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Military Projects and Military Operations: Apples and Oranges, but Both are Fruits

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ABSTRACT

The essay that follows demonstrates that project managers of advanced technology projects such as those delivering capabilities based on emerging information technology could benefit from applying methods and ideas that are currently employed by commanders as they plan and execute operations. It speculates that military operations take place in uncertain and quickly changing environments that are not dissimilar to advanced technology projects that contend with ill-defined requirements and fast evolving technologies. Using apples and oranges as analogies, it argues that if advanced technology projects were apples, then military operations would be oranges. Noting that both are fruits, it carries on to propose that one may come up with a better apple design process by studying how the orange is designed.

Defining projects as ventures that have a beginning and an end, that generate predefined change, that expend energy and material, that are unique in that no two projects are alike; the essay contends that military operations are really projects. Operations begin with a deployment and end with the redeployment. They have missions that define change using action words such as destroy, occupy, secure, or protect. They entail significant effort on the part of the assigned forces and utilize specialized equipment. Every experienced commander would confirm that no two operations are alike. Military operations are thus projects.

After comparing both environments and the processes through which projects and operations are planned, the essay makes a number of recommendations based on military doctrine that could be applied to the project management profession. The reader may not agree with the specific recommendations made. The objective is not to convince him of their validity, but rather to submit that such suggestions can be formulated. In other words, to convince him that he can improve on the apple by studying the orange.

CHAPTER 1 – INTRODUCTION

Can one directly compare military projects to military operations? If military projects were apples, would military operations also be apples or would they be something else? Recognizing that the differences are significant, this essay nevertheless argues that they are both of the same class. Starting from the position that projects and operations are both fruits, it argues that they can be compared and that improvements can be made to the apple's design by studying the way the orange is built.

> *It has been argued that warfare is presently experiencing a military-technical revolution (MTR), and that this is the third such MTR in history; the first two being the invention of gunpowder and then the explosion of the late nineteenth and early twentieth centuries resulting in the railroad, machine gun, aircraft and submarine. John Warden goes farther, acknowledging the existence of the present MTR, but arguing it is actually the first such event. He maintains the current leap in technology is so profound it makes prior changes appear as minor evolutionary steps.*[1]

The above quote is indicative of the times to come. Recognizing, that technology is evolving at a pace never seen experienced before, various military forces throughout the developed and developing world are investing significant proportions of their budgets in technological improvements to keep up with the capabilities of their allies or prospective adversary. Through new weapon, mobility and surveillance technologies, naval and marine forces are bringing their influence far inland. Land forces are acquiring weapons with reach equivalent to those reserved to the air forces of the past and are extending the impact of the single soldier to the point that he or she may have an operational vice solely a tactical impact on

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[1] Colonel Phillip S Meilinger, *10 Propositions regarding Air Power* (n.p.: USAF School of Advanced Aerospace Studies, 1995), 60. Also available from http://www.airforcehistory.hq.af.mil/Publications/fulltext/10_propositions_regarding_air_power.pdf; Internet; accessed 2 May 2005.

John Warden is a contemporary air power theorist who has significantly influenced the strategic planning thinking of the first Gulf war.

the battle space. Air and space power has always and continues to be been built on "advanced developments in aerodynamics, electronics, metallurgy, and computer technology;"[2] technologies currently evolving at an unequalled and accelerating rate. Military forces throughout the world are capitalizing on the immense potential and threat generated by the exploding developments in communications and information technology that offers emerging and revolutionary worldwide real-time situational awareness and decision making capabilities at all levels of command.

Taming these ever-changing technological developments in order to apply them in the military context is the function of the project manager who is normally a military or a departmental civil servant. This essay proposes that the challenge offered to an advanced technology project manager is not dissimilar to the one posed to a military commander in charge of a military operation.

Projects are "temporary endeavour[s] undertaken to create a unique product, services or result."[3] They are characterized by their temporary, unique and progressive nature.[4] The typical life cycle of a project extends from the initiation phase when a project is sanctioned, the planning phase when resources are sought and committed to the various activities that must be completed to generate the end result, the execution phase when the plan is carried out and the closing phase when the project is stood down.

Projects are lead by managers who are concerned with the management of resources such as time, personnel and finance. These managers are also intimately involved in the integration of

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[2] *Ibid*., 57.

[3] Project Management Institute, *A Guide to the Project Management Body of Knowledge*, 3rd ed. [CD-ROM] (Evanston: EIS Digital Publishing, 2004), 368. Hereafter referred to as *PMBOK*.

[4] *Ibid*., 5-6.

the various activities associated with their project, with the assurance that their project continues to serve the mandate for which it was commissioned, that the quality of the end result conforms to expectations, that those with a stake in the project remain involved throughout to ensure their continued commitment and that risks are reliably identified and addressed. In addition to a keen awareness of the project management discipline, areas of expertise often associated with project managers include strong inter-personal skills, general management knowledge and skills, strong understanding of the environment in which the project exists and a good understanding of the application area targeted by the project.[5]

A military operation, in the Canadian context, is defined as "the employment of an element or elements of the CF [Canadian Forces] to perform a specific mission"[6], the specific mission being normally assigned by a higher command authority. The mission is defined through a mission statement which describes the exact intentions is terms of the participants, the type of action being contemplated, timings, locations and the rationale under which the mission is ordered.[7]

It is the position of this essay that military operations meet the recognized characteristics of projects. They are temporary ventures that are unique and progressive in nature. CF operations are normally conducted in five broad phases: warning, preparation, deployment, employment, and re-deployment.[8] One can easily align these military operation phases with the initiation, planning, execution and closing phases of the project life cycle.

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[5] *Ibid*., 13.

[6] Department of National Defence, B-GJ-005-500/FP-000 *CF Operational Planning Process* (Ottawa: DND Canada, 2002), 1-3. Also available from http://www.dcds.forces.ca/jointDoc/docs/opsPlanProcess_e.pdf; Internet; accessed 2 May 2005. Hereafter referred to as CFOPP.

[7] *Ibid*., 4-6.

A commander holds the "legal authority and responsibility to organize, equip, train, and employ forces to accomplish assigned missions" and is responsible for the "health, welfare, morale, and the discipline of the [assigned] forces."[9] Commanders are intimately aware of their mission and are ultimately responsible for its success. They control resources assigned to them in the execution of their mandate. Their success is predicated on their military expertise, their planning and organizational skills, their understanding of the environment in which the operation takes place, their focus on the mission in abstraction to distractions external to the mandate, the synchronization of effects generated by subordinate commanders and frequent consultation with their superiors who assigned them their mission and personnel. At least from a conceptual basis, the management and leadership skills required of military commanders and project managers are very similar. One can thus argue that military operations are equivalent to projects and, by extension, that operational commanders can be compared to project managers.

Advanced technology includes information technology (IT) which in-turn includes the "technological and engineering disciplines as well as . . . the management technologies used in information handling, communication and processing, their applications and associated software and equipment and their interaction."[10] IT projects cover "both software development, hardware and software acquisition, and replacement of and enhancements to existing applications."[11] This essay limits its analysis to IT projects assuming, without further demonstration, that the

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[8] Department of National Defence, B-GG-005-004/AF-000 *Canadian Forces Operations* (Ottawa: DND Canada, 2000), 1-8. Also available from http://www.dcds.forces.ca/jointDoc/docs/AF000-18dec00_e.pdf; Internet; accessed 2 May 2005. Hereafter referred to as CF Ops.

[9] Major Frederick L. "Fritz" Baier, *50 More Questions Airman Can Answer* (Maxwell AFB Alabama: Air Force Doctrine Center, n.d.), 2.

[10] Department of National Defence, "Glossary," *Defence Planning and Management (DP&M) Website.* http://www.vcds.forces.gc.ca/DGSP/dmsmanual/glossary/intro_e.asp; Internet; accessed 2 May 2005.

[11] *Ibid*.

challenges of IT project managers are representative of those experienced by managers of projects using other advanced and fast-evolving technologies.

The latest public Standish Group's CHAOS[12] report, released in 2001, states that: "In 1994 only 16% of application development projects met the criteria for success – completed on time, on budget and with all of the features/functions originally specified. This year [2000] 28% of projects were in the successful column."[13] Obviously, performance is improving, but it has yet to achieve reasonable standards. That being said, the Canadian government and the Department of National Defence in particular have also had similar dismal success with IT projects. This essay will show that the departmental experience is consistent with the rest of the industry. It will demonstrate that the triumph of an IT project is contingent on factors such as skilled and empowered project teams, ongoing commitment of senior executives, good communication, clear mandate and priorities, and a common vision.

The environment for military action ranges from humanitarian operations such as the 2005 operation in Sri-Lanka, to peace enforcement operations such as those that took place in the ex-Yugoslav Republics throughout the 1990s and continuing to this day, to full out combat such as the recent war against the Taliban regime in Afghanistan. Throughout this spectrum of conflict, forces are employed in conditions ranging from peace to all out war.[14] Some are domestic single-nation operations such as the central-Canada ice storm humanitarian relief operation of 1997, but many are mandated under an alliance or a coalition and involve multiple

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[12] Standish Group is a world class group of IT professionals experienced in assessing risk, cost, return and value for Information Technology (IT) Investments.

[13] The Standish Group International, "Extreme Chaos," (West Yarmouth: The Standish Group International, 2001); available from http://www.standishgroup.com/sample_research/PDFpages/extreme_chaos.pdf; Internet; accessed 2 May 2005.

[14] CF Ops, 1-3, 1-4.

military forces and associated organizations in far away lands. In all cases, military operations are characterized by the safeguard of national interests and values, threat to national security, commitment of the national will, entrustment of significant national resources to the commander for the success of the mission, a highly uncertain and changing operating environment, threat to the safety of the forces committed, and the critical essence of timely action.

There are definite similarities between military operations and IT projects. Both have objectives set by higher authorities that are often ill-defined or ill-communicated. Both are set in a rapidly changing and most uncertain operating environment and are prone to significant unavoidable risks. Both are entrusted with significant resources. Both contend with stringent timing issues. Lastly, and importantly, the success of both is critically dependent on the quality and motivation of their assigned personnel.

Acknowledging the similarities, do the differences nevertheless overshadow the resemblances? The first area that stands out as differentiating military operations from Information Technology Projects is the wager. From a strategic perspective, military commanders may be entrusted with nothing less than the survival of their nation, whereas failure of an IT project, in its worst outcome, may trigger the breakdown of a corporation. Secondly, from a human perspective, the life of the soldier and his adversary may be at stake during military operations whereas, in its most negative revelation, only the livelihood of project members is in the balance for IT projects.

Recognizing that military operations and IT projects are both high-risk ventures that contend with a fast changing operating and technical environments, practitioners of both the military and project management professions place a high degree of importance to planning activities phase and have well developed and documented planning procedures. It has been

demonstrated earlier, though, that IT projects are prone to failure. One can speculate that because of the high stakes involved, the planning process followed by military commanders is more mature in areas such as meeting expectations and managing time than the one followed by IT project managers.

The essay that follows will demonstrate that practitioners of the IT project management discipline would have interest in studying the methods through which military operations are managed and will propose, for illustrative purposes, improvements to the current project planning process based on the military Operational Planning Process (OPP). Explicitly, it will compare both environments and map the current mandated Defence Management System (DMS), which provides process guidelines to National Defence project managers, over the CF OPP and will argue that the similarities and differences support the grafting of lessons learned. In effect, it will argue that project managers in National Defence could improve their rate of success by studying and adopting elements of the OPP. It will also speculate that this advice may apply as well to project staffs dealing with other fast evolving technologies.

The essay is organized in five distinct chapters. Chapter 2, which follows this introduction, will show that IT projects have a dismal rate of success from the perspective of meeting their assigned timeline, falling within budget, and addressing the requirements of their end-users and the expectations of their sponsors.

Chapter 3 will present how the Canadian military planning process has evolved to its current state. It will argue out that military operations are based on plans that are achievable and seldom fail in meeting the exp

Chapter 4 will focus its attention on the associated processes. It will describe the IT project planning processes as it is proposed in the industry and applied within National Defence. It will describe in detail the military operational planning process and map the two processes against each other.

At this point, the necessary background knowledge will have been developed to move onto the nub of the topic. Chapter 5, the crux of the essay, will present representative lessons that can be transferred from the military environment to the realm of IT project management. As opposed to convincing the reader of the validity of the stated lessons, the intent of this section is to demonstrate that lessons can be learned.

The conclusion, Chapter 6, will summarize the findings and highlight the most significant arguments.

CHAPTER 2 – THE APPLE

INTRODUCTION

Recalling one of the affirmations of the previous chapter, what does the literature indicate in so far as the success of IT projects in general, in the Canadian government and the Department of National Defence in particular? The previous chapter proposed without proof that a significant proportion of IT projects within National Defence are deemed unsuccessful. What is this affirmation based on? This is one of the questions considered in this chapter.

Once one agrees with the argument that IT projects tend to have a dismal success rate within National Defence, one may wonder what are the success criteria that are not met and what are the probable causes for the failures? This chapter reviews the findings presented in a variety of third party open-source reports that reviewed large government IT projects. As this essay concentrates on project planning, it will focus on observations related to this particular process group.

To give context to this chapter, insight into the state-of-affairs in the delivery of IT projects within the industry as a whole will first be provided by relating the findings of the Standish Group, which developed a useful comparison framework to assess project success and publishes informative historical statistics. The chapter will then present in broad terms the success rate of IT projects within National Defence and the federal government and will provide an overview of the investment in IT initiatives currently undertaken by the Department. Using the Standish Group framework, the chapter will next categorize a number of large governmental and departmental projects and summarize the findings of third-party observers. The second-last section will extract lessons related to factors that contributed to the success or failure of the

projects studied. Lastly, the chapter will conclude with a summary of the most significant findings, relating them to the other sections of the essay.

APPLES INDUSTRY-WIDE

The Standish Group classifies projects into three types:

- *Successful*: The project is completed on time and on budget, with all features and functions as originally specified.
- *Challenged*: The project is completed and operational, but over-budget, over the time estimate and with fewer features and functions than initially specified.
- *Failed*: The project is cancelled before completion.[15]

The latest Standish Group public report indicates that slowly but steadily, IT project management success rates have been improving.

> Time overruns have significantly decreased from 222% over the original time estimate in 1994 down to 63% in the latest [2000] study. Cost overruns have gone from 189% over the original cost estimates in 1994 down to 45% in the 2000 study. In 1994 required features comprised 61% of the final product. This year's [2000] research shows 67% of the required features and functions. This notably increased end-user satisfaction in terms of time, cost and features.[16]

As indicated earlier, "[i]n 1994 only 16% of application development projects met the criteria for success – completed on time, on budget and with all the features/functions originally specified. This year [2000] 28% of projects were in the successful column."[17] "Lack of executive support has replaced user involvement as the number one cause of project failure."[18] Other factors, in order of diminishing impact, include the experience of the project manager, the clarity of the

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[15] The Standish Group International, "Chaos: A Recipe for Success," (West Yarmouth: The Standish Group International, 1999); available from http://www.standishgroup.com/sample_research/PDFpages/chaos1999.pdf; Internet; accessed 2 May 2005.

[16] Standish Group, "Extreme Chaos", 1.

[17] *Ibid*., 2.

[18] *Ibid*., 1.

objective and the breadth of the scope.[19] Even though success rates are improving, one must conclude that IT projects remain risky ventures throughout the industry.

APPLES IN THE GOVERNMENT AND NATIONAL DEFENCE

A review of 25 major IT projects by the Treasury Board Secretariat (TBS) carried out in 1995 identified "failures of major information technology investments and key systems development projects have raised concerns for the achievement of service improvement through information technology."[20] The same report also stated that "business, project management, risk management, and human resource issues influencing the [favourable] outcome of these projects."[21] An audit carried out the following year by the Auditor General of Canada identified five key factors influencing the success of government IT projects. Firstly, government projects commonly fail to clearly define requirements prior to contract award. Secondly, senior management and the project leadership team are often insufficiently involved in the process of delivering the project. Thirdly, the organization carrying out the project does not have the requisite "maturity" to take on the assigned challenge. Fourthly, priorities are not set, fail to be communicated or fail to be reviewed as the project evolves. Lastly, effective performance metrics remain unidentified or unmeasured as the project proceeds.[22] The projects studied by

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[19] *Ibid*., 4.

[20] Treasury Board of Canada Secretariat, *Management of Large Public IT Projects – Canada* http://www.cio-dpi.gc.ca/emf-cag/largeitproj/lrg-public-it-grnd-ti02_e.asp; Internet; accessed 2 May 2005.

[21] *Ibid*.

[22] Office of the Auditor General of Canada, "Chapter 24 - Systems under Development: Getting Results," *Report of the Auditor General of Canada to the House of Commons*. (November 1996): 2 of 25. Also available from http://www.oag-bvg.gc.ca/domino/reports.nsf/html/9624ce.html; Internet; para 24.71; accessed 2 May 2005. Hereafter referred to as the OAG Report.

both the Treasury Board and the Auditor General are all complex multi-year ventures requiring investments measured by multiples of tens of millions of dollars having significant operational impact on a particular department or across government services.

The National Defence Strategic Capability Investment Plan issued in November 2003 identified thirty-four planned capital equipment procurement initiatives that meet the definition for IT projects proposed in the previous chapter. They total $2.9 billion, an average of $86 million per project, to be spent over an undetermined period. These are mostly command and sense projects that will assist the commander in sensing the environment through space, air or land based assets; fuse information from various sources in order to generate better understanding of the situation; facilitate information sharing and networking through collaboration tools; and improve the reach and capacity of communication systems.[23] The investment plan also includes a number of corporate systems projects related to the management of the department's resources.[24]

APPLES: CASE STUDIES

Given the breadth of investment, the number of projects involved and the anticipated benefits, the department is understandably concerned with obtaining value for money. Recalling the Standish Group statistics and the two governmental reviews presented above, one may wonder where projects are specifically experiencing challenges and what are the causes for these

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The list also included a sixth factor, but this last one, related to a governmental initiative called the Enhanced Framework for the Management of Information Technology Projects, is too specific to fit in the above list.

[23] Department of National Defence, "National Defence Strategic Capability Investment Plan," *DP&M Website.* http://www.vcds.forces.gc.ca/dgsp/pubs/rep-pub/ddm/scip/annex04-05/ctdyn_e.asp?ct=1; Internet; accessed 2 May 2005.

[24] *Ibid*.

challenges. These questions will be answered by examining representative projects of various types. One will be *nearing failure*, others will be deemed *challenged* and the last one will denote *success*. In each case, the review will extract observations on factors that contributed to the project's success and on those that negatively impacted on its outcome.

Chapter 24 of the1996 Report of the Auditor General of Canada considered large IT projects under development. It reviewed four of the government's largest projects: the Army's Tactical Command, Control and Communications System (TCCCS), the Canadian Forces Supply System Upgrade (CFSSU), Public Works and Government Services' Real Property Services (RPS) system, and Transport Canada's Canadian Automated Air Traffic System (CAATS). First, even though TCCCS experienced "serious risks associated with delays in software development", the audit was satisfied that the risk was sufficiently mitigated through knowledgeable staffs that held sufficient delegated decision authority to act appropriately.[25] The auditors were concerned that the CFSSU schedule "started slipping very early in its development", but were reassured by senior management who took "specific actions regarding key management and technical risks."[26] According to the audit report, the project team of the third project, the RPS, generated significant risk by attempting to develop concurrently eleven separately planned projects.[27]

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[25] OAG Report, 2 of 25.

[26] *Ibid*.

[27] *Ibid*.

Canadian Automated Air Traffic System (CAATS)

The auditors had significant concerns to report when it came to the last project, CAATS. CAATS, a Transport Canada project, has a definite impact on the Canadian Forces. It is closely associated with National Defence's Military Automated Air Traffic System (MAATS) project. CAATS and MAATS were and still are in the process of replacing the existing manual Air Traffic System (ATS) with automated equipment and a distributed flight planning service. The original contract had been awarded in 1989. According to the 1996 timeline, CAATS was scheduled for completion in July 1998. But, "[s]tatus reports [dated 1996] from the prime contractor indicate that the CAATS project is very unlikely to be delivered on time and at currently specified cost and requirements."[28] This projection has been validated by a report dated March 2004 indicating that the "core of CAATS - its flight data processor - has been developed and delivered . . . and is in operational use at Moncton ACC [Area Control Centre]" and that "CAATS will be implemented nationally over the next three years."[29] CAATS remain, as of the writing of this essay, a project under implementation – sixteen years after initial contract award.

The 1996 audit chastises the CAATS project from a number of wide ranging perspectives. First, it appears that "the project leader[30] and project sponsor[31] were only

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[28] *Ibid*. , 8 of 25

[29] Nav Canada, "Canadian Automated Air Traffic System (CAATS)," Http://www.navcanada.ca/NavCanada.asp?Language=en&Content=ContentDefinitionFiles\Newsroom\Backgrounders\caats.xml; Internet; accessed 5 May 2005.

[30] A project leader is the person named in the project documentation as being accountable to the Deputy Minister for the overall management of the project. The project leader is at the very least a Director.
For details, see "Project Approval Guide," *DP&M Website,* http://www.vcds.forces.ca/dgsp/pubs/pag/pag_e.asp?chp=4&sec=350#564; Internet; accessed 2 May 2005.

[31] A project sponsor is the "person or group that provides the financial resources in cash or in kind for the project." see *PMBOK*, 391 for further details.

minimally involved in the decision making process."[32] Secondly, the project did not benefit from effective communication within the team and with its user community. Responsibilities were not delegated appropriately throughout the organization, thus rendering decision making "cumbersome and slow".[33] Thirdly, recognizing that the requirements for CAATS were extremely broad and complicated, they were poorly understood by the team members and ineffectively communicated throughout. This resulted in overly slow progress as work was often redone because of misinterpretation.[34] An interesting observation from the audit report states:

> While it is true that requirements can legitimately change over time and that some cannot be detailed in advance, it is important that all parties agree to specified requirements for reasonable and realistic time horizons. Action plans can be created to deal with any vague or outstanding need that extends beyond predictable time horizons.[35]

The fourth weakness concerned the review and acceptance of the system design. Not only were the requirements misunderstood, but the project also failed to develop and validate a comprehensive and workable design to demonstrate how the requirements were to be achieved.[36] It appears as well as though the project failed to resolve on a timely basis design issues that developed as the system was being built, resulting in significant hindrance to the project's progress.[37] Lastly, milestones were established, but the plan was allowed to proceed past milestones that had yet to be fully confirmed.[38] The 1996 perspective on CAATS was that it was

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[32] OAG Report, 3 of 25.

[33] *Ibid*.

[34] *Ibid*., 5 of 25.

[35] *Ibid*.

[36] *Ibid*., 17 of 25.

[37] *Ibid*., 18 of 25.

[38] *Ibid*., 19 of 25.

on its way to become a definite failure. It was, and remains, an example of a project with significant shortcomings.

Defence Integrated Human Resource System (DIHRS)

The next project examined is one that although challenged, delivered a functional system and is building on to its partial success as it progresses. In 2001, National Defence's Chief of Review services commissioned KPMG Consulting to review the Defence Integrated Human Resource System (DIHRS) Project. This particular project was established in 1996 to implement a system to "support human resource administrative and analytical requirements for military and civilian staff."[39] At the time of the review, HRMS had delivered an operational system, and was preparing for a new project phase building on the capability. Comparing the December 2001 and the March 1999 budget estimates for the complete project described in its charter, one clearly notes that costs have multiplied by a factor close to three whereas the timeline was delayed by approximately 5 years.[40] The DIHRS Project certainly falls in the challenged category of projects.

According to the KPMG report, the project had a difficult beginning. It suffered from "user resistance, lack of executive level acceptance and sponsorship and incomplete integrated business process design."[41] Other significant liabilities included inadequate levels of assigned resources and lack of control over the broadening of project scope.[42] Notwithstanding that the

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[39] KPMG Consulting, *Review of the Implementation of the Human Resource Management System* (August 2003); available from http://www.dnd.ca/crs/pdfs/hrmsrv_e.pdf; Internet; accessed 2 May 2005, 3/28.

[40] *Ibid*., 4/28.

[41] *Ibid*.

[42] *Ibid*.

system delivered was functional, the consultant continued to assess in December 2001 that the project remained at risk as it still experienced the challenges of its early days. Looking first at user opposition, the report indicates that new users tended to resist its employment but that as they gain proficiency with the system, their satisfaction improved accordingly.[43] On the subject of senior level commitment and business integration, the report states that "the buy-in required from all groups within the Department has not been universally strong, leading to such issues as the establishment of parallel systems."[44] This statement is indicative of lack of unified vision within the organizations impacted by the project. On the subject of scope control, indications are that "there was a constant pressure to expand functionality and processes within the modules which resulted in significant scope growth; however these changes were necessary to meet evolving business practices and needs."[45] It thus appears that the scope growth was legitimate, thus explaining at least partially the growing cost and expanding timeline for the project. Other problems stated in the report include an overly optimistic assessment in the early days of the project of the technical complexity for the customisation and integration efforts.[46] The report finishes on an optimistic note indicating that communications with users and decision making with senior management has greatly improved since various configuration control boards and working groups have been incorporated. These bodies ensure that issues be discussed and resolved before they become problematic.[47] But it also cautions the team that the increased

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[43] *Ibid*., 9/28.

[44] *Ibid*., 10/28.

[45] *Ibid*., 16/28.

[46] *Ibid*., 17/28.

[47] *Ibid*., 18/28.

complexity and greater user reach of the remaining phase may generate extensive project risk and encourages them to capitalize on the lessons learned thus far.[48]

Year 2000 Project

Now for a success story. Between April 1998 and March 2000, the government of Canada put in place a $1.9 billion project to ensure that the millennium bug would not impact critical governmental information systems.[49] National Defence was identified as one of the four lead departments[50] with a $366 million share.[51] As a result of this project, "[d]epartments and agencies ended up with better information about their systems than they had ever had previously, and IT infrastructures were strengthened."[52] "Almost all government-wide mission critical (GWMC) systems were remediated [*sic*] and tested by July 1999, and all departmental mission critical systems well before December 1999, leading to a successful transition into Year 2000."[53]

Two significant contributing factors to the success of this large government-wide undertaking were "strong support of senior management, and the fixed Year 2000 deadline."[54] The noteworthiness of the success is further reinforced by the realization that resource and time limitations forced the various teams to adopt a "risk management approach, paying attention to

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[48] *Ibid*.

[49] Treasury Board of Canada Secretariat, *Management of Large Public IT Projects – Canada* http://www.cio-dpi.gc.ca/emf-cag/largeitproj/lrg-public-it-grnd-ti13_e.asp; Internet; accessed 2 May 2005.

[50] *Ibid*.

[51] Department of National Defence, "Internal Audit of DND Year 2000 (Y2K) Expenditures," (n.p.: Chief of Review Services, June 2000), 4/16; http://www.dnd.ca/crs/pdfs/y2k_e.pdf; Internet; accessed 2 May 2005.

[52] Treasury Board of Canada Secretariat, *Management of Large Public IT Projects – Canada* http://www.cio-dpi.gc.ca/emf-cag/largeitproj/lrg-public-it-grnd-ti13_e.asp; Internet; accessed 2 May 2005.

[53] *Ibid*.

[54] *Ibid*.

their mission-critical systems and their most vulnerable technologies first."[55] Business continuity being the prime objective for the undertaking, team members were encouraged to imagine creative solutions that often extended beyond technology into the realms of manual process redesign and contingency planning. Factors that have been identified as critical for the favourable outcome include:

- "The declaration of Year 2000 as a government imperative established it as a clear priority";
- Establishing accountability at the Deputy minister level ensured "management commitment at the most senior level";
- The "adoption of a risk focus . . . provided . . . a context for decision making and issues management";
- "The results of these three items enabled . . . disciplined use of project management, the creation of partnership, and many other support elements";
- "Performance management . . . was an essential tool for establishing credibility for government-wide initiatives"; and
- "The control loop . . . was provided . . . through extensive communications and formalised [*sic*] monitoring and reporting".[56]

From the government's perspective, the Year 2000 Project is presented as a showcase success. The success is attributed, though, in great part to its immovable deadline of 1 January 2000 and its strategic importance to the continuity of government services. It is noteworthy that military operations are often attributed equivalent imperative of success.

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[55] *Ibid*.

[56] *Ibid*.

APPLES: LESSONS DRAWN

The case studies bring us to observe that unclear project objectives, unspecified roles of the various players, ill-defined responsibilities, poor communication, unclear lines of command, a disorganized team structure, lack of project manager credibility, distance, poor team member involvement and commitment, inappropriate selection of team members and lack of knowledge and experience can all undermine the success of an IT project.

What are the overarching lessons that can be extracted from the earlier statistics and various case studies? The first one that comes to mind is the clear and continual requirement for senior executive commitment. IT projects tend to reach throughout the organization and disturb the comfort level of those uncomfortable with change. Users and other stakeholders may resist and may even sabotage projects if senior executives do not routinely demonstrate their support. As well, projects may stray if they do not periodically confirm with their sponsors and leaders that they are in the right track. Projects must diligently and effectively verify with their masters their appreciation of the problem, their understanding of their mandate, their prospective solutions, their resource requirements and their risks and mitigation strategies in order to ensure that they are adequately meeting the expectation of their boss and his associates.

Communication down and across is also critical. IT requirements are closely related to business processes that are, more often than not, badly documented. As well, technology is seen as a critical enabler to the integration of disparate, but associated, business processes. These two factors combine to generate significant project complexity and uncertainty, which can only be resolved through frequent exchange of perspectives between those who operate within the existing processes and those who are mandated with changing them. In the alternative, the project is doomed to failure as it will deliver a system that based on the documentation meets the

requirements, but bears little resemblance to the real needs of the operator. Clearly, communications between all levels is critical to the success of an IT project. Projects operating on their own, in a vacuum, risk marginalizing both their targeted user community and their senior leadership.

Another challenge posed by IT projects is the difficulty in assessing and meeting timelines. A contributing cause is most probably the struggle with meeting the expectations of senior management and the requirements of end users, as discussed above. Another cause is certainly the pace of technological change. Moore's law, 40 years ago stated that "transistor density on integrated circuits doubles about every two years."[57] Today, the density doubles every year.[58] Project managers build timelines based on their assessment of probable technological changes, their understanding of their boss's expectations and their comprehension of the project's requirements. How can accurate timelines be proposed when the technology changes at an ever-increasing pace and expectations and requirements are ill defined, complex and uncertain? Time estimates are so poor that successful project managers have been known to apply a factor of two and a half to their best guess when submitting time estimates to their executives.[59] The case studies considered earlier suggest that poor time estimation can be mitigated by ensuring that project team members be knowledgeable and empowered to make decisions for the good of the project. This implies strong dedication and common understanding

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[57] Intel Corporation, "Moore's Law," http://www.intel.com/technology/silicon/mooreslaw/index.htm; Internet; accessed 2 May 2005.

[58] *Ibid*.

[59] The Standish Group International, "Extreme Chaos," (West Yarmouth: The Standish Group International, 2001), 3; available from http://www.standishgroup.com/sample_research/PDFpages/extreme_chaos.pdf; Internet; accessed 2 May 2005.

throughout the team of the environment, critical objectives, priorities, and interrelationships between the various tasks.

Similarly, one may ask, what is the impact of the pace of technological changes and the unclear nature of requirements on project scope? The case studies pointed out that most IT project manager have difficulty in controlling scope creep. Only the Year 2000 Project, which had enviable senior executive support, an unmovable deadline and bounded resources, successfully managed scope creep. For this project, triumphant management of scope creep resulted from the establishment of firm priorities and the recognition that risks be identified and managed. Other projects appear to have been unduly challenged by pressures from all sides to "*add-one-more-user"*, "*add-one-more-function-table-or-report"* or "*incorporate-this-single-new-state-of-the-art-feature*."

CONCLUSION

This chapter looked at the issue of IT project management. It presented the IT project environment as changing and uncertain. It stressed the importance of senior executive buy-in and continual oversight and discussed the value of open lines of communications with all stakeholders including the system operators. It presented the difficulty in managing the scope of the project, assessing resource requirements and building firm schedules. It suggested the need for firmly established objectives, the importance of common understanding of the manner through which the objectives will be met, the criticality of commitment and expertise of the project team, the importance of managing risk and the associated need to empower qualified team members to make decisions. All in all, it will have left the reader with the sense that IT

projects are high risk and complicated ventures that more often than not lead to unfavourable outcomes.

One may wonder how one can improve the success rate of IT projects. One may also wonder whether such improvements could also apply to other technology fields experiencing similar high and unpredictable rate of change of the state-of-the-art. To answer these questions, the next chapter presents the environment in which military operations are planned and take place. It will attempt to convince the reader that the planning and implementation environment of IT, and by extension other advanced technology, projects is quite analogous to the one in which military operations are planned and executed. Chapter 4 will go one step further and compare the planning processes of both disciplines and form definitive relationships between them. Based on the similarities, Chapter 5, the core of the essay, will propose improvements for the consideration of IT and advanced technology project managers and thus demonstrate that the project management profession can learn from studying the means and ways of the military profession.

CHAPTER 3 – THE ORANGE

INTRODUCTION

This chapter will look at military operations and present where they diverge and converge with IT projects. It will first provide a short historical context on the adoption of the Canadian Forces (CF) Operational Planning Process (OPP) as the mandated approach for planning campaigns and operations within the CF and will discuss whether the CF planning has improved as a result of increased use of the formalized approach. It will then introduce the environment in which military operations are planned and will deduce implications using the principles of war as a framework for the discussion. Lastly, it will extract similarities and disparities with the IT project environment and will conclude by refocusing the conclusions proposed thus far in relation to the essay's thesis.

ORANGES: THE HISTORY

In 1988, the Chief of Defence Staff and the Deputy Minister commissioned the Little-Hunter study to examine how National Defence Headquarters could improve its ability to perform crisis management in peace, emergencies, and war.[60] The report, tabled in January 1989, strongly criticized the war and crisis planning abilities of the time.[61] In 1992, the Little-Hunter report was followed by the Somalia Commission of Inquiry report. Many are familiar with Somalia Inquiry findings concerning failures in leadership. Less well known, the commission

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[60] Douglas Bland, ed., *Canada's National Defence: Volume 2 Defence Organization* (Kingston: Queen's University, 1997) 410.

[61] *Ibid.,* 411.

report also strongly criticized the military planning system, as it existed in 1992.[62] Some of the recommendations of the Somalia report concerned improvements to military planning and mirrored those produced earlier by the Little-Hunter report. Specifically, the Somalia report states that

> Senior commanders did not adequately address fundamental military factors requiring their personal attention. They did not provide a clear statement of the operational mission; analyse the steps necessary to accomplish that mission; complete an adequate estimate of the situation and an assessment of tasks to determine systematically the force size, composition, and organization needed; assess the rules of engagement from a Canadian perspective; or properly estimate the time the CF and, especially, unit commanders, needed to respond to their orders. Nor did they allow sufficient time for thorough assessments of the readiness of units and to correct deficiencies discovered in assessments.[63]

And

> Estimates of the situation prepared by commanders or prepared for them by senior staff officers were universally incomplete, overly dependent on untested assumptions, and lacking in basic information and professional rigour. They were undependable sources for senior decision makers but were accepted by these officers without comment.[64]

Both studies criticized the existing system as lacking documented policies and for being "reactive, incomplete and constrained by short time-lines."[65] A number of progressive initiatives have been introduced over the ten years that followed the Somalia Inquiry. In 2000, the "keystone manual within the CF doctrine publication system", *Canadian Forces Operations*, was

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[62] Commission of Inquiry into the Deployment of Canadian Forces to Somalia, *Dishonoured legacy : the Lessons of the Somalia affair,* volume 3. (Ottawa: Minister of Public Works and Services Canada, 1997) 797-848. Also available from http://www.dnd.ca/somalia/vol3/v3c25ae.htm; Internet; accessed 2 May 2005.

[63] *Ibid.,* 846.

[64] *Ibid.*

[65] Colonel Robert Clark, "The Canadian Forces Operational Planning Process: A Maturing Process or Continued Improvisation?" (Toronto: Canadian Forces College Advanced Military Studies Course Paper, 2000), 7/31.

released.[66] Chapter 4 of this particular manual relates to military planning guidance at the operational level and formally introduces the OPP.[67] The doctrine was expanded in 2002 with the introduction of the *CF Operational Planning Process* manual which is the "keystone-planning manual in the Canadian Forces Doctrine Hierarchy" and targets "[c]ommanders and their staff at the strategic and operational levels".[68]

The CF OPP manual indicates that military planners routinely cope with external factors such as short response time, lack of intelligence on both the adversary and the environment, unclear mission, government pressure, ill-defined interaction with the mission of other forces and non-governmental organizations and lack of both planning resources and forces on the ground. The OPP was introduced to add structure to the development of plans. It is a structured, and thus repeatable, process that can be tailored to the needs of the commander.[69]

Regretfully, there are few Canadian articles at this time providing an honest assessment on the application, usefulness and success of this maturing planning paradigm. Anecdotal evidence indicate that most practitioners believe that the process works well with minor adaptations based on the specificities of their mission whereas many non-practitioners reject it as non-applicable to their particular situation. As commanders and their staff gain confidence and proficiency with the process and associated lessons learned are published, the doctrine is expected to mature and improve. Similarly, as the process matures, resistance is expected to taper off.

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[66] CF Ops, ii.

[67] *Ibid.,* 4-2 to 4-7.

[68] CFOPP, ii.

[69] *Ibid.,* 3-1.

ORANGES: THE ENVIRONMENT

Having introduced where the CF is from a doctrinal point of view, this section will turn its attention to the environment in which military planners function. It will begin by explaining what are military operations and describing the function of planning military operations. It will then focus on the challenge of planning military operations using as a framework those principles of war that guide the process of developing a plan.

The scope of operations can include the mobilization of forces in preparation for a potential crisis, the deployment of these forces in a theatre of operation, the employment and sustainment of these forces in theatre, the redeployment of these forces once the crisis is resolved or a combination thereof. The Canadian Forces, being a command driven organization, places much emphasis on the planning function and the preparation of plans and orders. In simple terms, planning is the organization in time and space of a commander's assets in order to meet the assigned mission. The end-result of the process is a directive to subordinate forces in the form of plans or orders. Plans and orders are often developed by commanders' staffs, but are only released by the commanders themselves, or their superiors, as only appointed commanders hold the requisite authority and accountability.[70]

According to the CF OPP, the first principle of war is *Selection and Maintenance of the Aim*. "Every military operation must have a single, attainable and clearly defined aim which remains the focus of the operation and towards which all efforts are directed."[71] External

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[70] *Ibid.,* 1-1, 1-2.

[71] *Ibid.,* 1-6.

pressures, such as an unclear mandate and government pressures often complicate the ability to conform to this critical principle. The planning staff expends considerable energy clarifying their mission statement and assessing whether it can be met considering the assigned forces, their capabilities and their readiness levels. Once this mission has been clarified and confirmed by their superior commander, the remaining planning activity is very much focused on ensuring that the analysis, the proposed courses of action and the resulting plan fully comply with the strategy and guidance of their immediate and superior commander.

Two other associated principles are *Concentration of Force*, which encourages planners to ensure that they allocate sufficient resources in time and space to ensure the success of critical tasks and *Economy of effort*, which encourages them to apply no more than minimal forces to activities that are not part of the main effort.[72] These two principles guide planners to produce plans that assign resources based on the activities most critical for the success of the operation at the expense of other less important activities. In effect, they encourage planners to accept diminishing risk according to the rising criticality of the activity.

The principle of *Co-operation*, which "entails a unified aim, team spirit, interoperability . . ., division of responsibility and coordination of effort to achieve maximum synergy,"[73] promotes communications both laterally to ensure that the influence of other organizations impacting the mission be well understood and coordinated, and vertically down to ensure that subordinate units fully comprehend their assigned tasking. It also promotes the empowerment of subordinate commanders who, by extension, must be well qualified and trustworthy. An important implication of this principle is that the team, including the commander, the staff,

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[72] *Ibid.,* 1-6, 1-7.

[73] *Ibid.,* 1-7.

subordinate commanders, and fighting forces must be well aware of their role and their linkages to the plan.

This principle also suggests that cooperation may be "best achieved by vesting in a single commander the requisite authority to direct and coordinate all forces employed in pursuit of a common operational objective."[74] Disciplined exchange of information and perspectives being essential to operational effectiveness, commanders often instigate a predictable battle rhythm thus ensuring that their staff and subordinate headquarters optimise their own routine to meet their commander's needs. As well, a standard applied in most military organization dictates that plans be produced at one level, but approved and released by the higher headquarter. This ensures that instructions issued throughout an organization be consistent with the recursive expectations of the commander one level up.

It has been stated that "*a plan never survives first contact with the enemy*." As opposed to "*Selection and Maintenance of the **Plan**"*, *Flexibility* is another critical principle of war. "Commanders must exercise judgement and be prepared to alter plans or to shift points of effort to take advantage of chance opportunities." Such amendments to the plan frequently become necessary because of the uncertainty, ambiguity, and the changing environment in which the military operates.

APPLES AND ORANGES: THE ENVIRONMENT COMPARED

The previous chapter demonstrated that IT projects have a historically blemished success rate in the industry in general and in National Defence in particular. Few projects meet their assigned timeline, deliver on the intentions of their sponsor and adequately address the

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[74] *Ibid*.

requirements of their operator. It has been demonstrated in the current chapter that military operations, on the other hand, are planned and organized in a way that their timelines remain flexible and that the expectations of higher commanders remain at the forefront of planning considerations along with the mission.

These two chapters also demonstrated that the environment in which IT projects are planned is similar to those in which military operations are conceived. Military operations and IT projects are both high-risk ventures that contend with a fast changing operating and technical environment. They both often contend with ill defined or misunderstood mandate. The success of both is predicated on a number of factors including:

- consistent interest from superiors with decision-making authority;
- empowering of competent subordinate decision-makers;
- effective lateral and vertical communication and coordination;
- a continual focus on the desirable end-state;
- an ability to readjust or re-plan when dictated by the changing situation; and
- the need to accept and manage risk.

One must admit that there are many similarities between the planning environment for IT projects and that of military operations.

There are definite differences, as well, not the least of which being the wager. Military operations are always associated with critical strategic and political objectives whereas such links are not always clear for IT projects. Of the projects discussed in the previous chapter, only the most successful one, the Year 2000 project, had strategic and political stakes similar to typical military operations. The review of this particular project, in fact, indicates that contrary to the other examples, the executive level remained quite involved throughout the planning and

delivery of the project. In a sense, from the senior management implication perspective, it conformed more to the military than to the project management model.

Another factor that appears to be different is the preoccupation with time and financial management. Project Managers appear to be more focused on timelines, schedules and costs than military commanders. Commanders will establish battle rhythms that dictate the daily timetable of their personnel, but they tend to place less emphasis on the assessment of the duration or the costs of the total operation. Project Managers, on the other hand, expend significant energy assessing, building, updating and briefing schedules and budgets. As well, many of the performance metrics used by projects compare project status with its forecasted schedule and budget. Military commanders have a different approach and appear to be more focused on measuring whether they are generating the effects they need to produce in order to attain the end-objective they have been tasked to reach.

CONCLUSION

As indicated at the outset, the intention of this essay is to demonstrate that advanced technology projects in general and IT projects in particular can be improved upon by applying the tried-and-trusted lessons learned by military commanders. The essay has demonstrated so far that the problem-space of both planning environments offers interesting parallels and that the military planning approach is more successful than the process followed by IT project managers. At this point, one may (hopefully) wonder whether there is cause for the essay's position.

Some of the lessons learned by military commanders have been incorporated in the CF Operational Planning Process (OPP) doctrine. As will be presented in the next chapter, practitioners of both the military and project management professions place a high degree of

importance to planning activities and have well-developed and documented planning procedures. Arguing that the military planning process copes better with challenges posed by the environment described above, Chapter 4 will propose improvements to project planning processes based on the practices of military planners. These improvements will be geared toward IT project managers, but may also apply to managers of other advanced technology projects.

CHAPTER 4 – COMPARING THE APPLE AND ORANGE DESIGN PROCESSES

INTRODUCTION

It is undeniable that military operations and projects are very different when looked at on the surface. How can one compare a project manager dealing with stacks of administrative and corporate lingo to a military commander who is concerned on an ongoing basis with the protection of his nation and his fighting forces? Nevertheless, it has hopefully been demonstrated thus far in this essay that the two worlds are more similar than some originally anticipated. If projects are apples, then operations are oranges, but one must certainly concede at this point that they are both fruits.

This chapter is focused on the construction of both fruits. It will present how the project, the apple, is designed and contrast the process with the development of the military operation, the orange. Realizing, as demonstrated in the earlier chapter, that the orange appears to be better designed than the apple, both processes will then be compared to establish whether there are sufficient similarities to warrant improvements upon the apple's design process using the one that applies to oranges.

In more tangible terms, the previous chapter demonstrated that military operations and IT projects have similarities and hinted that the planning of IT projects could benefit from the structure applied to military operations planning. The intent of this chapter is to map the IT project planning process as it applies to National Defence project managers over the CF operational planning process (OPP) to ascertain elements of the two processes that are comparable. This will set the scene for the following chapter that will provide recommendations to improve IT project planning within National Defence.

After providing regulatory context to project planning within the department, the current chapter will describe the process through which project managers plan projects, focusing on IT project planning where nuances arise. It will then outline the Canadian Forces doctrinal operational planning process and, in the third section, make parallels with project planning. It will conclude by summarizing where the two processes coincide and where they diverge.

APPLE DESIGN: PROJECT PLANNING IN NATIONAL DEFENCE

Large government departments such as National Defence are, by definition, large bureaucracies with comprehensive checks and balances to ensure that government resources are expended wisely and in accordance with government priorities and means. Projects in National Defence are regulated through a range of hierarchical standards, policies and instructions ranging from the Treasury Board Secretariat to individual group principals and environmental commanders.[75] In view of maintaining focus on the management of activities recognized within the department as legitimate projects, this essay will restrict itself to the review of documentation most often consulted by personnel properly recognized as project managers. In effect, it will focus on those policies and processes that apply to projects approved within the Defence Services Program (DSP).[76]

Change, in the department, is managed through the DSP. In theory and in practice, only projects identified in the DSP are funded and resourced. The *Defence Management System*

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[75] Group principals are senior civil servants and general officers reporting to the Deputy Minister and the Chief of Defence Staff. They normally hold centralized responsibility functions specific to individual resources such as departmental materiel, personnel and finances. The three environmental commanders are the Chiefs of Land, Air and Maritime forces. They also report to the Deputy Minister and the Chief of Defence Staff.

[76] "DSP is the sum of all departmentally approved activities and projects expressed in resource terms. A major component of the DSP is the Capital Program which is dedicated to the long-term sustainment of defence capabilities." The "Project Approval Guide" of the DP&M Internet Website (http://www.vcds.forces.gc.ca/dgsp/pubs/pag/pag_e.asp?chp=1&sec=10) refers.

(*DMS*), and more specifically its *Project Approval Guide* (*PAG*) insert, describes the documentation and processes through which projects are identified, initiated, funded and resourced.[77] In effect, the *PAG* describes the complete project delivery process from inception of the project to handover of the delivered capability to the organization that will operate, support, and maintain it during the in-service phase of the system's life-cycle.

According to the *PAG*, the principal reference for managing projects within National Defence is the *Material Acquisition and Support* (*MA&S*) *Desktop*,[78] a comprehensive web-based information repository that describes well-defined processes that can be tailored based on the preferences of the managing authorities. It includes tools such as templates and decision aids, best practices, and lessons learned. Amongst a multitude of other useful material, *MA&S Desktop* identifies the *Guide to the PMBOK*, as the professional knowledge foundation for project management within the department.[79]

As the departmental functional authority for information technology, the Associate Deputy Minister (Information Management) (ADM(IM))[80] publishes the *Project Management Document Requirements and Examples Handbook*. The purpose of this particular handbook is to assist IT project managers and their staffs in addressing the various documentation requirements

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[77] Department of National Defence, "PAG Chapter 7 – Capital Projects Approvals," *DP&M Website,* http://www.vcds.forces.ca/dgsp/pubs/pag/pag_e.asp?chp=2&sec=80; Internet; accessed 2 May 2005.

[78] Department of National Defence, "PAG Chapter 9 – Project Management Consideration," *DP&M Website,* http://www.vcds.forces.ca/dgsp/pubs/pag/pag_e.asp?chp=4&sec=310; Internet; accessed 2 May 2005.

[79] MA&D Desktop is only accessible from the DND Intranet. A description of the environment can be found at Public Works and Government Services Canada, "Knowledge Centre Directorate," http://www.kcd.gc.ca/kes/contente.html#Materiel%20Acquisition%20and%20Support%20Desktop%20:%20Reference%20Tool%20for%20Project%20Managers,%20Beta%20Version; Internet; accessed 2 May 2005.

[80] Department of National Defence, *Defence Information Management Strategy 2020* (Ottawa: Information Management Group, 2005) 6/8.

including those of the *DMS* and of the departmental IM program.[81] It is consistent with *DMS* directives and other than linking the departmental process to the various document requirements associated with the departmental information management program, it offers little process specific guidance at this time. The departmental processes for IT project managers is thus no different than those mandated to project managers of other technological domains.

The project life-cycle in National Defence consists of four phases, namely: *Identification*, *Option Analysis*, *Definition*, and *Implementation*.[82] This section describes the elements of these phases, their players and their key documentation elements.

The project *sponsor* is the senior departmental or military official who justifies and captures the requisite funding, oversees its delivery from a requirements and operation perspective, and mandates the project to a project manager who will ultimately be responsible for its delivery. During the *Identification* phase, the *sponsor* attempts to obtain an agreement on the capability deficiency from his peers, identifies "potential solutions in broad terms", allocates funding for the refinement of options, and initiates planning for the follow-on phases. During the early phases of the process as the project seeks approval, the project *sponsor* normally empowers one of his staff to coordinate on his behalf project related activities and appoints him the title of project *director*.[83]

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[81] Ann Whitton, *Project Management Document Requirements and Examples Handbook*, version 1.2 (Ottawa: DND Canada, 7 July 2004), 4 of 19.

[82] Department of National Defence, "PAG Chapter 7 – Capital Projects Approvals," *DP&M Website,* http://www.vcds.forces.ca/dgsp/pubs/pag/pag_e.asp?chp=2&sec=80; Internet; accessed 2 May 2005.

[83] Department of National Defence, "PAG Chapter 9 – Project Management Considerations," *DP&M Website,* http://www.vcds.forces.ca/dgsp/pubs/pag/pag_e.asp?chp=4&sec=350; Internet; accessed 2 May 2005.

During the *Options Analysis* phase, the *Project Charter* that "establishes the mandate for [the] project organization and provides guidance to the project team in the form of assigned responsibilities, broad project objectives, and constraints"[84] is approved. The resource requirements for the preferred option are assessed. An initial *Project Profile and Risk Assessment* (*PPRA*), which identifies the project risks and the mitigation measures, is submitted. The *Statement of Operational Requirement* (*SOR*) is refined and a *Senior Review Board* (*SRB*) composed of senior departmental and military representatives and providing comprehensive management oversight for the project is established.[85]

During the *Definition* phase, the *SOR* is finalized, the resource estimates are confirmed, the *PPRA* is updated, the *Project Management Plan* (*PMP*)[86] that describes how the project is implemented is created, and the leadership of the project is transferred from the sponsorship organization to the implementation organization. Up until this point, the project *leader* function belonged to the project *sponsor*. During the *Definition* phase, a senior manager within the implementation organization responsible for the project manager becomes the project *leader*.[87]

Lastly during the *Implementation* phase, the *PMP* is executed and updated as appropriate, the currency of the *PPRA* and *SOR* is maintained, the *sponsor* and the *SRB* are consulted as needed to consider changes to the scope or resource requirements, the project completion and

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[84] Department of National Defence, "PAG Chapter 9 – Project Management Considerations," *DP&M Website*; http://www.vcds.forces.ca/dgsp/pubs/pag/pag_e.asp?chp=4&sec=370; Internet; accessed 2 May 2005. PAG 9-36.

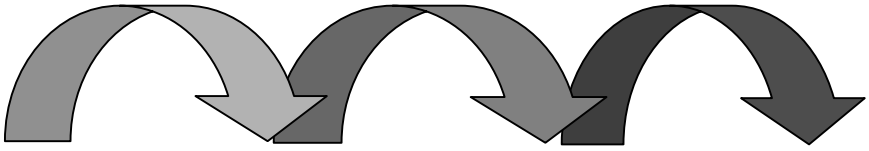
[85] Department of National Defence, "PAG Chapter 7 – Capital Projects Approvals," *DP&M Website,* http://www.vcds.forces.ca/dgsp/pubs/pag/pag_e.asp?chp=2&sec=100#2; Internet; accessed 2 May 2005.

[86] The PMP as defined in this essay is officially referred to as the PMP (Implementation) in the DMS as there also exists PMP(Identification), PMP(Option Analysis) and PMP(Definition) which correspond to the individual plans prepared to organize the work produced in earlier project phases.

[87] Department of National Defence, "PAG Chapter 7 – Capital Projects Approvals," *DP&M Website,* http://www.vcds.forces.ca/dgsp/pubs/pag/pag_e.asp?chp=2&sec=100#2; Internet; accessed 2 May 2005.

lessons learned reports are produced and the delivered capability is transitioned to the in-service phase.[88]

Figure 1 summarizes the complete project life cycle as defined in the DMS.



IDENTIFICATION	OPTIONS ANALYSIS	DEFINITION	IMPLEMENTATION
Identify Capability Deficiency	Formulate options Discard invalid options Assess benefits of remaining options Examine risk Decide which option should be pursued Development	Detailed review, risk assessment and costing of selected option. Implementation planning	Implementation Implementation management Implementation monitoring Reports on status of implementation Operational Handover Close out

Figure 1 - Defence Management System Project Management Phases
Source: Department of National Defence, "PAG Chapter 7 – Capital Projects Approvals," *DP&M Website,* http://www.vcds.forces.ca/dgsp/pubs/pag/pag_e.asp?chp=2&sec=100#2; Internet; accessed 2 May 2005.

The *PMP* is the most significant product of the *Plan Project* process. The *MA&S Desktop* describes the objective of the *Plan Project* process as "a process of devising and maintaining a workable scheme . . . to accomplish the need that the project was undertaken to address". Amongst others, it identifies as sub-processes *Define Scope* and *Develop Schedule* and refers to the *PMBOK* for guidance.

[88] *Ibid*.

For projects involving information technologies, *MA&S Desktop* also suggests as additional references, the *Software Program Managers Network (SPMN) Guidebooks* and the *16 Critical Software Practices* also produced by the SPMN.[89] These references provide a multitude of best practices from industry and government in support to military software-intensive systems and projects.[90] Specifically, the *16 Critical Software Practices* offers excellent management advice, but it is of little value for projects that "are expected to deliver under impossible schedule deadlines with inadequate funding and without the required staffing with essential skills."[91] Accordingly, both sets of references offer excellent advice to project managers, but don't comprehensively address the full range of challenges identified in Chapter 2 of this essay – specifically the difficult test of coping with strict timelines and fixed budgets and contending with ill-prepared staff. They provide guidance, though, in addressing some of the other identified ordeals including the changing requirements, keeping up with the technology, ensuring effective communication and addressing the lack of effective management oversight.

The *MA&S Desktop* presents the *Plan Project* process as an iterative process that gathers information of varying levels of completeness and confidence and develops or updates the project's implementation plan. It is iterative in that the process is continually revisited as both the facts and the approaches are clarified.[92]

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[89] Department of National Defence, "Plan Project Process Description," *Material Acquisition and Support (MA&S) Desktop*http://admmat.ottawa-hull.mil.ca/masd/index_e.htm; Defence Intranet; accessed 20 Feb 2005.

[90] Department of National Defence, "SPMN Guidebooks," *Material Acquisition and Support (MA&S) Desktop.* http://admmat.ottawa-hull.mil.ca/masd/index_e.htm; Defence Intranet; accessed 20 Feb 2005.

[91] Software Program Managers Network, "16 Critical Software Practices," http://www.spmn.com/16CSP.html; Internet; accessed 3 May 05.

[92] Department of National Defence, "Plan Project," *Material Acquisition and Support (MA&S) Desktop*http://admmat.ottawa-hull.mil.ca/masd/index_e.htm; Defence Intranet; accessed 20 Feb 2005.

Input and control elements include the *Project Charter*, the *SOR*, the *PPRA*, earlier versions of the *PMP* and resources including funding and personnel. The *Project Charter*, as indicated earlier, "formally authorizes the existence of a project, and provides the project manager with the authority to apply organizational resources to project activities."[93] The *SOR* "communicates the characteristics of the operational requirement for a . . . system to technical and procurement staffs and contains the critical performance criteria necessary for evaluating technical options."[94] The *PPRA* "documents the risks associated with a project and outlines the management strategy to deal with them."[95]

As indicated earlier, the *Plan Project* process' main output is the *PMP*. The PMP includes subsidiary plans to address communications, procurement, risk, schedule, scope, staffing and engineering and support.[96] The *Plan Project* process will also update on occasion the *Charter*, the *SOR* and the *PPRA* as further insight is gained and facts and assumptions are clarified throughout the development of the *PMP*.[97] To ensure a quality product, project planning must involve a high level of interaction with all stakeholders who have influence on project delivery, its acceptability and its outcome.

A simplified *Plan Project* process sequence, based on the *PMBOK* and the *MA&S Desktop*, is illustrated in Figure 2. For the sake of clarity, only the most significant interactions

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[93] PMBOK, 368.

[94] Department of National Defence, "PAG Chapter 9 – Capital Projects Approvals," *DP&M Website,* http://www.vcds.forces.ca/dgsp/pubs/pag/pag_e.asp?chp=4&sec=370; Internet; accessed 2 May 2005.

[95] *Ibid*.

[96] Department of National Defence, "Project Management Plan," *Material Acquisition and Support (MA&S) Desktop*http://admmat.ottawa-hull.mil.ca/masd/index_e.htm; Defence Intranet; accessed 20 Feb 2005.

[97] Department of National Defence, "Plan Project," *Material Acquisition and Support (MA&S) Desktop*http://admmat.ottawa-hull.mil.ca/masd/index_e.htm; Defence Intranet; accessed 20 Feb 2005.

and data flow among the sub-processes are shown therein. Figure 3 presents the structure of the *PMP* as it is described in the *ADM(IM) handbook*.

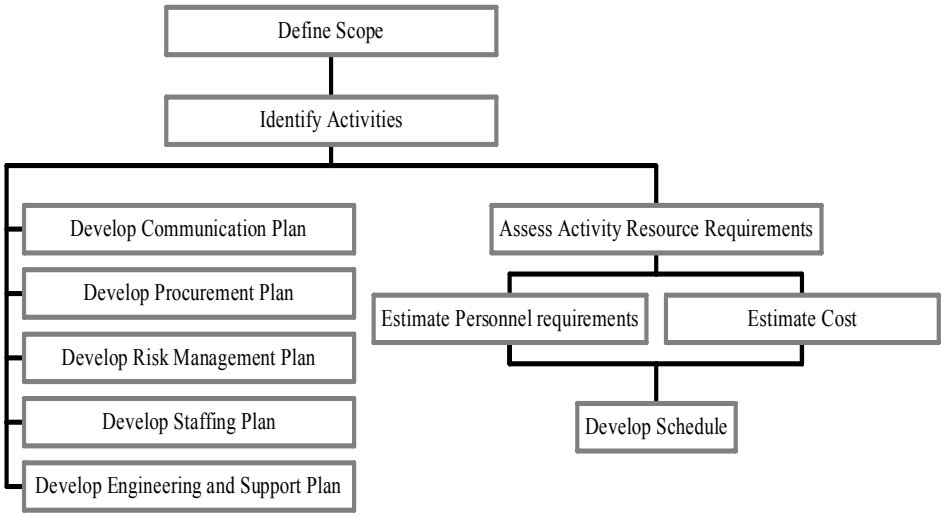

Figure 2 – Simplified Project Planning Process Sequence

The first step of the *Plan Project* process, *Define Scope*, uses the *Project Charter* and other associated material to produce a *Project Scope Statement*, a

> narrative description of the . . . major deliverables, project objectives, project assumptions, project constraints, and a statement of work that provides a documented basis for making future project decisions and for confirming or developing a common understanding . . . among stakeholders.[98]

In other words, it describes what needs to be accomplished.

[98] PMBOK, 370.

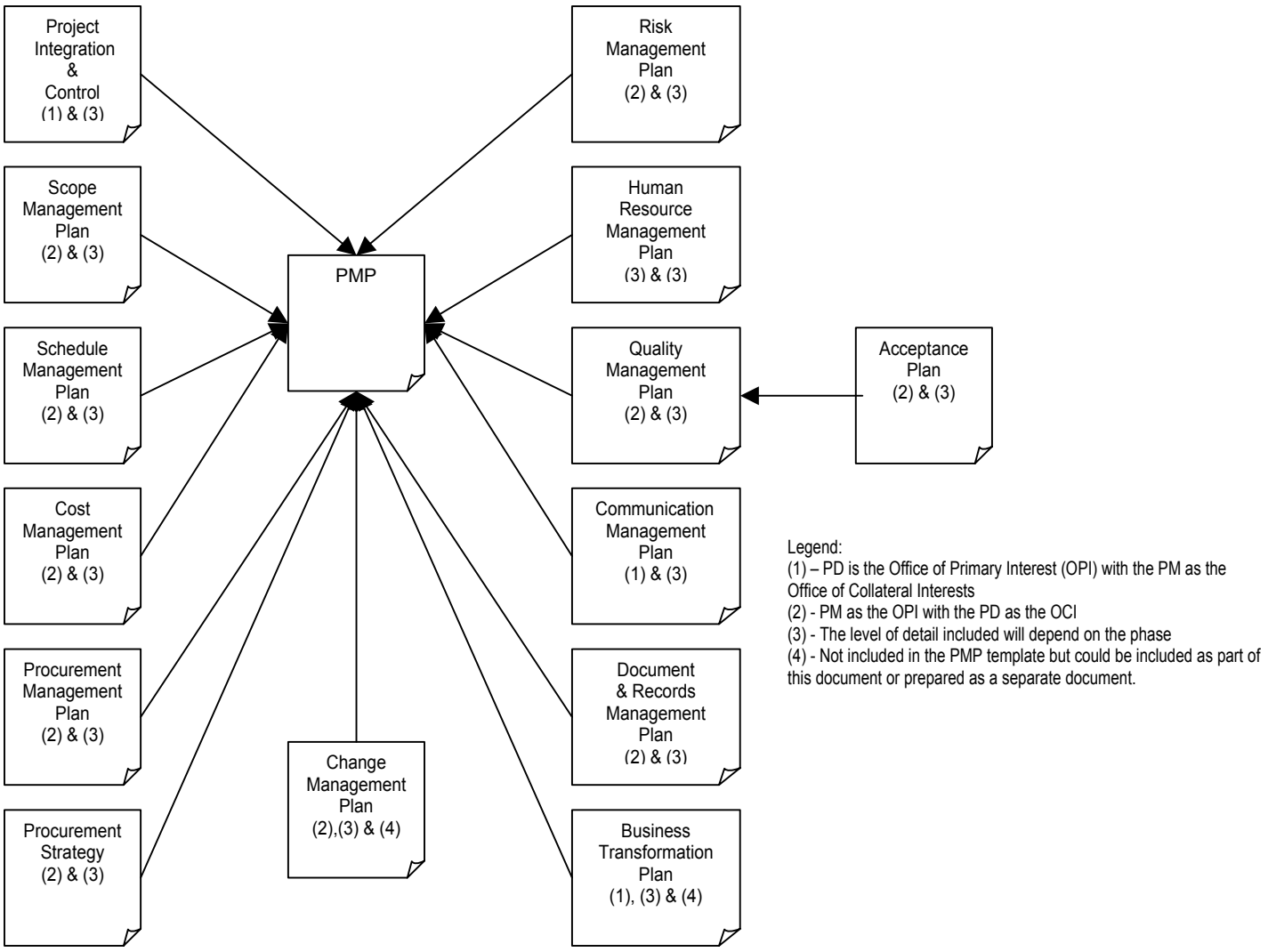

Figure 3 – Project Management Plan Document Description
Source: Ann Whitton, *Project Management Document Requirements and Examples Handbook*, version 1.2 (Ottawa: DND Canada, 7 July 2004), 4 of 19.

The second step, *Identify Activities*, breaks down the work into manageable packages that are frequently individually associated with identifiable project deliverables. Once the work packages have been defined, a number of concurrent planning activities are initiated. Some of the team members develop the communication plan that establishes how the reporting and the information gathering needs of the various stakeholders are met. Others generate a strategy for

obtaining contracted goods and services. Still others elaborate a structure to manage the *PPRA* and project risk, "an uncertain event or condition that, if it occurs, has a positive or negative effect on a project's objectives."[99] Two more groups define the staffing plan that describes how project human resources are acquired and the engineering and support plan that expresses the measures that are put in place to ensure that the team has access to the administrative and technical support they need to deliver the project.

As these various sub-plans are produced, the workload and skills associated with the various activities is assessed, the schedule is built and costs are estimated and phased. The end-aPPRAf 4d ensa

attainable assessment of skill requirements, and reliable resource and costing estimates. In effect, the typical IT project plan tends to be much more fluid than the typical project of more mature technologies such as construction or civil engineering.

Throughout, this essay speculated the planning of IT projects has affinities with the development of military operational plans and proposed that IT project planning could benefit from the processes used by military planners. Chapter 2 demonstrated that few IT projects in both the federal government and National Defence are deemed successful and hinted that part of the root cause lies in immature planning methods. Chapter 3 presented a case for similarities in the environment in which military operations and IT projects exist by highlighting, amongst other features, the high uncertainty levels and high risks of both ventures. This current chapter presented thus far the process through which projects are planned within National Defence. The essay will now turn its attention to the description of the military operational planning process in order to provide a basis for comparison of both processes.

ORANGE DESIGN: OPERATIONAL PLANNING PROCESS

Success in any operation requires some mechanism for changing the enemy's behaviour, for influencing the will of the adversary's leadership. Success is contingent on careful planning, thorough and sophisticated understanding of the enemy, and complete knowledge of one's own capabilities, requirements and vulnerabilities. Planning for military operations begins long before forces are engaged and carries on throughout the campaign as the plan is changed to adapt to changing circumstances and awareness of the situation.

There exist two categories of military plans. Military operations can either be deliberately planned or result from an immediate crisis. Deliberate plans are those that are produced in slow- time, when the staffs can leisurely assess the situation, confirm their assumptions, develop comprehensive courses of action and complete a detailed comparison of these options. Crisis action planning, on the other hand, "consists of initiating and developing plans in response to a current or developing crisis. It requires an expeditious co-ordination and approval. While following the same stages as in deliberate planning some activities are truncated to meet time constraints."[101] The plan to deploy the Navy in the Persian Gulf in late 2001 as a Canadian contribution for the war against terrorism is one that fell in the crisis action planning category whereas existing North Atlantic Air Defence (NORAD) counter-narcotics standing defence plans fall in the deliberate planning category. Realizing that both categories follow the same process, the leisure factor would nevertheless tempt one to compare project planning to deliberate planning vice crisis action planning.

The Canadian Forces Operational Planning Process (CF OPP) is a five stage iterative process, as presented in Figure 4. The process is both parallel and sequential in nature. Although certain elements must be completed before others can begin, it is advantageous from a time efficiency perspective to work tasks in parallel in many areas. It is also critical to stress that the process is iterative. One of the clichés commonly attributed to military operations states that "*the plan is nothing, planning is everything*." The saying highlights the provisional nature of a published military plan. In fact, the development of military plans is a continuous activity that carries on from the time the warning order is issued through the full duration of the operation. New information discovered in later stages will often force the re-evaluation of products of

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[101] CFOPP, 3-5.

earlier stages. In effect, the order the stages are initially accomplished may be of little impact because the products are periodically revisited multiple times before the operation is completed.

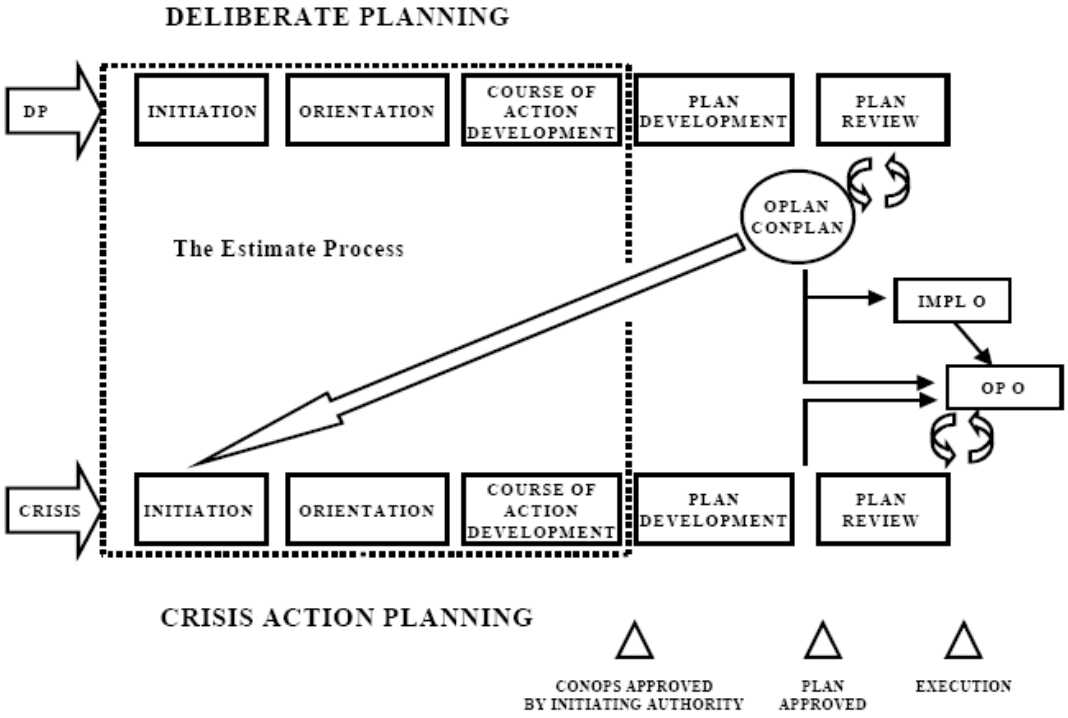

Figure 4 – CF Operational Planning Process
Source: CFOPP, 4-1.

Beginning with the *Initiation* stage, the process is instigated by a senior commander, the *Initiating Authority*, through an *Initiating Directive* such as a warning order. One of the first activities upon receiving the *Initiating Directive* is an assessment of the timeline for completing the planning process. Through this assessment, the commander will decide whether the full process will be followed or whether it will be abridged.[102]

[102] *Ibid.*, 4-2, 4-3.

During the *Orientation* stage, the planning staff "determines the nature of the problem, and confirms the results to be achieved."[103] The deliverables include a finalized *Mission Statement* and a briefing to their commander suggesting critical facts, assumptions, limitations, key strengths and weaknesses, assigned and implied tasks, success criteria and a description of the favourable end-state. The *Mission Statement* clearly and concisely summarizes the players involved in the operation, the actions to be undertaken, timings, locations and the purpose. Critical facts are statements of certified information vital for the success of the plan whereas assumptions are critical bits of uncertain but verifiable information that must be confirmed as facts before the plan is finalized. Limitations come in two forms: restraints prohibit certain actions whereas constraints compel them. For example, commanders are usually constrained to minimize enemy and friendly casualty and they are also almost always restrained from striking targets of special cultural, religious or humanitarian significance. Key strengths and weaknesses of own and opposing forces are those features that assist in eliciting opportunities and liabilities. The analysis of tasks refines those activities that are essential for the accomplishment of the mission. Assigned tasks are those specifically stated by the superior commander, whereas implied tasks are those deduced by the planning staffs through their analysis. Lastly, clearly identified success criteria and end-state ensures that the plan remains focused on the mission. One may note that the activities of the *Orientation* stage emphasize the cognitive as opposed to the creative skills of the planning staff.[104]

As indicated earlier, the staff briefs the commander on the findings of the mission analysis produced during the *Orientation* stage. The *Mission Analysis Brief* includes the

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[103] *Ibid.,* 4-4.

[104] *Ibid.,* 4-4 to 4-6.

elements described above. The commander's feedback to the briefing may include his endorsement of the findings thus far, further direction for analysis and guidance for the follow-on stage. In effect, the planning team and the commander have, at the end of this stage, a common understanding of the "*what"* and the "*why"* for the operation.[105]

During the third stage, the *Course of Action* (*COA*) *Development* stage, the staff works out the "*how"*. Based on environmental factors, the capabilities of the opposing forces, political considerations, the strength and weaknesses of friendly forces, time and space factors, risks and the tolerance thereof, anticipated actions of the opposing forces, and lessons learned in previous campaigns; the planning staff proposes a number of suitable, acceptable and feasible *COAs*. Upon being presented the candidate *COAs*, the commander may provide further guidance on the refinement options. The *COAs* are then further defined and ultimately compared, often through wargaming. The commander selects the most appropriate option and the planning staff outlines the plan in the form of a *Concept of Operations* (*CONOPS*) that describes in broad terms the manner through which the operation is to be conducted. The *COA Development* stage ends with the production and endorsement of this *CONOPS*. Final approval of the *CONOPS* is the purview of the *Initiating Authority*.[106]

When developing *COAs*, planners must carefully think through the causal links between the end-state being sought, effects that need to be attained in view of reaching the end-state, and the targets being considered to reach the effects. *Operational Art* is "the skill of translating . . .

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[105] *Ibid.,* 4-6, 4-7.

[106] *Ibid.,* 4-8 to 4-12.

strategic direction into operational and tactical action."[107] Much of the *Operational Art* contributing to the development of *COAs* involves the skilful and difficult abstraction, assessment and organization of the actions of friendly forces with anticipated reactions of opposing forces moving through the objectives toward the anticipated favourable end-state. The identification of these links almost always involve subjective judgments about the nature of the enemy and how it will react to the initiatives of friendly forces. Much of the focus of the assessment is on the very highest levels of the opposing forces' decision chain. Sorting out the linkages usually entails assistance from sources exterior to the planning team with deep knowledge of the enemy. Automated tools may someday help, but such tools will only be as accurate as the underlying assumptions planners make concerning enemy motivation, psychology and structure.

It is essential that *COA* comparison and wargaming be done qualitatively, not just quantitatively. Through wargaming, planners must consider the complex, non-linear nature of effects on enemy leadership, perceptions, strategies, and systems.[108] Consistent with the *COA* development activity and contrary to a chess game where the rules are clear, the requisite talents in wargaming fall more in the sphere of arts than sciences.

During stage four, the *Plan Development* stage, planning culminates in the production and validation of an *Operational Plan* that provides specific guidance for near term actions and a framework for succeeding activities. At this stage, resource shortfalls are resolved to ensure that the plan be fully achievable and the approved *CONOPS* is refined and reissued as detailed

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[107] CF Ops, 3-1.

[108] CFOPP, 4-11.

instructions to subordinate units. Directive in nature, the plan is often broken down into phases and may include initial *Branch* and *Sequel* plans in differing levels of clarity depending on the clarity of the situation. The plan is normally structured so that it includes a number of annexes and sub-plans that are structured for ease of development by specialists within the planning staff and for ease of use by the subordinate forces that are only concerned by specific portions of the plan. Having been prepared by the planning staff, the plan is reviewed by the immediate commander and is released by the *Initiating Authority*, thus reconfirming the mandate of the immediate commander and endorsing the operational design.[109]

The plan produced by the OPP is inherently flexible. The concepts of *branches* and *sequels* illustrate this intrinsic characteristic. The adversary is fully expected to anticipate friendly action and to develop responses that mitigate the effect sought by friendly forces. Intelligent planners, anticipating enemy workarounds, build *branch* and *sequel* plans. *Branches* are options built into the initial plan that are exercised at decision points in accordance with the enemy's reactions. *Sequels* are subsequent operations based on possible outcomes of current operations.[110] To exercise *branch* and *sequel* plans, commanders must have access to performance indicators that determine progress toward the achievement of particular effects or objectives. Such indicators have most likely been derived by planners and are often identified in the plan.

During stage 5, the *Plan Review* stage, the plan is reassessed and adjusted regularly to ensure its continued viability as the operation progresses. The reviews are either periodic and

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[109] *Ibid.,* 4-13, 4-14.

[110] *Ibid.*

scheduled or triggered by significant changes in the situation. The reviews often result in the refinement of *sequel* and *branch* plans as further insight comes to light. On occasion, if the necessary adaptations are extensive, the planning process may be recommenced from the *Orientation* stage and carried through, in either complete or abbreviated form, to the development of a full revised or updated plan. It is thus clear that planning of military operations definitely does not end once the initial plan is written, endorsed and issued. It really terminates once the objectives are met, the mission is achieved and the troops are safely returned home.

Throughout the whole process, the commander and the staff always maintain perspectives on the end-state and on their ability to attain it given the anticipated risks, the complexity of the plan, their understanding of the situation and the actions of the opposing forces. If at any time, taking into consideration the risk that he and his commander are willing to accept, the commander ascertains that his forces are insufficient or inadequate; he is duty-bound to either seek a change in his mandated mission or to request additional forces, assets or support. Both of these alternatives are addressed through continual, sincere and open communication with his superior commander.

The military operational planning process can be summarized as follows. A superior commander engages a subordinate commander with a mission and assigns appropriate resources. The subordinate commander confirms the superior commander's intent, determines the desired effects on the enemy systems, confirms the assets and capabilities required to achieve those effects and works out a plan with the assistance of his planners. The subordinate commander takes this plan to his superior for endorsement and issuance. As the situation evolves and its awareness changes, the plan is refined. If the expected effects are not forthcoming, planners

redirect and refocus the plan under the continual leadership of the commander. The planning function does not end until the operation is completed.

COMPARING THE APPLE AND ORANGE DESIGN PROCESSES

Having been presented both the project and the military operations planning approaches, some readers may already see strong parallels between the DMS and the CF OPP. Others may remain unclear about such correspondence. Recalling that main argument of this essay indicates that IT project planning can benefit from the CF OPP approach, equivalency between both processes must first be demonstrated. The intent of this next section is to analytically compare both processes and establish whether they are sufficient analogy to warrant the transfer of lessons.

Before process elements are matched, correspondences between the various players will first be established. Equating a project to a military operation, one could associate a project director in the early phases and a project manager once the project is funded to an operational commander. By extension, the superior commander would be associated with the project sponsor and the project leader. The project planning team would correspond to the commander's planning team.

But what project element would match with the adversary? Opposing forces are actors that are often ill-defined, always unpredictable and a threat to the mission success. Friendly forces expend extensive resources and energies building knowledge on the opposing forces. Much of the effort of the commander and his fighting forces is directed toward the taming of the opposing forces. Much of the operational plan is focused on eliciting a low risk but confident approach to break or pacify the opposing forces. As presented in Chapter 2, the main source of

uncertainty and risks in IT projects originates from the fast pace of technological change which complicates planning by both raising the expectations of end-users on an ongoing basis and obscuring the timely definition of potential technical solutions to the problem. In effect, technology is to IT projects what opposing forces are to military operations. IT project managers expend equivalent energies building their awareness of and taming technology as military commanders exert gathering intelligence on and vanquishing their enemy.

As well, the project planning process places much emphasis on stakeholders such as the end-users and in-service support and maintenance organizations. What are the OPP equivalent players? This is one area that appears to be divergent. Projects put much more emphasis on users, supporters and maintainers than military operations do. The superior commander, or Initiating Authority, who issues the orders, embodies not only the project leader and sponsor, but also the target audience for a military operation. Accordingly, the operational planning process appears to be focused on meeting the needs of the superior commander almost in exclusion from the needs of other stakeholders.

Now that the various players are matched, attention is turned to the individual process element. Beginning with the stages of the OPP and the phases of the DMS, one can easily equate the Identification phase to the Initiation stage. Both introduce their corresponding process through a directive, which includes specific planning guidance issued from a higher authority. Similarly, one can easily match the Implementation phase to the Plan Review stage. Both include mechanisms for updating the plan as the operation evolves or the implementation progresses, facts change, assumptions are confirmed or proven wrong, and better insight into the environment is acquired.

The correspondence between the two remaining phases of the DMS and three remaining stages of the OPP is slightly less straightforward. As indicated earlier, during the Option Analysis phase, a clear mandate for the project is established, requirements are refined, delivery options are proposed and the resources necessary to implement the preferred option are assessed, and risks are identified. Much of this activity is focused on clarifying the *what*, *why* and *how*. Similarly, it has also been stated that the Orientation Stage focuses on the "*what*" and "*why*" whereas the COA Development stage is concerned with the *how*. It thus appears that the Option Analysis phase of the DMS covers the full Orientation stage as well as the COA Development stage. During the Definition phase, detailed resource requirements are computed, the schedule is built, and the risk management plan is produced. The Definition phase corresponds fully to the Plan Development stage of the OPP, which produces the operational plan. One must conclude that both processes are definitely conceptually equivalent. For the sake of clarity and for references purposes, the mapping proposed herein is presented at Figure 5.

Having considered players and process elements, key documentation can now be matched. Since the focus of this essay is improvements to the project planning process, this chapter limits itself to those project documents identified as key for the DMS as opposed to those that are key to the OPP. The Project Approval Guide (PAG) identifies three such documents, namely the Project Charter, the Statement of Operational Requirements (SOR) and the Project Profile and Risk Assessment (PPRA).[111]

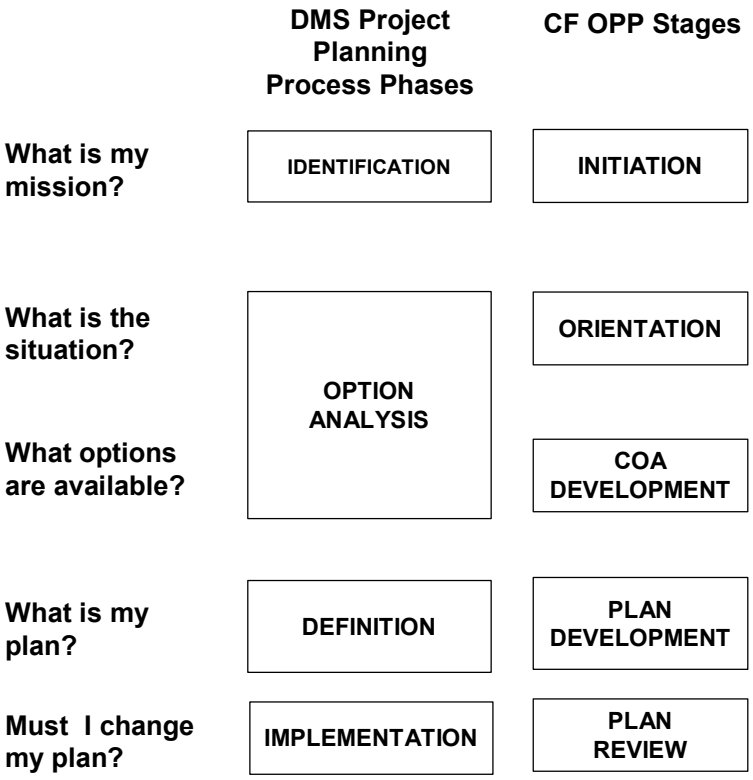

Figure 5 – CF OPP And DMS Project Planning Process Correspondence map

The Project Charter is the instruction that establishes the mandate for the project organization, empowers them to conduct planning, provides broad project objectives and specifies initial constraints. The Initiating Directive issued by a superior commander to engage the planning process normally states much of the same information, but seldom includes the equivalent detail. The guidance from the superior commander typically confirms the content of the Initiating Directive and specifies constraints and restraints, objectives and specified tasks that must be met, a description of the envisaged favourable end state, and the criteria for success.

The Project Charter is thus analogous to the Initiating Directive supplemented by the associated superior commander's guidance.

As presented earlier, the Statement of Operational Requirement (SOR) communicates the characteristics of the capability to be delivered by the project. The Project Scope Statement, frequently a standalone sub-document of the SOR, describes the major deliverables, project objectives and constraints, and the work to be completed. Analogously, the Mission Statement approved by the superior commander during the tail end of the Orientation phase specifies the forces, the action, the timings, the location and the purpose of the operation. Associated with the Mission Statement, the Mission Analysis Brief provides further clarification on the factors and deductions impacting the mission. The SOR is thus equivalent to the Mission Statement enhanced by the details of the Mission Analysis Brief.

One must remember, though, that the SOR does not only specify the needs and intentions of the Project Sponsor and Leader. The SOR also documents a wide variety of requirements stemming from the end-user, the maintainer and the support organization. The Mission Statement, on the other hand, only addresses the needs perceived by the superior commander. One must again conclude that the project planning process diverges from the operational planning process in that it is concerned with a greater number of stakeholders.

The Project Profile and Risk Assessment (PPRA) considers both external and internal risks factors. External risk factors are those that cannot be controlled by the team such as externally imposed deadlines whereas internal risks are those that can be controlled such as the schedule and technical risks. Mitigation measures must be described in the PPRA for each identified risks. In effect, the PPRA is the document that answers the question "w*hat happens if*

. . . ."[112] Insofar as military operations are concerned, risks are managed through their own five phase process that is carried out in parallel with the OPP. Risks are identified and assessed during through an iterative process that takes place during the Initiation, Orientation, COA Development and Plan Review Stages. Control measures are identified during the Orientation, COA Development, Plan Development and Plan Review stages.[113] Chapter 3 of the manual *Risk Management for CF Operations* demonstrates how to integrate the risk management process into the operational planning processes.[114] The PPRA is a living document that is updated iteratively as the project plan is being developed. Similarly, the military risk management process integrates fully into the iterative OPP in all stages of planning. The products of the CF operations risk management process, a variety of risk management worksheets and matrices, form the documentation equivalent to the PPRA.[115]

Are there not other key documents to a project plan? One must not forget the PMP, which obviously from the analysis thus far corresponds to the operational plan. Similarly, the communications, procurement, staffing and engineering and support plans correspond to either sub-plans or annexes to the operational plan.

The PMP and the operational plan are both extensive and critical documents, but are they really fully equivalent? In Chapter 3, it was shown that one area that both environments appear

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[112] *Ibid.*

[113] CFOPP, 7-9.

[114] Department of National Defence, B-GJ-005-502/FP-000 *Risk Management for CF Operations* (Ottawa: DND Canada, 2002), 3-6 to 3-10. Also available from http://www.dcds.forces.gc.ca/jointDoc/docs/riskManagement_e.pdf; Internet; accessed 3 May 2005.

[115] Irrespective of the correspondence identified herein, it is the author's opinion that the OPP and the risk management processes can be better integrated. They remain currently two stand-alone processes that are not well linked. The Risk Management manual does a fair job at demonstrating where it fits in the OPP, but the converse is not true at this time. Operational planners are at danger of neglecting risk assessment and mitigation if they simply base their approach on the OPP.

to diverge is in time and financial management. Figure 2 highlighted the importance of the scheduling and costing activity within the project planning process. There is no activity equivalent to the scheduling and costing activities in the OPP. Operational plans are usually proposed in phases, but they do not define the schedule to the granularity normally expected in a project plan. Similarly, the project planning process puts greater emphasis on financial matters than does the OPP, which tends to emphasize the human and equipment elements.[116]

One may conclude this section by noting that from the conceptual and the macro level, both processes offer interesting parallels and divergences. If the project manager is equated to the operational commander, the project sponsor and project leader correspond to the senior commander and technology is mapped to the adversary. As illustrated in Figure 5, every operational planning stage can be paired with a corresponding project planning phase, the boundaries matching perfectly in all cases, the only distinction being that the Options Analysis phase corresponds to a combined Orientation and COA Development stage. The two divergences identified in this section relate to the increased focus in the project planning process on addressing the requirements of stakeholders other than the project sponsor and on the management of finance and time.

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[116] Upon reading this paragraph, one may get the faulty impression that time and financial resource management are neglected in so far as military operations are concerned. Military commanders are also resource managers and control budgets in accordance with regulations. Through the OPP, a commander will identify to his superior his budgetary needs and during the operation, adequate control measures will be put in place to administer this budget. That being said, as opposed to a project manager, funding is considered as critical a resource as personnel and equipment.

On the other hand, time is a critical resource to military commanders, but its management and control vary significantly from those employed by project managers. The OPP assists commanders in phasing operations and sequencing tasks but because of the uncertainty of the timeframe required to meet individual objectives, operational plans seldom include the timing detail normally associated with a project plan.

CONCLUSION

Recognizing that a military operation has a beginning and an end, that the end state is defined, that resources and energy are applied to move from the beginning-state to the end-state and that the venture is organized and planned; it is arguably a project. This chapter described the processes through which project plans are developed in National Defence and military operations are planned within the CF. It presented the four phases of project planning and the five stages of operational planning and found correspondences between the players, the process elements and the key documentation of both processes. All in all, it demonstrated that analogies could be formulated between the corporate project management process and the military operational planning process.

The only diverging areas uncovered by reviewing the corresponding processes are in the stakeholder and time and budget management realms. The military planning process is very much focused on meeting the expectations of the senior commander. On the other hand, the project planning process puts an increased emphasis on the needs of a much broader group of stakeholders, including the end-users and the in-service support and maintenance organizations. As well, the project management process puts greater importance on time and cost management than does the operational planning process.

The reader will recall that Chapter 2 identified time and budget management and executive oversight as two significant problem areas for IT project managers. In that particular chapter, the essay focused on the low success rate of IT projects and presented the main cause as the changing and uncertain environment generated by the high pace of evolution of the state-of-the-art. It concluded that IT project managers are challenges by the difficulty in maintaining effective oversight by senior executive, ensuring effective communication both down and across,

assessing and meeting timelines and budgets, and in managing scope creep. In Chapter 3, the military operating environment was also presented as changing and uncertain; but it argued that military commanders are better able to cope with the resulting challenges.

It is interesting to note that the areas where the processes diverge are problem areas for IT project managers. It is also important to realize that the two processes have more similarities than differences. One may wonder at this point whether IT project managers could learn from the practices followed by military planners. This is the question that is considered in the next chapter.

CHAPTER 5 – DESIGNING A BETTER APPLE

INTRODUCTION

One may still wonder in this second last chapter how can the essay legitimately compare a project manager dealing with stacks of administrative and corporate lingo to a military commander who, from his earliest days as a young officer, has been focused on taking charge and following orders. The essay has demonstrated thus far that one can compare both the environment in which projects, specifically those that contend with uncertain requirements or fast changing technologies, and military operations take place and the processes through which projects and military operations are planned, but can lessons originating from the military environment really be applied to the project environment? This chapter hopes to demonstrate that they can.

Furthering the analogy developed throughout the essay, it has been argued that projects are apples and military operations are oranges, but both are fruits. It has also been argued that oranges are better designed than apples. This chapter will now present ways to design a better apple using the methods through which the orange is designed. It will provide advice to those who are entrusted with the planning of projects using lessons from those who plan military operations. The objective is not to convince the reader of the value of the exact lessons proposed, but simply have him recognize that lessons can be transferred from the military to the project management profession.

The chapter is composed of four sections. The first will provide insight into the rationale for which projects and operations are seen to be so different. The second will suggests lessons based on the exterior interfaces into a project. It will discuss items such as communication with

stakeholders, capturing and managing requirements, ensuring senior executive commitment, and coping with changes to the scope. The third section will look inward. It will cover areas such as internal communications, empowering, coordinating team efforts, skills, risk tolerance, and scheduling. The conclusion will tie these sections together and summarize material that one may want to remember.

HOW APPLES AND ORANGES ARE DIFFERENT

First and foremost, many military commanders consider themselves leaders and some may even cringe at the idea of being called managers. On the other hand, the title project manager itself stresses the managerial nature of the position. That being said, both professions really embrace both concepts. The Canadian Army doctrine on command states that "command . . . embraces both management activities . . . and leadership . . . ."[117] Moreover, the Project Management Institute's agenda for change specifically singles out "leadership excellence a strategic competency" as one of its four primary goals.[118] The CF doctrinal manual from 1973 defines leadership as "the art of influencing human behaviour in order to accomplish a mission in the manner desired by the leader"[119] whereas the management function is primarily focused on the allocation and control of human, material and financial resources to achieve objectives.[120] Both are related, but different in that one is about motivating people whereas the other is about

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[117] Department of National Defence, B-GL-300-003/FP-00 *Command* (Ottawa: DND Canada,1996), 1-7, 1-8.

[118] Project Management Institute, *PMI Strategic Plan*, Revision 11 (6 November 2004); available from http://www.pmi.org/prod/groups/public/documents/info/ap_strategicplan.pdf; Internet; accessed 3 May 2005.

[119] Department of National Defence, A-PD-131-001/PT-001 *Leadership: Junior Leaders Manual* (Ottawa: DND Canada, 1973).

[120] Department of National Defence, B-GL-300-003/FP-00 *Command* (Ottawa: DND Canada,1996), 1-7.

organization and staffing. The military has a long history of focusing on leadership skills whereas the project profession is just beginning. This is one area of differences where the project management discipline has already shown interest in closing the gap.

Chapter 4 demonstrated that the operational planning process puts greater emphasis on the arts, as opposed to the sciences. Operational Art is defined as "The skilful employment of military forces to attain strategic and/or operational objectives through the design, organization, integration and conduct of theatre strategies, campaigns, major operations and battles."[121] One of the objectives of the operational planning process is "to maximize the commander's and staffs' creative thinking and associated thought processes."[122] Both of these statements are indicative of the artistic and creativity emphasis being placed on the OPP. An the other hand, the *Guide to the PMBOK* defines project management as "the application of knowledge, skills, tools and techniques to project activities to meet project requirements."[123] As also pointed out in Chapter 4, the project management discipline presently highlights engineering approaches to problem solving and, without necessarily curtailing it, places less emphasis on creativity.

These two observations are significant. Could the current emphasis on management and engineering disciplines of the project management profession as opposed to the relatively higher prominence of leadership and artistic approaches in military operations contribute to the difficulties currently experienced by those entrusted with the delivery of IT projects? This is definitely a question that warrants further considerations.

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[121] CFOPP, 2-1.

[122] *Ibid.,* 3-1.

[123] PMBOK, 368.

IMPROVING THE APPLE'S EXTERIOR

Getting to the crux of the essay: how can project planning of projects dealing with advanced technologies, such as IT, be improved? This is the first of two sections addressing this question. This particular section addresses the question from the macro perspective. The next one will look at it from a micro perspective.

Two vantage points will be considered in this section. First, how can the process be improved from the perspective of the senior executives: the project sponsors, the project leader, and their associates who are members of the SRB? Second, how can it be improved from the point of view of the other stakeholders: the end-users and the system supporters such as the administrators and the maintainers?

Chapter 2 identified a number of challenges posed to IT project managers related to their interactions with their superiors. In summary, it appears that senior executives do not sufficiently remain involved throughout the project delivery process. One impact of this perceived lack of commitment is the difficulty IT project managers have in achieving the full support of the organization in their efforts. According to the process, the SRB, the project leader to whom the project manager is responsible and the sponsor to whom he is responsive are the primary senior executive influence on the project manager. The SRB is of prime importance as it is the final body that approves programmatic decisions related to the project.

Senior leadership remains involved throughout the OPP through numerous exchanges during which the commander seeks clarification on his superior's intent and on the facts. This participation, though, is mostly limited to the superior commander who is in the direct reporting

chain of the commander. Decisions made by the senior leadership are most often confirmed through the approval by the superior commander of orders drafted by subordinate commanders.

The two processes differ mainly in that the OPP emphasizes the superior commander's position whereas the DMS stresses the standing of the SRB, a decision-making committee. This difference is not surprising, as projects tend to have an impact on the internal working of the organizations as well as the balance of power between the different executives and their branches whereas military operations tend to mainly exhort pressures outside of the organization.

The challenge IT project managers face relates to their organizational distance to the SRB and the significant role this body needs to take on as to champion the project that may impact the whole department. The problem is based on the reality that the SRB does not have a single face and that it is not easily accessible to the project manager. To address this challenge, many project managers establish a special relationship with an identifiable champion who should be a member of the SRB, who is more readily accessible and who has access to the other members when a situation arise. This champion who could be the Project Sponsor or the Project Leader, must have the time, commitment and the drive to push through the resolution day-to-day programmatic issues that put the project in jeopardy. In effect, the project manager should attempt to build a relationship with the project champion that is, in many ways, analogous to the one established between a commander and his superior commander. It must be noted that such a relationship, according to the project planning process would be an informal relationship, whereas the interaction between a commander and his superior is formal in the OPP. The first recommendation is thus that project managers of IT projects that generate radical change within the department or within a defined branch of the department consider the establishment of a an

informal project manager – project champion relationship modelled on the relationship between the commander and the Initiating Authority in the OPP.

Another challenge experienced by IT project managers is the management of scope creep. Chapter 2 has indicated that scope creep must be tolerated as changes to the mandate may be necessary to ensure that the project remains relevant as the technology changes or business practices are redefined independently to the project. Chapter 4 confirmed that the project planning process allows for the changing of the scope as the plan is being refined. The concern lies in the management of the scope of IT projects which is complicated by the extensive rate of change of the technology and the ill-defined or misunderstood requirements as the project undergoes planning.

Military operations also contend with a fast changing ill-defined environment and the OPP acknowledges the need to adjust to these changes as the mission develops. It does so by establishing early in the process a very clear, concise and well communicated mission statement, by identifying decision points where the plan will be allowed to branch off depending on the state of the environment and by prioritising every effort such that focus on a well defined, decisive, measurable and attainable end-state is maintained throughout the planning and implementation effort.

The OPP approach has the potential of easing the challenge of scope management of IT projects. The DMS is, on first reading, not incompatible with this approach which would involve structuring the Project Charter such that it would specify a clear and concise mission statement on which all other activities would focus, assign the project manager some level of flexibility in the delivery process providing he keeps total focus on the desired end-state, and clearly

document in measurable terms the functional and programmatic priorities of the project. It must be recognized, though, that consenting to this structural form to the Project Charter would impact other areas of the management of the project. Namely, the schedule and the cost of the project would be considerably less defined in the early stages than current expectations. Most of the benchmarks incorporated in current charters and associated documentation relate to cost and cash phasing. That being said, it has also been presented in Chapter 2 that IT project managers have the hardest challenge in assessing time and cost and delivering timely and on-budget projects. Why not recognize that finances and schedules associated with advanced technology and IT projects are simply too difficult to manage to the degree currently expected by senior executives? In so far as projects dealing with a high incidence of change, getting the product delivered on time and within budget are not the meaningful benchmarks for success since they are seldom met. On the other hand, a military commander is seldom given an unmovable end-date nor is the cost normally one of the driving factors when it comes to meeting the expectations of his superiors. Why would it be any different for an IT project manager who contends with an equivalent level of missing facts and uncertainty?

Recognizing that the importance of financial and scheduling metrics would be lessoned, the second recommendation is that the Project Charter of IT and possibly other advanced technology projects focus on describing the characteristics of the project's end-state and be less specific on identifying resource and time constraints.

The bread and butter of the CF is carrying out military operations. The reason the Department exists is to support the CF. The OPP is thus one of the critical processes for both the CF and the department. Most of the military officers, including military project staffs, are

becoming well versed in the emerging OPP. Similarly, many of the project sponsors, project leaders, other SRB members, representatives of the user community, maintainers and supporters are also educated practitioners of the OPP. On the other hand, understanding of the PAG and more specifically the PMBOK is limited to those involved in project management. DMS is not typically taught in military institutions whereas the OPP is.

Given that there is a broader awareness of the OPP than the DMS and the PMBOK, why not standardize some of the common terminology to the OPP standard? Would this not alleviate some of the communication challenges experienced by project managers? As an example, the DMS planning process described in Chapter 4 is a four phase process that can easily be mapped to the five stage process of the OPP. Why not redefine the DMS process using the OPP terminology, thus easing communication with those well versed in the OPP? Other examples abound where standardizing terminology between the two processes may facilitate communication between project staffs and their military stakeholders. The third recommendation is thus simply the standardization of project management terminology to the OPP where equivalencies exist.

Looking at IT project planning from an outside perspective uncovered three specific recommendations on improving the process. It has been proposed that project managers muster the service of a project champion who would unofficially take on functions equivalent to those of the superior commander in the OPP. Secondly, it is recommended that the emphasis on the Project Charter be changed such that it would better describe the end-state, but allow greater flexibility on achieving it. Thirdly, there would be benefit in standardizing, where possible, the terminology between both processes thus facilitating communication with military stakeholders.

The next section will now focus on the internals of project planning, the relationship between the project manager and his personnel.

IMPROVING THE APPLE'S INTERIOR

As demonstrated in Chapter 2, the challenges experienced by an IT project manager in managing his team are significant. Ill-understood or ill-defined requirements generate misunderstandings related to the nature of the product to be delivered and, by extension, a lack of coordinated effort within the team responsible for planning and implementing the product. Misplaced aversion to project risks and a lack of confidence in the skills of the team contribute to an environment where decision-making is often limited to the project manager and those closest to him. These are two of the challenges studied in this section.

A significant issue for project managers stems from the fact that requirements for IT projects are usually still in a relative ill-defined and incomplete state when such projects are approved. More often than not, requirements are still being defined, confirmed and even identified after the plan is released. The lack of a firm and well understood requirement base makes the planning and implementation teams' job significantly difficult. Eliciting the activities that are necessary for the delivery of the product is one of the first planning activities that must be carried out according to the PMBOK. This particular activity presumes a good understanding of the requirements that need to be addressed. How can planners successfully complete this activity if they do not have a common understanding of the requirements or these requirements change on a continual basis?

Chapter 4 equated the SOR to the Mission Statement enhanced by the details of the Mission Analysis Brief. It also stated that the match is imperfect as these two documents only convey the perspective of the superior commander, at the exclusion of the end-users, maintainers and support staffs. The Mission Statement is an unambiguous proclamation that answers the "*who", "what", "where", "when"* and *"why"* of the operation. The Analysis Brief ensures a constructive dialog between the commander and the staff to clarify the requirements and specificities of the mission. Insofar as IT projects are concerned, clear focus is also required, but requirements cannot be clarified through simple dialogue with a single stakeholder. Timely and open lines of communications with representatives of all stakeholders are essential for the elicitation of the requirements and the maintenance of their currency. Similarly free and effortless communication within the project organization facilitates consistent interpretation of these requirements. The first recommendation is thus that project managers favour an environment where communication is encouraged and expected. This is similar to the environment commanders favour within their own planning organizations and between their staff and those of adjacent and subordinate commands.

Another impact of the lack of clear and defined requirements is that the project planning staff must remain creative as it adjusts the plan based on improved understanding and refinements in stakeholder needs. Similarly, the project staff must also demonstrate resourcefulness as it adapts the plan to contend with changes to the state-of-the-art of the technology. The expectations are not unlike those of operational planning staff that skilfully alter the plan according to its changing situational awareness or reaction by the enemy to the

to move away from the science of management and closer to the arts, away from the rationalization and closer to the imagination. The second recommendation is thus that project managers of projects experiencing a high incidence of change foster creativity and out-of-the-box thinking.

Chapter 2 highlighted a number of situations where decisions were rendered too late. The various audit reviews presented chastised a number of projects for establishing centralized decision making, for not sufficiently empowering subordinate project staffs. The chapter also underlined the difficulty in finding skilled and experienced IT project staffs. Both issues are certainly related. Project managers are understandably leery in empowering their staffs if they are not confident in their abilities. The results are, unfortunately, potentially devastating to the success of projects as work progresses while issues relating to earlier phases remain unresolved.

The military structure has always favoured the empowerment of subordinate commanders The Officer Professional Development program details the employment, education and training expectations for all CF officers. From a young age, military officers are entrusted with significant power and learn very quickly how to exercise limited decision making authority. As they gain knowledge and experience, they are rewarded with greater authority. Ideally, as young officers progresses up in rank, they rotate between line appointments where they are members of combats unit and staff appointments where they participate in planning functions. As they move up in rank, they become thus quite proficient in both line and staff functions. By extension, both line and staff organizations understand each other's perspectives, as they are composed of members having similar backgrounds.[124]

Could this model be emulated within the project management profession? The problem with advanced technology projects is that such projects are staffed with members that have either proven themselves with their technical abilities or have demonstrated project management experience. Language and process barriers are raised between successful project managers that have little understanding of the technology and technologists that have limited insight into the management sciences. The profession would benefit from encouraging a good balance of technical and project skills by establishing a career development path for project managers analogous to the one established for military commanders. There lies recommendation number three.

The last observation the essay raises concerns the management and tolerance of risks. The essay has already highlighted that advanced technology and IT projects are, by their very nature, risky ventures. The fact that the project is deemed risky implies that risks must be well managed throughout the planning and implementation processes. Risk is defined by the PMBOK as "[a]n uncertain event or condition that, if it occurs, has a positive or negative effect on a project's objective."[125] Chapter 2 has singled out a number of situations when projects accepted risks without a full understanding of the impact. For example, many of the decisions rendered on CAATS in the late 1990s are indicative of a willingness to accept significant contractual risk. Unfortunately, as pointed out in the Auditor general report, this tolerance toward

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[124] Department of National Defence, "DAOD 5031-8 Canadian Forces Professional Development," *Defence Administrative Orders and Directives*; available from http://www.admfincs.forces.gc.ca/admfincs/subjects/daod/5031/intro_e.asp; Internet; accessed 2 May 2005.

[125] PMBOK, 373.

risk was not matched with diligence in managing, or mitigating, this risk. As a result, bad decisions were taken without the ability to recover within the project's mandate.[126]

A Military operation, it has been demonstrated, is also a risky business. Commanders may be somewhat more disciplined in risk management than their project counterparts. They appear to be intolerant of unnecessary and unmanaged risk. They put high emphasis on ensuring that decisions related to risk be made at the appropriate level, tend to accept risk whenever benefits outweigh the cost, and to employ the planning process to develop mechanisms to anticipate and manage risks.

Both processes include equivalent structures, but military commanders appear to be more disciplined in practicing risk management. IT Project managers are encouraged to follow the lead of their military counterparts. The prospect of success for their venture would greatly improve if they would diligently anticipate what could go wrong and plan to adjust the course if ever the unfortunate events come up. The fourth recommendation is thus simply for project managers to follow the lead of their military counterparts and take full advantage of existing and emerging risk management tools and practices.

The essay deliberately stayed away thus far from discussing another significant management area normally associated with projects. Specifically, little mention was made of procurement management. The obvious cause for this omission is that the OPP has, on the surface, little to contribute in this area. Commanders do not typically contract out war-fighting and one may assume that the processes followed by commanders has little to contribute to the challenges posed by contract management.

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[126] OAG Report, 3 of 25.

One may wonder whether the reliance on contracts by project managers would invalidate some or many of the recommendations made thus far. In response to this question, it must be realized that there exists three types of contracts: *Fixed Price* contracts where the exact cost is pre-negotiated, open-ended *Cost-reimbursable* contracts where the contractor is paid the exact cost of the work plus a specified profit margin, and *Time and Material* contracts where a contractor is paid based on an hourly rate plus the materials used up.[127] While it is true that military commanders do not contract their forces, one must acknowledge that human resources obtained through a *Cost-reimbursable* or *Time and Material* contract are more versatile than those hired under a *Fixed Price* contract. Just as a fighting force cannot be committed to succeed in its mission given a fixed and predetermined wage and benefits envelope, a contractor hired under a *Fixed Price* contract cannot be expected to deliver a fully compliant IT system based on ill-defined and changing requirements. Would a military commander come up with a mission such as: "*On order, forces X with a firm budget of $AAA will liberate port city Y in order to establish the necessary military conditions for the delivery of humanitarian assistance to Z in accordance with United Nations Security Council Resolution BBB*"? How can the manager of a high risk emerging technology contract contending with equivalent lack of certainty be expected to deliver results given tight fixed costing constraints? The fifth recommendation is thus that managers contending with projects having a high incidence of uncertainty and change stay away from *Fixed Price* contracts in favour of *Cost-reimbursable* or *Time and Material* contracting mechanisms.

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[127] PMBOK, 277, 278.

In summary, this particular section offered five new recommendations to the project management profession based on the internal function of managing projects. Firstly, in the absence of well-defined requirements, a working environment that encourages free and open communication between the staff and stakeholders is a must. Secondly, this working environment should also favour out-of-the-box thinking. Both of these recommendations would facilitate the development of a plan that is innovative and responsive to change. Thirdly, a professional development environment that encourages maturity of technical and management skills alternatively would allow the profession to develop project staffs that are skilled and trustworthy. Fourthly, project managers should be more diligent in addressing risks thus improving their ability to readjust to unfortunate events. Lastly, because of the significant level of uncertainty and the high rate of change in the IT project environment, open ended contracts, such as *Cost-reimbursable* or *Time and Material* contracts are favoured over *Fixed Price* contracts.

CONCLUSION

Project management emphasizes the science of management whereas command highlights the operational art. Both, although similar, apply a different problem solving approaches. The operational art evolved because of the uncertain and ill-defined environment in which campaigns are fought. Contrary to a chess game, the rules of warfare are not fully defined and the enemy's posture is not well known. Accordingly, a scientific approach to warfare has yet to be developed.

Advanced technology projects experience the same challenges as military operations. Technology is so vast and changing so quickly that it is certainly ill-defined and comparable to

the military operational environment. Management sciences are showing significant shortcomings when applied to such projects. This chapter suggests OPP-based addendums to the method through which advanced technology and IT projects are planned.

Namely, from the outside looking in, the chapter recommends that project managers muster the service of a project champion who would unofficially take on functions equivalent to those of the superior commander in the OPP. It also suggests that the Project Charter puts less emphasis on schedule and cost performance measures and be adjusted such that it focuses on describing the measurable features of the end-state, thus allowing the project manager some latitude on the manner through which it is scheduled and costs are managed. Thirdly, it advocates standardizing the project planning terminology to the one employed by OPP thus facilitating communication with military stakeholders.

Considering the issue from the perspective of the project manager relating to the internal workings of the project, it came up with an additional five adaptations. Recognizing the lack of well-defined requirements, the project manager must establish a working environment that, first, promotes effective communication and that, secondly, welcomes creative thinking. Thirdly, to address the scarcity of experienced and skilled IT project staff, the project management profession is encouraged to establish a professional development environment that fosters the growth of complimentary technical and management skills through alternating employment. Fourthly, project managers are advised to be more diligent in addressing risks. Lastly, because of the significant level of uncertainty and the high rate of change in the IT project environment, the use of *Fixed Price* contracting is strongly discouraged.

The above recommendations are simply illustrative of those that can be formulated by applying military lessons to the project problem. Readers are advised to consider their relevance

to their own situation, which may or may not be conducive to their application. Their remains one recommendation that definitely stands and which has yet to be stated in this chapter: National Defence project managers are urged to study the OPP with an open mind. They are bound to find similarities with their every day challenges and, if they are lucky, may uncover solutions that have eluded them until now.

CHAPTER 6 –CONCLUSION

The essay that is concluding demonstrated that project managers of advanced technology projects such as those delivering capabilities based on emerging information technology could gain by applying methods and ideas that are currently employed by commanders as they plan and execute operations. It confirmed that military operations that take place in uncertain and quickly changing environments are not dissimilar to advanced technology projects that contend with ill-defined requirements and fast changing state-of-the-art. Using apples and oranges as analogies, it argued that if advanced technology projects were apples, then military operations would be oranges. Noting that both are fruits, it carried on to argue that one may come up with a better apple design process by studying how the orange is designed.

Projects are ventures that have a beginning and an end, that generate predefined change, that expend energy and material, that are unique in that no two projects are alike. Military operations are also projects. A military operation is normally initiated by a deployment phase and terminates with the redeployment. It has a mission that defines a change to the environment using action words such as destroy, occupy, secure, or protect. It entails significant effort on the part of the assigned forces and utilizes specialized equipment. Every experienced commander would confirm that no two operations are alike. Some may sarcastically add that if it weren't so, the job security of many planners would be in jeopardy. Military operations comply with all of the characteristics that are normally associated with projects. One must thus acknowledge that conceptually, a military operation is a project and that the two can thus be compared.

On the other hand, some will argue that projects managers manage whereas military commanders lead. This is not fully accurate. The Canadian Army doctrine on *Command* states

that "command . . . embraces both management activities . . . and leadership . . .."[128] Moreover, the Project Management Institute's agenda for change specifically states that "leadership excellence a strategic competency" is one of its four primary goals.[129] Both concepts are related, but different in that one is about motivating people whereas the other is about organization and staffing. Recognizing that the military has a long history of focusing on leadership skills whereas the project profession is just beginning, one must admit that leadership is one area of expertise where the military profession can teach the project management profession.

IT projects, as a representative of a larger group of advanced technology projects, are challenging ventures that seldom deliver on their promises. Such projects tend to overextend their budget and timeline by a very large margin, deliver capabilities that fall short of the expectations of their operators, and fail in mustering and upholding the commitment of the organization throughout the project life. From the management perspective specific challenges related to the poor success rate include the inability to maintain direction from senior executives as the project progresses, poor communication with stakeholders and its own team members, lack of effective tools for the assessment and control of time and cost, and the willingness to tolerate unmanaged risk. The primary cause for these difficulties is the fast pace of change in technology, which consistently offers new options to system designers seeking workable technical solutions and new opportunities to end-users whose project expectations grow as the art-of-the-possible steadily becomes more comprehensive. The effect is often revealed as slipping deadlines as the system is continuously redefined and redesigned, risings costs as the

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[128] Department of National Defence, B-GL-300-003/FP-00 *Command* (Ottawa: DND Canada,1996), 1-7, 1-8.

[129] Project Management Institute, *PMI Strategic Plan*, Revision 11 (6 November 2004); available from http://www.pmi.org/prod/groups/public/documents/info/ap_strategicplan.pdf; Internet; accessed 3 May 2005.

scope grows; lack of management oversight as the incidence of project pressures outscores the ability of the executive body to make timely decisions; ill-defined, misunderstood and fluid requirements as stakeholder expectations change; and an inability to internally identify, assess and manage risks. The essay painted a bleak picture of the project management profession in so far as dealing with information technology projects and speculated that some of the challenges may also transfer to other technologies evolving at a high pace.

In the late eighties and early nineties, the Canadian Forces experienced challenges that can be compared to those IT project managers face today. Two studies, one in 1989 and the other in 1992, identified a number of concerns with the manner through which the CF were planning operations. These two studies strongly criticized the CF, at the time, for being reactive, time-bound and, by extension, shortsighted. To remedy the situation *CF Operational Planning Process* (OPP) manual which is the "keystone-planning manual in the Canadian Forces Doctrine Hierarchy"[130] was introduced in 2002.

Military commanders contend with uncertain and changing situations throughout the life of an operation. This is not unlike the ill-defined requirements and changing state-of-the-art that project managers experience. To address the challenge, the military has evolved a planning doctrine that emphasizes the need to, first and foremost, focus on the mission at the exclusion of other unrelated opportunities that may arise; concentrate forces on objectives that are critical to the success of the mission at the expense of those that are less decisive; encourage cooperation up and down the chain of command and coordinate activities with other friendly forces in the theatre of operation; empower a single commander with the authority to direct and coordinate all activities associated with the mission; and continually adapt the plan based on the changing

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[130] CFOPP, ii.

situation or the changing awareness. Recognizing the similarities in both environments, one must acknowledge that many of these adaptations could also be applied to the advanced technology project environment.

Notwithstanding the similarities, one significant difference in the environment whose impact must not be neglected: the wager. Military operations are always associated with critical strategic and political objectives whereas such links are not always clear for IT projects. Military commanders are entrusted with nothing less than the survival of their nation, whereas failure of an IT project, in its worst outcome, may trigger the breakdown of a corporation. Secondly, from a human perspective, the life of the soldier and his adversary may be at stake during military operations whereas, in its most negative revelation, only the livelihood of project members is in the balance for IT projects.

The process through which projects are planned within National Defence process is bureaucratic, based on management sciences and complies with governmental policies and standards. It refers to the Project Management Institute (PMI) Project Management Body of Knowledge (PMBOK) as the internationally recognized "sum of knowledge within the profession of project management."[131] The objective of project management is the delivery of a specific product within identified parameters such as scope, budget, schedule and performance. The departmental keystone guide for program and business management is the *Defence Management System* (DMS) manual, which includes a useful section called the *Project Approval Guide* (PAG) specifically aimed toward personnel involved in the approval and management of projects.

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[131] PMBOK, 3.

The CF OPP is a less bureaucratic process that puts more emphasis on interaction between commanders, their superiors, their subordinate commanders and their staffs; and less emphasis on structural forms and reports. Because of the potential complexity engendered by "inadequate information, insufficient time and limited resources", "conflict is . . . a non-linear phenomenon wherein inputs have disproportionate outputs"[132]; operational planning is as much based on the arts as it is on the sciences. Operational planning is an iterative process designed to determine alternative suitable, feasible, acceptable and exclusive courses of action and ascertain the most appropriate one. Much of the process involves both analytical and cognitive skills and creative thinking.

Contrasting both processes, one can easily map the four phases of project planning with the five stages of the OPP, the borders of each phase corresponding perfectly with those of a stage. Two diverging areas concern interaction with stakeholders and the management of time and finances. The military planning process is very much focused on meeting the expectations of the senior commander whereas the project planning process puts an increased emphasis on the needs of a much broader group of stakeholders. Additionally, the project planning process puts greater importance on time and finance management than does the operational planning process. The two areas where the processes diverge are problem areas for IT project managers. From a conceptual oversight perspective, the two processes have more similarities than differences.

Words of wisdom based on the practices of military planners can be extended to assist the project management profession in the information technology, and possible other advanced technology, application domains. To address the difficulty in mustering the ongoing commitment of senior executives, project managers should engage the service of a project champion who

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[132] CFOPP, 2-1.

would unofficially take on functions equivalent to those ascribed to a superior commander in the OPP. Recognizing the almost impossible challenge of meeting time and cost performance standards, the project charter should put less emphasis on schedule and cost and focus more on describing the attributes of the end-state. Noting the strong correspondence between both processes, standardizing the project planning terminology with the one employed by OPP would facilitate exterior communication. Considering the lack of well defined and stable requirements, a working environment that promotes open and free communication and that welcomes creative thinking should be established. To address the scarcity of project staff experienced and skilled in both IT and project management, a professional development environment that encourages the growth of complimentary technical and management skills through employment alternating between staff and line should be instituted. Realizing that the professional standards already exist but noting nevertheless that risks are often neglected, project managers should become more disciplined in their management of risks. Lastly, because of the significant level of uncertainty and the high rate of change in the environment, the use of *Fixed Price* contracting is discouraged.

The primary objective of the essay was to argue that IT, and possibly other fast evolving technologies, projects has some similarities with military operations, and that the process of planning such projects could be improved upon by adopting some of the practices followed by military planners. Readers may or may not agree with the specific recommendations made and summarized in the above paragraph, and that is fine. The objective is not to convince readers of the validity of these explicit suggestions, but rather that such suggestions can be formulated. In effect, the only recommendation that really stands is that defence advanced technology project managers are urged to study the OPP with an open mind. They are bound to find similarities

with their every day challenges and, if they are lucky, may uncover solutions that has eluded them until now. In other words, the intent is for them to study the orange, identify which design feature they like and thus ascertain how they can improve on their apple.

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