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Analysis of Governance and Management (GM) approach agility during the Vancouver 2010 Olympic Games

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Defence R&D Canada
Technical Memorandum
DRDC Toronto TM 2011-124
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Abstract

The conduct of major operations, such as the Vancouver 2010 (V2010) Olympics, requires the interaction of various departments, organizations and actors. In order to deal with these complex endeavours effectively and efficiently, the collective of organisations must be able to adopt and transition to a Governance and Management (GM) approach that is appropriate for the complexity of the situation. Unforeseen or sudden changes in the environment – or "disturbances" – may increase the complexity of a situation, and require the collective to adopt a new GM approach. The objective of the analysis presented in this report was to determine whether evidence supporting the concepts defined in the GM approach agility model could be found in sources documenting the V2010 Olympics. The analysis focused on the Integrated Security Unit in charge of security for V2010, and consisted in reviewing and analysing documents pertaining to security operations before, during, and after the Olympics. The findings revealed evidence for several of the concepts of the GM approach agility model. A new concept to describe GM approaches – the desired GM approach – was added to the model to account for forces outside the collective that can influence the sought-after approach. Future work should focus on further development and validation of the GM approach agility model by refining definitions of the concepts and their relations within the model using modeling and simulation studies as well as controlled experimentation. Once the model is more mature, its concepts could be tested in field exercises and/or controlled experiments simulating a complex endeavour.

Résumé

La conduite d'opérations d'envergure, comme celles menées lors des Jeux olympiques de Vancouver 2010 (V2010), exige une interaction entre divers ministères, organisations et acteurs. Afin de composer avec efficacité et efficience avec ces entreprises complexes, le groupe d'organisations doit être capable d'adopter une approche de gouvernance et de gestion (GG) adaptée à la complexité de la situation. Des changements, ou des « dérangements » imprévus ou soudains peuvent rendre la situation encore plus complexe et demander au groupe d'adopter une nouvelle approche de GG. L'analyse présentée dans ce rapport avait pour objet de déterminer si on pouvait recenser des preuves appuyant les concepts définis dans le modèle d'agilité de l'approche de GG dans les documents d'information sur les Jeux olympiques de V2010. L'analyse se concentrait sur le Groupe intégré de la sécurité, responsable de la sécurité pendant les Jeux de Vancouver 2010, et consistait à examiner et à analyser des documents portant sur les opérations de sécurité menées avant, pendant et après les Olympiques. Les résultats démontrent la présence de plusieurs des concepts du modèle d'agilité de l'approche de GG. Un nouveau concept décrivant les approches de GG – l'approche GG désirée – a été ajouté au modèle afin de tenir compte des forces extérieures au groupe pouvant influencer l'approche visée par le groupe. Les recherches futures devraient se concentrer sur la poursuite de l'élaboration du modèle d'agilité de l'approche de GG et sur sa validation en peaufinant les définitions des concepts et de leurs relations dans le cadre du modèle par le biais d'études de modélisation et de simulation ainsi que par l'expérimentation contrôlée. Quand le modèle sera plus évolué, on pourrait faire l'essai de ses concepts au cours d'exercices en campagne et (ou) d'expériences contrôlées simulant une entreprise complexe.

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Executive summary

Analysis of Governance and Management (GM) approach agility during the Vancouver 2010 Olympic Games:

Marie-Eve Jobidon; Brenda M. Fraser; David Smith; Philip S. E. Farrell; DRDC Toronto TM 2011-124; Defence R&D Canada – Toronto; October 2011.

Background: The conduct of major operations, such as the Vancouver 2010 (V2010) Olympics, requires the interaction of various departments, organizations and actors. In order to deal with these complex endeavours effectively and efficiently, the collective of organisations must be able to adopt and transition to a Governance and Management (GM) approach that is appropriate for the complexity of the situation. Unforeseen or sudden changes in the environment – or "disturbances" – may increase the complexity of a situation, and require the collective to adopt a new GM approach.

The objective of this analysis was to determine whether evidence supporting the concepts defined in the GM approach agility model could be found in sources documenting the V2010 Olympics. The analysis focused on the Integrated Security Unit in charge of security for V2010, and consisted in reviewing and analysing documents pertaining to security operations over the three phases included in the model; that is, before, during and after the event.

Results: The analysis revealed evidence for most concepts in Phases 1 and 3 (before and after the Olympics). As there was no significant security disturbance during the V2010 Olympics that would have required GM approach agility, there was no potential for finding evidence for several of the concepts relevant to Phase 2 (during the event).

We introduced a new concept – the desired GM approach – to account for external forces that can influence the collective's sought-after approach.

Significance: Despite some limitations inherent to the nature of the analysis, evidence supports several of the concepts of the GM approach agility model. The analysis suggests that once validated, the model could be used as a tool for planning and analysing GM approach agility in major events.

Future plans: Future work should focus on further development and validation of the GM approach agility model by refining definitions of the concepts and their relations within the model using modeling and simulation studies as well as controlled experimentation. Once this has been completed, further analyses could be conducted on V2010 documentation to include all partners in the collective as well as on other large-scale joint operations. Once the model is more mature, its concepts could be tested in field exercises and/or controlled experiments simulating a complex endeavour.

Sommaire

Analysis of Governance and Management (GM) approach agility during the Vancouver 2010 Olympic Games:

Marie-Eve Jobidon; Brenda M. Fraser; David Smith; Philip S. E. Farrell; DRDC Toronto TM 2011-124; R & D pour la défense Canada – Toronto; Octobere 2011.

Contexte : La conduite d'opérations d'envergure, comme celles menées lors des Jeux olympiques de Vancouver 2010 (V2010), exige une interaction entre divers ministères, organisations et acteurs. Afin de composer avec efficacité et efficience avec ces entreprises complexes, le groupe d'organisations doit être capable d'adopter une approche de gouvernance et de gestion (GG) adaptée à la complexité de la situation. Des changements, ou des « dérangements » imprévus ou soudains peuvent rendre la situation encore plus complexe et demander au groupe d'adopter une nouvelle approche de GG.

L'analyse avait pour objet de déterminer si on pouvait recenser des preuves appuyant les concepts définis dans le modèle d'agilité de l'approche de GG dans les documents d'information sur les Jeux olympiques de V2010. L'analyse se concentrait sur le Groupe intégré de la sécurité, responsable de la sécurité pendant les Jeux de Vancouver 2010, et consistait à examiner et à analyser des documents portant sur les opérations de sécurité pendant les trois phases comprises dans le modèle, c'est-à-dire avant, pendant et après l'événement.

Résultats : L'analyse a permis de relever des éléments prouvant la plupart des concepts des phases 1 et 3 (avant et après les Olympiques). Comme il n'y a eu pendant les Jeux olympiques de Vancouver 2010 aucun dérangement sur le plan de la sécurité qui aurait exigé une approche de GG agile, il était improbable que l'on trouve des faits susceptibles d'étayer plusieurs concepts de la phase 2 (pendant l'événement).

Nous avons ajouté un nouveau concept pour décrire les approches de GG – l'approche GG désirée – pour tenir compte des forces extérieures pouvant influencer l'approche que le groupe d'organisations vise à atteindre.

Importance : En dépit de certaines limites inhérentes à la nature de l'analyse, des éléments viennent appuyer plusieurs des concepts du modèle d'agilité de l'approche de GG. L'analyse nous donne à penser que lorsqu'il sera validé, le modèle pourrait être utilisé dans la planification et l'analyse de l'agilité de l'approche de GG lors de la tenue d'activités d'envergure.

Recherches futures : Les travaux futurs devraient se concentrer sur la poursuite de l'élaboration du modèle d'agilité de l'approche de GG et sur sa validation en peaufinant les définitions des concepts et de leurs relations dans le cadre du modèle par le biais d'études de modélisation et de simulation ainsi que par l'expérimentation contrôlée. Ces travaux terminés, on pourrait poursuivre l'analyse de la documentation sur V2010 et l'étendre à tous les partenaires du groupe et à d'autres opérations conjointes de grande envergure. Quand le modèle sera plus évolué, on pourrait faire l'essai de ses concepts au cours d'exercices en campagne et (ou) d'expériences contrôlées simulant une entreprise complexe.

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1 Background

Major domestic and expeditionary operations typically require several players. It is common for operations to include: different levels of government, several government departments, international governments, and non-governmental actors. This occurs because no one agency has the staff or capability to successfully act on its own. This approach to operations is referred to as the Comprehensive Approach (CFJP, 2009). While the need for coalition, interagency, and joint operations is well acknowledged, they have an inherent cost: groups with different and potentially conflicting mandates, cultures, procedures, etc. have to work together to accomplish a joint mission. Organizational agility hopes to minimize these costs while maximizing effectiveness by employing a changing governance and management approach that is commensurate with changes in the circumstances (SAS-085, 2009).

The analysis reported in the present document focuses on the 2010 Vancouver Olympics. In February and March 2010, the city of Vancouver, British Columbia hosted the Olympic and Paralympic Winter Games (V2010). The Vancouver Organizing Committee (VANOC) for the 2010 Olympic and Paralympic Winter Games led Games operations, the Integrated Security Unit (ISU) led security operations, and Emergency Management British Columbia led public safety operations.

The aim of the ISU was "to provide for public safety and security at the Olympic venues located in the Vancouver and Whistler areas during the 2010 Vancouver Olympics and Paralympics. The ISU has two main tasks: 1) to maintain situation awareness of security and safety issues that arise during the Games, and 2) to respond to any incidents where assistance is required" (Goodwin, Essens, & Smith, 2011, pp. 25-26). This analysis examines whether evidence supporting a model of organizational agility could be found in reports documenting the V2010 security operations.

1.1 GM approach agility model

In order to deal with a complex endeavour such as domestic or expeditionary operations effectively and efficiently, a collective that comprises various departments, organizations and actors must adopt a Governance and Management[1] (GM) approach that is appropriate for the complexity of the situation (from which the required GM approach is derived). Unforeseen or sudden changes in the environment – or "disturbances" – can increase the complexity of a situation and require a change in GM approach. It has been suggested that GM approach agility is necessary for a collective to manage these changes successfully (see Farrell, 2011; Farrell & Connell, 2010 for a description of the GM approach agility conceptual model and definitions of the concepts associated with the model). A GM approach is defined by a specific combination of three dimensions in the GM approach space (SAS-065, 2010):

- Allocation of Decision Rights (ADR) to organizations that are part of the collective (varies from none to broad)

[1] Governance and Management (GM) is a concept similar to Command and Control (C2) but is meant to be more inclusive of non-military actors. GM and C2 are discussed further in Annex A.

- Distribution of Information (DI) among entities participating in the collective (varies from none to broad)
- Patterns of Interaction (PI) among participating entities (vary from tightly constrained to unconstrained)

Five GM approaches are defined based on possible combinations of these three dimensions:

- Conflicted[2]
- De-conflicted
- Coordinated
- Collaborative
- Edge

Of the five approaches defined by SAS-065 (2010), the three that appear most relevant for this analysis are de-conflicted, coordinated and collaborative. The goal of a de-conflicted GM approach is to avoid "adverse cross-impacts between and among the participants by partitioning the problem space. In order for entities to de-conflict their intents, plans, or actions, they need to be able to recognize potential conflicts and attempt to resolve them by partitioning across geography, function, echelon, and/or time" (p. 51).

The goal of a coordinated GM approach is "to increase overall effectiveness by (1) seeking mutual support for intent, (2) developing relationships and linkages between and among entity plans and actions to reinforce or enhance effects, (3) some initial pooling of nonorganic resources, and (4) increased sharing in the Information Domain to improve the quality of information" (SAS-065, 2010, p. 54).

The goal of a collaborative GM approach is "to develop significant synergies by (1) negotiating and establishing collective intent and a shared plan, (2) establishing or reconfiguring roles, (3) coupling actions, (4) rich sharing of non-organic resources, (5) some pooling of organic resources, and (6) increasing interactions in the Social Domain to increase shared awareness" (SAS-065, 2010, p. 36).

Because clear evidence was lacking for ADR, PI, and DI dimensions in the documents reviewed, these descriptions of goals were used in the analysis to infer which GM approaches were used during the V2010 Olympics.

As complex endeavours take place in dynamic environments, more than one GM approach might be required throughout the course of a given endeavour. Banbury, Kelsey, and Kersten (2011) proposed that complex endeavours have three main phases: before the event, during the event, and after the event. If significant disturbances occur during the event, one can further decompose this phase into just before the disturbance, during the disturbance, and immediately after the disturbance. Each phase and sub-phase may require different GM approaches, depending on the

[2] A parallel effort investigated GM agility for the 1972 Munich Olympics, and has recommended the term "Independent" that would include non-conflicting, conflicted, and anarchical GM Approaches (Banbury & Kelsey, 2011).

evolution of the situation complexity.[3] An agile collective should be able to transition from one GM approach to another as required, so as to cope with disturbances and achieve mission success.

The GM approach agility model posits that the collective can use various entity behaviours (learning, compensatory, anticipatory or adaptive) that will change the collective's parameters (i.e., size, resistance, and stiffness) allowing it to move from one GM approach to the next (Farrell, 2011; Farrell & Connell, 2010). During Phase 1 – before the event – the collective is likely to engage in learning and/or anticipatory behaviours. These behaviours aim to help the collective reach, maintain, and be comfortable with the ADR, DI, and PI values of the GM approach(es) required for the event. Learning behaviours can take such forms as training, exercises and education, while anticipatory behaviours could consist of contingency planning, mission analysis, etc.

In this first phase, anticipatory behaviours are focused on planning and development rather than execution. Contingency plans are developed to address various anticipated events based on expected situation complexity. It is important to note that if the collective anticipates incorrectly then compensatory behaviours may need to be employed.

It is also during this phase that the initial size of the collective emerges (e.g., number of people, resources, and budget). It is important to remember that since the collective operates in a dynamic environment, all of its characteristics and parameters can vary throughout the endeavour as required by changes in the situation complexity.

Time before the event can also be used by the collective to reduce potential resistance. Resistive variables internal (e.g., culture, procedures, trust) or external (bureaucracy, disruption in technology capability or energy supply) to the collective can impede its ability to move from one GM approach to another (Farrell, 2011). During this phase, one might observe evidence of resistive variables as well as evidence of the collective trying to minimize these variables.

During Phase 2, which takes place during the event, significant disturbances might occur that will change situation complexity, resulting in a shift to a new GM approach (see *Figure 1*). In that case, the collective will adopt new values of ADR, DI, and PI, and potential changes in size and resistance might also take place. Assuming that the GM approach adopted in Phase 1 is the "comfortable" GM approach, moving away from that approach may produce a restoring force that always pulls the collective back towards its "comfort zone". In other words, the collective should feel uncomfortable when adopting an alternative approach that they are not used to.

[3] Situation complexity refers to a combination of environmental complexity and "self" complexity. Environment complexity involves characteristics such as the stability and predictability of the situation, while "self" complexity includes characteristics related to the collective itself, such as the number of organizations within the collective with different values, cultures, norms, and languages, and the level of trust among members of the collective (SAS-065, 2010).

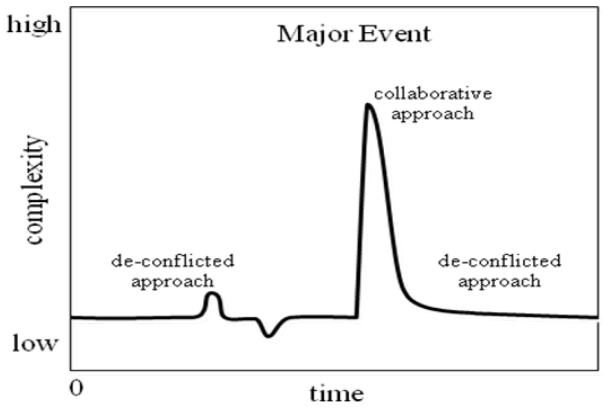

Figure 1: Hypothetical complexity profiles for a major event

During the second phase, entity behaviours can be:

- Compensatory: Aim to decrease the difference between the actual and the required GM approach by monitoring the transition in real-time (i.e., feedback) and making real-time decisions based on the difference.
- Anticipatory: Execution of the anticipatory measures planned in the first phase (e.g., contingency planning) as needed to reach the new GM approach.
- Adaptive: Aim to adapt the parameters of stiffness and resistance over time.

During all phases, but particularly the second phase, the collective may display signs of[4]:

- Robustness: "The ability to maintain effectiveness across a range of tasks, situations, and conditions".
- Responsiveness: "The ability to react to a change in the environment in a timely manner".
- Resilience: "The ability to recover from or adjust to misfortune, damage, or a destabilizing perturbation in the environment".
- Flexibility: "The ability to employ multiple ways to succeed and the capacity to move seamlessly between them".
- Adaptiveness: "The ability to change work processes and the ability to change the organization".
- Innovation: "The ability to do new things and the ability to do old things in new ways".

Farrell's GM approach agility model (2011) incorporates only robustness, responsiveness, resilience, and to some degree adaptiveness. If no significant disturbances occur, it is unlikely that any of these agility variables would be observable.

Phase 3 takes place once the event is over. At that point, organizations comprising the collective will likely go back to the pre-event GM approach (e.g., independent), unless they decide to adopt

[4] Taken from Alberts and Hayes (2003).

a new GM approach (e.g., de-conflicted). This is an opportunity to observe a transition from one approach to another. The third phase is also an opportunity for members of the collective to learn from the experience with the GM approach for the next event.

1.2 Scope and objectives of the analysis

The present analysis focused specifically on the ISU in charge of security for V2010. The Royal Canadian Mounted Police (RCMP) was tasked as the lead organization in providing security during the Games. Considering the magnitude of the operation, security efforts involved multiple entities in charge of different aspects of security, including several municipal and provincial police forces, civilian government departments, and the Canadian Forces (CF). The V2010 ISU constitutes an interesting and valuable focus for analyzing GM approach agility, as it involves a well defined collective in charge of security for a major international sporting event.

The goal of the analysis presented in this paper was to examine documents pertaining to operations during V2010 to determine if there is evidence that the concepts present in the GM approach agility model played a role in the Olympics. Hence, for each concept we attempted to find excerpts from the documents that seemed to reflect the concept.

The analysis was not an attempt to validate the model, as that would entail quantifying the model's parameters and determining if the model's predictions are accurate. Instead, we attempted to determine if the conceptual elements of the model are represented in accounts of how the ISU operated.

2 Methodology

As mentioned above, the aim of this analysis was to determine whether there is evidence that the concepts defined in the GM approach agility model were present at the V2010 Olympics, specifically in the three main phases of the model:

1. Before the event
2. During the event
3. After the event

The following section describes the data collection and analysis methodology, which includes identification of data sources, defining the collective and the analysis method.

2.1 Sources of information

Based on availability and classification, the following eight reports were used as a basis for evidence in this analysis:

- 3350-1 (DCOS ops) (August 2010). *Canada Command Joint Task Force Games Post-Operations Report – Op PODIUM*.
- Billyard, A., & Collin, I. (2008). *Vancouver 2010 Olympics – Identifying CF communication issues associated with the CH-146 acting as an interceptor* (Secret). Defence R&D Canada – CORA TM 2008-064. Ottawa, Canada.
- Carson, N., & Caron, J. (2010). *Vancouver 2010 Winter Olympics – Intercept and engagement platform option analysis* (Secret). Defence R&D Canada – CORA TM 2010-118. Ottawa, Canada.
- Carson, N., Caron, J., & Bourdon, S. (2010). *Vancouver 2010 Winter Olympics – A spatial and temporal analysis of the asymmetric air threat* (Secret). Defence R&D Canada – CORA TR 2010-119. Ottawa, Canada.
- Goodwin, G. F., Essens, P. J. M. D., & Smith, D. (2011). Multiteam systems in the public sector. In S. J. Zaccaro, M. A. Marks, & L. DeChurch (Eds.), *Multiteam systems: An organization form for dynamic and complex environments* (Part I: Introduction). New York: Routledge Academic.
- Genik, L., & Smith, D. G. (2011). Command and control analysis of the South West Provincial Regional Emergency Operations Centre during Vancouver 2010. *Proceedings of the 16th International Command and Control Research and Technology Symposium*, Québec City, Canada.
- Smith, D. G., & Maceda, G. E. (2010). *Strategies for ad-hoc data collection and analysis during major event interagency exercises and operations*. Paper presented at Knowledge Systems for Coalition Operations 2010, Vancouver, Canada.

- Smith, D. G., McLellan, L., & Hobbs, D. (2010). *Cultural differences between the Canadian Forces and the Royal Canadian Mounted Police*. Paper presented at the NATO Workshop on Collaboration in a Comprehensive Approach to Operations, Toronto, Canada.

The majority of the evidence was extracted from the 3350-1 Canada Command Joint Task Force Games (JTFG) report. One of the challenges in compiling evidence from the JTFG report as well as several of the other papers and reports is that they are heavily CF focused. Though the CF was part of the collective, they were not the collective as a whole. As a result, we extrapolated the CF focused evidence to the collective when possible.

2.2 Defining the collective

The ISU for V2010 was led by the RCMP and was comprised of the following organizations:

- RCMP
- CF
- Vancouver Police Department (VPD)
- West Vancouver Police Department (WVPD)

Several liaison officers were also employed in the ISU to coordinate with other organizations or teams not included in the ISU (e.g., North American Aerospace Defense Command, Public Safety Canada, Emergency Management British Columbia) but these outside teams were not considered part of the ISU.

2.3 Extracting evidence

In order to determine whether evidence was present in each phase, the first two authors classified any relevant quotations into a particular phase and concept (see *Table 1*). This process was repeated for each document resulting in a final Excel spreadsheet. After completing the spreadsheet, a table was created for each phase to summarize the evidence (or lack thereof) found for each concept in the model (see **Results** section). If sufficient evidence existed for a given variable, a value was inferred and entered into the last column of the table (see *Tables 2*, *3* and *4*).

Table 1: Data collection template

Phase	Concept	Source	Page / Para	Evidence
1	Resistance	JTFG report	p. 16 (para 35)	Significant cultural differences existed between the CF and our security partners for this operation. These differences included such things as: the use of terminology, overtime pay, training, environmental clothing, alcohol, discipline and expectations of comfort (hot food and hotel-type accommodations).

3 Results

The results are presented by phase: before (Phase 1), during (Phase 2) and after the event (Phase 3). During each phase, one could potentially find evidence of four types of GM approaches (required, desired, comfortable, and actual), three key parameters (size, resistance, and stiffness), and four entity behaviours (compensatory, anticipatory, adaptive, and learning). A check mark (√) indicates that support for the concept/variable was found in the documents.

The tables below summarize the evidence supporting the concepts defined in the model. When possible, the variable values were inferred from evidence found in the documents. One should note that the inferred values for the GM approaches were based on the goal definitions described in the introduction (de-conflicted, coordinated, and collaborative), rather than from inferred levels of ADR, DI, and PI.

3.1 Phase 1: Before the event

Table 2: Summary of support found for GM approach agility concepts during Phase 1

Phase 1: Before the Event			
Concept	**Collective**	**CF**	**Variable Value (Inferred)**
Required GM Approach	√	√	Between de-conflicted and collaborative
Desired GM Approach	√	√	Collaborative
Comfortable GM Approach			
Actual GM Approach	√	√	Between de-conflicted and collaborative, closer to coordinated
Allocation of Decision Rights	√	√	
Distribution of Information	√	√	
Patterns of Interaction	√	√	
Size	√	√	RCMP, CF, VPD, WVPD
Resistance	√	√	Resistive variables include: government policy, organizational culture differences
Stiffness			
Compensatory			
Anticipatory	√	√	Contingency planning
Adaptive			
Learning	√	√	Training exercises

Required GM approach: Recall that the required GM approach is directly related to the situation complexity. Also, note that situation complexity can be divided into two aspects: complexity in the environment and complexity in self (SAS-065, 2010). Phase 1 occurs before the start of the Games but includes exercises and other preparations. It is inferred that during Phase 1, the required GM approach was somewhere on the continuum between de-conflicted and collaborative (assuming a direct relationship between situation complexity and required GM approach).

Desired GM approach: Although not originally part of the model, the authors noted that V2010 operations were partially driven by the desire to reach a certain approach. There can be forces outside the collective that influence the sought-after approach (e.g., political influences). The documents indicate that the entities of the collective were directed to adopt a collaborative GM approach. That is, the ISU was intended as a means to carry out security operations as an integrated interagency team. This introduces a new concept to describe GM approaches, named the desired GM approach. Ideally, the desired GM approach should be identical to the required GM approach. However, this was not the case for the ISU; the required GM approach was probably between de-conflicted and collaborative while the desired GM approach was collaborative. This difference may potentially lead to decreased GM approach effectiveness and efficiency.

Actual GM approach: The evidence suggests that the actual GM approach went from de-conflicted to somewhere around coordinated. The Government of Canada gave guidance to the collective as to the level of cooperation it should achieve (the desired GM approach), which was a powerful forcing function that aided in moving the actual GM approach towards collaborative. However, it seems that the collective achieved a level close to coordinated by the end of the exercise phase and the start of the Olympics.

ADR: We found evidence of ADR at the strategic level; that is, the RCMP was tasked as the lead agency of the ISU and other organizations were supporting entities. However, there was no evidence in the documents reviewed of the specific allocation of decision rights at the operational level.

PI: Although the collective tried to build ties between the various organizations prior to the Olympics (Phase 1) through several exercises, evidence indicates that the interactions were hampered by a complex command structure. For instance, there were four CF commands operating in the Joint Operations Area, which created interaction challenges for the other members of the collective.

DI: There was no evidence from the source documents to determine how information was distributed specifically.

Comfortable GM approach: The model refers to a position in the GM approach space with which the collective is most comfortable. In Canada, there exists legislation and policy that clearly lays out the jurisdiction of each security organization. Indeed, these organizations have similar goals and areas of operation that create a need for cooperation and sharing of information but could also potentially lead to conflict. However, conflict is minimized by operating within well-defined mandates and geographical boundaries. Although Canadian security organizations function at a de-conflicted level in day-to-day operations, it is not possible to know whether it is their

comfortable GM approach as we did not find evidence in the documents that would allow us to infer values for any of the phases.

Size: The collective was comprised of RCMP, CF, VPD, and WVPD.

Resistance: The analysis revealed various types of resistance. For instance, there were significant cultural differences among the organizations of the collective. Some of the differences included discipline, terminology, and treatment of overtime, training, and work conditions. These differences create a challenge for interoperability since the same instructions may be treated differently by the various organizations. This, at times, had a negative impact on the passage of information among partners as well as the ease at which they interacted with one another. There were a number of times that conscious efforts were made to reduce the presence of resistive variables. It is difficult to comment on the resisting forces as the collective moved from somewhere around de-conflicted to somewhere around coordinated because the resistive elements where changing at the same time. Based on the model, this is a classic example of adaptation.

Entity behaviours: Evidence for learning (exercises) and anticipatory (planning and contingency planning) behaviours were found. A key learning behaviour was to hold Whole of Government training exercises. During these exercises, multiple organizations had a chance not only to train on their tasks but also to experience interacting with one another and establish interoperability. Anticipatory behaviours took the form, among other things, of contingency planning through red teaming efforts. As stated above, some evidence of adaptive behaviours were noted in the documents reviewed; that is, the collective minimized resistive variables while they transitioned from de-conflicted to coordinated.

It was noted in the Canada Command JTFG report (2010) that the CF had not incorporated previous experience in a similar operation (Operation GRIZZLY; G8 Summit in Alberta, 2002) into current doctrine and procedures. This led to a situation where organizational experience was not exploited; hence, new procedures had to be created when suitable procedures may have already been established and tested in past operations.

3.2 Phase 2: During the event

Table 3 indicates support for the model's concepts during Phase 2. One aspect of the model is that several concepts are contingent on the occurrence of a significant disturbance in Phase 2, requiring the collective to transition from one approach to another. However, there was no significant disturbance during the V2010 Olympics (such as a terrorist attack or a major natural disaster) so there was no potential for finding evidence for several of the concepts of that phase (e.g., compensatory, adaptive, anticipatory, stiffness, and resistance).

Required GM approach: During the actual event, the Games were planned and conducted to be safe and secure – everything from access passes to vehicle traffic control was carefully predetermined, planned, and executed to plan. The Olympics ran smoothly with no significant security issues. That is, the situation complexity was relatively low since no major security-related events took place. Thus, the required GM approach was likely closer to de-conflicted than coordinated.

Desired GM approach: There was no evidence to suggest that the desired GM approach had changed during this phase. The expectation was that the ISU would operate at a collaborative level.

Table 3: Summary of support found for GM approach agility concepts during Phase 2

Phase 2: During the Event			
Concept	**Collective**	**CF**	**Variable Value (Inferred)**
Required GM Approach	√	√	Between de-conflicted and coordinated
Desired GM Approach	√	√	Collaborative
Comfortable GM Approach			
Actual GM Approach		√	Between de-conflicted and collaborative, closer to coordinated
Allocation of Decision Rights			
Distribution of Information	√		
Patterns of Interaction			
Size	√	√	Increase in collective personnel on the ground
Resistance			
Stiffness (Restoring Force)			
Compensatory			
Anticipatory			
Adaptive			
Learning			

Actual GM approach: While the collaborative GM approach appeared to be the goal, evidence indicates that the actual GM approach was closer to coordinated. For instance, the collective did not have one single plan but rather the entities synchronized their respective plans.

DI: There was a desire for a level of information sharing that would be found between the coordinated and collaborative GM approach but this was not fully achieved. For instance, a single secure network was created for the Olympics but was not fully exploited. Also, the CF and police forces have legislated responsibilities that require them to protect certain kinds of information.

Comfortable GM approach: There was no evidence in the documents that would allow inferring values for the comfortable GM approach.

Size: The size of the collective increased at the beginning of Phase 2 as security personnel on the ground came on strength for the event.

Resistance: There was no opportunity to seek evidence for resistance because there was no security incident that would have required the collective to transition from one approach to another.

Entity behaviours: Because there was no significant disturbance and therefore no need to transition from one approach to another, there was no opportunity to identify compensatory, anticipatory, or adaptive behaviours in the documents.

3.3 Phase 3: After the event

Table 4: Summary of support found for GM approach agility concepts during Phase 3

Phase 3: After the Event			
Concept	**Collective**	**CF**	**Variable Value (Inferred)**
Required GM Approach		√	Likely de-conflicted
Desired GM Approach	√	√	Between de-conflicted and coordinated
Comfortable GM Approach			
Actual GM Approach		√	Between de-conflicted and coordinated
Allocation of Decision Rights			
Distribution of Information			
Patterns of Interaction			
Size			
Resistance			
Stiffness			
Compensatory			
Anticipatory			
Adaptive			
Learning	√	√	

Note. The grey areas indicate concepts are not applicable to this phase.

Required GM approach: The ISU was required to return to normal operations as dictated by government legislation. That is, the required GM approach was likely de-conflicted (see *Table 4*).

Desired GM approach: Evidence suggests that the desired GM approach was somewhere between de-conflicted and coordinated. For instance, the CF expressed the intent to maintain the relationships built during the Olympics with regional and provincial security partners.

Actual GM approach: Since all but one document reviewed were written before the end of the V2010 Olympics and the lone document did not discuss the post-Olympics level of collaboration

between members of the collective, there is no evidence to indicate what the actual GM approach was in Phase 3. Given that the collective dispersed following the Games, the GM approach in Phase 3 was likely somewhere between de-conflicted and coordinated (i.e., they did not remain at the GM approach level that they achieved during the Olympics).

Comfortable GM approach: There was no evidence in the documents that would allow inferring values for the comfortable GM approach.

Size, Resistance and Stiffness: There was no evidence in the documents regarding resistance and stiffness during this phase. With regards to size, the ISU stood down and the collective dispersed.

Entity behaviours: As expected, there were no signs of compensatory, anticipatory, or adaptive behaviours during Phase 3. However, there was evidence of intent to incorporate learning behaviours in preparation for other events (e.g., implementing an exercise plan for future events similar to the one conducted for the V2010 Olympics).

Figure 2 provides a summary of the approach(es) that the collective adopted during each phase. It is constructed from the inferred values discussed in this section and it illustrates the notion of movement within the GM approach space. Note that the desired GM approach is a force that has the potential to affect the actual GM approach. The double ellipses in Phase 1 reflect the significant change in the collective from the beginning of that phase (i.e., when the ISU was created and members of the collective were still interacting in a day-to-day manner) to the end of Phase 1 (when the collective was operationally ready for the Olympics).

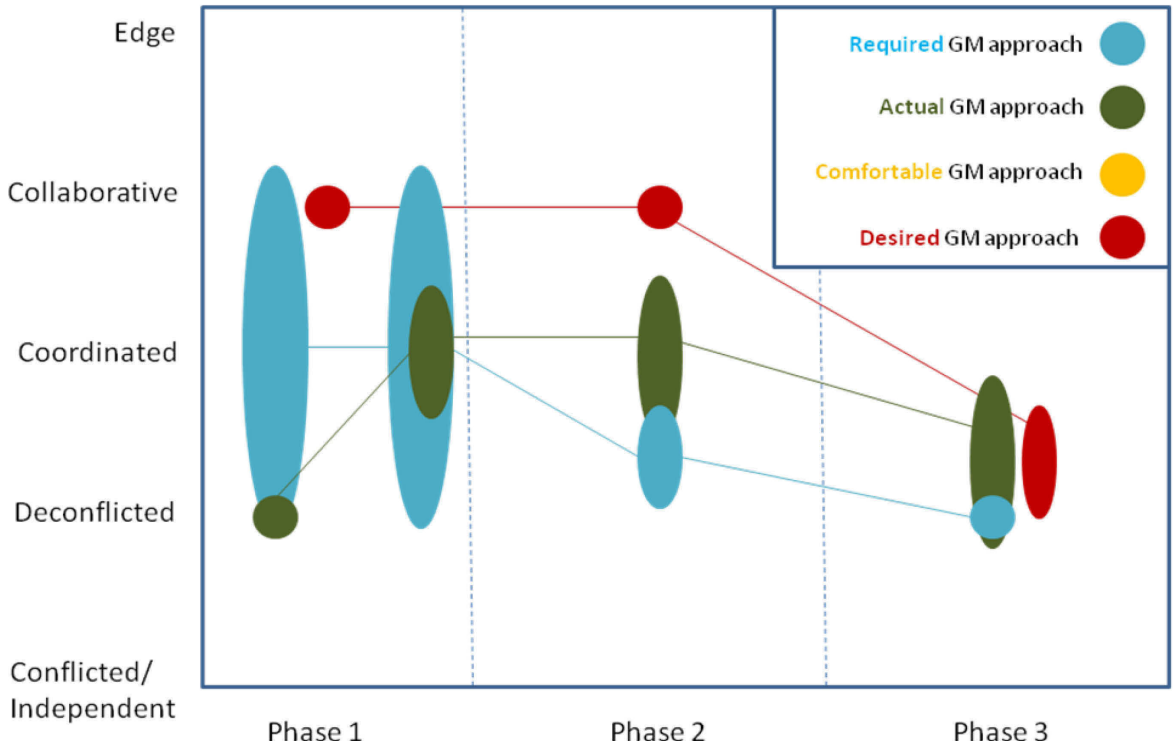

Figure 2: Inferred value of the GM approach(es) adopted by the collective throughout the V2010 Olympics in the GM approach space.

3.4 GM approach effectiveness and efficiency

Ideally, the GM approach is one hundred percent effective when the required and actual GM approaches match. For example, one can see from *Figure 2* that the required and actual GM approaches do not match completely during Phase 2, although there is some overlap. That is, the actual GM approach is at a higher level than required for the situation. Thus, the inference is that the GM approach was only somewhat effective. It could also be inferred that the GM approach was not as efficient as it could have been, since GM approach efficiency is a function of GM approach effectiveness and cost. In this case, cost can be measured by the amount of monetary, human, and physical resources it took to implement the V2010 Olympics security operations.

When undertaking a complex endeavour, such as the V2010 Olympics, a responsible and accountable government needs to prepare for "worst-case" scenarios. Though the model posits that the actual and required GM approaches should match for optimal effectiveness, a security collective may need to operate at a higher GM approach level than actually required during the event. Indeed, there is a cost with moving from one approach to another as well as a cost with operating at a different level than required. From a cost-benefit perspective, it is possible that operating consistently at a single GM approach throughout the event might be preferable than adjusting the GM approach as needed. The implication is that the conceptualization of GM

approach agility may be too rigid. Instead of trying to match the required and actual GM approaches, it may be more efficient for the collective to try and determine (e.g., through risk analysis) the boundaries of low and high situation complexity that they might encounter throughout an event and strive to operate at the median GM approach.

3.5 Limitations

Our ultimate goal was to determine if evidence for the concepts of the model could be found in reports documenting real-life operations. The current analysis however is limited to the materials made available to us and the particular circumstances around the Olympics. That is, the fact that we had limited materials impacted the scope of the analysis as most of the documents we reviewed were written for or by the CF. We were also unable to do a full analysis of the concepts in Phase 2 because there was no significant disturbance.

The nature of the analysis itself has certain limitations. For instance, the lack of evidence for a given concept does not necessarily entail that this concept was not present but that it may not have been documented in the materials. Similarly, whether the data were classified as evidence for a concept was a subjective process. Hence, there is a possibility that a given piece of evidence could be interpreted differently by others.

The method used to gather evidence was indirect: We analyzed reports documenting security operations rather than observing the operations themselves. The reports are subject to any number of biases and limitations due to the authors of the reports, their view of the actual events, and the audience for which the reports were intended.

The reader should note that the GM approach agility model is still in a state of evolution. Therefore, a number of concepts and their relations to one another are not yet fully defined. For example, it is not clear how to assess GM approach effectiveness and efficiency if a coordinated GM approach is adopted but only a de-conflicted GM approach is required.

4 Conclusion and future work

Security during the Vancouver 2010 Olympics required the interaction among multiple organizations. The ISU was created as a large-scale effort to integrate all of the defence and security partners involved. The analysis reported herein was an attempt to determine if evidence supporting the concepts described in the GM approach agility model could be found in relevant sources documenting security operations throughout the V2010 Olympics.

To account for external forces (e.g., political influences) that can influence the collective's sought-after approach, we introduced a new concept to describe GM approaches named the desired GM approach. Ideally, the desired GM approach should be identical to the required GM approach. A difference between desired and required GM approaches may lead to decreased effectiveness and efficiency.

We found evidence of most concepts in Phases 1 and 3; that is, before and after the Olympics. As there was no significant disturbance during the event (Phase 2) that would have required GM approach agility, there was no potential for finding evidence for several of the concepts in that phase.

The established jurisdictions and mandates for Canadian security organizations suggest that prior to the V2010 Olympics the organizations that would form the ISU were working at a de-conflicted level. The ISU had guidance to adopt a collaborative GM approach; however, the analysis indicates that the actual GM approach achieved was closer to a coordinated one. Following the Olympics, some members of the collective expressed the desire to adopt an approach on the continuum between de-conflicted and coordinated ("enriched" de-conflicted GM approach).

Despite some limitations, there is evidence for many of the concepts in the reports reviewed. The analysis provides a way forward for further development of the GM approach agility model. Future work should focus on refining definitions of the concepts and their relations within the model using modeling and simulation studies as well as controlled experimentation. Once this has been completed, further analyses could be conducted on the V2010 Olympics to include all partners in the collective (i.e., RCMP, VPD, and WVPD) as well as on other large-scale joint operations (e.g., G8/G20). Finally, once more mature, the model and its concepts could be tested in field exercises and/or controlled experiments simulating a complex endeavour where disturbances can be manipulated. This would remove some of the limitations of the current analysis; specifically, it would be possible to observe participants directly and to collect their opinions.

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Annex A Governance and Management (GM) versus Command and Control (C2)

Command and Control (C2) is a term commonly used in a military context. While Governance and Management (GM) is a similar concept, GM and C2 are not exact equivalents. GM may be a more appropriate term for operations that include both military and non-military partners.

There are several definitions of C2:

- "The exercise of authority and direction by a designated commander over assigned forces in the accomplishment of the force's mission. The functions of command and control are performed through an arrangement of personnel, equipment, communications, tactics and procedures when are employed by a commander in planning, directing, co-ordinating and controlling forces in the accomplishment of the mission" (NATO, 1988).
- "The exercise of authority and direction by a properly designated commander over assigned and attached forces in the accomplishment of the mission..." (Defense Technical Information Center. Department of Defense Dictionary of Military and Associated Terms. Joint Publication 1-02).
- "Command and Control is about focusing the efforts of a number of entities (individuals and organizations) and resources, including information, toward the achievement of some task, objective, or goal." (Alberts & Hayes, 2006).
- "The establishment of common intent to achieve coordinated action." (Pigeau & McCann, 2000, 2002).

These definitions include notions of authority, direction, focusing efforts and resources towards goal achievement, and the establishment of common intent to achieve coordinated action. The equivalent notions for non-military organizations might be summed up as the management of an event, where senior management sets the vision and mission of the organization and middle management manages resources (people, money, equipment, information, etc.) in order to carry out the mission and realize the vision.

Governance is the policies, business rules and regulations that regulate, limit, or constrain the organization as they move towards the vision. The Carver governance model promotes governance by limitation – as opposed to regulation (Oliver, 2009). For a sports team, management would include the front office, the coaches, and even the individual team members who manage the flow of the game in real time. Governance would be the rules of the game, and those officials who enforce the rules. The notion of governance is not explicit in C2 definitions per se. However, there are extensive sets of rules and regulations that govern the operations (e.g., rules of engagement, international law).

Thus, GM seems to be an appropriate construct that would be applicable to both military and non-military organizations.

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List of symbols/abbreviations/acronyms/initialisms

ADR	Allocation of Decision Rights
C2	Command and Control
CF	Canadian Forces
DI	Distribution of Information
DRDC	Defence R&D Canada
GM	Governance and Management
ISU	Integrated Security Unit
JTFG	Joint Task Force Games
PI	Patterns of Interaction
RCMP	Royal Canadian Mounted Police
VANOC	Vancouver Organizing Committee
VPD	Vancouver Police Department
V2010	Vancouver 2010
WVPD	West Vancouver Police Department

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The conduct of major operations, such as the Vancouver 2010 (V2010) Olympics, requires the interaction of various departments, organizations and actors. In order to deal with these complex endeavours effectively and efficiently, the collective of organisations must be able to adopt and transition to a Governance and Management (GM) approach that is appropriate for the complexity of the situation. Unforeseen or sudden changes in the environment – or "disturbances" – may increase the complexity of a situation, and require the collective to adopt a new GM approach. The objective of the analysis presented in this report was to determine whether evidence supporting the concepts defined in the GM approach agility model could be found in sources documenting the V2010 Olympics. The analysis focused on the Integrated Security Unit in charge of security for V2010, and consisted in reviewing and analysing documents pertaining to security operations before, during, and after the Olympics. The findings revealed evidence for several of the concepts of the GM approach agility model. A new concept to describe GM approaches – the desired GM approach – was added to the model to account for forces outside the collective that can influence the sought-after approach. Future work should focus on further development and validation of the GM approach agility model by refining definitions of the concepts and their relations within the model using modeling and simulation studies as well as controlled experimentation. Once the model is more mature, its concepts could be tested in field exercises and/or controlled experiments simulating a complex endeavour.

La conduite d'opérations d'envergure, **comme** celles menées lors des Jeux olympiques de Vancouver 2010 (V2010), exige une interaction entre divers ministères, organisations et acteurs. Afin de composer avec efficacité et efficience avec ces entreprises complexes, le groupe d'organisations doit être capable d'adopter une approche de gouvernance et de gestion (GG) adaptée à la complexité de la situation. Des changements, ou des « dérangements » imprévus ou soudains peuvent rendre la situation encore plus complexe et demander au groupe d'adopter une nouvelle approche de GG. L'analyse présentée dans ce rapport avait pour objet de déterminer si on pouvait recenser des preuves appuyant les concepts définis dans le modèle d'agilité de l'approche de GG dans les documents d'information sur les Jeux olympiques de V2010. L'analyse se concentrait sur le Groupe intégré de la sécurité, responsable de la sécurité pendant les Jeux de Vancouver 2010, et consistait à examiner et à analyser des documents portant sur les opérations de sécurité menées avant, pendant et après les Olympiques. Les résultats démontrent la présence de plusieurs des concepts du modèle d'agilité de l'approche de GG. Un nouveau concept décrivant les approches de GG – l'approche GG désirée – a été ajouté au modèle afin de tenir compte des forces extérieures au groupe pouvant influencer l'approche visée par le groupe. Les recherches futures devraient se concentrer sur la poursuite de l'élaboration du modèle d'agilité de l'approche de GG et sur sa validation en peaufinant les définitions des concepts et de leurs relations dans le cadre du modèle par le biais d'études de modélisation et de simulation ainsi que par l'expérimentation contrôlée. Quand le modèle sera plus évolué, on pourrait faire l'essai de ses concepts au cours d'exercices en campagne et (ou) d'expériences contrôlées simulant une entreprise complexe.

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Command and control; governance and management; Vancouver 2010 Olympics; organizational agility; Canadian Forces

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