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Analysing command challenges using the command and control framework:

Pilot study results

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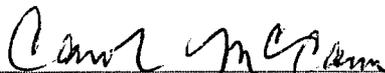
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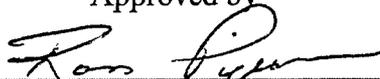
February 2003

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Abstract

This paper describes a pilot study in which we explored the utility of the Pigeau-McCann framework for command and control for analysing real-world military command challenges. The framework is a re-conceptualization of command, control and C² that is intended to provide a comprehensive and consistent base both for the scientific investigation of C² and for the development of military C² policy and doctrine. The study involved a preliminary assessment of the explanatory power of the framework in the context of actual situations in which military personnel confronted operational challenges. The results endorse the value of the framework as an approach for categorizing and quantifying significant aspects of command, of control and of C². In addition, several areas were identified for improving the procedure used for analysis of the challenges. With refinement, the tool has strong potential to be used by the military to understand challenging C² situations.

Résumé

Le présent document décrit une étude pilote dans laquelle nous avons examiné l'utilité du cadre de commandement et de contrôle Pigeau-McCann pour ce qui est d'analyser des défis réels en matière de commandement militaire. Ce cadre consiste en une nouvelle conceptualisation du commandement, du contrôle et du commandement et contrôle (C²) qui vise à fournir une base complète et cohérente tant pour l'étude scientifique du C² que pour l'élaboration de la politique et de la doctrine de C² militaires. L'étude que nous avons réalisée comprenait une évaluation préliminaire de la capacité d'explication du cadre dans le contexte de situations réelles dans lesquelles du personnel militaire affrontait des défis opérationnels. Les résultats confirment la valeur du cadre en tant que méthode de catégorisation et de quantification d'aspects importants du commandement, du contrôle et du C². De plus, nous avons repéré plusieurs éléments à modifier afin de perfectionner de la procédure utilisée pour l'analyse des défis. Moyennant certaines améliorations, l'outil pourrait très bien être utilisé par les forces militaires pour comprendre des situations de C² difficiles.

Executive summary

This paper describes a pilot study in which we explored the utility of the Pigeau-McCann framework for command and control for analysing real-world military command challenges. The framework is a re-conceptualization of command, control and C² that is intended to provide a comprehensive and consistent base both for the scientific investigation of C² and for the development of military C² policy and doctrine. Within the framework, the core axiom that *only humans command* provides a unifying construct on which is based new definitions of command and of control. In addition, the framework hypothesizes a set of capabilities that are necessary and sufficient for effective command, it establishes the proper relationship between command and control and it re-defines the concept of C² in terms of common intent.

This study involved first, the collection of “command challenges”, written description of real-world situations in which a member of the Canadian army had been placed in a difficult command situation. These command challenges (CCs) were then individually analysed by a panel of five experts using an analysis tool derived from the framework. The analysis entailed identifying, from the CCs, detailed factors that had been derived from the concepts in the framework. These concepts included a) the three dimensions of command capability (competency, authority, responsibility); b) the “Balanced Command Envelope” (BCE); c) control structures and processes intended to support for the command capabilities; and d) shared implicit and explicit intent.

Overall, the framework provided a strong perspective and good utility for analysing these command challenges. According to panel members, most of the command capabilities were implicated in the CCs, with the exception of physical competency. Primary factors associated with the dimensions of command were more often identified than support factors. The results indicate that it was possible to obtain consistency among the panel members concerning the question of whether or not the person in the CC was on the BCE. Furthermore, a striking finding was the proportion of times that competency was identified as the inadequate capability for those CCs where the focal person was judged outside the BCE. The framework was strongest in providing an understanding of the command aspects of the CCs, but rather less informative concerning command and control aspects of the CCs (as conceptualized in terms of shared intent).

In addition to providing some preliminary results concerning issues in command challenges, the study identified several areas in which the method for applying the framework could be improved: a) CCs should be structured to focus on a single individual; b) the analysis tool should be revised to permit assessment of degree and direction of influence of the factors and should be expanded in respect of the concept of intent; c) a manual providing guidelines for applying the tool should be developed to facilitate the training of new panel members.

Finally, it is recommended that a new set of CCs from all three military environments be collected and analysed using a revised analysis tool. With refinement, the Pigeau-McCann framework could assist military policy makers, requirement analysts, training coordinators, boards of inquiry and strategic planners by providing a more consistent and coherent approach for understanding command and control challenges.

McCann, C., Pigeau, R., English, A. 2003. Analysing Command Challenges using the Command and Control Framework: Pilot Study Results. DRDC Toronto TR 2003-034. DRDC Toronto.

Sommaire

Le présent document décrit une étude pilote dans laquelle nous avons examiné l'utilité du cadre de commandement et de contrôle Pigeau-McCann pour ce qui est d'analyser des défis réels en matière de commandement militaire. Ce cadre consiste en une nouvelle conceptualisation du commandement, du contrôle et du commandement et contrôle (C²) qui vise à fournir une base complète et cohérente tant pour l'étude scientifique du C² que pour l'élaboration de la politique et de la doctrine de C² militaires. Le principe fondamental du cadre, selon lequel *seuls les êtres humains peuvent commander*, constitue une notion unificatrice sur laquelle sont fondées de nouvelles définitions du commandement et du contrôle. De plus, le cadre présente un ensemble de capacités hypothétiques qui seraient nécessaires à l'exercice d'un commandement efficace et qui y suffiraient, il établit le lien approprié entre le commandement et le contrôle et il redéfinit le concept du C² du point de vue de l'intention commune.

La présente étude a d'abord supposé le recueil de « défis en matière de commandement » (DC), c'est-à-dire une description écrite de circonstances réelles dans lesquelles des membres des Forces canadiennes s'étaient trouvés dans une situation de commandement difficile. Ces DC ont ensuite été analysés individuellement par un groupe composé de cinq experts au moyen d'un outil découlant du cadre. L'analyse consistait à cerner, à partir des DC, des facteurs détaillés qui avaient été établis à partir des concepts du cadre. Ces concepts comprenaient a) les trois dimensions de la capacité de commander (compétence, autorité et responsabilité); b) l'« enveloppe de commandement équilibré » (ECE); c) les structures et les processus de contrôle visant à appuyer les compétences de commandement; et d) l'intention implicite et explicite partagée.

Dans l'ensemble, le cadre a fourni une solide perspective et s'est révélé assez utile pour analyser les défis en matière de commandement. Selon les membres du groupe d'experts, la plupart des capacités de commandement étaient sollicitées dans les DC, sauf la compétence physique. On a cerné plus souvent des facteurs principaux liés aux dimensions du commandement que des facteurs de soutien. Les résultats indiquent qu'il a été possible d'observer une cohérence entre les réponses des divers membres du groupe d'experts relativement à la question de savoir si la personne relevant le DC se situait dans l'ECE. En outre, il a été frappant de constater le pourcentage de fois où la compétence a été considérée comme la capacité inadéquate dans le cas des DC pour lesquels il a été jugé que le principal intéressé ne se situait pas dans l'ECE. Le cadre s'est révélé un outil supérieur pour ce qui est de comprendre les aspects des DC liés au commandement, mais a fourni moins de renseignements sur les aspects des DC se rattachant au commandement et au contrôle (concept de l'intention partagée).

En plus de fournir certains résultats préliminaires au sujet de questions liées aux défis en matière de commandement, l'étude a permis de cerner plusieurs aspects de la méthode d'application du cadre qui pourraient être améliorés : a) les DC devraient être structurés de façon à être centrés sur une seule personne; b) l'outil d'analyse devrait être remanié de façon à permettre d'évaluer dans quelle mesure et de quelle façon les facteurs exercent une influence et il devrait être élargi en ce qui a trait au concept de l'intention; c) il faudrait élaborer un

manuel fournissant des lignes directrices sur l'utilisation de l'outil, afin de faciliter la formation de nouveaux membres du groupe d'experts.

Enfin, il est recommandé de recueillir un nouvel ensemble de DC au sein des trois armées et de l'analyser au moyen d'un outil remanié. Moyennant certaines améliorations, le cadre Pigeau-McCann pourrait aider les décideurs, les analystes des besoins, les coordonnateurs de la formation, les commissions d'enquête et les planificateurs stratégiques militaires en leur fournissant une méthode plus uniforme et plus cohérente pour comprendre les défis en matière de commandement et de contrôle.

McCann, C., Pigeau, R., English, A. 2003. Analysing Command Challenges using the Command and Control Framework: Pilot Study Results. DRDC Toronto TR 2003-034. DRDC Toronto.

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Introduction

Over the last five years, Pigeau and McCann have been developing a re-conceptualization of command, control and C^2 that is intended to provide a comprehensive and consistent framework both for the scientific investigation of C^2 and for the development of military C^2 policy and doctrine. The intention of this new framework is to provide a unifying construct for discussing, exploring and explaining the multi-faceted nature of command and control.

Pigeau and McCann [1,2] have argued that C^2 has typically been defined in a seemingly *ad hoc* fashion, reflecting either particular support technologies (e.g., $C^3 = C^2 + \text{computers}$, $C^4 = C^3 + \text{communications}$) or particular problem domains for which technological solutions were being developed (e.g., $C^4I = C^4 + \text{information}$, $C^4IS = C^4I + \text{surveillance}$, $C^4ISR = C^4IS + \text{reconnaissance}$, etc). Missing from this view was a central construct that stated, explicitly, the *purpose* for which these support technologies were being developed. What was lacking was a perspective that allowed command and control to be treated consistently from a single theoretical position.

The core axiom that *only humans command* provides the necessary unifying construct, the construct on which the Pigeau-McCann framework bases its new definitions of command and of control [1, 3]. In addition, the framework hypothesizes a set of capabilities that are necessary and sufficient for effective command [4], it establishes the proper relationship between command and control [4] and it re-defines the concept of C^2 in terms of common intent [5].

This study¹ describes our first attempt to use the framework in the analysis of real-world command challenges (CCs): the aim was to identify consistent command themes arising from these challenges. The study also addressed the general validity of the framework for its applicability to real world military situations.

We begin by briefly describing the framework. This is followed by an outline of the approach taken for the analysis and a discussion of the results.

¹ The work of collecting and compiling Command Challenges and their analysis was carried out under contract W7711-017711 to DRDC Toronto.

Framework for command and control

The Pigeau-McCann framework for command and control clearly separates the concepts of command, control and C². The concept of *command*, the centerpiece of the framework, is defined as “the creative expression of human will necessary to accomplish the mission” [4]. This places command (and by extension, C²) squarely in the domain of the human, asserting that human qualities like judgement, motivation, and courage are essential for effective command. The framework, however, does not limit command only to commanders (see [6] for a discussion of the distinction), but instead argues that, in principle, any human can command. It further hypothesizes that the degree of *command capability* embodied by a military person is a function of that person’s competency, authority and responsibility.

These three dimensions of command capability can be further subdivided as follows:

Competency

- Physical competency - the ability for sustained and skilled performance of tasks requiring physical effort and involving the senses and the body (e.g., the ability to see and hear well, endurance).
- Intellectual competency - the ability for skilled performance of mental or intellectual tasks such as reasoning, problem solving, creativity, decision making, visualizing, planning, judgment and ability to learn.
- Emotional competency - the ability to handle and cope with situations that are personally stressful or that are stressful for others.
- Interpersonal competency - the ability to interact socially with other individuals including the ability to speak and write well, to show concern for others, to be perceptive in social situations.

Authority

- Legal authority - the degree of formal power given to an individual by the military organization, specifically, the power over resources and personnel.
- Personal authority - the degree of informal power given to an individual by others, including subordinates, peers and superiors, earned, for example, through reputation, integrity, experience, strength of character and personal example.

Responsibility

- Extrinsic responsibility - the willingness of an individual to be held accountable for his or her actions to another person or to an organization.
- Intrinsic responsibility - the degree of personal commitment (moral or otherwise) that an individual feels towards another individual, towards an organization, or towards the mission.

It is proposed that the ideal levels of competency, authority and responsibility held by military members will increase with rank and experience. Furthermore, the competency, authority and responsibility of any individual must be in balance for effective command – that is, the degree of an individual’s competency must be commensurate with the degree of authority, and that authority, in turn, must be commensurate with the person’s responsibility. Crucially important is the balance across the authority-responsibility dimensions. If a member holds high authority without a commensurate degree of responsibility, which the framework terms “dangerous command”, there is potential for mis-use of that authority. Conversely, when responsibility exceeds authority – that is, a military member feels more accountable or more committed than the level of authority given or earned – this can lead to “ineffectual command”. Both of these imbalances must be avoided, as, indeed, must any imbalance between these dimensions and that of competency. The framework introduces the idea of the *Balanced Command Envelope (BCE)* to refer to that desirable portion of the command capability space where the three dimensions are balanced, and where it is desirable that all military members lie. The command dimensions and the implications of an imbalance in the dimensions are discussed in more detail in McCann and Pigeau [3] and in Pigeau and McCann [6].

The second important concept within the framework is that of *control*. The framework defines the concept of control as “those structures and processes devised by command to enable it and to manage risk” [4]. Control’s sole purpose is to support command by allowing it to take action in the operational context. In essence, control consists of the set of tools that have been developed and implemented by humans to help them command efficiently, and especially, to help them handle operational uncertainty. Control structure and process is instantiated in a variety of mechanisms, including doctrinal guidelines, rules of engagement, organizational structure, software technologies and equipment. The relationship between command and control and the notion of control as a support for command is explored in McCann and Pigeau [3].

The concept of *command and control* (C^2) is the third principle concept that is addressed by the framework which defines it as “the establishment of common intent to achieve coordinated action”. The core idea in this definition is that of common – i.e., shared – intent. According to the framework, there are two parts to intent. The first is *explicit intent*, the part of intent that is made publicly available through orders, briefings, questions and discussions. But since it is impossible to be completely explicit about every aspect of an operation, the interpretation of explicit intent is supported by a vast network of *implicit intent*. Implicit intent derives from personal expectations, military training, tradition and ethos and from deep cultural values. The framework proposes that all members of a military organization must share intent at both the explicit and implicit level for C^2 to be successful. The concept of common intent as a basis for C^2 and the mechanisms by which intent is shared are addressed in Pigeau and McCann [5].

These principle concepts of the Pigeau-McCann framework, namely, the concepts of explicit and implicit intent, the command dimensions, control support for command and the balanced command envelope were assessed in this study, using the approach described in the next section.

Method

The study involved first, the collection of descriptions of actual military circumstances where a person had been placed in a challenging command situation; and then, the analysis of these challenges by a panel of experts using an analysis tool derived from the framework. This section describes the procedure for collecting the command challenges (CCs), the membership of the panel, the analysis tool, and the procedure used for doing the analysis.

Collection of command challenges

We solicited descriptions of military situations, occurring in the last decade, in which members of the Canadian army (including those in tactical aviation) had been faced with a command challenge. Contributions were requested from historical researchers, war studies faculty and students, and from serving members of the CF. Contributors were requested to provide a description of the situation (between two and four pages) that included title, geographic location and date, background to the situation, the specific nature of the challenge, a comment on the command issues raised by the challenge, and the bibliographic source(s) of the material used in the submission. Serving members who were contributing challenges were instructed to avoid mentioning any characteristics that would identify individuals in the command situation, including specific dates and locations. (The identity of individuals in the researchers' accounts were expected to be on the public record.) Otherwise, contributors were given a considerable degree of latitude in selecting the type of situation that constituted a challenge.

Panel

A panel of five members, four with extensive military service and one civilian, was formed to undertake the detailed analysis of the command challenges. The military members each had between 27 and 36 years of experience in the Canadian Forces, two of them in the army and the other two in the navy and air force. One member had experience both as a non-commissioned member and in the reserve. All but one had graduate-level academic training in the area of history, war studies, or psychology. Together, the panel members provided a considerable breadth of military and academic experience.

Analysis tool

The analysis tool consisted of a set of questions (see Annex A) that were intended to explore the adequacy and utility of the framework in accounting for the command challenges.

Part A of the tool addressed the eight hypothesized subdimensions of command (e.g., physical competency, personal authority, intrinsic responsibility, etc.). The panel members were asked to judge whether the particular subdimension was an issue in the CC, and if so, to select, from a list provided, the primary and support factor(s) involved. Primary factors referred to particular aspects of the subdimension associated with the person in the command situation. For example, primary factors under interpersonal competency included the ability to use

language (e.g., articulateness, interpretation), opportunity for interaction with others (e.g., number, visibility, availability), and social maturity (e.g., empathy, sensitivity to the wider military situation, tolerance). Support factors referred to the control structures and processes that were expected to support the command capability. Again, in the case of interpersonal competency, these included communication methods (e.g., radios, computer, in-person communication), organizational policies (e.g., on talking to the media, on visiting troops), and training (e.g., in public speaking, writing, media awareness).

Part B of the analysis tool addressed the concept of the Balanced Command Envelope (BCE), asking the respondents to judge, on a 5 point Likert scale, whether the individual involved in the particular command challenge was on the BCE. Then the panel members were asked to categorize the adequacy of that individual's command capability in each of the three principle dimensions (i.e., competency, authority and responsibility) in terms of "less than adequate", "adequate" or "more than adequate".

In part C, the panel members judged whether common intent was an issue in the CC. Panel members were also queried concerning relevant aspects of explicit intent in the CC such as aim or purpose, the language, the means of communication, and the time available for transmitting explicit intent as well as relevant aspects of implicit intent (e.g., person, service or cultural expectations, opportunity for implicit intent to be shared).

Finally, part D of the analysis tool asked panel members to rate, on a scale of one to ten, the overall utility of the framework for analysing the CC and to identify any aspects of the CC that were not covered by the framework.

Throughout, the panel members were requested to amplify their assessments with a short written explanation.

This paper version of the tool shown in Annex A was converted to an electronic version that was attached to an Access database in which the analysis data provided by each panel member was compiled.

Procedure

In order to ensure a common understanding of the conceptual framework for C², the panel first reviewed, in detail, all the documentation concerning the framework [1-5]. The panel members then attended a one-day training session consisting of a briefing on the framework and the analysis tool by its authors, followed by an opportunity for clarification of any areas of conceptual uncertainty concerning the framework or the tool. During this session, five command challenges, selected as test cases, were independently assessed by the panel members and the authors, and discrepancies in the interpretation of the framework were resolved.

During the training session, panel members noted that some of the CC situations involved multiple participants, thus leading to confusion as to which participant was intended as the focus of the assessment. To resolve this confusion, all CCs were reviewed by the panel prior to detailed analysis to reach a consensus on who, exactly, was the *focal person* and what, exactly, was that person's challenge in the CC. For some CCs, the situation (and thus the challenge) could legitimately be viewed from the perspective of more than one participant

(i.e., more than one focal person). These CCs were split up into separate challenges for analysis from the perspective of the various focal persons identified.

The CCs were independently analysed by the five panel members using the electronic analysis tool and the results were consolidated into a single database.

Results

Fifty descriptions of challenging command situations were contributed. Thirty-two were submitted by researchers (most of whom held post-graduate degrees in history, war studies or the behavioural sciences) and were derived from publicly-available documentary sources such as official DND documents, books, websites and articles. The remaining 18 were submitted by 11 serving members based on their personal experience. Two of the CCs (contributed by different researchers) described exactly the same situation, and one was therefore deleted. The situations described in the CCs varied widely in geographic location (e.g., Kosovo, Croatia, Haiti, Cyprus, Canada), encompassing the diverse settings of Canadian army operations in the last decade. A brief description of the nature of each situation is given in Annex B.

A preliminary general analysis was carried out on the situations to identify the major issues brought forward in the descriptions. A total of 226 issues across all situations were identified (range of 1 to 10 issues per situation, with a mean of 4.6). The issues could be grouped into 18 categories as shown in Table 1. These issues (as represented by the categories) are clearly command and/or control issues, and thus we were confident that the CC situations could legitimately be analysed from this perspective. The frequency distribution of issues in these categories is also shown in the table. The top five categories, which together accounted for 45.2% of the issues, were (in order of frequency): leadership, problem solving ability, accountability, knowledge and ethical/unethical behaviour, all clearly command issues. These issues are consistent with those raised in previous studies of command and leadership conducted within DND which have cited, among others, concerns with military accountability [7,8,9,10], leadership [7, 11], problem solving skills [11], and ethics [7,11].

In preparation for the detailed analysis, the command situations were reviewed to identify the focal person, as described in the procedure. The review of the 49 situations by the panel determined that sixteen of those situations could be considered from the perspective of more than one participant. These cases were consequently split into two, three or four separate CCs, as viewed by the different focal persons involved. This resulted in a total of 73 CCs for analysis by the panel.

Finally, a rough categorization of the CCs, carried out independently by three members of DRDC Toronto, indicated that about half resulted in a positive outcome, and half in a negative outcome.

Frequency of command dimensions and factors

Recall that part A of the framework analysis process addressed the extent to which the eight sub-dimensions of command were involved in the command challenges. A majority² of the panel concluded that at least one of competency, authority or responsibility was an issue in

² Unless otherwise noted, the criterion for counting capabilities and factors was that a majority of the panel members (i.e., at least 3 out of the five) agree that the capability or factor pertained to the CC.

Table 1. Categories of issues arising from challenging military situations

| CATEGORY | DESCRIPTION OF ISSUE | FREQUENCY | % OF ISSUES |
|----------------------------|--|------------------|--------------------|
| Leaders | How the actions of leaders impacted on the situation | 23 | 10.2 |
| Problem Solving | How the ability of the person to solve difficult problems impacted on the situation | 22 | 9.7 |
| Knowledge | How the person's knowledge or lack of knowledge to accomplish his/her mission impacted on the situation | 20 | 8.9 |
| Accountability | How the accountability of the person to his/her superiors impacted on the situation | 19 | 8.4 |
| Unethical/Ethical Behavior | How unethical or ethical behaviour impacted on the situation | 18 | 8.0 |
| Resources | How the quality and quantity of materiel and/or personnel resources impacted on the situation | 16 | 7.1 |
| Trust | How the trust between the person and his subordinates impacted on the situation | 15 | 6.6 |
| Communications | How effective or ineffective communications impacted on the situation | 15 | 6.6 |
| C2 arrangements | How the specific structure C2 structure, including lines of authority and responsibility impacted on the situation | 14 | 6.2 |
| Respect | How the mutual respect between the person and his/her subordinates impacted on the situation | 14 | 6.2 |
| Organization | How the organizational structure or the relationship between organizations impacted on the situation | 12 | 5.3 |
| Clarity of ROEs/Mission | How the clarity of the ROEs or assigned mission impacted on the situation | 10 | 4.4 |
| Devolution of Authority | How the devolution, or the failure to devolve, authority impacted on the situation | 10 | 4.4 |
| Morale | How the morale of the person's subordinates impacted on the situation | 6 | 2.7 |
| Cohesion | How unit cohesion impacted on the situation | 6 | 2.7 |
| Careerism | How putting career advancement ahead of the mission or subordinates' well-being impacted on the situation | 4 | 1.8 |
| Recognition | How the person's ability to motivate his/her subordinates impacted on the situation | 1 | 0.4 |
| Motivation | How a desire for recognition by either the person or his/her subordinates impacted on the situation | 1 | 0.4 |
| | Total | 226 | 100.0 |

every CC. Furthermore, the majority agreed that competency played a role in all of the challenges (100%), that authority was involved in 93% and that responsibility was also involved in 93%. Figure 1 shows a breakdown of the command sub-dimensions within each dimension. Note that intellectual competency, legal authority and extrinsic responsibility played a role in a large proportion (at least 74%) of the challenges. Also, all remaining command sub-dimensions, except one, were noted in at least 50% of the situations. The exception was physical competency which was an issue in only 11% of the situations.

The analysis tool listed primary and support factors that might constitute issues within each command sub-dimension. As shown in figure 2, primary factors (i.e., those associated directly with the focal person) were more often identified than support factors, except in the case of physical competency (which itself was an issue in only a small number of CCs) and legal authority where they were equally important.

Table 2 shows the percent of times that each factor was noted by the majority of members³ for a given sub-dimension of command capability. Situation awareness and problem solving ability of the focal person were frequently identified under intellectual competency. Level of maturity of the focal person was an issue in many CCs – either personal maturity (under emotional competency) or social maturity (under interpersonal competency). Mission mandate and the availability of resources to carry out the mission were both implicated (either positively or negatively) as primary factors under legal authority, but the support for legal authority, especially the chain of command, also played a role in many CCs. In terms of personal authority, the principal factor was the influence of the focal person on subordinates, although influence up with superiors was also a frequently identified factor. The willingness to accept responsibility was identified as an issue by most panelists (87%) in the CCs involving extrinsic responsibility. Finally, commitment and personal ethics were frequently named in those CCs involving intrinsic responsibility. The list of possible factors provided for each capability in the analysis tool appeared to be comprehensive – there were almost no cases of “other” factors being named as accounting for a sub-dimension.

The explanations provided by the panel members⁴ for citing a factor were collapsed into categories as shown in the last column of table 2. Overall, the explanations typically give a qualitative indication of whether the factor had a positive or negative influence on the situation. For example, the social maturity factor (under interpersonal competency) was explained as “empathy”, “patience”, “maturity”, and “understanding” (in the positive direction) for some CCs and “immaturity”, “political correctness”, “lack of empathy” and “low tolerance” (in the negative direction) for other CCs. Under situational awareness (intellectual competency), there were an equal number of instances cited of “good” and “poor” situational awareness on the part of the focal person.

³ Factors are counted only for those CCs where a majority of members agreed that the particular sub-dimension was involved. Percentages are the mean, over CCs, of the number of panel members who cited a factor within a sub-dimension divided by the number who cited the sub-dimension. Note that the percentages for each sub-dimension do not sum to 100% since more than one factor could be identified for any particular CC by any panel member.

⁴ Explanations were counted only when they represented the consensus of three or more panel members.

Figure 1. Percent of command challenges involving command dimensions and sub-dimensions (according to a majority of panel members)

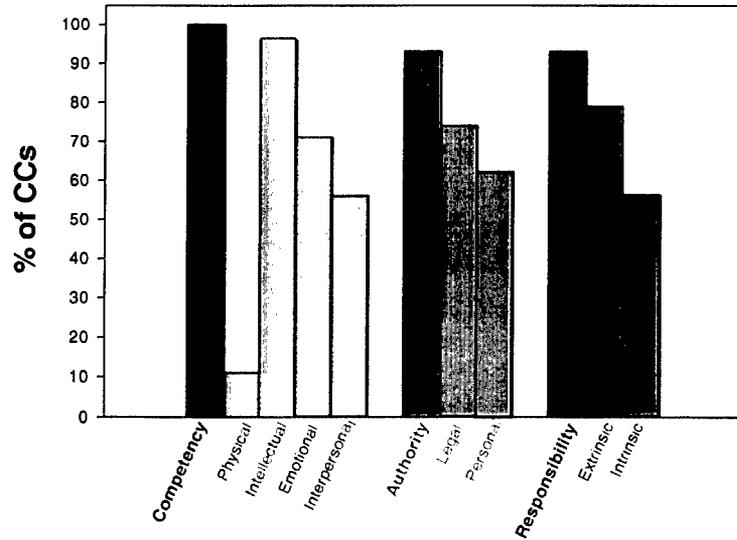


Figure 2. Mean percent of primary versus support factors, by sub-dimension

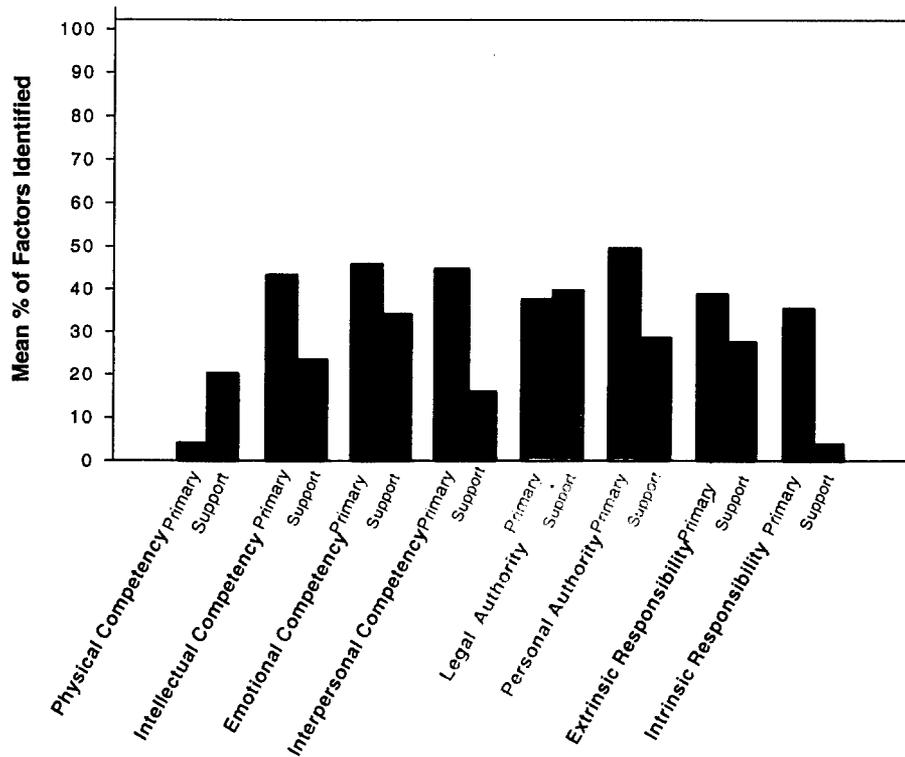


Table 2. Frequency of sub-dimensions of command that were cited in the CCs, together with the breakdown of factors involved and aggregated explanations for citing the factor

| CAPABILITY (NO. OF CCS*) | PRIMARY / SUPPORT | FACTOR | PERCENT OF TIMES FACTOR IDENTIFIED + | SPECIFIC EXPLANATIONS (NUMBER**) |
|------------------------------------|----------------------|-----------------------|--|--|
| Physical Competency (8) | Primary | Sensing | 2 % | |
| | | Acting | 3 % | Lack of flying skill |
| | | Maintaining | 4 % | Stress, extreme heat, fatigue (2), physical abilities, prolonged duty |
| | | Experience | 5 % | Inexperienced/junior officer, experience played a factor in training, inadequate training |
| | | Other | 1% | |
| | Support | Sensing equipment | 14 % | Issues with night vision goggles |
| | | Acting equipment | 16 % | |
| | | Supplies & Support | 17 % | |
| | | Training | 34 % | Troops were trained and prepared |
| | | Other | 0% | |
| Intellectual Competency (70) | Primary | Situational Awareness | 76 % | Inadequate information (18), decision making (2), adequate information, good situational awareness (18), good comprehension (11), poor situational awareness (18), lack of comprehension (12), lack of time, poor judgment (2) |
| | | Problem Solving | 60 % | Time pressure (30), inadequate information, decision making a factor (14), positive DM (9), negative DM (10), media pressure (2), poor leadership, poor communication, lack of responsibility, changing conditions (3) |
| | | Creativity | 36 % | Creative decision making (14), good decision making, uncreative decision making (3), flexibility, poor decision making (2), decision making was a factor (2) |
| | | Maintaining | 12 % | Stress (4), time pressure, fatigue (3), long hours (3) |
| | | Experience | 32 % | Decision making was a factor (2), high level of experience (4), low experience (6), leadership, experience was a factor (4), inadequate training |

| | | | | |
|-------------------------------|---------|--------------------------|------|---|
| | | Other | 2% | |
| | Support | C ² Equipment | 4 % | Inadequate equipment (2) |
| | | Decision Support | 37 % | Time pressure, inadequate support (14), inadequate information (9), negative decision making, inadequate resources, inadequate staff (3), adequate support (3) |
| | | Procedures | 40 % | Inadequate report system, inadequate SOPs (4), inadequate ROEs (6), unclear policies/procedures (6), ignored ROEs-SOPs (3), ineffective planning (2), effective procedures/policies, clear ROE's |
| | | Training & Education | 12 % | High level of training, high confidence/preparation, inadequate training |
| | | Other | 1% | |
| Emotional Competency (52) | Primary | Acute Stress | 27 % | Time pressure, stress (6), morals were a factor (3), environmental problems, crisis situation |
| | | Chronic Stress | 33 % | Fatigue (10), stress (11), poor environment (2), difficult mission |
| | | Personal Maturity | 77 % | Negative decision making (4), irresponsible (7), good judgement (23), responsible (5), mature (11), immature (9), civil military relations, poor judgement (15), dishonest, positive decision making, poor leadership |
| | | Other | 3% | |
| | Support | Formal | 22 % | Inadequate chain of command, inadequate supervision, inadequate support, inadequate training |
| | | Informal | 40 % | Lack of cohesion (3), unit moral was a factor (6), conflicting interests, positive leadership (3), low moral, positive moral |
| | | Policies | 40% | Inadequate policies (3), disregard of policies (4) |
| | | Other | 0% | |
| Interpersonal Competency (41) | Primary | Language & Communication | 38 % | Language (5), communication, unclear orders, poor communication, good communication (2) |
| | | Opportunity | 30 % | Availability (2), visitation issue (2), opportunity (2), ignored opportunity, forced opportunity to solve problem |
| | | Social Maturity | 65 % | Immature (4), empathy (9), political correctness (4), patience (2), tolerance (13), lack of empathy (8), low tolerance (2), maturity (2), understanding, poor decision making |

| | | | | |
|------------------------------|-------------------------|------------------------|--------------|--|
| | | Other | 11% | Inadequate communication, communication issues |
| | Support | Communications Methods | 34 % | Positive communication, negative communication (3), communication issues |
| | | Policies | 8 % | Media influenced policy enforcement |
| | | Training | 5 % | |
| | | Other | 0% | |
| | | | | |
| Legal Authority (54) | Primary | Mission Mandate | 45 % | Inadequate mandate (17), changing (9), unclear chain of command |
| | | Resources | 38 % | Inadequate resources (7), poor leadership, inadequate support (3), inadequate staff (4), improper allocation of resources (2), adequate staff, abuse of power |
| | | Rank Level | 8 % | Rank too low |
| | | Use of Power | 58 % | Abuse of power/authority (14), gender discrimination, poor leadership, appropriate use of power (5) |
| | | Other | 2% | |
| | Support | Rules & Regulations | 37 % | Inadequate rules/regulations (3), unrealistic ROE's (6), lack of enforcement, disregard for rules, language issues |
| | | Chain of Command | 42 % | Ambiguous chain of command (4), ineffective chain of command (6), inadequate chain of command, effective chain of command |
| | | Other | 1% | |
| | Personal Authority (45) | Primary | Influence Up | 44 % |
| Influence Down | | | 70 % | Decision making a factor, lacking influence (6), positive influence (7), other chain of command, positive leadership (7), negative leadership, poor leadership, lacking authority, strong influence down |
| Appropriateness of influence | | | 34 % | Abuse of power (5), abuse of trust (7), inappropriate trust |
| Other | | | 1% | |
| Support | | Traditions | 22 % | Regimental system, traditions had negative impact, disregard of traditions |
| | | Loyalties | 27 % | Loyal to mission, loyal to subordinate, loyal to army (2) |

| | | | | |
|-------------------------------|---------|----------------------------|------|--|
| | | Opportunities | 36 % | Positive role model (4), opportunities exist to set examples (2), attempted to be a positive role model but was viewed negatively |
| | | Other | 0% | |
| Extrinsic Responsibility (58) | Primary | Acceptance/Reticence | 87 % | Decision making was a factor, responsible (33), reticence, too accepting (2), ownership problem, irresponsible (14), problems with ROE's |
| | | Clarity | 24 % | Lack of clarity in directions or implications |
| | | Personal Involvement | 18 % | Adhered to personal decision making, too involved personally (2) |
| | | Trust | 25 % | Trust, misplaced trust, faith in subordinates and chain of command |
| | | Other | 2% | |
| | Support | Accountabilities | 28 % | Lacking accountabilities (2) |
| | | Accountability enforcement | 27 % | Lack of enforcement |
| | | Other | 1% | |
| Intrinsic Responsibility (41) | Primary | Motivation | 16 % | Highly motivated, lacking motivation |
| | | Commitment | 53 % | Committed (14), lack of commitment |
| | | Pride | 6 % | Proud of alcohol tolerance |
| | | Personal Ethics | 66 % | Morals (10), lack of morals (11) |
| | | Other | 3% | |
| | Support | Promotion Criteria | 5 % | Subordinate believed CO to be promotion focus |
| | | Reward System | 3 % | Questionable rewards |
| | | Opportunities for Growth | 3 % | |
| Other | | 2% | | |

* Number of CCs involving the capability, in the opinion of a majority of the panel members (i.e., 3 members or more).

+ Based on N in column 1. Percentages are the mean, over CCs, of the number of panel members who cited a factor within a capability divided by the number who cited the capability.

** Explanations were counted only when they represented the consensus of three or more panel members.

Balanced command

In 29 of the 73 command challenges (40%), the focal person was judged to be on the Balanced Command Envelope by a majority of the panel members. Table 3 shows how those panel members assessed these 29 cases in terms of the specific balance between competency, authority and responsibility. In the table, the data have been collapsed into three categories based on the relationship between authority and responsibility. The “dangerous” category are those cases where authority was assessed by the panel member as being greater than responsibility; the “ineffectual” category includes cases where authority was assessed as being less than responsibility; and the “balanced” category includes cases where authority and responsibility were assessed as being equivalent. These three categories were then crossed with the three possible degrees of competency (“less than adequate”, “adequate” and “more than adequate”). Consistent with the notion of the BCE, the majority of assessments indicated a balance in terms of authority/responsibility, with either an adequate level of competency (67%), or a more than adequate level (11%). There were several assessments of ineffectual authority/responsibility (15% of the total) but almost no cases of dangerous authority/responsibility (only 5%).

Table 3. *Distribution of assessment of competency, authority and responsibility for cases where the focal person was judged to be on the BCE*

| AUTHORITY / RESPONSIBILITY RELATIONSHIP | DEGREE OF COMPETENCY | | |
|---|----------------------|----------|--------------------|
| | LESS THAN ADEQUATE | ADEQUATE | MORE THAN ADEQUATE |
| Dangerous | 0% | 4% | 1% |
| Balanced | 1% | 67% | 11% |
| Ineffectual | 0% | 8% | 7% |

In the remainder of the challenges, with the exception of five where consensus was not achieved amongst the assessment panel, the focal person was judged to be off the BCE by a majority of the panel. This occurred in 39 cases (53% of the total of 73). Table 4 shows how panel members judged these cases in terms of the authority/responsibility relationship and degree of competency. Again, consistent with the notion of the BCE, almost no assessments (2%) placed the focal person in balance (i.e., balanced authority/responsibility with adequate competency). Rather, in 75% of the assessments the focal person was viewed as having less than adequate competency (i.e., collapsing over authority/responsibility relationship). Furthermore, in half of *these* cases (37% of the assessments), the focal person was placed in the dangerous authority/responsibility region.

Table 4. Distribution of assessment of competency, authority and responsibility for cases where the focal person was judged to be off the BCE

| AUTHORITY / RESPONSIBILITY RELATIONSHIP | DEGREE OF COMPETENCY | | |
|---|----------------------|----------|--------------------|
| | LESS THAN ADEQUATE | ADEQUATE | MORE THAN ADEQUATE |
| Dangerous | 37% | 7% | 0% |
| Balanced | 22% | 2% | 3% |
| Ineffectual | 16% | 6% | 7% |

Common intent

Issues of common intent were involved in 25 (34%) of the command challenges, based on a majority opinion of the panel. Of these, 23 challenges entailed explicit intent, and 15 entailed implicit intent. As shown in table 5, most of these cases involved either an issue with the (explicit) aim of the mission or an issue of the (implicit) personal or service expectations of those involved in the challenge.

Table 5. Breakdown of frequency of factors associated with intent

| INTENT (NO. OF CCS*) | FACTOR | EXAMPLES | PERCENT OF TIMES FACTOR IDENTIFIED ⁺ |
|----------------------|------------------------|---|---|
| Explicit (23) | Aim or purpose | unrealistic, unclear, illegal | 96 % |
| | Language | translations, articulateness | 18 % |
| | Means of Communication | info load, bandwidth, time delays | 23 % |
| | Time | for elaboration, questions, back briefs | 16 % |
| | Other | | 5 % |
| Implicit (15) | Personal Expectations | of a specific individual | 69 % |
| | Service Expectations | army, navy, air force, reserves | 56 % |
| | Cultural Expectations | sex, racial or religious differences | 16 % |
| | National Expectations | coalition forces | 24 % |
| | Opportunity | for socialization | 2 % |

* In the opinion of a majority of the panel members (greater than 3).

+ Based on N in column 1.

Overall utility of the framework

In responding to part D of the analysis tool, panel members felt that, on average, the framework had a high utility for analysing the CCs, with the mean rating of 7.0 (standard deviation = 1.1) on a scale of one (low) to ten (high). Furthermore, a score of 6.2 or greater was achieved for 75% of the CCs. Thirteen CCs had a mean rating of less than 6.0; however, these CCs also had a large standard deviation (mean s.d. of these cases was 3.3) indicating a lack of agreement amongst panel members.

In amplifying the above response, most panel members (i.e., three or more) felt that the framework covered the important aspects of every CC. However, panel members did note some situations that were not addressed adequately, including those where decisions about policy were made, where advice was given (as opposed to action being taken). The framework also does not easily handle situations where there is a difference in the levels of legal and personal authority.

Discussion

Overall, the framework provided a strong perspective and good utility for analysing these command challenges. This section discusses the preliminary insights into the challenges that were gained by applying the framework, as well as methodology issues raised in its application.

Insights obtained by using the framework

According to panel members, all of the command sub-dimensions identified in the Pigeau-McCann framework were implicated in the CCs, with the exception of physical competency. That physical competency was not frequently identified may reflect the nature of the CCs: most involved officers, many at a senior level, in situations where decision making and judgment rather than physical action was required. Although panel members identified some aspects of the CCs that were not adequately addressed by the framework overall (for example, regarding the creation of organizational policy), none of the assessment panel identified specific aspects of command that had not been included in the framework. Thus, in terms of the command dimensions, the framework seems to be comprehensive.

The distribution of frequency with which the factors within each sub-dimension were identified by the panel members provides some further insight into the capabilities that were in play in these CCs. All of the factors listed in the assessment tool (except those in physical competency) were implicated to some degree in the CCs. However, primary factors were more frequently identified than support factors. This suggests that factors involving the individual (e.g., their knowledge, skill, and personal traits) were prominent in these CCs. This conclusion is consistent with the central assumption in the Pigeau-McCann framework -- that the human in the C2 setting is the most important factor. Indeed, the view that the human is the critical component of C2 has been affirmed frequently by military inquiries and in military doctrine in the last decade, for example, in the Somalia Inquiry [7] and in Army doctrine [12].

The BCE concept is one of the unique features of the framework and the results indicate that it was possible to obtain consistency among the panel members concerning the question of whether or not the focal person was on the BCE (in only 5 of the 73 cases was a majority view not obtained). Furthermore, there was good consistency between the response to this question and the subsequent assessment of the balance between competency, authority and responsibility. The most striking finding was the proportion of times that competency was identified as the inadequate capability for those CCs where the focal person was judged outside the BCE.

The framework (in the form of the analysis tool) was strongest in providing an understanding of the command aspects of the CCs (as conceptualized in terms of competency, authority and responsibility), but rather less informative concerning command and control aspects of the CCs (as conceptualized in terms of common intent). This difference is a reflection of the less extensive conceptual and theoretical development of the concept of common intent in the framework. The concept of common intent and the mechanisms for sharing of intent are topics that we expect to address in depth over the next year.

The study demonstrated that the Pigeau-McCann framework provides a good base for CC analysis and that, in general, it was possible to achieve a considerable degree of consensus concerning the results of independent analyses using the tool. However, there were still many instances of disagreement in the analysis of particular CCs, in some cases with panel members at opposite ends of the spectrum of opinion (e.g., concerning the BCE). There are two potential sources of variance in analysis between panel members: interpretation of the content of the CC itself, and/or the application of the analysis tool to the interpretation of the CC. The remainder of this section will address problems identified in each of these areas and will propose some possible solutions.

Content of command challenges

The first set of issues relates to the selection, content and format of the CCs. Our criterion for what constituted a CC in this study was fairly loose – and was stated to potential contributors as “any real-world situation in which command was challenged”⁵. We were not specific in terms of what constituted “command”. There was, therefore, potential for a variety of different situations to be considered “command situations”, ranging from small tactical situations to broad strategic and policy situations. This range, however, is in keeping with the philosophy of the framework, since it defines command as “the creative expression of human will necessary to accomplish the mission”, something that anyone can do, at any level, and not a capability limited to those who have simply been given legal authority. Our broad hypothesis is that the framework will be adequate for explaining the wide variety of problem-solving situations that are contributed.

Another issue concerned the exact formulation of the challenge as well as the degree of detail provided. Some CCs did not provide enough information on which to base a reliable analysis. A CC with a thoroughly described focal individual (thoughts and actions detailed, if possible) is far preferable to a loosely described set of circumstances from which the command decision must be inferred. Our experience in this study suggests that a CC should be formulated in the same way as “critical incidents” which have been used to conduct job analyses study and to decision making [13, 14]. In particular, a CC should be written from the perspective of one person (the focal person) and should include the background to the situation, a clear statement of what the challenge was for that person, what actions that person undertook to meet the challenge, and what the outcome was. This formulation provides a focus for the application of the analysis tool. This is not to suggest, however, that a CC deliberately exclude other people involved in the situation, otherwise the CC could not be analysed in terms of aspects like interpersonal competency and sharing of intent⁶. Finally, the analysis against the framework would benefit from having an indication of the outcome of the actions taken in the CC – either positive or negative – although the contributors of the current set of CCs were not asked to provide it. Since the framework hypothesizes, in general, that being off the BCE is detrimental to command, these additional data would allow us to test this hypothesis in terms of the outcome of the CC.

The CC set included both CCs contributed by researchers based on documentary evidence and those from serving members based on personal experiences. There are advantages and

⁵ Recall that we did not limit the CCs to those focussing on the actions of only commanders.

⁶ In fact, this study has shown that a given military situation may offer command challenges of different kinds for the different people involved.

disadvantages to each. The research-based CCs were able to address some of the larger organizational challenges and, because they drew on several sources, provided, perhaps, a more balanced view of the situations they described. However, these CCs usually lacked a description of the thoughts and emotions of the people involved. On the other hand, the first-person CCs probably incorporated some of the personal biases of the contributor concerning the situation described, but they were more likely to provide the associated rationale and emotional responses of the focal person.

The use of real-world CCs gave the study excellent face validity. However, some of the panel members were familiar, to a greater or lesser degree, with many of the situations described, either from direct personal experience or indirectly from knowing the people involved. Prior knowledge can influence the analysis of a CC, in the sense that more is being “read into” the interpretation of the situation than just what is provided in the written description. It is impossible, in the end, to avoid this problem, but the effects of prior knowledge on the part of an individual panel member can be alleviated by increasing the number of members. Some consideration might also be given to specifically asking each member about their familiarity with each CC situation.

Finally, the CCs collected in this study were limited to those in the land force, due to the way that the project was funded. It would be beneficial to extend the set of challenges to all three services to determine if there are service differences in the types of challenges, or differences in the way that challenges are met.

Analysis tool

The analysis tool was constructed to allow the assessment of the CCs in terms of the framework. In this first version of the tool, we were principally interested in determining whether the various constructs (e.g., intent) and dimensions (e.g., authority) in the framework, as well as the factors (e.g., maturity), could be recognized. Thus, almost all the response scales were cast in terms of binary (yes/no) answers about the presence of a dimension/factor. So, for example, the response to the question “Was there an issue with maturity?”, (under the sub-dimension of personal authority) was limited to either “yes” or “no”⁷. One substantial problem was that the yes/no response format did not allow any indication of the direction or degree of the influence of the factor in question. In the previous example concerning maturity, the only way of determining whether the maturity of the focal person had had a positive or a negative influence on the situation (and the degree of that influence) was if the rater happened to mention it in the explanation. Finally the dichotomous (yes/no) response format did not lend itself easily to quantitative analysis methods⁸. We propose a revision of the response scales in the next version of the analysis tool so that both direction and degree of influence can be captured on an ordinal scale for all capabilities and factors.

One other issue that arose in the use of the tool pertained to a degree of uncertainty, on the part of panel members, about the exact meaning of certain factors (e.g., “opportunities” under interpersonal competency). This problem can be resolved by clarifying the exact concept that

⁷ The exceptions were in parts B and D, where a Likert scale was used to measure degree.

⁸ The approach taken in the data analysis involved adopting “a majority of panel members” as the criterion for whether a capability or factor was counted.

is being tapped through the factor (including through explanations in the manual and during training) and/or re-wording the factor names as required.

The related set of issues concerned panel members' ability to understand and interpret the framework and to apply it consistently across CCs. Bearing in mind that the framework is still evolving (and that part of the overall purpose of this project is to uncover its deficiencies so that it can be improved further), it is nonetheless important that the analysts have a common understanding of the framework and that they apply it consistently in their analysis of CCs. The procedures undertaken in this project to train the panel members (as a group) were a start in that direction. Now that this panel has some practical experience in applying the framework, it seems timely to capture that experience in the form of a manual that can provide guidance for a more standardized application of the framework to future challenges that are collected. And since it also seems desirable to expand the panel membership (to allow for turnover, as well as to increase the number of analysts available to score a given set of CCs), the development of a manual to expedite training of new analysts is really essential at this stage. The training of new analysts will also require appropriate CCs to be identified (and possibly further developed) for use in training and testing. The issue of shared understanding and interpretation of the framework will continue to be with us into the future, and must be addressed on an on-going basis by elaboration and clarification of the framework through discussion and by identification and resolution of problem areas and deficiencies.

Finally, raters found that generally the electronic version of the tool worked quite well, with the exception of the fact that they could not go back to look at previous scores in a CC. This issue will be examined to see if it can be resolved.

Conclusions

This study has described the analysis of a collection of command challenges from the perspective of a new conceptual framework for C². It has demonstrated that, using the framework, we are able to identify consistent command themes arising from the challenges. It has also confirmed the general validity of the framework for its applicability to real world military situations.

In addition to providing some preliminary results concerning issues in command challenges, the study helped identify several areas in which the method for applying the framework could be improved. It is therefore recommended that

1. CCs – be written to focus on an single individual's behaviour; be formatted to explicitly provide background and outcomes of that behaviour; and continue to be solicited from both researchers and serving members;
2. Analysis tool – two response scales be used for each factor in the analysis tool, one to assess degree and the other to assess direction of influence; unclear terms and wording be clarified; sections be re-ordered to improve usability; the section on common intent be expanded as appropriate based on further conceptual development of the framework; the electronic tool be revised as necessary;
3. Manual and training – a manual providing guidelines for applying the tool be developed; a training package be developed; a pool of individuals trained in the framework and application of the analysis tool be established, to be used as a source of panel members.

Furthermore it is recommended that a new set of CCs from all three environments be collected and analysed using the revised tool. With refinement, it is concluded that the Pigeau-McCann framework could assist military policy makers, requirement analysts, training coordinators, boards of inquiry and strategic planners by providing a more consistent and coherent approach for understanding command and control challenges.

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Annex A – Command Challenge Analysis Tool

Rater _____

CC# _____

CC Title: _____

PART A – COMMAND CAPABILITY (CAR)

1. Competency

1.1 *Physical Competency*

The ability for sustained and skilled performance of sensory-motor tasks involving physical effort. For example, this would include strength, visual or auditory acuity, endurance, vigilance, manual dexterity, etc.

⇒ Was physical competency an issue in this CC? No Yes

If 'Yes' then:

Primary Factors

Was there an issue with:

⇒ No Yes : **Sensing** (e.g., seeing, hearing, etc)

Explain:

⇒ No Yes : **Acting** (e.g., lifting, running, firing weapons, etc)

Explain:

⇒ No Yes : **Maintaining** (e.g., acute or chronic fatigue, injuries, sickness, etc.)

Explain:

⇒ No Yes : **Experience** (e.g., number of tours, range of jobs, years of service)

Explain:

⇒ No Yes : **Other**

Explain:

Support Factors

Was there an issue with:

⇒ No Yes : **Sensing equipment** (e.g., radar, night vision goggles, etc.)

Explain:

⇒ No Yes : **Acting equipment** (e.g., weapons, vehicles, bridges, etc)

Explain:

⇒ No Yes : **Supplies & Support** (e.g., food, ammunition, gas, SOPs, maintenance, etc)

Explain:

⇒ No Yes : **Training** (e.g., appropriateness of courses, etc.)

Explain:

⇒ No Yes : **Other**

Explain:

1.2 Intellectual Competency

The ability for skilled performance of mental or intellectual tasks such as reasoning, problem solving, creativity, decision making, visualizing, planning, judgement and ability to learn.

⇒ Was intellectual competency an issue in this CC? No Yes

If 'Yes' then:

Primary Factors

Was there an issue with:

⇒ No Yes : **Situational Awareness** (e.g., understanding, too little or too much info, etc.)

Explain:

⇒ No Yes : **Problem solving** (e.g., decision making, time pressure,)

Explain:

⇒ No Yes : **Creativity** (e.g., novel solutions, creating new SOPs, changing plans, etc.)

Explain:

⇒ No Yes : **Maintaining** (e.g., sleep loss, work/rest cycles, acute stress, etc)
Explain:

⇒ No Yes : **Experience** (e.g., number of tours, range of jobs, years of service)
Explain:

⇒ No Yes : **Other**
Explain:

Support Factors (i.e., Control structures and processes that support primary factors)

Was there an issue with:

⇒ No Yes : **C2 equipment** (e.g., radios, computers, displays, maps, etc.)
Explain:

⇒ No Yes : **Decision Support** (e.g., intelligence, advisors, expert systems, etc)
Explain:

⇒ No Yes : **Procedures** (e.g., SOPs, ROEs, planning process, approval process, etc)
Explain:

⇒ No Yes : **Training & Education** (e.g., appropriateness of courses, etc.)
Explain:

⇒ No Yes : **Other**
Explain:

1.3 Emotional

The ability to handle and cope with situations that are personally stressful or that are stressful for others. Emotional competency includes, for example, the ability to cope in emotionally-charged situations, to control anger, to maintain a sense of humour, to keep a balanced perspective.

⇒ Was emotional competency an issue in this CC? No Yes

If 'Yes' then:

Primary Factors

Was there an issue with:

⇒ No Yes : **Acute stress** (e.g., personal, familial, social, moral, environmental, etc.)

Explain:

⇒ No Yes : **Chronic stress** (e.g., extended acute stress, extended fatigue, op tempo, etc.)

Explain:

⇒ No Yes : **Personal maturity** (e.g., appropriate behaviour, good judgement, etc.)

Explain:

⇒ No Yes : **Other**

Explain:

Support Factors (i.e., Control structures and processes that support primary factors)

Was there an issue with:

⇒ No Yes : **Formal** (e.g., chaplaincy, supervisor, medical professionals, etc.)

Explain:

⇒ No Yes : **Informal** (e.g., unit morale and cohesion, etc)

Explain:

⇒ No Yes : **Policies** (e.g., compassionate leave, phone calls home, alcohol, etc)

Explain:

⇒ No Yes : **Other**

Explain:

1.4 *Interpersonal*

The ability to interact successfully with other individuals. This includes, for example, articulateness, empathy, perceptiveness and social sensitivity.

⇒ Was interpersonal competency an issue in this CC? No Yes

If 'Yes' then:

Primary Factors

Was there an issue with:

⇒ No Yes : **Language** (e.g., articulateness, interpretation, etc.)

Explain:

⇒ No Yes : **Opportunity** (e.g., no. of visits, visibility, availability, etc.)

Explain:

⇒ No Yes : **Social maturity** (e.g., empathy, political correctness, tolerance, etc.)

Explain:

⇒ No Yes : **Other**

Explain:

Support Factors (i.e., Control structures and processes that support primary factors)

Was there an issue with:

⇒ No Yes : **Communication methods** (e.g., radios, computers, in-person, etc.)

Explain:

⇒ No Yes : **Policies** (e.g., on talking to media, on touring troops, etc.)

Explain:

⇒ No Yes : **Training** (e.g., public speaking, writing, media awareness, etc.)

Explain:

⇒ No Yes : **Other**

Explain:

2. **Authority**

2.1 Legal Authority

The degree of power formally given to an individual by the military organization. Legal authority includes power over both resources and personnel, as well as the power to act.

⇒ Was legal authority an issue in this CC? No Yes

If 'Yes' then:

Primary Factors

Was there an issue with:

⇒ No Yes : **Mission mandate** (e.g., non-existent, unrealistic, unclear, changing, etc)

Explain:

⇒ No Yes : **Resources** (e.g., accessibility, appropriate type of supplies, personnel, etc)

Explain:

⇒ No Yes : **Rank level** (e.g., rank too high or too low for task, etc.)

Explain:

⇒ No Yes : **Use of power** (e.g., appropriate, inappropriate, consistent, etc.)

Explain:

⇒ No Yes : **Other**

Explain:

Support Factors (i.e., Control structures and processes that support primary factors)

Was there an issue with:

⇒ No Yes : **Rules and regulations** (e.g., conflicting, confusing, imprecise, lacking, etc.)

Explain:

⇒ No Yes : **Chain of Command** (e.g., ambiguous, multi-national, ineffective, etc)

Explain:

⇒ No Yes : **Other**

Explain:

2.2 *Personal Authority*

The degree of empowerment provided informally and tacitly to an individual by superiors, peers and subordinates. It is that authority earned, for example, through reputation, experience, strength of character and personal example.

⇒ Was personal authority an issue in this CC? No Yes

If 'Yes' then:

Primary Factors

Was there an issue with:

⇒ No Yes : **Influence up** (e.g., with peers and superiors in chain of command, HQ, etc)

Explain:

⇒ No Yes : **Influence down** (e.g., with subordinates, NGOs, civilians, etc)

Explain:

⇒ No Yes : **Appropriateness of influence** (e.g., abuse of trust, degree, etc.)

Explain:

⇒ No Yes : **Other**

Explain:

Support Factors (i.e., Control structures and processes that support primary factors)

Was there an issue with:

⇒ No Yes : **Traditions** (e.g., regimental system, service traditions, etc.)

Explain:

⇒ No Yes : **Loyalties** (e.g., to unit, to mission, to service, etc)

Explain:

⇒ No Yes : **Opportunities** (e.g., for setting examples, for demonstrating skills, etc)

Explain:

⇒ No Yes : **Other**

Explain:

3. Responsibility

3.1 Extrinsic Responsibility

The willingness to be held accountable to another person or to an organization for actions taken. It usually entails meeting formal or legal expectations for behaviour or performance, although it can also entail informal expectations on the part of peers and subordinates.

⇒ Was extrinsic responsibility an issue in this CC? No Yes

If 'Yes' then:

Primary Factors

Was there an issue with:

⇒ No Yes : **Acceptance/Reticence** (e.g., problem ownership, diverting blame, etc)

Explain:

⇒ No Yes : **Clarity** (e.g., moral implications of situation unclear, fuzzy ethos, etc)

Explain:

⇒ No Yes : **Personal involvement** (e.g., lack of perspective, too involved, etc.)

Explain:

⇒ No Yes : **Trust** (e.g., faith in system, in chain of command, etc.)

Explain:

⇒ No Yes : **Other**

Explain:

Support Factors (i.e., Control structures and processes that support primary factors)

Was there an issue with:

⇒ No Yes : **Accountabilities** (e.g., conflicting, confusing, imprecise, lacking, etc.)

Explain:

⇒ No Yes : **Accountability enforcement** (e.g., too lax, too rigid, etc)

Explain:

⇒ No Yes : **Other**

Explain:

3.2 Intrinsic Responsibility

The degree of self-generated commitment (moral or otherwise) that one feels towards an individual or organization. Intrinsic responsibility is associated with the concepts of dedication, honor, fame, pride, and loyalty.

⇒ Was intrinsic responsibility an issue in this CC? No Yes

If 'Yes' then:

Primary Factors

Was there an issue with:

⇒ No Yes : **Motivation** (e.g., too much, too little, etc)

Explain:

⇒ No Yes : **Commitment** (e.g., to mission, to service, to personnel, etc)

Explain:

⇒ No Yes : **Pride** (e.g., too much, too little, etc.)

Explain:

⇒ No Yes : **Personal ethics** (e.g., moral obligation, etc.)

Explain:

⇒ No Yes : **Other**

Explain:

Support Factors (i.e., Control structures and processes that support primary factors)

Was there an issue with:

⇒ No Yes : **Promotion criteria** (e.g., not aligned with organisational values, etc.)

Explain:

⇒ No Yes : **Reward systems** (e.g., too arbitrary, too few, too many, etc)

Explain:

⇒ No Yes : **Opportunities for growth** (e.g., new skills, degrees, training, etc)

Explain:

⇒ No Yes : **Other**

Explain:

PART B – BALANCED COMMAND ENVELOPE (BCE)

4. Balanced Command Envelope (BCE)

Command Dimensions:

Competency: the combination of skills and abilities available to the focal person to deal with the CC

Authority: the degree to which the focal person is empowered to act, the scope of this power and the resources available for enacting will in this CC

Responsibility: the degree to which the focal person accepts legal and moral commitment in this CC

Answer both of the following questions.

⇒ Assess the following statement (check one box):

From an organizational perspective, the focal person in this CC was on the BCE.

Strongly
Disagree

Disagree

Neither Agree
Nor Disagree

Agree

Strongly
Agree

⇒ Assess, from an organizational perspective, the adequacy of the focal person's capability in each of the Command dimensions (as defined above). Check one box for each dimension.

| Command dimension | Less than adequate | Adequate | More than adequate |
|-------------------|--------------------------|--------------------------|--------------------------|
| Competency: | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Authority: | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Responsibility | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

Explain:

PART C – COMMAND AND CONTROL

Definitions

C²: *the establishment of common intent to achieve coordinated action.*

Intent: *an aim or purpose with all of its connotations.*

Explicit intent: *the publicly communicated aim or purpose (e.g., orders).*

Implicit intent: *the implicit or tacit meaning of explicit intent (based on personal, service, military and cultural/national expectations).*

Common intent: *shared explicit intent plus operationally relevant shared implicit intent.*

5. Command & Control (C²)

⇒ Was 'the establishment of common intent to achieve coordinated action' (i.e., C²) an issue in this CC? No Yes

If 'Yes' then:

5.1 **Explicit intent (see definition above)**

Was there an issue with:

⇒ No Yes : **Aim or purpose** (e.g., unrealistic, unclear, illegal, etc)

Explain:

⇒ No Yes : **Language** (e.g., translations, articulateness, etc)

Explain:

⇒ No Yes : **Means of communication** (e.g., info load, bandwidth, time delays, etc)

Explain:

⇒ No Yes : **Time** (e.g., for elaboration, questions, backbriefs, etc.)
Explain:

⇒ No Yes : **Other**
Explain:

5.2 *Implicit intent (see definition above)*

Was there an issue with:

⇒ No Yes : **Personal expectations** (e.g., of a specific individual (i.e., commander))

Explain:

⇒ No Yes : **Service orientated expectations** (e.g., army, navy, AF, reserves, etc)

Explain:

⇒ No Yes : **Cultural expectations** (e.g., sex, racial or religious differences)
Explain:

⇒ No Yes : **National expectations** (e.g., coalition forces, etc.)
Explain:

⇒ No Yes : **Opportunity** (e.g., for socialisation)
Explain:

⇒ No Yes : **Other**
Explain:

PART D - GENERAL

6. Overall Assessment

⇒ In your opinion, how useful was the framework for analysing this CC? (Rate on a scale of 0 to 10, where 0 is not useful at all and 10 is extremely useful).

Amount: _____

⇒ Are there important aspects of this CI that are not covered by the framework?

No Yes

⇒ If 'Yes', then
Explain:

Annex B – Military Situations for Command Challenges

| NUMBER | TITLE | SITUATION |
|----------|---------------|--|
| 1. | South Sector | Gen Forand dealing with Croatian attack (Aug 95) |
| 2. | Harassment | The impact of harassment on women's integration in CF in the 1980s and 1990s |
| 3. & 12. | Perron | The reaction of the army to its first female infantry officer, Sandra Perron (1990s) |
| 4. | 2PPCLI | Battalion-level command decisions in a peacekeeping environment (Apr to Sep 1993) |
| 5. | UNCRO | Gen Forand's experiences with UNCRO (Aug 1995) |
| 6. | Bryan | Removal from command and court martial of LCol Steven Michael Bryan (Aug 1999) |
| 7. | Calvin - a | Pre-Deployment Training CANBAT 1, Roto 2 (Jan 1993) |
| 8. | Calvin - b | Cancellation of Leave, CANBAT 1, Roto 2 (Jul 1993) |
| 9. | Haiti | Mistreatment of Haitian Detainees (Jul 1997) |
| 10. | Matasi | Rules of Engagement (ROE) and Right to Engage (RTE), UNPROFOR, Croatia (Spring 1994) |
| 11. | Dismissal CAR | Removal of LCol Morneau from command of the Canadian Airborne Regiment (Oct 1992) |
| 13. | KVM Challenge | Command in a Quasi-Civilian Monitoring Mission, BGen Maisonneuve in Kosovo (Oct 1998-Mar 1999) |
| 14. | Rwanda | Dallaire, UNAMIR and the Rwanda Genocide 1994 |
| 15. | Wlasichuk | Wlasichuk's attempt to intimidate belligerents near Vosoko through use of mortar fire for illumination, 4 Jul 1994 |
| 16. | Kosovo | CDS issues new dress regulations in response to photos & videos of beards and appearance of CF soldiers at Mitrovica, Kosovo, Mar - Jun 2000 |
| 17. | Ice Storm 98 | Forand as Commander of the Joint Force assisting the Province of Quebec in Ice Storm 1998 |
| 18. | Sarajevo | Command of a Multinational Force of UN Military Observers in Sector Sarajevo, 14 Oct 1992 - 14 Jul 1994 |

| | | |
|-----|----------------|--|
| | | Sector Sarajevo, 14 Oct 1993- 14 Jul 1994 |
| 19. | Dallaire | Major-General Dallaire, duty, and the murder of UN Belgian troops, 7 Apr 1994 |
| 20. | Mequine | Prescription of anti-malarial medication for troops deployed to Somalia, Sep 1992 |
| 21. | Somalia | Torture and murder of a prisoner, 16 Mar 1993 |
| 22. | Senior Officer | Ethical issues surrounding the treatment of a senior officer who had been convicted of poaching, 1989-93 |
| 23. | Deployment CAR | Issues surrounding approval of the Canadian Airborne Regiment (CAR) for deployment to Somalia, Sep-Nov 1992 |
| 24. | ROE CAR | Problems with the development of ROE for the CAR in Somalia, 5 Dec 1992 to 4 Mar 1993 |
| 25. | Beaver Lodge | Creating a crisis to gain leverage for negotiations, The Green Line, Nicosia, Cyprus, Aug 1986 |
| 26. | Alcohol | The effect of alcohol and stress or a lack of command that led to a series of five separate challenges in 48 hours involving Canadian troops in Bosnia, 24-26 Nov 2000 |
| 27. | GWS | The treatment of CF personnel reporting unexplained medical symptoms after service overseas, particularly during the Gulf War, 1991-today |
| 28. | Kuwait | Rescue efforts by Canadian soldiers' of 1 CER during explosions at a US Army ammunition dump in Kuwait, 11 Jul 1991 |
| 29. | Drinking | Drinking to excess by an officer on duty and the commander's decision to deal "in house" with the challenge, 1993 |
| 30. | Reserves | Reaction of senior leadership to the "crisis" in the Army Reserves, 1994-2000 |
| 31. | Thomas | The Thomas Report account of the handling of the investigation into events at the Bakovici mental hospital in Bosnia Herzegovina, 1993-96 |
| 32. | Davis | Analysis of Sgt James R. Davis' account of a frontline decision by his Reconnaissance Squadron Commander when dealing with Croat troops who had "arrested" two Canadian vehicles, May 1992 |
| 33. | Ice Storm | Deployment of junior rank reservists in positions of responsibility during Ice Storm 1998 |

| | | |
|-----|----------------|---|
| 34. | Unaccept Order | Consequences for a senior reserve officer of an unacceptable order from his CO |
| 35. | Leave | Issues surrounding public support (funding) for travel on compassionate leave |
| 36. | Croatia 1 | Balance between following the "technically correct" action and doing what common sense dictates to be the correct thing |
| 37. | Croatia 2 | Fairness in applying discipline |
| 38. | Kosovo | A unit's trust in its CO |
| 39. | Gulf War | Command relationships among general officers |
| 40. | Haiti | Dealing with a subordinate who breaks the rules |
| 41 | Haiti2 | Relationship between senior officer and NCMs – privacy and discipline |
| 42. | Haiti3 | Competence and acceptance of a senior officer by subordinates |
| 43. | Furniture | Poor management and leadership at an Area Headquarters and a Base Supply Section |
| 44. | Loan | Loan of government property to civilians |
| 45. | Rift | Conflict between key subordinates in a subunit |
| 46. | Ethical Behav | Unethical conduct of subordinate in acquiring materiel. |
| 47. | Ethical Behav2 | Unethical conduct of a superior during a competition |
| 48. | Lack Skill | Lack of personal skill to conduct a training exercise |
| 49. | Loss Equip | Loss of UN equipment in an overseas operation |
| 50 | Lessons Not | Failure to derive lessons learned from major exercise |

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14. ABSTRACT

(U) This paper describes a pilot study in which we explored the utility of the Pigeau-McCann framework for command and control for analysing real-world military command challenges. The framework is a re-conceptualization of command, control and C2 that is intended to provide a comprehensive and consistent base both for the scientific investigation of C2 and for the development of military C2 policy and doctrine. The study involved a preliminary assessment of the explanatory power of the framework in the context of actual situations in which military personnel confronted operational challenges. The results endorse the value of the framework as an approach for categorizing and quantifying significant aspects of command, of control and of C2. In addition, several areas were identified for improving the procedure used for analysis of the challenges. With refinement, the tool has strong potential to be used by the military to understand challenging C2 situations.

(U) Le présent document décrit une étude pilote dans laquelle nous avons examiné l'utilité du cadre de commandement et de contrôle Pigeau-McCann pour ce qui est d'analyser des défis réels en matière de commandement militaire. Ce cadre consiste en une nouvelle conceptualisation du commandement, du contrôle et du commandement et contrôle (C2) qui vise à fournir une base complète et cohérente tant pour l'étude scientifique du C2 que pour l'élaboration de la politique et de la doctrine de C2 militaires. L'étude que nous avons réalisée comprenait une évaluation préliminaire de la capacité d'explication du cadre dans le contexte de situations réelles dans lesquelles du personnel militaire affrontait des défis opérationnels. Les résultats confirment la valeur du cadre en tant que méthode de catégorisation et de quantification d'aspects importants du commandement, du contrôle et du C2. De plus, nous avons repéré plusieurs éléments à modifier afin de perfectionner de la procédure utilisée pour l'analyse des défis. Moyennant certaines améliorations, l'outil pourrait très bien être utilisé par les forces militaires pour comprendre des situations de C2 difficiles.

15. KEYWORDS, DESCRIPTORS or IDENTIFIERS

(U) Command; Framework; Competency; Authority; Responsibility; Intent; Explanation

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