiveness by reducing the calendar time required to bring new pilots up to full combat effectiveness.[141]

There is an important relationship between the time to absorb a new pilot and career management policies that determine the average posting duration and rotation rate between flying and non-flying positions.

From an absorption capacity perspective, the need to accelerate the process of developing experienced pilots arises due to the limitations on squadron size, and

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[139] Note that in some air forces, certain aircraft are restricted to previously qualified pilots, for example the B-2 Bomber in the USAF.

[140] United States Air Force, *Air Force Instruction 11-412,..*, 20.

[141] Stewart, *Pilot Management Policy and Pilot Training Rates,…*14.

requirement for a continuous stream of new pilots entering the system to counter the various sources of attrition, including promotion beyond the flying ranks. The system begins to fail when the time to absorb a pilot exceeds the posting duration, since a pilot will move on from their foundational tour still not yet be experienced.[142]

The rate at which pilots are rotated between flying and non-flying positions also impacts the system. Just as pilots may be pushed from the squadron due to the arrival of a newly graduated pilot or promotion, pilots may be pulled from squadrons due to demand to fill high priority non-flying staff positions or attend professional development training. This generates the requirement to furnish a replacement, which will normally be an inexperienced or a previously qualified pilot, both of which create a demand on the training system and impact absorption capacity of the operational squadrons.

The pilot career management policies must also balance the need for an economic payback for the costly training, especially considering a pilot is not fully employable until he or she becomes experienced. Stewart has suggested that the career management directly impacted the number of pilots that had to go through the pilot training system. His thesis is "based on the premise that the way the Air Force manages the careers of its pilots significantly affects overall pilot training costs."[143] By adjusting the number of years a pilot is expected to remain in the cockpit following their initial qualification, and throughout their career, along with the rotational pattern of flying and non-flying positions, the number of new pilots that need to be trained can be reduced.

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[142] Taylor *et al*., *Absorbing Air Force Fighter Pilots,…* 75.

[143] Stewart, *Pilot Management Policy and Pilot Training Rate,…* i.

Stewart proposed the concept of re-training rates (RTR) as an index of the cost of training to be balanced against other criteria such as the need for quality (experience), career progression, mobilization requirements in case of emergency, and acceptability to prospective pilots to ensure sufficient new entrants.[144] In a system where few pilot would rotate to non-flying positions, such as the U.S. Air National Guard or an airline, retrain rates are very low. Due to air force requirements to fill staff positions and develop senior leaders, different approaches to job rotation can result in different retrain rates. Although the focus of Stewart's paper was to discover the pilot specific policies that would meet the requirements while reducing training costs, his definition of training encompassed all aspects of flying training ranging from undergraduate pilot training through to full combat ready status and continuation training to maintain skills. Therefore, despite the cost focus of his methodology, it addressed absorption requirements.

Absorption Capacity Issues

Since many Air Forces have at one time or another experienced a deliberate reduction of pilot manning and/or suffered pilot shortages, the problem of absorption capacity has been confronted. Problems arise when the managers of the under-graduate and operational training system capacity do not consider the operational unit absorption capacity in determining where the bottleneck exists in the system. Producing too many pilots resulting in over-absorption will decrease experience levels, and therefore squadron capability levels, further reducing absorption capacity. Left uncorrected, this creates a vicious cycle worsening air force's pilot manning sustainability and capability.

[144] *Ibid.*, 6-7.

Similarly, under-absorption will result in an insufficient number of pilots moving through the system to counter attrition of pilots leaving the occupation or the air force, and the demand for experienced pilots in the system will not be met.[145] The operational unit absorption capacity then becomes the basis for determining under-graduate and graduate pilot generation which in turn informs recruitment levels.[146] After faltering on this concept to try to address pilot shortages the USAF now acknowledges in its Aircrew Management policy that:

> Attempting to set absorption levels based on inventory overages or shortfalls is problematic and results in insufficient number of aircrews and/or reduced unit readiness. Regardless of retention/inventory levels, operational squadrons can only effectively absorb a set number of new aircrews.[147]

There is no easy approach to dealing with absorption capacity issues when confronted by a pilot shortage. Taylor *et al.* offer possible measures that address both the supply side, and demand side of the problem: On the demand side, the first measure is to reduce the number of incoming pilots in order to prevent absorption capacity from decreasing further as described above. In order to reduce the number of newly recruited pilots, retention must increase to compensate accordingly. Other options include reducing the total pilot manning levels or using alternate sources of manning (such as civilians or reservists).[148] The other approach involves increasing the absorption capacity of the system through measures such as increasing the force structure by adding aircraft,

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[145] Seguin, *PARSim, a Simulation Model of the Royal Canadian Air Force,…2.*

[146] United States Air Force, *Air Force Instruction 11-412,*…21.

[147] *Ibid., 20.*

[148] Taylor *et al., Absorbing Air Force Fighter Pilots,* 82.

increasing flying rates, adjusting flying distribution rates to enable faster development of inexperienced pilots, adjusting posting duration and frequency or lowering the standards expected of experienced pilots. Individually, each of these options has limitations and negative impacts on other goals within the pilot occupation system.[149]

The USAF has learned from their past experiences, realizing that changes to the system should be applied in "smooth, incremental, [aircraft fleet] specific adjustments over time vice major, non-specific corrections."[150] Any comprehensive approach taken to addressing absorption problems must include a variety of carefully considered initiatives and incorporate tradeoffs to address the supply and demand side of the problem.[151] These tradeoffs also have to consider rank progression requirements and limitations to satisfy the need to produce institutional leaders for the future.

This requires a comprehensive approach that strives to maintain the system in balance by coordinating career management policies and objectives, and operational force capability requirements with the realistic absorption capacities of the system. Decisions must be coordinated to ensure they make sense and keep the system operating in balance within a reasonable band, as measured at the weapon system level (i.e., CF-18, or C-130J). The system is said to be in balance when absorption capacity is greater or equal to sustainment requirements, and the training pipeline capacity is greater than the absorption capacity.[152]

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[149] *Ibid.*, 102.; United States Air Force, *Air Force Instruction 11-412,…*57-58.

[150] United States Air Force, *Air Force Instruction 11-412,…*57.

[151] Taylor, *et al.*, *Fighter Drawdown Dynamics,…* 97.

[152] United States Air Force, *Air Force Instruction 11-412,…*20.

The concepts of managing aircrew are fundamental to the sustainment of the pilot occupation. The parameters that define pilot experience and squadron experience levels also dictate the capability level of air force squadrons. The ability to sustain manning levels is dependent on maintaining a sufficient absorption capacity at the operational squadrons. Failure to do so will result in degraded capabilities and slow the process of new pilots becoming experienced, thus creating a vicious cycle that is difficult to reverse. Pilot recruitment, therefore must be conducted with consideration of the ability to absorb new pilots. As a result, there is a close relationship between the concepts of aircrew management discussed in this chapter and career management policies pertaining to flowing new pilots in and through the system.

The next chapter will provide a description of the issues with managing the pilot occupation which have arisen due to a number of internal and external factors.

CHAPTER FOUR

PILOT OCCUPATION MANAGEMENT CHALLENGES

In 1991 the need for an occupational analysis of the pilot occupation was recognized. This was the result of thirty years of structural including integration, unification, creation of environmental commands, and a pending downsizing.[153] A problem definition paper was issued to guide the development of an occupational analysis (OA) of the pilot occupation. The goal of the OA was to determine an occupational structure that would satisfy criteria related to training, assignment, pay and career. The document stated that "the OA should strive to achieve long-term stability for the occupation as a whole while providing individual members with challenging and realistic careers."[154] The problem definition paper (PDP) identified the requirements for the occupational structure to support peacetime and wartime scenarios and the requirement for pilots to be a part of the staff cadre at all levels in representative balance with other officer occupations. The paper identified a wide range of relevant issues concerning squadron experience levels, career management, professional development, pay and compensation, the societal factors affecting the workforce, and lifestyle dissatisfiers.

The PDP made extensive references to the lack of career streams for anyone who not selected to the command path, citing that "by not having defined career paths for those not selected to command, the air force denies itself the full services of many

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[153] Department of National Defence, "Pilot Occupation Analysis Problem Definition" (Ottawa: DND, 1991), 2.

[154] *Ibid.*,1.

talented airmen."[155] It also acknowledged the differences in squadron structure between communities has negative impacts on promotion opportunities since a 20 pilot squadron and a 50 pilot squadron still had the same number of supervisory positions, thus limiting opportunities for some pilots. It also re-iterated a call from the 1989 Officer Corps Study for "individuals to have more meaningful input to posting and career decisions."[156]

The report also identified that operational squadrons were chronically under-experienced as a result of continuously pushing new pilots into the squadrons causing experienced pilots to be posted out. The number of positions reserved for new pilots denied many experienced pilots more than two operational flying tours. Simultaneously, there was a need to fill a large number of staff positions designated for experience pilots. Furthermore, the rotation of pilots on a "three year posting cycle means that most officers, staff and operational are essentially unproductive for much of their careers." It continues to state that "While there is much to be said for diversity and broadening, there is also much to be said for productive efficiency. In this too, perhaps we have failed to achieve a balance."[157]

The report addressed general officership concerns such as the need for a clear understanding of air force officers' responsibilities; the primacy of officership over piloting; the accommodation of officership and piloting through a dual-stream pilot career path; pilot professional development; air force control over recruiting, selection

[155] *Ibid.,* 3.

[156] *Ibid.,* 3.

[157] *Ibid.,* 6.

and induction; and recruitment of pilots too far in advance of courses.[158] The report acknowledges that

> Many military pilots are drawn to the profession primarily because of the opportunity to fly; officership must be nurtured very early in the training program….The problem of how and when to provide professional education and training without infringing on the need for the junior pilot to hone operational skills and performance, may deserve particular attention.[159]

There was also a sense of frustration expressed with the situation and potential solutions. Previous occupational studies were criticized as having been insufficient as they were completed outside of Air Command by individuals who do not understand the particularities of the occupation. Furthermore, despite the issues being well defined, Air Command did not have the authority to implement solutions.[160] The report left the OA team with an ambitious task of considering thirty-three items related to the management of the occupational.

The OA returned several recommendations. Among them included the recommendation to create a Pilot Branch to manage the occupation, to create five separate speciality pilot occupations according community, the proposal for creating a three-stream flying training system and recruiting specifically to the aircraft type, and to the flying-non-flying position ratios by eliminating some non-flying positions. In 1995, a response to the recommendations was provided by the Air Command Headquarters Strategic Personnel Planning citing several problems with the methodology and overly

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[158] *Ibid.*,6-7.

[159] *Ibid*.

[160] *Ibid.*, 2,9.

subjective nature of the assessments, characterizing the recommendations as being based solely on the operational aspects of the occupation and not considering the broader implications related to progression to command.[161] As a result, many recommendations were not implemented.

Around the turn of the century there was a renewed effort correct some of the existing occupation structural issues. Project Military Occupational Structure Analysis, Redesign and Tailoring (MOSART) was to conduct a job analysis of the pilot, air navigator and aerospace controller occupations to "evaluate the occupational structure of the occupations and to ensure the most efficient and cost effective selection, training, employment, career management and retention processes so as to meet foreseeable Air Force (AF) and Canadian Forces (CF) requirements."[162] A secondary objective was to investigate the impact of creating an Air Operations Career Field that would encompass pilots, air navigators, and aerospace controllers. The investigation of a career field structure was a way of addressing, among other things, career management issues, namely, promotions and the assignment to certain staff positions.[163]

The project re-initiated an analysis of the occupational issues. It acknowledged that the pilot occupation specification was drafted in 1981 and was obsolete. Furthermore, considering few of the recommendations from the previous iteration

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[161] T. A. Ewashko, *Situating the Recommendations of the Pilot MOC 32 Occupational Analysis* (Ottawa: Air Command Headquarters Strategic Personnel Planning,1995).

[162] Department of National Defence, *Air Operations Officer Occupation Final Analysis Report Air Navigator (ANAV), Pilot (PLT), Aerospace Controller (AEC)- Draft.* (Ottawa: DND, 27 May 2007), vi.

[163] Department of National Defence, *MilPers Instruction03/07 – Use of the Sub-Occupation Construct within the Military Employment Structure (MES)* (Ottawa: DND Canada, 20 September 2007), A-1.

implemented, many of the same problems remain.[164] The project team noted specific problems with meeting recruiting targets, cyclical attrition, squadron experience levels, and insufficient capacity at the OTU's.[165]

The project work was completed from 2002-2006 and delivered a draft report with recommendations in 2007. The final recommendations included maintaining a single pilot occupation, with three sub occupations by stream (Jet, Rotary Wing, Multi-engine), and providing consideration for a flying only/ career officer dual stream construct.[166] This was intended to address the realities of career progression noting that:

> Career progression for the vast majority of Air Force officers, including pilots, does not exist as advertised — during the previous 20 years, on average, 80% of officers have left the Air Force at the rank of Captain, 10% at the rank of Major and 10% at the rank of LCol or above.[167]

Furthermore the report acknowledged that the sub-occupations are in-line with the de facto constructs of the occupation and noted apparent benefits of the sub-occupational construct:

> Sub-occupations seem to have a built in flexibility that allows for each sub-occupation to tailor its personnel management framework to its needs, will allow an individual's needs to be taken into consideration more easily, creates few barriers to movement between fleets.[168]

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[164] Department of National Defence, *Air Operations Officer Final Report Annex G: Pilot Job Analysis Report 10 August 2004* (n.p.: DND, 2007), vi.

[165] Department of National Defence, *Air Operations Officer Final Report Annex I: Air Ops Officer Nov 05 Conference Minutes,* (Ottawa: DND, 2007), I-4.

[166] DND, *Annex G: Pilot Job Analysis Report: ,…*37.

[167] *Ibid., 35.*

[168] *Ibid., 40.*

Unfortunately, the MOSART project was terminated in April 2007, the same time as the draft final report was produced.[169] No actions were taken to adjust the occupational structure and responsibility for continued analysis was handed over to the Directorate of Personnel Generation Requirements.[170]

Besides the occupational structure issues, there has been a continuous parallel effort to monitor and adjust the real time health of the occupation to address the personnel shortages of the pilot occupation. These efforts have been challenged by a continuous sequence of internal and external impacts.

Internal and External Impacts

In 1992, the Forces Reduction Program (FRP) was initiated offering a compensation package "designed to entice member to take early release or retirement from the CF."[171] The FRP was initially offered to Non-commissioned members and later to officers in targeted occupations.[172] In 1994, the Chrétien Liberal government issued the 1994 Defence White Paper calling for a one-third reduction in the manning levels of the Canadian Forces. Among the Minister of National Defence's (MND) stated objectives included the following: "Military career paths will be restructured to reduce the number of postings and assignments. This will result in fewer relocations, ease the burden on

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[169] Department of National Defence, *Occupation Structure Development Plan Memorandum,* (Ottawa: D Air Pers Strat, 31 December 2007).

[170] DND, *Air Operations Officer: Final Analysis Report,…*9-1.

[171] Chief of Review Services, *Audit of Force Reduction Program* (Ottawa: DND Canada ,1997), i.

[172] *Ibid.*

military personnel and their families; and result in savings for the government."[173] The FRP continued until 1996 and was coupled with a period of little to no recruitment.[174] This had numerous unintended consequences such as disrupting manning and experience levels and the years-of-service (YOS) demographic profile of the CF.[175]

FRP was particularly difficult for the Air Force; the number of aircraft in the RCAF fleets was reduced by roughly 50%. Furthermore, in the midst of 25% cuts to environmental (Air, Land and Maritime) personnel, the Air Force suffered a 45% personnel reduction, making it the smallest it had been since the Second World War[176] Following the FRP, attrition levels remained higher than average at around 12%.[177] Concern was raised in 1997 at the perceived high rate of attrition among Air Transport Group Pilots, which precipitated a report on the attrition rates of CC130 pilots. Analysis conducted by the Directorate of Operational Research found that the rates had indeed increased dramatically, as airline hiring increased and "military pilots were prime candidates for these airlines because of the quality of their training and their experience

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[173] Canada. Department of National Defence, *1994 Defence White Paper* (Ottawa: DND Canada, 1994), 33.

[174] Chief of Review Services, *Audit of Force Reduction Program*,…7.

[175] A. Zegers, *Retention Bonus Costing Analysis - Research Note* (Ottawa, ON: Directorate Strategic Human Resource Coordination Personnel Operational Research Team & Directorate, Department of National Defence, 2003). Years of service demographic profile refers to the population size for a given years of service. The ideal profile is provides a relatively stable decreasing number of personnel for an increasing number of years of service (Appendix 2, Fig A2.2) In 2003 Zegers found a disproportionate number of members in the 12-20 Years of Service (YOS) with a shortage in the 2-11 YOS bracket. These problems are difficult to correct and create numerous side effects ranging from career progression limitations to attrition spikes followed by critical experience shortages.

[176] Allan English and John Westrop, *Canadian Air Force Leadership and Command: The Human Dimension of Expeditionary Air Force Operations.* (Kingston: DND Canada, 2007), 63.

[177] Department of National Defence, "Pilots Encouraged to Remain in Air Force", June 1, 1998. http://www.forces.gc.ca/en/news/article.page?doc=pilots-encouraged-to-remain-in-the-air-force/hnlhlxec.

level on heavy and/or complex aircraft."[178] The attrition problem gained attention at the highest levels.

In December 1997, Chief of the Air Staff Lieutenant-General Allan DeQuetteville reported to the Standing Committee on National Defence and Veterans Affairs (SCONDVA) that by March of 1998 the air force expected to be short 240 pilots – 14% below their establishment. In response, he directed increased in pilot training as a priority, acknowledging that experience levels would suffer to accommodate the newly trained pilots into the system and stating, "The direct and immediate consequence of this action has been to lower the number of experienced pilots in our operational squadrons and to reduce the operational effectiveness of these squadrons."[179] The structural issues of the occupation were now being exacerbated by the manning shortfall.

The focus on ensuring closing the manning gap continued for the better part of the next two decades however the PML was a moving target. PML went from 1613 in 1998-99 to a low of 1447 in 2002-03, rising again to 1478 in 2003-04. During this same period attrition rates dropped due to a combination of economic factors that slowed airline hiring and retention efforts. By 2004 the pilot occupation was at 94% of PML. The occupation remained "healthy" until 2006 when PML began to grow above 1500, reducing TES to 91%. Around 2007, a high number of pilots eligible for an immediate annuity, combined with a return to hiring by the airlines contributed to a spike in attrition.[180] Attrition

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[178] P. Fournier, *A Briefing on the Analysis of CC130 Pilot Attrition Rates* (Ottawa: Department of National Defence Directorate of Operational Research (CAM), 1997), 5.

[179] Lieutenant General Allan DeQuetteville, House of Commons. Standing Committee on Defence and Veterans Affairs, *Minutes of Proceedings and Evidence,* No 16, 4 December 1997, 15:45.

dropped off in coincident with the economic downturn in 2009 and has remained fairly stable since 2009/2010 and consistent with the broader CF average attrition rate of approximately 6%.[181]

TES has continued to fluctuate between 85% and 89% since that time in large part due to PML growth. PML has grown roughly 10% since 2004 while TES has grown only 4%.[182] Much of the PML growth can be attributed to increased demand for pilots to facilitate the procurement and introduction of new aircraft to the RCAF. In addition to these health problems, there has been long standing recognition of the structural problems of the pilot occupation. During this period there were major changes to flight training that impacted the ability to produce new pilots.

Flight training was also changing towards a contract delivered model throughout this period. In 1992, the first contract flight training program for the Air Force was established as CFB Portage la Prairie was closed. Primary flying training was provided by civilian contractors, while multi-engine and rotary wing training continued to be provided by military instructors.[183] Then in 1997, the Canadian government announced a 20 year, $2.8 billion contract with Bombardier Inc. to provide pilot training services at 15 Wing Moose Jaw, Saskatchewan. The NATO Flying Training in Canada (NFTC) construct was born out of need to reduce the costs of pilot training and relied upon

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[180] Pelchat's survey indicated that 53% of the 904 respondents had completed more than 15 years of service. Attrition is highly correlated with 20 YOS point which more than half of the pilots would have reached by 2007.

[181] DND, *DGMPRA Pilot 00183 database extracts*, 31 Aug 2014.

[182] *Ibid.*

[183] Department of National Defence, "3 Canadian Forces Flying Training School," accessed, 15 February 2015, http://www.rcaf-arc.forces.gc.ca/en/15-wing/3-flying-training-school.page.

international participation to be successful.[184] The contract provides fully serviced aircraft, training material, flight simulators, and airfield and site support services to support undergraduate and graduate flight training to Canadian and North Atlantic Treaty Organization (NATO) allies.[185]

The NFTC program has been plagued with difficulties since its inception. Due to a combination of late aircraft and simulator deliveries, difficulties with technical data, aircraft serviceability problems, and an insufficient number of instructor pilots, the new training system was unable to generate the required number of sorties to meet its contractual obligations. [186] In 2002, the Office of the Auditor General (OAG) reported that only 41% of the paid-for training capacity had been used.[187] The original production plan for was for 216 pilots through the Phase IIA pilot training in the first two years. The actual output during this period was 61 pilots – less than the total produced under the military training system with the CT-114 Tutor in 1999 (64 graduates). [188] These problems were attributed to inevitable program start-up issues and therefore were not forecast to persist.[189]

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[184] Office of the Auditor General, "1999 September and November Report of the Auditor General of Canada Chapter 27 Case Study 27.1-NATO Flying Training in Canada."(n.p. OAG, 1999), 27-15. Available at http://www.oag-bvg.gc.ca/internet/English/att_9927se01_e_9980.html.

[185] Department of National Defence, "NFTC-NATO Flying Training in Canada" last modified 17 April 2015, http://airforce.mil.ca/caf/dairsim/page-eng.asp?cid=1045.

[186] Office of the Auditor General, *Report of the Auditor General of Canada: NATO Flying Training in Canada* (Ottawa: Government of Canada, 2002), 6.

[187] *Ibid.*, 9.

[188] *Ibid.*, 6.

[189] *Ibid.*,19.

The delays in the program created a backlog of pilots awaiting training. In Sept 2001, there were 161 students awaiting pilot training, with another 109 in Basic Officer Training, second language training and completing university requirements. At this time, the wait-times for pilot training was 18-22 months. By July 2002 the backlog had be reduced to 131 and the wait time had decreased to 14 months.[190] Despite the shortfall in NFTC production, DND reported that the system was producing as many pilots as could be absorbed by the follow-on multi-engine and helicopter training schools and subsequent operational training units.[191]

In 2006 the OAG status report provided an update on the NFTC program. The report found that the contractor was now meeting their obligations; however, the CAF was unable to enroll enough pilots to use all the training capacity. From December 2002 to December 2005 the CAF was only able to use 78% of the available training capacity.[192] As the Auditor General report indicated:

> The training program has remained underused because National Defence has not enrolled enough pilots into the NFTC program. In addition, however, we found that the ability of the operational training units to absorb pilots after their NFTC training is an ongoing problem—the units do not have enough room to take in all the pilots that the NFTC program would graduate if it was used at full capacity. Therefore, the Department has been limiting the number of pilots it enrolled in the program in 2003 and 2004. This trend has continued into 2005.[193]

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[190] *Ibid.*, 9.

[191] *Ibid.*

[192] Office of the Auditor General, "National Defence: NATO Flying Training in Canada," *Status Report of the Auditor General of Canada* (Ottawa: Government of Canada, May 2006), 84.

[193] *Ibid.*

Part of the low enrolment was deliberate. In 2004 the CAF lowered enrolment due to an anticipated interruption in the follow-on training. A new contract was being awarded for multi-engine and helicopter training and a two-year transition period was expected to reduce through-put capacity. The decision was made to lower enrolment through the basic NFTC course until the next stage of training reached full capacity. By this time, the pilot training backlog was at 80 pilots with wait times reduced to 11 months.[194]

By 2012, CRS noted that there appeared to be no solution in sight. [195] The pilot occupation had a persistent shortage of 200-250 personnel over the previous 10 years. This was attributed to "bottlenecks in the RCAF contracted flying training program", having only met 74% of its contracted goal of producing newly winged graduates. Wait times for pilot training over the previous five years was "consistently more than 12 months" and "as a result of training delays between various phases, it can now take four years to graduate a pilot to wings standard."[196] There were numerous contributing factors. [197]

Throughout the first 10 years of its contract, the CT155 Hawk jet trainer suffered engine problems that resulted in several forced landings and two crashes. Engine maintenance precautions had slowed jet pilot training throughput to such an extent that in

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[194] *Ibid.*, 85.

[195] Chief Review Services, *Evaluation of Air Force Training and Readiness Part 1 – Air Force Initial Occupational Training*, http://www.crs-csex.forces.gc.ca/reports-rapports/2012/187p0940-eng.aspx ed., Vol. 2015 (Ottawa, ON: Department of National Defence, 2012).

[196] *Ibid.*

[197] *Ibid.*

2011 the RCAF was required to contract additional training in the Euro-NATO-Joint Jet Pilot Training (ENJJPT) in the United States.[198] The recruiting system also struggled to deliver to attract enough successful applicants.

The pilot occupation has historically drawn a higher number of applicants than most occupations. However, in 2000 changes to this pattern began to emerge. In 1996/97 the Officer Cadet Training Plan (OCTP) ceased in response to the requirement for a degreed officer corps. The OCTP entry plan historically accounted for 50% of new pilot entrants. Alternate entry plans have opened and closed over the past several years, however, the recruiting system, for a variety of reasons, has been unable to attract the desired number of applicants. For example, from FY 96/97 to 99/2000 the Continuing Education Officer Training Plan (CEOTP) attracted about half of the historical OCTP numbers.[199] The negative impacts of low recruiting were muted in part by the backlog for pilot training. In addition to recruiting challenges, there were challenges with pilot selection.

CRS noted that the pilot selection process was outdated and may have contributed to throughput challenges. The Canadian Automated Pilot Selection System (CAPSS) in use at the Canadian Forces Aircrew Selection Centre (CFASC) had been in use for 15 years. It suffered from obsolescence issues, reliability issues and a poor track record of selecting successful candidates. Only 59% of screened candidates were successful in

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[198] David Pugliese, "Canadian Fighter Pilots were sent to the U.S. due to Problems with Training Program." *Ottawa Citizen* July 29, 2014.

[199] Department of National Defence, DG Air Pers, *Minutes of the Meeting Air Human Resources Committee 10 February 2004* (Ottawa: DND Canada, 2004).

graduating to "wings standard," compared to an 85% success rate with the Royal Air Force system.[200]

In an effort to modernize pilot selection and the RCAF retired the RCAF retired the CAPSS in 2013 and procured the RAFAAT selection system, now known as the Canadian Forces Aircrew Selection Test. Furthermore, selection procedures were amended to ensure a "top down selection" process was used, whereby the highest performing candidates are provided enrollment offers as opposed to a "first through the gate system" which provides offers to all candidates who meet the minimum standard until the annual recruitment quota is filled. Essentially, the top down selection ensure the best applicants are selected, not just the first minimally suitable applicants.[201]

Operational Squadron Absorption

Despite the low production of newly winged pilots, the operational communities were having difficulty accepting the new pilots for a number of reasons including low squadron experience levels, availability of flying hours, and limited opportunity to conduct training missions. Operations in Kosovo, Bosnia, Afghanistan, Libya, Iraq, Eastern Europe, Haiti, Mali and other parts of Africa, have ensured virtually every RCAF platform has been engaged in operations overseas since 1995. Furthermore, routine air movement, Search and Rescue (SAR) operations, and North American Aerospace Defence (NORAD) operations, are continuous domestic operations that must be

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[200] Chief Review Services, *Evaluation of Air Force Training and Readiness Part 1*.

[201] Patrick O'Dwyer, "RCAF Pilot Selection Simulator Retires," Department of National Defence, accessed 05 May 2015, http://www.rcaf-arc.forces.gc.ca/en/news-template-standard.page?doc=rcaf-pilot-selection-simulator-retires/hn1f6mvd.; DND, *Record of Discussion of the AMOR-Pilot MOSID 00183 05 December 2013,…* F3.

fulfilled.[202] In 2005, then Chief of the Air Staff Lieutenant-General Pennie testified before the senate stating:

> The Air Force is at a critical time in its evolution…we have one-half of the number of people and one-half the number of aircraft that we did at the end of the Cold War. Over the same period, the number of air force personnel on operations has roughly doubled with no sign that future operational tempo will decrease….The Air Force faces a sustainability gap in its ability to generate operational capability at it transforms to fulfill its roles in defence of Canada and Canadian interests.[203]

This high operational tempo combined with reduced manning, equipment and financial resources resulted in a reduction in the ability to generate dedicated training missions. These missions limit the opportunities to provide training and qualification upgrading for the new squadron pilots.

As the squadrons became manned to their establishment limits, newly posted-in pilots caused experienced pilots to be posted out. In 2004 squadron commanders were feeling the effects of low experience.[204] In 2008, the experience levels were at a ratio of 1:1.5. The average time for a pilot to become experienced was three years, and upgrades to aircraft captain and four plane lead were taking three to four years.[205] Due to planned

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[202] André Deschamps, "Into the 21st Century – An Overview of Canada's Air Force in 2010," *Canadian Military Journal*, Volume 10, Number 4 (Autumn 2010): 59-65.

[203] LGen Ken Pennie, Chief of Air Staff, House of Commons. Standing Senate Committee on National Security and Defence, *Proceedings of the Standing Senate Committee on National Security and Defence* Issue 11 - Evidence, 7 February 2005, cited in English, Canadian Air Force Leadership,…81.

[204] Denko, "An Inquiry into the Relationship,..113.

[205] Department of National Defence, *Pilot Production Absorption Plan Briefing*, (n.p.: DG Air FD, 02 April 08)

production rates, it was deemed there was no choice but to limit a pilot's first flying tour to two and half years. In response, pilots had to become experienced within two years.[206]

In 2012 the available flying hours was reduced significantly in response to defence budget cuts. Some fleets, such as the CF-18 have been experiencing retention problems with technicians, putting additional pressure on the ability to absorb new pilots into the operational squadrons.[207]

Temporary Solutions

Over the years there have been a series of temporary solutions implemented to attempt to counter some of the manning and experience challenges the pilot occupation was encountering. In 1998, the Pilot Terminable Allowance (PTA) retention scheme was offered to eligible pilots. It consisted of a $50,000 to $75,000 retention bonus, paid over a three year period, for five years of obligatory service.[208] This was the only time a retention bonus has been offered in the CAF. It was a controversial measure that caused dissatisfaction due to perceived unfairness in determining eligibility. In total, 567 (65%) of the 867 eligible pilots accepted the PTA.[209] Unfortunately the effectiveness of the PTA in reducing attrition is largely unknown. Major D. Pelchat's 2002 study was the only follow-up examination of the retention bonus; and while it asked many questions

[206] Department of National Defence, *Pilot Production Absorption Plan Briefing*, (n.p.: DG Air FD, 02 April 08)

[207] CFB Cold Lake continues to suffer high attrition rates of air technicians due to the high draw locally from the oil industry.

[208] Deb Howe, *The Bonus Fix: The Role of Retention Bonuses in the Canadian Forces and Policy Recommendations* (Ottawa: Director Military Employment Policy, 2005), 61.

[209] Doug Pelchat, *Canadian Forces Pilot Retention Study: Sponsor Research Report 2002-11* (Ottawa: DND, 2002), 46.

about the bonus, it did not ask what role if any the bonus played in the stay/leave decision of pilots who accepted it. Analysis of the voluntary release data showed a significant decrease in the release rate following the year 2000. This was however coupled with significant external events that affected pilot attrition during this period. These included the September 11, 2001 terrorist attacks and the collapse of the domestic air carrier, Canada 3000, both of which impacted in airline hiring. In 2005, Major Deb Howe of the Director of Military Employment Policy concluded that "in the absence of meaningful measures and data, the organization lacks the opportunity to learn from its only experience with a retention bonus." In addition to retaining pilots, there was increased effort to recruit experienced military pilots.

Skilled Applicants and Loaned Pilots

The RCAF has sought skilled enrollees from three main categories. The first targeted group consists of retired RCAF pilots, who were welcomed back into service with the caveat that they must serve a four year ground tour prior to being awarded a flying position.[210] Second are foreign military pilots were also offered entry into RCAF under the Skilled Applicant Recruitment Program (SARP). These initiatives are said to have the benefit of "adding quickly and directly to the TES, thus saving important time in training and positively impacting experience levels of occupations."[211] To achieve a similar effect, a one-way loan program was arranged that provided twelve Royal Air

[210] This rule has not been steadfast. However it is still briefed in the annual career manager briefing leaving that impression with current members who may release.

[211] DND, *Air Personnel Doctrine*,…5-5.

Force pilots and three German Air Force pilots for a period of three years.[212] A further five French Air Force pilots are planned to be loaned to the RCAF. The success of these loans varied by community and in some cases, the pilots, despite their previous background, lacked the experience and training required for RCAF operations.[213] However these loans are temporary and a plan has yet to be devised to fill the gap they will leave at the end of their tours.

Amendments to Training Programs

There have also been a number of initiatives to increase pilot throughput at all levels of training. In addition to compressing the time to experience on operational squadrons to two years, there was direction for "sweeping changes all phases of ab initio pilot training." [214] Additional training slots were contracted through ENJPT, and OTU training plans were also under pressure to be able to handle the throughput, and questions of "how good is good enough" were at the forefront. [215] Entire capabilities were being dropped from OTU training in an effort to meet production numbers. By 2015 pilot's in the jet stream were now

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[212] Department of National Defence, *Record of Discussion of the Annual Military Occupation Review (AMOR) -Pilot MOSID 00183,* 06 December 2012 (Ottawa: D Air Pers Strat 5, 15 March 2015), F2.

[213] DND, *Record of Discussion of the AMOR-Pilot MOSID 00183,* 05 December 2013,… F2, 4.

[214] Department of National Defence, *Record of Discussion of the Annual Military Occupation Review (AMOR)-Pilot MOSID 00183,* 07 December 2011 (Ottawa: D Air Pers Strat 5, 29 February 2012), F3.

[215] The CF-18 OTU was in constant revision from 2007-2013 to attempt to reduce the course duration. The squadron even changed their mission from "To Train World's Class Fighter Pilots" to "To Train Fighter Pilots to Meet Canada's Needs". In 2012, a pilot project was initiated to graduate pilots from the CF-18 OTU pilots as Air-to-Air only qualified pilots, with the intent of returning them at a later date for additional training. Maj. Ian Decarlo, "It Ain't Easy! Training a Canadian Fighter Pilot*." Royal Canadian Air Force Journal* 3, no 2(Spring 2014), 28. This pilot project was cancelled in 2014.

conducting a new version of Phase III training to receive their wings on the Harvard II.

Current and Future Issues

Despite efforts to regain stability in the pilot occupations, problems still persist. In 2012 the available flying hours was reduced significantly in response to defence budget cuts. This restricted the ability to fly to such an extent that many squadron level pilots were not meeting their annual minimum hours for flight currency creating challenges absorbing new pilots.[216] Given the high pace of ongoing operations for some fleets, this has created challenges for training newly qualified pilots. The ability to accept newly winged pilots was so limited that the possibility posting new graduates to staff tours was being considered. [217] By 2015, most cockpit positions were full, experience levels are suffering, and flight hours have not increased with the exception of the support required for deployed operations.

There are more challenges on the horizon that will pressure the pilot occupation. The introduction of new fleets will continue, to include a new fighter aircraft, a fixed wing SAR replacement, and the introduction of the Cyclone maritime helicopter. The pilot training system will undergo another substantial change in the next decade which create potential for disruption to the pilot production system. The future security environment does not provide hope for operational reprieve. Operations over the past five years are an indication of how rapidly the RCAF can be expected to deploy in response to unexpected events, which are sure to continue to arise in the future, ensuring the pilot occupation is under constant pressure.

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[216] Department of National Defence, *CAG Backbrief to the Commander*, Presentation To the Commander 1 Canadian Air Division, (Winnipeg: 1CAD Director Fleet Readiness, 26 February 2014)

[217] DND, *Record of Discussion of the AMOR-Pilot MOSID 00183,* 05 December 2013,…4.

The current years of service and age demographic profiles (Figure A2.1) cause concern for filling senior positions with experienced Air Force officers in the future.[218] In the current profile, there is a high number of pilots that are eligible for an immediate annuity, with relatively few pilots in the cohorts behind them to take their places as they begin to retire. Furthermore, there is a large group of pilots that were recruited in the late 90's that are approaching 20 years of service and will become eligible for an immediate annuity. The ideal years of service profile (Figure A2.2) ensures that there are sufficient personnel in the system to continue to a full career, which is required to progress to the highest rank levels. Essentially "it is a tangible reflection of the distribution of experience and relative military value among CF personnel."[219] Furthermore, newly winged graduates are on average 30 years old. These pilots have expressed less interested in the Fighter and Tac Hel communities.[220] Furthermore, as a result in minimum time in rank requirements, their age may impact their ability to progress through the rank structure to the highest levels. This deterministic factor could influence attrition trends.

Pilot attrition has always been closely related to airline hiring activity. There is an industry expectation for high demand for pilots in the near future. For many years it has been expected that a large number of airline pilots worldwide will reach retirement age in the coming decade. There is a predicted shortage of approximately 533, 000 pilots

[218] DND, *DGPRA Pilot 00183 database extracts*, 31 October 2014.

[219] Tasseron, *Military Manning and the Revolution in Social Affairs*,…55.

[220] DND, *Record of Discussion of the Annual Military Occupation Review-Pilot MOSID 00183*, 07 December 2011,… F2.

worldwide, including 88,000 in North America over the next 20 years.[221] At the same time, civilian pilot training costs and low starting salaries for pilots has reduced the number of civilian pilots entering the workforce.[222] These conditions could create a spike in attrition of experienced pilots that further delay any attempts that have been made over the past two decades to stabilize the pilot occupation.

There have clearly been a number of issues, internal and external that have impacted the management of the pilot occupation. The scope of managing the occupation is vast and the inertia of the system, combined with an inability to control numerous aspects of it, presents an immense challenge. The current state of the occupation can be characterized as having a high operational tempo, lower than desired experience and restricted training hours. The future has many challenges due to an expectation of continued operations, slow, if any progress on improving manning levels and problematic age-years of service demographics that will cause pressure to fill experience gaps and could impact attrition trends. Furthermore, the upcoming changes to the training system are likely to cause a disruption in production at a time when the industry demand for pilots is forecast to increase. The future is uncertain but there is potential for the perfect storm in pilot manning.

The next chapter will provide a description of individual perspective of pilot careers and career paths.

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[221] Guy Norris, "Boeing Urges International Action to Meet Pilot Shortage Challenge," *Aviation Week*, 30 July 2014. http://aviationweek.com/commercial-aviation/boeing-urges-international-action-meet-pilot-shortage-challenge

[222] Arshy Mann, "Despite pilot shortage, few students choosing aviation," *The Ubyssey, 06 November 2011.* http://ubyssey.ca/news/despite-pilot-shortage-few-students-choosing-aviation631/.

CHAPTER FIVE

PILOT CAREER MANAGEMENT

Pilots conduct a large variety of roles throughout their careers. The most recent review of the pilot occupation described these roles as follows:

> "The primary task of a pilot in the Canadian Forces is to operate aircraft to accomplish air operations and training missions in the air, land and sea elements. In addition to flying aircraft they may participate in the selection, development, design, acquisition, testing, evaluation, and operating techniques of aerospace equipment applicable to his qualifications. They also participate in the formulation of strategic and tactical plans, policies, and standards of existing and future aerospace systems as well as fill training, operational, and administrative positions that will benefit from pilot expertise. Officers of this classification command flights, detachments, units, stations, and bases and serve in appropriate staff positions at units, commands, and headquarters."[223]

This expansive list of roles spans a large spectrum of roles within the aerospace power domain and reaches into the strategic levels of the profession of arms. As a result, the positions for these roles are labelled as "Hard" or "Generic" positions. Hard positions must be filled by qualified pilots based on the requirements of the position and include all flying positions and some non-flying positions. Generic positions may be filled by pilots or other occupations depending on the nature of the job. The result is that a pilot may conduct a variety of different jobs leading to numerous possible career paths.

The pilot occupation is predominantly a closed, hierarchical system comprised of distinct capability-based communities. Therefore, personnel enter the RCAF at the bottom of a career path, are assigned to a community early in their career, and move through the officer rank structure in a progressive rank-in-person system. Career

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[223] DND, *Air Operations Officer: Final Analysis Report,…*1-1.

progression is frequently connected to rank progression, which is tied to the officer developmental process known as the professional development framework. The professional development framework consists of five developmental periods with a clear line of demarcation at the junior officer and senior officer levels that determines who participates in professional development. Resulting, pilot's careers can be characterized by rank progression and community affiliation. This section will provide a description of pilot careers paths and career management based on these constructs.

A pilot's career begins with the entry scheme. Pilots are recruited into the CAF under three entry plans: The Regular Officer Training Plan (ROTP), Direct Officer Entry Plan (DEO), and Continuing Education Officer Training Plan (CEOTP). All officers are required to have an undergraduate degree upon commissioning, therefore each of these entry schemes address that requirement as appropriate.[224] The length of the initial contract for pilots is variable; however all pilots must serve for seven years following their Wings graduation.[225]

In the ROTP entry plan new enrollees enter the CAF and complete an undergraduate degree either at the Royal Military College of Canada, or in some cases at a civilian university, prior to their training. Applicants who already hold an

[224] Contained in the Report to the Prime Minister on the Leadership and Management of the Canadian Forces, by The Honourable M. Douglas Young, P.C., M.P., Minister of National Defence , 25 March 1997, stated: " In order to improve officer development and to inculcate an ethos appropriate to the Canadian Forces, we will: …10. Change policies beginning in 1997 to make a university degree a prerequisite to commissioning as an officer, with the only exceptions to be made for those commissioned from the ranks…"

[225] Department of National Defence, "Canadian Armed Forces Jobs: Pilot Entry Plans," accessed 10 March 2015, http://www.forces.ca/en/job/pilot-32.

undergraduate degree may enter under the DEO and proceed directly to the developmental period (DP) 1 officer and flying training.[226]

The Continuing Education Officer Training Plan (CEOTP) accepts high school graduates who proceed directly to DP1 training in similar fashion DEO candidates.[227] The original version recruited pilots required pilots to complete a university degree by the end of the initial contract (within seven years of wings graduation). A new version is now offered in conjunction with Seneca College whereby new pilots will obtain a Bachelor of Aviation Technology and their pilot's wings over a four-year period of combined academic, officer and flight training.[228]

Graduates from select Canadian aviation college programs may enroll in the DEO or CEOTP schemes depending on their level of academic achievement (diploma or baccalaureate degree). These candidates graduate from their respective colleges with a Transport Canada Commercial Pilot's Licence. Their previous flying experience allows them to bypass the primary flying course and proceed to directly to the second phase following officer training.[229]

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[226] *Ibid.* The now defunct Officer Cadet Training Plan (OCTP) accepted candidates possessing only a high school diploma. This program closed with following MND 10, which negatively impacted pilot recruiting. The Community College Entry Plan (CCEP) accepted candidates from select aviation colleges who graduated with a college diploma and Transport Canada Commercial Pilot's Licence. These pilot The CEOTP entry scheme was initiated as a way to address the recruiting challenges while addressing the need for a university degree.

[227] *Ibid.*

[228] *Ibid.*

[229] Formerly, there was a specific entry plan that targeted aviation college graduations called the Community College Entry Plan (CCEP)

Once enrolled an officer's training, education, self-development and work experience and is guided by the Canadian Forces Professional Development System (CFPDS). The five DP's that progressively prepare officers for increased demands and responsibilities are divided by junior officer development (DP 1 and 2), which all officers are expected to complete for employment in their occupation and environment, and senior officer development (DP 3-5), which is selection-based depending on an individual's potential to continue progression to the more senior ranks.[230]

DP 1 consists of nearly two years training comprised of basic officer training, aeromedical and survival training, and flying training. Undergraduate pilot training consists of three phases. All pilots conduct Phase I and Phase IIA training on a similar path. Upon completion of Phase IIA, pilots are streamed towards one of three advanced paths consisting of jet, multi-engine or rotary-wing.[231] Pilots distributed between the Jet/Trainer, Rotary Wing and Multi-engine streams based upon a combination of individual desire, flying performance, academic standing and leadership evaluation.[232] Furthermore, the allocation of streams is relative to the overall ratio of RCAF positions in each stream as depicted in Figure 5.1.[233] In the past this has resulted in roughly one third

[230] Department of National Defence, *A-PD-055-002/PP-003 Officer General Specification* (Ottawa: DND Canada, last revised 23 April 2014), 2A-1.

[231] Department of National Defence, "NFTC – NATO Flying Training in Canada", last updated 17 April 2015, http://airforce.mil.ca/caf/dairsim/page-eng.asp?cid=1045.

[232] *Ibid.*

[233] DND, *Pilot Production and Analysis Team Final Report*,… 12.

of pilots being assigned a stream that they did not request.[234] This stream selection also separates the pilots on to their advanced flying training courses.

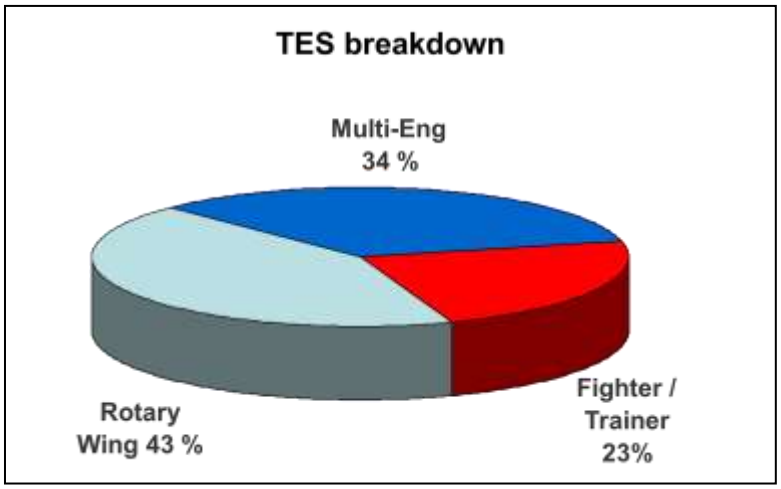

Figure 5.1- Trained Effectiveness Strength Stream Ratio

Source: DND – Pilot Production Analysis Team Final Report, 12.

Those assigned the multi-engine stream complete their Phase III training on the Beech C90A King Air while those in the rotary-wing stream will complete Phase III on the Jet Ranger and Bell 412 helicopters. Pilots remaining in the jet stream will conduct their Phase III flight training on the Harvard II. DP 1 culminates with the end of Phase III graduation to "wings standard" with 150-220 total flight hours depending on the stream and promotion to Lieutenant.[235] At this stage these newly winged pilots are considered part of the trained effective strength of the occupation. Whereas most officers will proceed to their first unit for employment, these pilots are still not qualified for

[234] Chris Denko, *An Inquiry into the relationship between pilot retention and Canadian Forces Career management practices*. (Master's thesis, Royal Roads University, 2005), 79, 80. Denko found that 64% of pilots were assigned to a community they desired. Further, only 53% agreed with the statement "I wish to remain in my current operational community", while 27% disagreed and 15% were neutral.

[235] DND, *NFTC – NATO Flying Training in Canada*.

meaningful employment until they have been trained and qualified on their future aircraft types at one of the four OTU's, or for certain aircraft, directly at their first operational squadron.[236]

The pilots selected for the jet stream are split between instructor pilot and fighter pilot routes. Those selected for the CF-18 must complete the Phase VI Fighter Lead-in Training (FLIT) prior to proceeding to the OTU, while the remainder proceed for instructor training on the Harvard II.[237] Upon successful completion of the OTU, pilots are assigned to their first operational squadrons where they begin to build experience and proceed to higher levels of qualification in their aircraft.

The aircraft and community assignments play a significant role in shaping how a pilots career develops based on both the operating environment and the squadron environment. The tactical role of these squadrons determines to which operational communities they belong. These communities consist of fighters, air mobility, search and rescue, maritime air, and tactical aviation. Fighters and air mobility conduct core air force tasks which may support any environment. Tactical helicopter (Tac Hel) squadrons provide integral support to the Army and Special Forces and as such are co-located on Army bases. The Maritime air community is divided between fixed wing long range patrol (LRP) and maritime helicopter (MH) fleets, and are located on both Canadian coasts. MH squadrons are integral to the Navy and deploy detachments onboard naval vessels. Search and Rescue community is comprised of fixed wing and rotary wing aircraft and conduct a non-military role that has been assigned to DND. As a result, each

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[236] DND, *Pilot Production and Analysis Team Final Report-Annex G*,… 32.

[237] DND, *NFTC – NATO Flying Training in Canada*.

community has a culture of its own that ultimately influences how individual's careers will evolve. Furthermore, the operational communities function as de facto sub-occupations, in which pilots tend to spend most of their career.[238]

The remainder of junior officer development is conducted as part of DP 2 which primarily consists of employment at the tactical level. Due the educational and training requirements, most pilots are in their late twenties or early thirties by this stage of their career.[239] Pilots will continue to develop the technical skills in the aircraft and learn about their operational environment through experience and training.[240] In addition to developing flying experience pilots are expected to participate in professional development through self-study in the Air Force Officer Development (AFOD) Program[241], and until recently the Officer Professional Military Education (OPME) program. However, completion is only mandatory for those who wish to compete for promotion.[242] Pilots who enrolled in under the CEOTP without an undergraduate degree are expected to complete their degree by the end of their obligatory service, and all

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[238] Allan English and John Westrop, *Canadian Air Force Leadership and Command: The Human Dimension of Expeditionary Air Force Operations* (Kingston: Canadian Defence Academy, 2007), 156.

[239] This data is also confirmed by the Directorate General Personnel Research Analysis database extracts for the pilot occupation.

[240] DND, *Officer General Specification*,…2A-1.

[241] Department of National Defence," Air Force Officer Development" accessed 20 May 2015, http://17wing.winnipeg.mil.ca/cms/en/aftc/winginfo/CFSAS-home/Courses/AFOD.aspxAFOD. AFOD is a five block program consisting of a total of 235 hours of onl-line self-study and a two week residential component.

[242] Department of National Defence, "Officer Professional Military Education", accessed 01 May 2015, http://www.forces.gc.ca/en/training-education/opme.page. The OPME program consisted of six academic and professional courses delivered in either a residential or distance learning. In accordance with CANFORGEN 218/12 the program concluded in 2013.

officers are encouraged to develop their second language abilities through self-study.[243] Promotion beyond Captain is competitive based on a combination of performance, potential, employment experience, second language abilities and completion of the professional development requirements. To be eligible, pilots must serve at least four years as a Captain.[244]

Senior officer develop consists of developmental periods 3-5. DP3 spans the rank of Major and Lieutenant Colonel and consists of employment and education depending on an officer's assessed potential for continued rank promotion. As a Major, pilots will be employed at the tactical level flying supervisory positions to prepare for future command. They are also expected to broaden their management skills and knowledge in the joint and interagency realm at the tactical and operational level in preparation for command appointments. This is accomplished through non-flying positions which comprise approximately one third of Major's pilot positions in the RCAF. There is no Air Force specific professional development at this stage however, completion of a post graduate degree is encouraged.[245] Selection for succession planning also occurs at the Major rank level. Succession planning aims to identify those who demonstrate the potential and motivation for rapid progression through the ranks to hold senior

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[243] It is possible to attend second language training courses at many air force bases, however course loading is subject to availability and prioritization. CAF members can access Allies Web, an online second language training program for self-study programs. Department of National Defence, "Second Language training - ALLIES Web" accessed 20 May 2015, http://www.forces.gc.ca/en/training-elearning/second-language-allies.page

[244] Department of National Defence, "Canadian Forces Administration Orders 11-06 Promotion to Captain, Major, Lieutenant Colonel", accessed 24 March 2015, http://corpsec.mil.ca/admfincs/subjects/cfao/011-06_e.asp.

[245] DND, *Officer General Specification*,…2A-1.

appointments. In addition to demonstrating the performance and aspirations for this career path, age and years of service and second language abilities are considered, to ensure there is sufficient time remaining in an individual's career to progress through each rank level and serve as a General officer for four years.[246]

These officers will normally conduct additional professional development through the year-long Joint Command and Staff Program (JCSP) to prepare officers for command and headquarters staff appointments. Majors must serve a minimum of four years to be eligible for promotion. Those promoted to Lieutenant Colonel will occupy flying positions if they have been selected for squadron command. Otherwise, these officers can expect employment in non-flying staff positions.[247] The RCAF has been criticized for not identifying a formally preferred career path for air operators consisting of specific "using" and "developing" jobs.[248] However, for Lieutenant Colonels and Colonels, command appointments are a de-facto pre-requisite for promotion.[249] The result of this rotation of jobs is that these pilots are guaranteed to fly less as they rotate jobs and are promoted to progressively higher ranks for which there are fewer flying positions.

Promotion to Colonel is the beginning of DP4, and is the last rank where officers remain part of the pilot occupation. There are no operational flying positions for

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[246] Department of National Defence, ACO 1000-7, *Royal Canadian Air Force Personnel Management – Officers* (Ottawa: DND Canada, modified 01 January 2010), 19.

[247] DND, *Officer General Specification*,…2A-1.

[248] English and Westrop, *Canadian Air Force Leadership and Command*,…152.

[249] Lynn Chaloux, "RCAF Succession Management", (Master of Defence Studies Paper, Canadian Forces College, 2014), 15.

Colonels, however if appointed to one of the 13 Wing Commander positions, some may continue to maintain flying qualifications and fly on an as available basis.[250]

The opportunities for promotion depend on a number of factors, not the least of which includes recruiting and attrition patterns. Promotions are limited by the number of positions at each rank, therefore, the number of individuals recruited and releasing over a period will impact the probability of promotion for all officers of a given cohort.[251] Of the 1618 pilot positions, 1087 are Lieutenant/ Captain positions. There are 373 Major positions for pilots which is the initial senior officer rank from which selection is made for squadron command as part of the succession planning process. Fewer than 10% of the total pilot positions are above the rank of Major with 122 Lieutenant Colonel positions and 36 Colonel positions. As a result, over the past 10 years, 46% of pilots have not progressed to DP 3 and retired from the RCAF as Captains and 35% of pilots release from the service at the rank of Major.[252] These officers have either plateaued in rank potential, elected not to participate in promotion competition via choosing not to complete the mandatory requirements, or released from the RCAF before they were promoted. This creates a de facto divide in career paths and career management commonly referred to as the dual-track flying/career streams. Like the community sub-occupations, the dual-track flying career streams don't formally exist but its de facto existence is based at least in part on the premise that that most pilots joined the Air Force

[250] DND, Air Personnel Doctrine,…3-1.

[251] This is due to the constraints on PML at each rank, therefore a large recruitment period will create circumstances where there are more individuals competing for the same promotions. This causes a trickle-down effect to subsequent cohorts.

[252] DND, *DGPRA Pilot 00183 database extracts,* 31 October 2014.

to fly aircraft and are not interested in progressing on the traditional vertical career path.[253]

The career paths for those that do not proceed on the traditional hierarchical path are not defined. Pilots' assignments following their first tour are at the discretion of the career management system which attempts to balance the desires of the members with the needs of the CAF. There are a few opportunities for pilots to apply to certain positions with a separate selection process outside of normal career management process, such as attending Test Pilot School, or the trying out for the Snowbirds Air Demonstration Team. Opportunities to change aircraft fleets has also been restricted in order to preserve OTU course slots for newly winged graduates.[254]

In reality however, the service needs always come first, and military members have little say in their postings.[255] This has perhaps contributed to dissatisfaction with the career management system. Past surveys of the broad CAF as well as pilot specific responses have shown consistent themes of unfairness, mistrust and lack of control.[256] In 2004-05 Captain Chris Denko conducted a study of the impact of career management on pilot retention. He found that "there did not appear to be a shared understanding amongst members of what the CF career management system is, how it functions, and what it is supposed to achieve."[257] Furthermore, Denko's findings suggested that a lack of member

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[253] DND, Annex G: *Pilot Job Analysis Report,…*40.

[254] DND, *Record of Discussion of the Annual Military Occupation Review-Pilot MOSID 00183,* 07 December 2011,… F2-3.

[255] Okros, *Becoming an Employer of Choice*,…185.

[256] See Denko, Pelchat, Butler or Grant for examples.

[257] Denko, *An Inquiry into the Relationship,…* 125.

involvement in the career management process caused many to perceive the system to be unfair and therefore fostered a general distrust towards the system.[258] Few believed the career management process was administered fairly, that it addressed their personal aspirations, or had confidence that they would get their next posting of choice.[259]

Interestingly, commanding officers, who take a leading role in the career management decisions, viewed things differently. They believed that members concerns were considered in posting decisions, but agreed that the greater needs of the RCAF came first. They recognized that the career management system was perceived as simply "filling holes", and had inability to provide any long-term focus. Furthermore, they believed this was a major source of dissatisfaction that ultimately impacted a members career decisions.[260]

A variety of factors starting from the point of entry into the military, and evolving through community assignment and subsequent positions will influence how pilots view their careers. The real and perceived opportunities will also contribute to an individual's formulation of their future career path as a pilot and officer in the RCAF. There is some truth to the generalization that many pilots were drawn to the Air Force to "fly airplanes, not a desk". In a 2012 retention survey directed at pilots, when asked why they joined the CAF, 100% of respondents selected *Occupation of Interest*. This is compared to 52.5% of the overall CAF population. 92% of pilot respondents indicated they felt their

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[258] *Ibid.,*127.

[259] *Ibid.,*124, 217.

[260] *Ibid.,*199.

occupation was still a good fit, compared to 80.4% of the general population. However, survey data also indicates that flying isn't the only important aspect of pilot careers.

Geographic factors are repeatedly cited as a contributing factor to releases from the CAF. In Denko's research, 43% of pilots surveyed indicated that location was more important than the type of employment. [261] The fact that there are few opportunities for pilots to change communities means that pilots are geographically tied to certain locations and working environments. Geographic factors have implications for spousal employment. Dual-career families are now common place for CAF members. The requirement for officers to have a university degree makes it likely that their spouse will also be similarly educated and have career aspirations. [262] Survey data has shown that nearly half of CAF members indicated that their spouses' careers have suffered as a result of the conditions of military service and one third indicated that their spouse's career had a higher priority than theirs. [263] These various factors all shape an individual's approach to self-management of their career.

The first part of a pilot's career unfolds in a relatively predictable manner due to the structure of pilot training. The long duration of training places most officers in their

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[261] Denko, *An Inquiry into the Relationship ,…* 77.

[262] Jason Dunn, Samantha Urban and Zhigang Wang, "The Impact of Spousal Employment on Military Personnel Decisions," in *Military Human Resource Issues: A Multinational View*, eds. P. J. Johnston and Kelly Farley (Kingston, ON: Canadian Defence Academy Press, 2013), 149.

[263] Jason Dunn, Samantha Urban and Zhigang Wang, *Canadian Forces Spousal/Partner Employment and Income Project: Phase Three Findings and Final Report* (Ottawa, ON: DRDC Director General Military Personnel Research and Analysis, 2011), 40. ; Dunn, Urban and Wang, *The Impact of Spousal Employment on Military Personnel Decisions*, eds. Johnston and Farley (Kingston, ON: Canadian Defence Academy Press, 2013), 150. Dunn *et al*. are citing results from the Fall 2008 Your-Say Regular Forces Survey (YSS) and 2008 Quality of Life Among Military Families: A survey of Spouses/Partners of CF members administered in 2008 and 2009.

30's when they are established in their careers. Those who are selected to proceed on the traditional rank based route agree to accept increased geographic mobility and higher variety of employment. They will have their career paths shaped more closely than others in order to attain the requirements for continued rank promotion. Those who are not interested, not able or do not see opportunity in a rank progression career path are able to remain at the tactical level. Since these officers have not accepted a tradeoff of rank promotion for a less stable job rotation rate, other life factors such as geographic stability and spousal employment may begin to increase in relative importance. However, the perception is that these officers have little direct control over where they are employed. The reality is that only 10% of positions are at the Lieutenant Colonel and Colonel ranks, and 80% of pilots release at the rank of Captain or Major.

Therefore, there for a large number of pilots whose career path becomes less certain as they progress through the middle career stage of life. This can have important implications to career path selection, commitment and retention. This individual aspect contributes to the challenges with the management of the pilot occupations.

CHAPTER SIX

APPROACHING WICKED PROBLEMS

The pilot occupation can be considered a complex system that is susceptible to imbalances that are difficult to correct. The previous chapters described some of the tensions and challenges associated with managing the occupation. It also described some of the attempts to resolve longstanding occupational issues: short-term solutions were successfully implemented and brought successful short-term results. The occupation/job analysis process, despite extensive efforts with representatives from many stakeholders failed twice to provide senior leaders with long term solutions they could accept. This conflation of characteristics suggests a certain degree of wickedness to managing the pilot occupation. The point is not necessarily to verify whether or not this is a wicked problem, "but to have a sense of what contributes to the wickedness" of it.[264] This chapter will characterize the problems of the pilot occupation and present an approach to improve its management.

The challenges in the pilot occupation arise from natural tensions in human resource management as the RCAF tries to simultaneously achieve multiple objectives with limited resources. These include recruiting and training pilots to replace those who have left the military; supporting and conducting current operations; and selecting and developing leaders for the future. A vital element of managing the pilot occupation is concerned with flowing people in, through and out of the organization. This is done

[264] Conklin, *Wicked Problems and Social Complexity,*…8.

utilizing the functions of the officer career management model and is supported by other HR functions such as work systems, and rewards systems.[265]

A pilot's career path is relatively structured from enrollment through most of the period of obligatory service. This continues to a degree for those who progress into the senior officer ranks through succession planning. In between however, is a period of career path uncertainty for a large volume of pilots at a time when they are finally of high value and low cost to the RCAF. Most of the high cost training has been completed and these pilots are now established with experience. This expands their employability into a variety of roles. This also coincides with the middle career years where a pilot has gained enough experience in the Air Force to begin evaluating his or her career choices and make decisions for the next phase of their career. Unfortunately the career management system offers little certainty in terms of clear career paths or control to create one's own. Therefore the RCAF career management must strive to attain some sort of balance between the individual and organizational needs, neither of which are necessarily clear, and both of which evolve over time making the system very complex to manage. The absence of career paths for the majority of pilots contributes to the challenges of managing the system.

As a whole, the flow of personnel through the system is dynamically complex, depending simultaneously on forecasted data and real time changes to operations and personnel. There are no absolute solutions to solving manning issues that arise; every proposed solution seems to create another problem. Many of the decisions made, big or

[265] Beer et al., *Managing Human Assets*,…177, 178.

small, have long term consequences that cannot be undone. For example, the decision to move to contractor supported pilot training was a decision that has had serious consequences, but was essentially irreversible. Other decisions, such as pilot intake decisions, changes to career management policies, changes to pilot training systems may be reversible, but will leave traces through the system that cannot be fully removed. This complicates the solution space and can paralyze the decision making process.

Managing the pilot occupation is not a classic wicked problem in the class of solving world hunger, or climate change. However, the system is inherently social, as it deals with different stakeholder groups, including more than one thousand pilots, each of whom may view problems and solutions from a different perspective. The sheer cost of the conducting pilot training and air operations has implications for CAF resource management. The inherent joint nature of the RCAF operations means that the RCN and Canadian Army are also implicated in the success or failures of the RCAF's ability to manage the pilot occupation. The VCDS and Chief of Military Personnel (CMP) are stakeholders for occupational structure and manning establishment issues. There are also numerous external factors that are beyond the influence of the RCAF. The economic conditions of the country and resulting industry trends will impact defence budgets and influence industry hiring, creating additional manning pressure on the RCAF.

Despite a long list of similarities amongst the air forces of Canada's allies, or other occupations within the CAF, there are distinguishing properties of overriding importance that make the problems and challenges associated with managing the RCAF pilot occupation essentially unique. For these reasons, applying "solutions" that have been used in seemingly similar problems may be inappropriate for this occupation and

therefore may result in unanticipated outcomes. This implies a degree of wickedness to managing the pilot occupation for which different methods of resolving the issues are required.

As Russell Ackhoff describes the problem with the traditional approach to solving these types of problems as follows:

> The characteristic way of management that we have taught…is to take a complex system, divide it into its parts, and then try to manage each part as well as possible. And if that's done the system as a whole will behave well, and that's absolutely false because it is possible to improve the performance of each part taken separately and destroy the system at the same time.[266]

Although there is no solution per se to a wicked problem, they are not necessarily unsolvable. However, traditional analytic methods are not sufficient to deal with wicked problems. Nor are they suitable to deal with the dynamic complexity of the pilot occupation.[267] In the purest sense of wicked problems, the best that be done is to manage the problem in a way that seems to better the situation and provides the least unintended consequence.[268] The characteristics of wicked problems lend themselves some generally agreed upon approaches which involve strategic orientation, design thinking, dialogue, and systems thinking.

Wicked Problem Resolution

As discussed in Chapter One, strategic orientation is a key component of developing a human resources strategy. Likewise, an organization facing a wicked

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[266] *A Theory of a System for Educators and Managers* , directed by Russell Ackoff (n.p., CC-M Productions, 1993)

[267] Peter Senge, *The Fifth Discipline: The Art and Practice of the Learning Organization*, Revised Edition (New York: Doubleday, 2006), 71.

[268] Rittel and Webber, *Dilemmas in a General Theory of Planning*, 155-169.

problem is going to be affected at the strategic level. When considering how to deal with wicked strategic problems organizations must stay true to their sense of purpose. John Camillus suggests weighing options against the organizations identity, which he describes as an "enduring statement of strategic intent" composed of the organization's values, competencies and aspirations.[269] This long term view should ensure there is a balance between short-term and long-term objectives. The strategic level is also a vital level to engage stakeholders in dialogue.

Dialogue and language have been recognized as key elements to taming wicked problems through establishing a shared understanding of the different perspectives of the problem and creating a joint commitment resolving it."[270] The use of frame-breaking language is key to gaining shared understanding and breaking down false barriers based on unqualified statements and taken for granted assumptions. The dialogue process can open the door to designing new solutions to address the problems.

Design methods can be used to create new options, as opposed to using decision methods to choose between existing alternatives or mutually exclusive either-or solutions.[271] Design methods involve heuristics and generative reasoning, asking what might be, rather than deductive analytical reasoning.[272] Design problems seek to resolve

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[269] John Camillus, "Strategy as a Wicked Problem," *Harvard Business Review* (May, 2008), 99-106, 103.

[270] *Ibid., 102.;* Philippe Vandenbroeck, *Working with Wicked Problems* (Brussels: The King Baudouin Foundation, 2012), 44.

[271] Neumeier, *The Designful Company*.

[272] Mascarenhas, *Business Transformation Strategies*,… 249.; Roger Martin, *The Opposable Mind: How Successful Leaders Win Through Integrative Thinking*. (Boston: Harvard Business School Press, 2007), 144-146. According to Roger Martin abductive logic or generative reasoning seeks the best

the tensions between what is and what ought to be. Solutions can be implemented using experiments, prototypes, and pilot programs. This begins with asking two questions simultaneously while working towards a design solution: what is needed and what can be done.[273]

Wicked problems are worked through using systems methods to seek "patterns such as vicious and virtuous circles, self-fulfilling and self-defeating prophecies, and deviation-amplifying feedback loops."[274] The systems approach is dependent on problem solvers' understanding of the dynamic and detail complexity at play to find leverage amongst non-obvious interacting system components.[275] In some highly complex systems where the outcome may be far separated from a given implemented solution, the assistance of systems dynamics modelling can be used for scenario development to better understand the dynamics of the situation.

These methods can be used to provide a new approach to seeking resolution to some of the long standing problems associated with managing the pilot occupation. The remainder of this Chapter will provide suggestions for how these methods can be applied to the challenges of the pilot occupation.

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explanation, and attempts to create the best model in response to novel or interesting data that doesn't fit an extant model. Abductive reasoning inquiries into what might be instead of what is.

[273] Conklin, *Wicked Problems and Social Complexity*,…16..

[274] King, "Learning to Solve the Right Problems: The Case of Nuclear Power in America" *Journal of Business Ethics*, Vol. 12, (1993), 105-116.

[275] Senge, *The Fifth Discipline*,...72.

Addressing Occupational Issues

Strategic Orientation

The pilot career system is an all-encompassing element of force generation, force employment and sustainment and leadership for the Air Force. Furthermore, the costs of training pilots run in the hundreds of millions of dollars annually. This makes the effective management of the pilot career system a matter that must be central to the RCAF strategy. The leadership at the strategic level must be involved in the strategy and design process. They must have a full understanding of the complexities of the system to make the value judgments and determine the measures against which tradeoffs will be compared. There is insufficient detail in RCAF HR strategy and doctrine as it pertains to the pilot occupation to support staff driven processes. As a result, their efforts have proven insufficient to support subjective, value driven recommendations that are necessary to resolve some of these tensions in managing the occupation.

The RCAF values should guide the decisions regarding what types of officers the Air Force wants to employ and grow into future leaders. At the tactical level, mismatches between aspirations and competencies can cause disaster. Competency judgments involve quality-quantity tradeoffs associated with developing skilled pilots to execute operations and broadening them for higher level employment. Herein lies the strategic judgments based on what ought to be done, what the government is asking to be done, and what can be done based on the systems capacities, capabilities and risk tolerances. Engaging in meaningful dialogue to define the attributes the RCAF is seeking from the pilot occupation is required to support the design process.

Dialogue

In 1974, organizational theorist, Russell Ackoff stated, "Successful problem solving requires finding the right solution to the right problem. We fail solving problems more often because we solve the wrong problem than because we get the wrong solution to the right problem."[276] The objectives for the management of the pilot occupation are generic and unclear. The RCAF seems to want more pilots, trained faster and cheaper, who remain in the service longer and strive for the highest attainable rank. There is no additional clarity to be found in the descriptors for officer career management and development.

The personnel management doctrine manuals are rife with unqualified statements. They contain generalizations such as: "avoid… over-specialization" creating a well-rounded officer; "carefully planned mix of line and staff positions" and paradoxes such as: "placing the right individual in the right job at the right time". The CAF relocates 15,500 personnel per year.[277] Is it even possible to place the right people in the right place at the right time, with that rotation rate? These unqualified statements lack meaning and leave much to the subjective judgment of continuously rotating career managers and squadron commanders; they provide no predictability for RCAF members and they do little to ensure personnel are being properly employed and developed in accordance with a higher level vision.

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[276] Russell Ackoff, *Re-Designing the Future: A Systems Approach to Societal Problems.* (New York: John Wiley & Sons, 1974), 8.

[277] Office of the Auditor General, *Report of the Office of the Auditor General: Providing Relocation Services* (Ottawa, ON: Public Works and Government Services,[2014])., 1.

Furthermore, descriptions of experienced pilot and squadron experience levels are either poorly defined or poorly understood. It is evident that over the years the concept of pilot absorption has shifted from being something that occurs at the operational unit, to occurring at the end of the training system. Furthermore, the terminology such as OFP and TES, do not apply well to the pilot occupation. The result is fragmented knowledge, understanding, interpretation and perspectives amongst stakeholders. This requires a renewed level of dialogue, the creation of a new lexicon, and a willingness to question tacit assumptions and immutable ideologies.[278] Among the list of assumptions that need to be questioned include: validity of the TES and PML as a measure of occupational health and pilot employment and career management practices.

PML

Since the mid-1990's, the real-time management of the pilot occupation management has placed a significant amount of attention and effort on solving the TES-PML gap through first targeting retention initiatives, and then by adopting a "train our way out" approach. However, there is good reason to re-question how the TES-PML gap is being used to drive decisions about the pilot occupation. The extent to which this is a problem or a symptom of greater problems is unclear.

The first question is the utility of the TES as a metric. Using this metric for pilots has been a point of contention for many years. Pilots are counted in the TES once they receive their pilot wings; however, at this point they are essentially unemployable.[279] TES is a generic metric that is applied to all occupations but does not provide a relevant

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[278] Conklin, *Wicked Problems and Social Complexity*,…1-3.

[279] DND, *Annex G: Pilot Job Analysis Report*. The job analysis noted for each stream that there was no meaningful employment between wings graduation and OTU completion.

measure of occupational health for pilots and can in fact misrepresent the state of the occupation. The TES-PML gap could be solved without actually providing qualified pilots to fill any vacant position, but by merely placing them in on the awaiting training list for their OTU. The alternative of posting these pilots to staff positions immediately after investing millions in their flight training is a poor use of resources and demotivating to the individuals, failing the logic of both the 'hard' and 'soft' camps of HRM theory. The use of TES as a metric may stem from the paucity of data that exists regarding pilots. The occupation is tracked at a macro level with little to no tracking of fleet or community specific data to generate a clear picture of the occupational health. The RCAF does not have the authority to change the how TES is defined or used for the CAF writ large. However, the RCAF is not prevented from independently establishing relevant manning metrics to contextualize the health of the occupation and inform critical decisions pertaining to pilot recruiting and production.

The second problem with the PML is that it not clear that it is valid. In 2014, the Pilot Production Analysis Team was tasked to validate the number of pilots required to support current CAF operations. Their findings were tautological based on the procedural process for allocating new positions stating:

> The PML for the Pilot Occupation has evolved over several decades with any increase or decrease to the size of the PML subject to the VCDS-controlled process in tandem with the CMP-sponsored AMOR. The result of this near continuous management of the Pilot Occupation is reflected in the current size and composition of the Pilot PML, including the current ratio of Hard, Generic and ATL positons.[280]

[280] Department of National Defence, *Pilot Production Analysis Team Final Report* (Ottawa, ON: DG Air Readiness, February 2015), 7-8.

This is consistent with the doctrinal approach which states: "…formations and units must be built with the presumption that all positions will be filled. The fact that all positions are not filled should not normally drive a change in an establishment to any occupation."[281] Nevertheless, this approach fails to verify that the requirements remain.

If the PML is deemed valid, then as seen in Chapter Three, closing the manning level gap must be done slowly based on the limits of the operational squadrons' capacity to absorb new pilots. To do otherwise, slows the absorption process in the long term.[282] This makes TES recovery a long-term objective and building pilot absorption capacity a short-term objective.

The dilemma of short-term vs. long term objectives is consistent with wicked problems and can be addressed by altering the scope and focus of the problem.[283] One way this can be done is by reducing the number of positions in the PML. This would enable the RCAF to regain balance and grow the capacity to absorb more pilots and grow the TES in the future, if required. Since these positions would come principally, but not necessarily exclusively from generic positions, the approach to apportioning generic positions needs to be reviewed. Past assessments of the number of pilot generic positions in the PML is made based on comparison with comparable line officer trades. Currently 21% of pilot positions are generic compared to 40% for the ACSO occupation and 48%

[281] DND, *Air Personnel Doctrine*…,4-5.

[282] United States Air Force, *Air Force Instruction 11-412,…*17.

[283] Mascarenhas, *Business Transformation Strategies*,…253.

for infantry officers. In volume, pilots contribute the second largest number of officers to generic positions with 240.[284]

Maintaining the current number of generic positions has been justified by the need to enable career progression, spread air-mindedness and burden share with the other occupations.[285] While there is some validity to this reasoning, the question must be asked: on what basis are we comparing infantry officers and pilots? For pilots, the classification as line officer does not necessarily acknowledge the realities of the occupation. Pilot training and employment, by virtue of the cost, duration, and requirement for requalification after periods away from flying are consistent with a specialist. However, the fact that pilots conduct the front line tasks of the air force is consistent with a line officer. The term specialist has a connotation that may imply a narrowly focused scope professional knowledge which does not fit well with rank progression in the "generalist" development model.. Furthermore, it must be questioned if comparative ratio approach is appropriate means to assess generic positions, or should there be other considerations ?[286] Is this a symptom of another manning problem? Should we be solving it by employing pilots in these positions?

The debate about the validity of the 'generalist' approach to developing senior officers is on-going and beyond the scope of this paper. Suffice to say it is not universally supported mechanism for executive development. Despite recommendations and

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[284] DND, *Pilot Production Analysis Team Final Report* ,…7-8.

[285] *Ibid.*

[286] Even the comparison between ACSO and pilots is suspect at a time when the ACSO occupation is in a transition phase due to changing technology that has altered their previous front line roles, and artificially increased their generic positions. This has occurred as new aircraft have been brought into service that did not have a role for the Air Navigator.

criticisms to the contrary, the CAF has re-affirmed their commitment to the 'generalist' approach to General and Flag officer development.[287] Nevertheless, there are many questions that remain to be asked. These include; to what extent does this apply to the pilot occupation; when should it begin; and how should it be done considering the time constraints imposed by long training periods, and the need to amortize the cost of that training through continued employment at the tactical level. Furthermore, the nature of pilot's training and employment at the tactical level may create specific requirements for development that are currently undefined. Can the RCAF develop a targeted development plan for pilots?

Considering the pilot occupation has operated well below PML for several years, decisions regarding which positions are left vacant are consciously being made based on the priority requirements of all positions. Nevertheless, the RCAF needs to be investigating whether these jobs are actually being used as developing jobs, or are they just "filling holes" with individuals who are not on or do not perceive themselves to be on a developmental track, thus contributing to the frustration of some pilots being forced into non-flying positions.

Finally, the PML should be determined with consideration of the long term sustainability. It is not a certainty that the current PML is sustainable within the current construct of career management and available resources. Aircraft numbers and available flying hours have decreased significantly over the past twenty years and the cost of pilot training is becoming increasingly unaffordable.[288] These factors among others directly

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[287] Chaloux, *RCAF Succession Management,…78-82.*

[288] English and Westrop, *Canadian Air Force Leadership and Command*,…62-63. The number of aircraft in the RCAF decreased by roughly 50% from 1989-2005.

impact the sustainability of the pilot PML.[289] New pilot production has been well below the target levels, and below the projected steady state production requirements for several years.[290] Yet the RCAF has still experienced challenges absorbing new pilots. How the system will cope in the long run with a higher level of new pilot production is uncertain.

Career Management

The RCAF needs to reconsider if its approach to the selection and assignment of positions and career paths is resulting in the desired outcomes. The potential of an employee to succeed in a given career path is determined by a combination of ability, aspiration and a willingness to engage and commit to the work and organization.[291] Therefore, there are certain types of positions to which one cannot simply be assigned with any expectation of success. This is recognized at the tactical level which requires pilots to apply to and compete for certain positions such as Test Pilot School and the Snowbirds Air Demonstration Team. Furthermore, when pilots are assigned to certain high performance communities that are not aligned with their preferences, such as Fighters or Special Operation Forces Aviation, lower success rates result regardless of ability. The outcome is an eventual reassignment at a high cost to the individual and

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[289] Taylor *Absorbing Air Force Fighter Pilots*,…60-62.

[290] The Pilot Production Analysis Team estimated that a steady state of 99 newly winged graduates per year would sustain the PML. However, this analysis is based on compensation for attrition, and does not include squadron absorption limitations.

[291] Jean Martin and Conrad Schmidt, "How to Keep Your Top Talent," *Harvard Business Review*, Vol 88, 5 (May 2010), 59.

organization.[292] This applies equally to selecting officers with high potential to progress through the rank structure to institutional leadership positions. ACO 1000-7 acknowledges this to a degree by requiring 'O-Listed' officers to acknowledge and accept the responsibilities and requirements of these career paths.[293] Despite this recognition, the CAF approach to career management still insists that the current method of assigning postings will ensure that people are in the right job.

The proposal for the dual track, flying pilot / career stream pilot paths provides an example of flawed assumptions and failure to recognize the limitations of career progression model. The proposal recommends a construct in which all pilots are in the career stream until the completion of their obligatory service. Pilots will then be given the opportunity to apply to the flying pilot stream and acceptance will be determined by a selection board to fill a designated number of positions depending on the RCAF's needs. This construct is in fact the opposite of how pilots' career paths naturally evolve.

Pilot training and employment in the beginning of a career is tantamount to specialist training and employment. Moreover, the typical career for the vast majority of pilots plateaus by the rank of Major. Those identified with the potential for higher level positions must also demonstrate the aspiration for those positions and accept conditions of employment that come with that career path. This means officers opt into a career stream, not opt out of one.

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[292] Travis Morenhan, "The Proposed Model for SOF Aviation in Canada," Royal Canadian Air Force Journal Vol 3, No 1 (Winter 2010), 28-31.; Author's experience.

[293] DND, *Royal Canadian Air Force Personnel Management – Officers*,…11. High potential officers are assigned to "O-Lists".

Furthermore, officers must demonstrate the ability to be successful at higher rank levels, which means that selection is required for the career stream. The proposed construct has the potential to create vicious cycle by establishing a competitive environment for selection into the flying stream, and thus attract pilots who may otherwise be well suited and develop aspirations for the career stream. By communicating to pilots that they are in the career stream until they elect to opt out, the RCAF may be creating perceptions of careers that cannot be fulfilled. This once again creates a mismatch in career plans that can cause individuals to seek alternatives.

Terms such as career officer stream and flying officer stream are limiting and do not consider how the RCAF wants to deal with plateaued pilots. The term career officer implies rank progression in which case officers are developed as 'generalists'- a path only available to a small percentage of pilots. Meanwhile, many pilots enjoy long careers without rank progression, and not necessarily in exclusively in flying positions. The flying pilot stream implies no professional development, which is inconsistent with the concept dual-track career paths. In a dual track career path professional development exists but remains focused on technical aspects, as opposed to broadening.[294] Such tracks exist in the RCAF in highly technical areas such as for test pilots or electronic warfare specialists. Furthermore, this expertise is not developed exclusively through flying positions and is required at rank levels beyond Captain and Major. However, paths to these positions are not evident in part due to the 'generalist' approach to promotion and senior officer development. Reconsidering the way in which pilots can participate their

[294] Baruch, "Career Systems in Transition: A normative model for organizational career practices," *Personnel Review, 32, 1 (2003), 250.*

careers choices and what types of career paths are designed is paramount to ensuring pilots are employed in the most effective manner. This doesn't mean simply giving pilots the posting they are looking for, but enabling pilots to see and strive for meaningful careers paths outside of the traditional career progression approach.

The use of these tools combined with asking hard questions regarding our current approach and assumptions is necessary prior to initiating the design process.

Design

Given that managing the pilot occupation is largely concerned with managing the flows of pilots in, through and out of the system, the RCAF needs to design the career flow through the organization to ensure they system is sustainable and meets the long term needs of the RCAF. The career flows need to address the long periods of education and training required at the beginning of a career to enable pilots to work in using jobs for long enough periods to address several important issues: the need to amortize the cost of training and minimize unnecessary retraining rates; allow enough time for pilots to achieve technical mastery as a foundation for building their professional mastery in the aerospace power domain and beyond; the need to maintain sufficient experience levels to ensure squadrons are operationally competent while retaining the capacity to absorb new pilots; enable a sufficient period to become established in their career to make assessments of future goals. Further, they should result in clear measures that can be used to model the sustainability of the system, and any amendments that might be required.

The career flow options can be assessed according to Beer's criteria for outcomes of HR policies. These measures adequately address four issues that affect the pilot career

system: The training and absorption capacity constraints, pilot professional development, plateaued employees, and career management issues.

Stewart identified a link between posting duration, rotation rate and training system capacity. In the same vein as reducing cost, is the ability to increase the capacity of the system. A deeper investigation into the ideal initial tour length and sequencing of rotations between flying and non-flying positions could improve the pilot career system's training and absorption capacity and reduce total training cost. Additionally it offers the potential to rotate fewer people and sequence jobs to minimize cost moves saving money for the entire system.

Career paths play an important role in the extent and nature of an employee's development, and therefore competency.[295] They can be based on the degree of technical specialization and cross-functional mobility that the RCAF desires of certain officers.[296] Through a combination of establishing the initial flying tour length, and then the right sequence and combination of specific using and developing jobs, specific competencies can be developed and if necessary, any training cost amortized much like the existing construct for Test Pilot School and the Aerospace Systems Course candidates.[297]

Having identifiable career paths that individuals can aspire to can foster commitment and congruence. Furthermore, it could help individuals navigate the middle career stage and better manage expectations regarding spousal employment and financial

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[295] Beer et al., *Managing Human Assets*,…103.

[296] *Ibid.*,89.

[297] Pilots who are accepted to Test Pilot School must agree to an obligatory terms of service of 5 years and can expect employment at the Aerospace Engineering Test Establishment, or an equivalent exchange position. Aerospace Systems Course candidates can expect employment in Operational Test and Evaluation, Aerospace requirements or procurement related positions.

obligations. If career paths are clear, it may improve the level of trust of the career management system. [298] The design of career flows should be done with a systems thinking approach that addresses problem areas, and ensures new ones are not created.

Systems Thinking

There are numerous vicious cycles and self-defeating prophecies are found in career management policy and practice. "De-linking" is used to break or hopefully reverse negative re-enforcing cycles. Examples include delinking pay from rank, and rank from position. De-linking pay from rank incentivizes retention by not requiring promotion for higher levels of pay.[299] De-linking rank from position ensures that a promotion does not force a posting before the training value invested in the individual has been amortized.[300] Furthermore, it allows flexibility to ensure individuals are assigned to suitable positions based on their ability and aspirations.

The emphasis on closing the TES-PML gap has created several vicious cycles and self-defeating prophecies. Actions that attempt to increase student pilot throughput such as reductions in under-graduate flight training hours are self-defeating and only address the short-term need to increase TES. It decreases success rates at the OTU and since

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[298] The worst of these cases has occurred with the CEOTP entry scheme, where pilot recruits entered the system without a university degree. These pilots were required to complete their undergraduate degree on their own time by the end of their obligatory service, participate in distance based officer development programs to be eligible for promotion. To be competitive they would normally require a second language profile. For some this was an unsurmountable task.

[299] The dual-track career paths in the RAF and RAAF have included both de-linking and incentivizing of pay and rank to support their desired outcomes. Royal Air Force, *Administrative Arrangements-Professional Aviator Pay Spine Annex A to PTC/557/12/P&A*, January 2003.; Australia, "Officer Aviation Remuneration Structure Decision", *Defence Force Remuneration Tribunal,* Matter 4 of 2012, 30 May 2013.

[300] Some positions can be designated as plus or minus one rank level.

experience is a cumulative function, slows the time it takes an inexperienced pilot to develop. It increases costs since it pushes the accumulation of experience to the operational unit where aircraft are more expensive to operate.

Furthermore, it slows their professional development. Professional mastery is a building block of which technical level of mastery is the first step to mastering the aerospace domain. Therefore pilots must reach a certain level of mastery in employing their aircraft before they will successfully expand their expertise and knowledge of aerospace power.[301] Without mastering their own domain first, pilots will be unable "to become true professionals in the joint, combined and inter-agency context that characterizes modern conflict."[302]

Equally, prematurely posting pilots from operational squadrons to instructor positions at the OTU causes frustration amongst pilots, which can negatively impact retention while simultaneously impacting the quality of instruction. A virtuous cycle to increase pilot absorption can only be developed by fostering the increase of pilot experience levels, which tends to come at the short term expense of increased pilot production. This is a difficult reality that must be accepted for the situation to improve.

Linking can have an equal positive effect to breaking vicious cycles or creating new virtuous cycles. Linking promotion to community streams prevents the promotion of pilots in one community from being negatively impacted by the pilots in another

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[301] Sanu Kainikara, "Professional Mastery and Air Power Education," *RCAF Journal* 3, no. 4 (Fall, 2014), 49.

[302] Department of National Defence, *Duty with Honour: The Profession of Arms in Canada*, 2nd ed. (Kingston: Canadian Defence Academy, 2009), 74.

community.[303] Furthermore linking extrinsic rewards to preferred career paths can create incentives for individuals to actively seek paths that fulfill the RCAF needs vice assigning pilots who may be unmotivated by those paths . The Royal Australian Air Force (RAAF) has taken this approach by amending their pay scheme to attach extrinsic rewards to the RAAF preferred career paths, thus deepening the pool of candidates from which to select.[304] Whereas, in the RCAF, the preferred career stream path can result in period of lower pay due to loss of flight pay that accompanies rotation between flying and non-flying positions and the costs associated with frequent relocations. The integration of the other elements of HR policy such as rewards can be used to enable a virtuous cycles to take hold. The use of systems methods is a complementary to the design process of developing solutions that eliminate self-defeating prophecies and create virtuous cycles. More sophisticated systems methods will also support the design process by addressing what can be done.

Systems dynamics models, such as PARSim have been used to model the RCAF pilot occupation to support scenario planning and decision analysis. These models should be used to evaluate scenarios and determine the sustainability of any potential changes to the pilot career flows. The pilot occupation functions as a dynamically complex system that operates in "in a delicate equilibrium and with large inertia. A single action or

[303] Pilots compete for promotion within the occupation. Problems arise when the cohort of pilots from one community performs either much higher or lower than normal the promotion board rankings of pilots in other communities are affected. The result is pre-mature or delayed promotions for some pilots. This problem is not exclusive to the pilot occupation and is one of the reasons for formalizing sub-occupations.

[304] Australia, "Officer Aviation Remuneration Structure Decision",…2-5.

decision may have drastic long-term effects."[305] Pressing harder to achieve outputs on these types of systems tends to push them into a downward spiral with long-lasting difficult to reverse effects.[306] The use of dynamic systems modelling, fosters understanding of a complex system and ensures outcomes are achievable and sustainable, enabling the answer to the question of what is possible.

Using strategic orientation, dialogue, systems methods will enable rethinking existing constructs and assumptions and might unlock new possibilities to address the issues of the pilot occupation. These activities will support leaders in their design of career paths that will enable a sustainable and stable approach to meeting the needs of the RCAF, while fostering trust and commitment from the pilots through improvements to career management. This approach will help to relieve some of the tension created by requirements to satisfy the organizational needs, individual needs within the practical resource constraints associated with the pilot occupation.

[305] Sequin, *PARSim, A Simulation Model of the Royal Canadian Air Force (RCAF) Pilot Occupation*…11.

[306] For examples see Sequin (RCAF) and Taylor (USAF).

CONCLUSION

The pilot occupation has unique characteristics that differentiate it from other Line officer occupations. Pilots provide the frontline operational contribution of the Air Force as well as participate in the command and control structure. This differs from line officers other elements who command operations that are primarily carried out by the non-commissioned members (NCM's) of the service. Furthermore, the costs, training duration and ability to absorb new pilots create unique challenges for the RCAF, while simultaneously creating an attractive employee to the civilian air industry. There is good reason to question whether the one-size fits all approach to officer careers is the best means of managing the pilot occupation.

The RCAF has struggled over the past few decades to implement any long term measures to address the unique aspects of this occupation. Simultaneously, the RCAF has struggled to grow the TES to meet the PML, and there is no indication that current measures will result in attaining this objective. This study set out, not to solve these problems, but to determine if by taking a new approach to characterizing the problems provide a new approach to applying the theoretical approaches to military human resource management. Chapter One introduced career and human resource management models that can be applied to military human resource management practice. In particular the Harvard HRM model is a useful conceptual tool that can be applied from the strategic perspective to understand and evaluate how the interaction of stakeholder inputs and human resource policies result in outcomes that determine if the goals of the organization and individual are being met. Furthermore, career management policies and objectives must ensure that the outcomes are considered from the individual,

organizational and societal perspectives. Chapter Two introduced the framework of officer career management models that militaries use to apply their human resource policies in an effort to deliver their desired outcomes. These functions represent some of the levers for managing how individuals flow into, through and out of occupations in the military environment. Chapter Three described the concepts of managing the pilot occupation that arise from systemic constraints on the ability to sustain and grow pilot manning levels. This chapter demonstrates the dynamic complexity, inertia and careful balance that must be maintained to ensure sustainable capability and manning levels. The theoretical concepts create the backdrop for the latter chapters of the study in which the problems of the occupation are described.

In Chapter Four, the description of the history and scope of the problems afflicting the pilot occupation make it clear that at best, this is a dynamically complex systems problem, and one that susceptible to external influences well beyond the control of the RCAF. Chapter Five describes how management of the occupation translates into de facto pilot career paths that only partially satisfy the needs of the individuals and the organization. Nevertheless, the acknowledgment of how pilot career naturally emerge is important to understanding which levers might be used to achieve different outcomes. The final chapter characterizes the challenges of the pilot occupation. These challenges stem from the tensions created by trying to simultaneously achieve multiple objectives in the face of significant constraints. The RCAF must continuously recruit and train pilots to meet the short-term operational needs, and develop future leaders of the RCAF. The management of this occupation represents a wicked problem, for which there is no final

solution; however experience has shown that certain solutions will worsen or prolong the problems.

Strategic HRM issues, by virtue of requirement to balance changing short-term and long-term needs of organizations and employees, imply a certain level of wickedness onto themselves. Therefore, taming the issues of managing the pilot career requires a different approach to problem solving by reversing the typical staff driven analytical process and placing strategic leaders at the center of the design process. By creating dialogue between senior leaders a common understanding of the dynamic complexities of the pilot occupation can be established. Furthermore, new language and metrics can be created and difficult value judgments can be made. This will enable descriptions for how best to employ and develop pilots throughout their career without the hindrance of institutional jargon. These leaders have the authority to change policy and regulation, and are therefore less constrained than staff driven solutions.

The result of this design process should include career paths that address the broader cadre of pilots, since the traditional, hierarchical career path is not the common one. Career paths can be designed to deliver benefits in cost, while fostering the competence the organization requires. At the same time both RCAF and pilots will benefit from career paths that foster higher levels of commitment and congruence.

APPENDIX 1 – Historical and Predicted Manning Levels

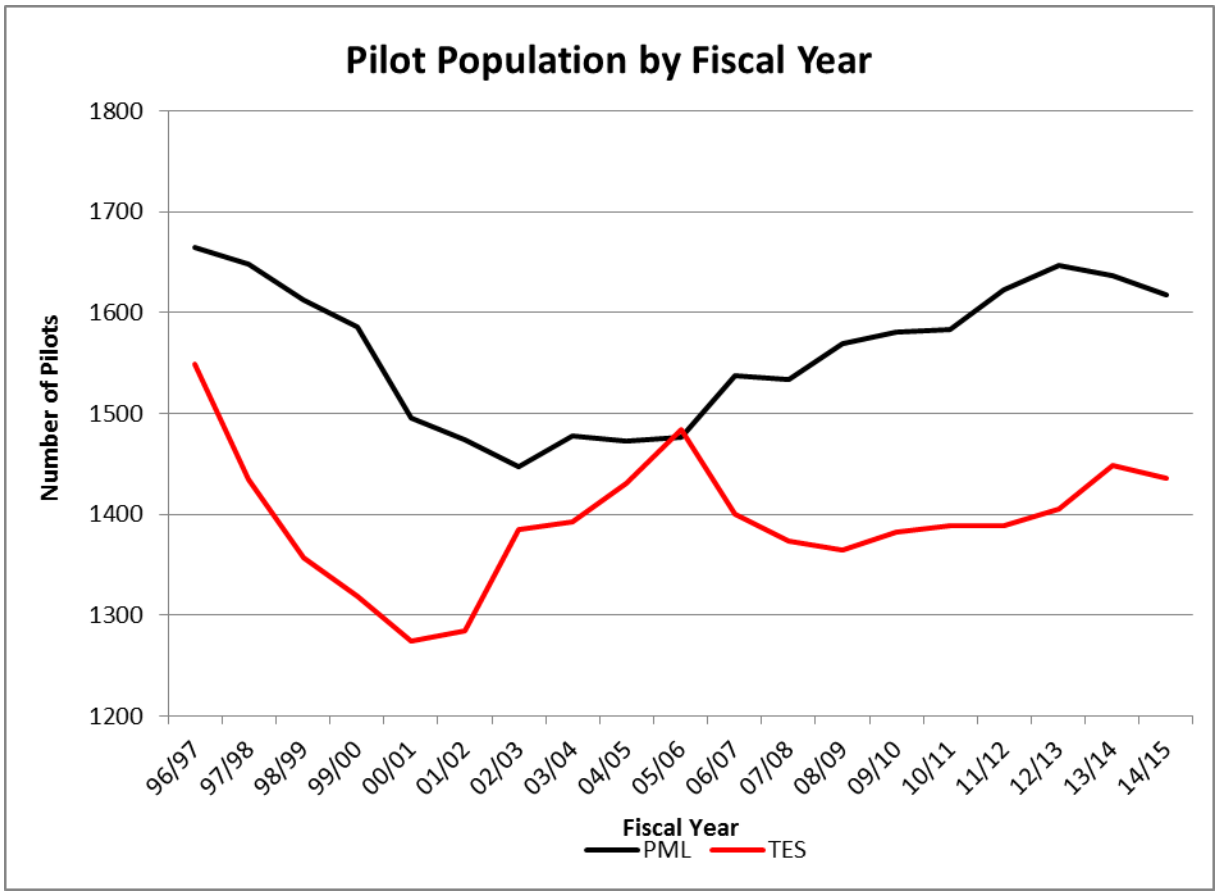

Figure A1.1 - Pilot Population by Fiscal Year

Source: DGPMRA Pilot MOSID 00183 Database extracts, September 2014.

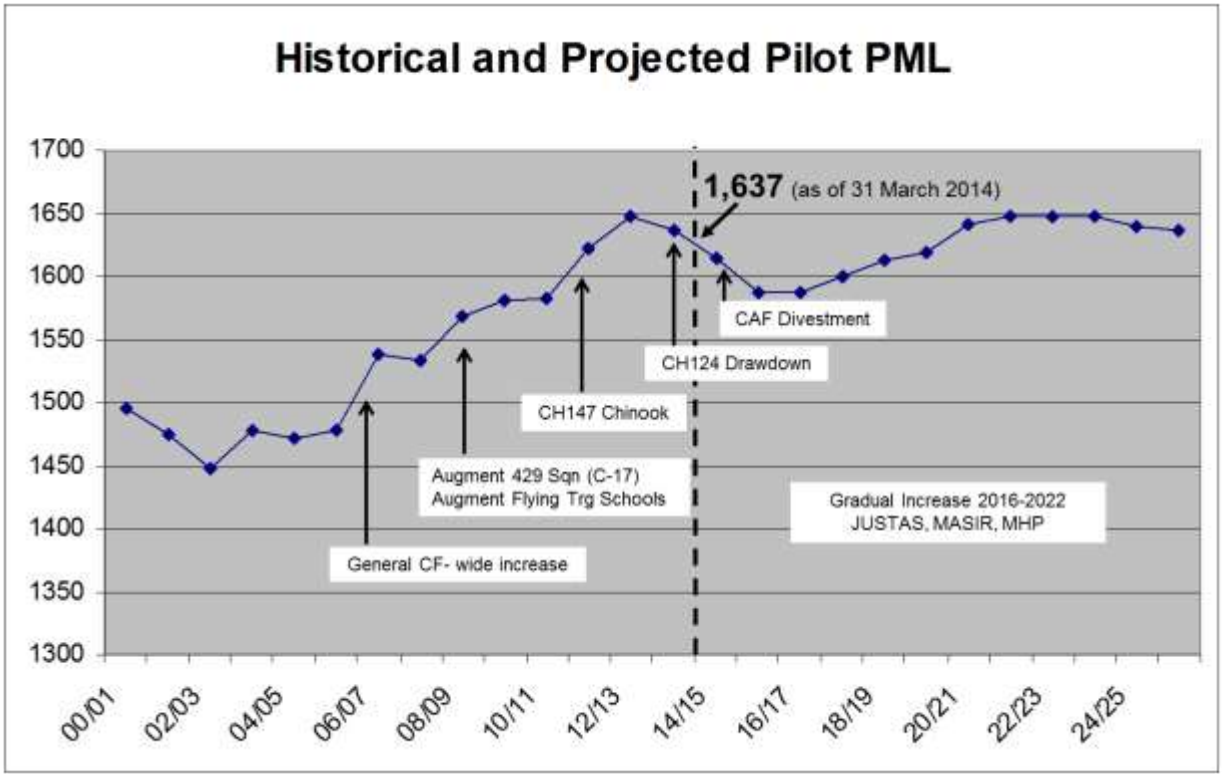

Figure A1.2 – Historical and Projected Pilot PML

Source: Pilot Production and Analysis Team Final Report.,6..

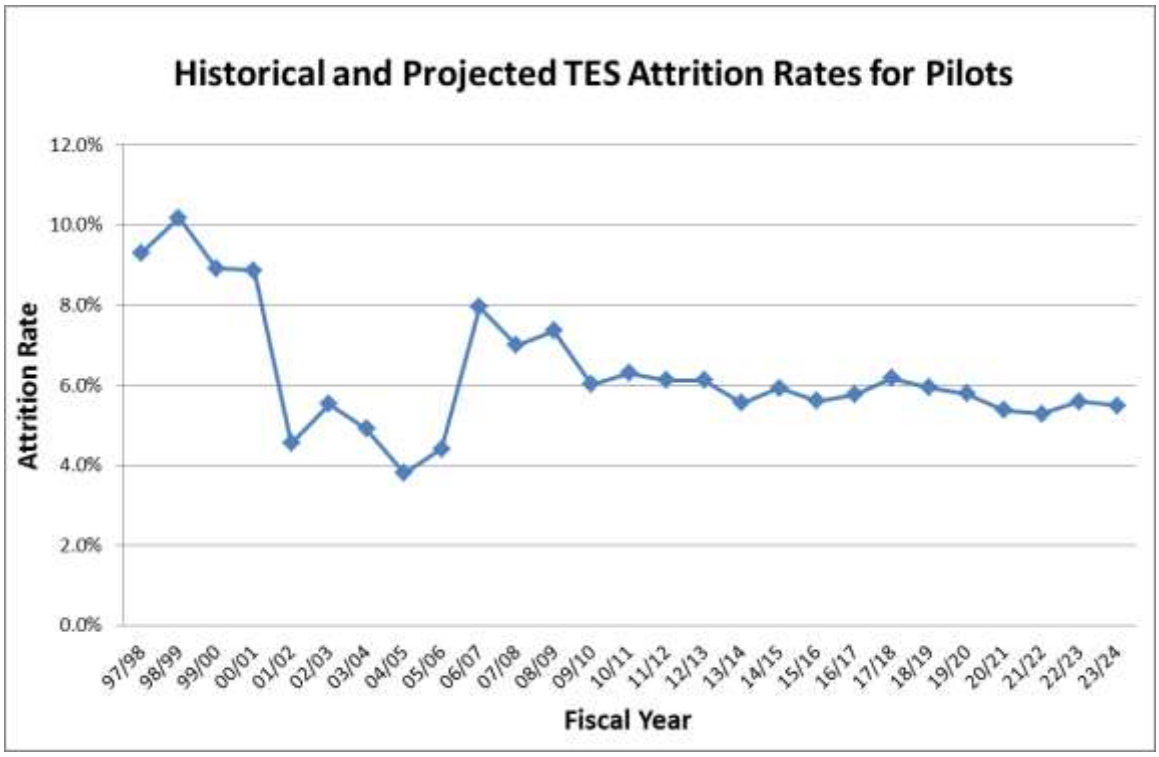

Figure A1.3 –Historical and Projected TES Attrition for Pilots

Source: Pilot Production and Analysis Team Final Report.,8.

APPENDIX 2- Pilot Rank and Years of Service Profile

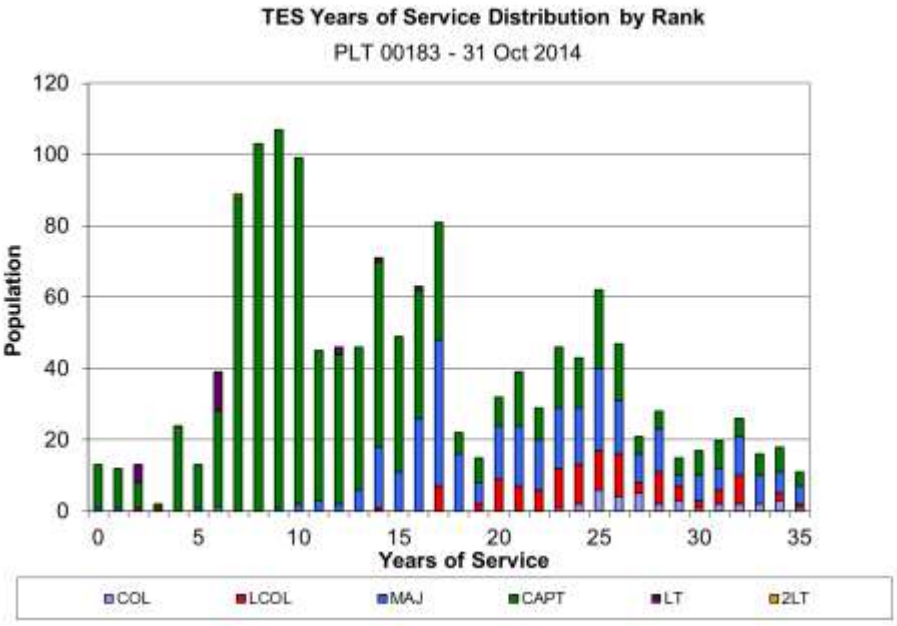

Figure A2.1 – Pilot TES Years of Service Distribution by Rank

Source: DGPMRA Pilot MOSID 00183 Database extracts, 31 October 2014.

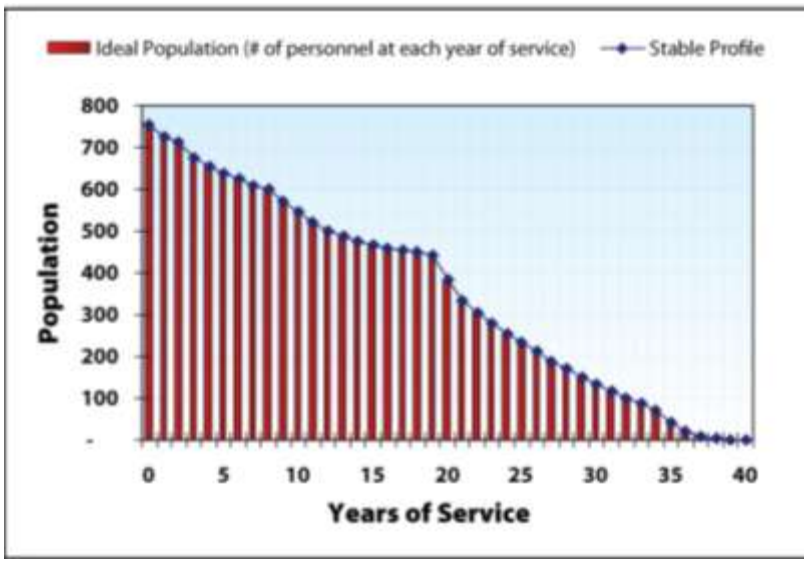

Figure A2.2 CAF Ideal Year of Service Population Profile

Source: DND, *Air Personnel Doctrine, 5.5.*

APPENDIX 3- Pilot Historical Releases by Rank

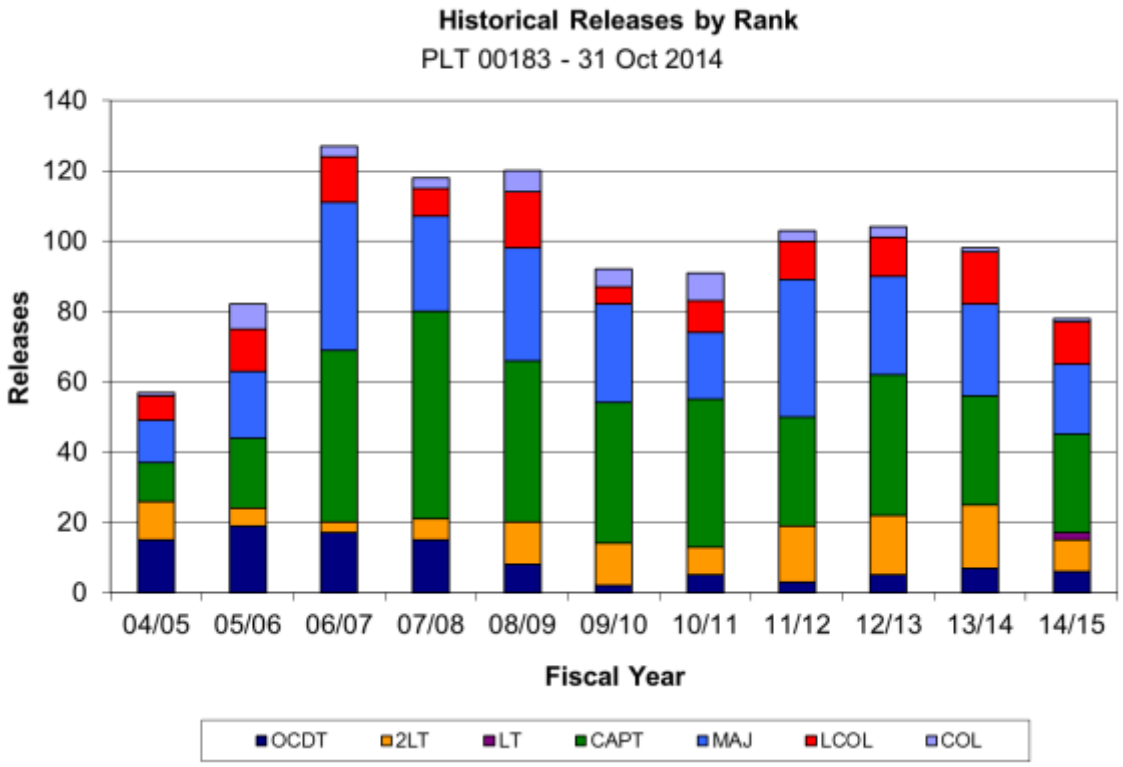

Figure A3.1 – Pilot Historical Releases by Rank

Source: DGPMRA Pilot MOSID 00183 Database extracts, 31 October 2014.

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