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The difficulty to document agility evidences from a C2 perspective

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Name of Author(s):

Micheline Bélanger

Point of Contact:

Micheline Bélanger

Name of Organization:

DRDC Valcartier

Complete Address:

2459 Pie-XI Nord, Québec, QC, CANADA, G3J 1X5

Telephone:

(418) 844-4000, x.4734

E-mail Address:

Micheline.Belanger@drdc-rddc.gc.ca

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The difficulty to document agility evidences from a C2 perspective

Micheline Bélanger

Defence Research and Development Canada – Valcartier
2459 route de la Bravoure, Québec, Québec, Canada, G3J 1X5
micheline.belanger@drdc-rddc.gc.ca

Abstract:

Agility can be defined as the capability to successfully effect, cope with and/or exploit changes in circumstances. Based on this definition, NATO SAS-085 has proposed a conceptual model of C2 agility, making the distinction between C2 approach agility (the agility a specific C2 approach), and C2 agility (the capacity to go from one C2 approach to another C2 approach). This paper presents a C2 agility case study and proposes some explanations about the difficulty to document evidences of C2 agility in military operations.

Section 1: Introduction

All military operations have to deal with unexpected events. In fact, one of the constant that military officers have to face is the impossibility to predict how the situation will evolve. While time goes by, the objectives, affiliation and capabilities of the different actors (friendly, adversary or neutral) change leading to fuzzy battlefield boundaries from different panes (moral, geographical or cyber). Furthermore, due to the tempo of the evolution of the situation, time and information are often insufficient to develop a full understanding of the situation.

NATO Research and Technology Organisation (RTO) Studies Analysis and Simulation (SAS) panel 065 characterizes these situations as complex endeavours (Alberts and al. 2010). Such endeavours are “distinguished by one or more of the following characteristics:

1. The number and diversity of participants is such that
 - a. there are multiple interdependent chains of command,
 - b. the intents and priorities of the participants conflict with one another or their components have significantly different weights, or
 - c. the participants’ perceptions of the situation differ in important ways; and
2. The effects space spans multiple domains and there is
 - a. a lack of understanding of networked cause and effect relationships
 - b. a resulting inability to accurately predict all of the relevant effects that are likely to arrive from alternative courses of action, and therefore,
 - c. a lack of ability to appropriately react to undesirable effects by making timely decisions, developing appropriate plans, and taking the necessary actions.”

Many of today's operations can be characterized as having a high degree of complexity, dynamics, and uncertainty. In such situation, military organizations have to find out and execute, in real-time, new ways and means to achieve the desired end state. Accordingly, Canadian Forces have identified that more agile organizations will be required to be responsive to defence and Government of Canada priorities in future security environments (National Defence 2008).

In 2001, Alberts and al. have documented some of the components that would make an organization more agile (Alberts and al., 2001). In their book *Power to the Edge*, Albert and Hayes (2003) talk about key dimensions of agility that are represented by the synergistic combination of the 6 following attributes: robustness, resilience, responsiveness, flexibility, innovation and adaptation: (Alberts & Hayes, 2003)

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

Force agility has been studied in different works such as in Alberts and Hayes, 2003 and Atkinson and Moffat, 2005. This concept mainly refers to the capacity of maintaining an acceptable level of effectiveness in the face of changing circumstances. In their work, NATO SAS-085 has defined the concept of agility as the capability to successfully effect, cope with and/or exploit changes in circumstances SAS-085 (Alberts 2011). They reviewed the attributes of agility and replaced the concept of robustness by the concept of versatility. While involving the achievement of a satisfactory state or an acceptable level of performance which should contribute to mission's success, demonstration of agility at one point of the mission does not necessarily assure the overall mission's success. However, it might be expected that if a force is behaving as an agile organization, this should lead to improved mission's success.

The concept of agility may be associated to entities such as individual, collection of individuals, organizations, as well as processes and technologies. One can assume that the best chances of demonstrating agility will be if we have agile entities, agile processes and agile technologies. While each one of these subjects is an area of research, this paper focuses on looking for evidences of agility in the main process of military operations, i.e. Command and Control (C2). This paper describes the different C2 approaches and how these approaches can be linked to the concept of agile C2. Then, using a case study, we are documenting some evidences of C2 agility and try to explain the difficulty to identify them in the selected case study.

Section 2: Approach

One of the key processes of military operations is the Command and Control. Command and Control has been defined (McCann and Pigeau, 1999) as the establishment of common intent to achieve coordinated action. This can be realized through:

- Gain situation awareness;
- Plan (develop Courses of Actions (COAs));
- Share and synchronize a plan (COA) across the organization;
- Control, synchronize and monitor the execution.

In a nutshell, 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 and Hayes, 2006)

NATO SAS-065 identified five classes of C2 approaches in their maturity model. They are (Alberts and al. 2006):

- Conflicted C2: There is no collective C2. Each entity is working independently of the collective;
- De-Conflicted C2: The entities of the collective C2 are trying to de-conflict their intents, plans or actions. The aim is to avoid negative impacts between and among the entities. Accordingly, they first need to recognize potential conflicts. Partitioning of activities, space, time and/or resources may be one approach to resolve the conflicts;
- Coordinated C2: The entities consider the increase of the overall collective effectiveness. This involves the development of some common intent leading to an agreement about linking actions in the various plans developed by the different entities;
- Collaborative C2: The entities are looking to maximize overall collective effectiveness. This involves the collaborative development of a shared single plan that will achieve common intent;
- Edge C2: The entities are engaged to the collective effectiveness. This involves self-synchronisation of the collective as well as self-organisation of each entity to achieve common intent.

C2 tasks and capabilities associated to these C2 approaches can be identified as: (Alberts and al. 2006)

- Conflicted C2:
 - No specific C2 tasks;
 - No specific capabilities;
- De-Conflicted C2:
 - C2 Tasks Required: Identification of potential conflicts and resolution of conflicts by establishing constraints and/or boundaries;
 - Capabilities Required: Limited communications involving limited individuals and limited information exchanges restricted to constraints and seams (strict Information Exchange Requirements (IER) on a need-to-know basis);

- Coordinated C2:
 - C2 Tasks Required: Development of a limited degree of common intent and development of links between and among individual plans and actions;
 - Capabilities Required: Establishment of a coordination process. Requires sufficient communications, information-related capabilities involving the appropriate individuals, and necessary information exchanges (fixed IERs on a need-to-know basis);
- Collaborative C2:
 - C2 Tasks Required: Development of common intent, shared understanding and trust, development of a single integrated plan, and parallel development of entities' plans that are synchronized with the overall plan. The different entities' resources are being used for the benefit of the mission;
 - Capabilities Required: Establishment of a set of collaborative processes, supported by a sufficiently robust and extensively distributed collaborative environment available to all appropriate individuals and organisations. A high degree of interoperability in all domains needs to be achieved in order to develop sufficient levels of shared awareness and understanding (dynamic IERs on a need-to-share basis);
- Edge C2:
 - C2 Tasks Required: Development of shared intent, awareness, and understanding;
 - Capabilities Required: Development of a rich, shared understanding of the common intent as well as the different entities. Self-synchronisation of the collective, self-organisation of each entity. Power to the Edge principles and associated doctrine must be adopted, supported by a robust, secure, ubiquitous, interoperable, info-structure that extends to all participating entities (dynamic IERs on a need-to-share basis).

To better characterize the proposed C2 approaches, 3 dimensions have been identified. They are: (Alberts and al. 2006)

- Allocation of decision rights: The allocation of the rights to be exercised by the entities. The allocation of the rights can be explicit, implicit or emergent;
- Patterns of Interaction : Patterns of interaction between and among participating entities;
- Distribution of Information: The information needed to accomplish required tasks is available to each participant.

Then for each C2 approach, the characteristics of the dimension have been described: (Alberts and al. 2006)

- Conflicted C2 :
 - No distribution of information between or amongst entities;
 - All decision rights remain within each of the entities;
 - No interaction between or among the entities. All interactions occur between and among individuals within some entity;

- De-Conflicted C2:
 - Limited information sharing (episodic interactions);
 - Delegation of those decision rights that are necessary to ensure de-confliction (participating entities agree not to act in a manner that violates any agreed upon constraint);
 - Limited interactions;
- Coordinated C2:
 - Significant amount of information sharing (broader dissemination);
 - Richer set of interactions, both formal and informal (relative to those required for de-confliction), among those in the various elements that are involved in establishing intent and developing plans. While the interactions required may be quite frequent, they do not approach continuous interaction;
 - Delegation of decision rights that are associated with the coordination process and the implementation of agreements that are a result of establishing a common intent and linked plans;
- Collaborative C2:
 - Very frequent interactions, indeed approaching continuous interactions between/among identified individuals/organisations;
 - Richer and more extensive interchange in both the information and cognitive domains, is required to establish shared understanding and the development of a single shared plan;
 - Considerable amount of delegation of decision rights to the collective. However, once common intent has been established and an integrated plan has been developed, the collective “delegates” back to the entities—the rights to develop supporting plans and to dynamically adjust these plans collaboratively;
- Edge C2:
 - Extensive sharing of information. The resulting distribution of information is emergent as a function of the emergent decision-related and interaction related behaviours;
 - Rich and continuous interactions. In Edge C2, patterns of interaction are dynamic and reflect the confluence of mission and circumstances;
 - The rights to decisions are broadly distributed even when it appears that decisions are being made by a limited set of individuals or entities. This is because other entities maintain their decision rights.

NATO SAS-065 recognizes the difficulty to draw precise boundaries between De-Conflicted, Coordinated, and Collaborative C2 (illustrated in Figure 1 by dashed lines).

C2 Approach	Allocation of Decision Rights to the Collective	Patterns of Interaction Among Participating Entities	Distribution of Information (Entity Information Positions)
Edge C2	Not Explicit, Self-Allocated (Emergent, Tailored, and Dynamic)	Unlimited As Required	All Available and Relevant Information Accessible
Collaborative C2	Collaborative Process and Shared Plans	Significant Broad	Additional Information Across Collaborative Areas/Functions
Coordinated C2	Coordination Process and Linked Plans	Limited and Focused	Additional Information About Coordinated Areas/Functions
De-Conflicted C2	Establish Constraints	Very Limited Sharply Focused	Additional Information About Constraints and Seams
Conflicted C2	None	None	Organic Information

Table 1: Variables Defining Collective C2 Approach (SAS-065, 2010)

Figure 1: Variables Defining Collective C2 Approach

While exploiting the agility definition identified earlier, NATO SAS-085 has proposed a conceptual model of C2 agility, making the distinction between the agility of specific C2 approaches, and C2 agility. The agility of a C2 approach is the capability of a C2 approach to successfully effect, cope with and/or exploit changes in circumstances. C2 agility is the capability to identify and applies the appropriate C2 approach to successfully effect, cope with and/or exploit changes in circumstances. When looking at the figure 2, the agility of a C2 approach corresponds to the spectrum of circumstances that the rectangle of this C2 approach can handle successfully. The C2 approach agility is looking at the number of situations a specific C2 approach can effectively handle. This work is looking at C2 agility, which corresponds to the capability to go from one of these rectangles to another one in order to maximize the chances of success of the mission. It corresponds to the capacity to go from one C2 approach to another C2 approach.

A nuance needs to be brought at this point. While it is believed that C2 agility will be required to mission success in a complex environment, it may happen that mission success is not achieved, even if the organization has demonstrated C2 agility. Accordingly, at this point, we do not make a direct cause-to-effect association between C2 agility and the accomplishment of mission success.

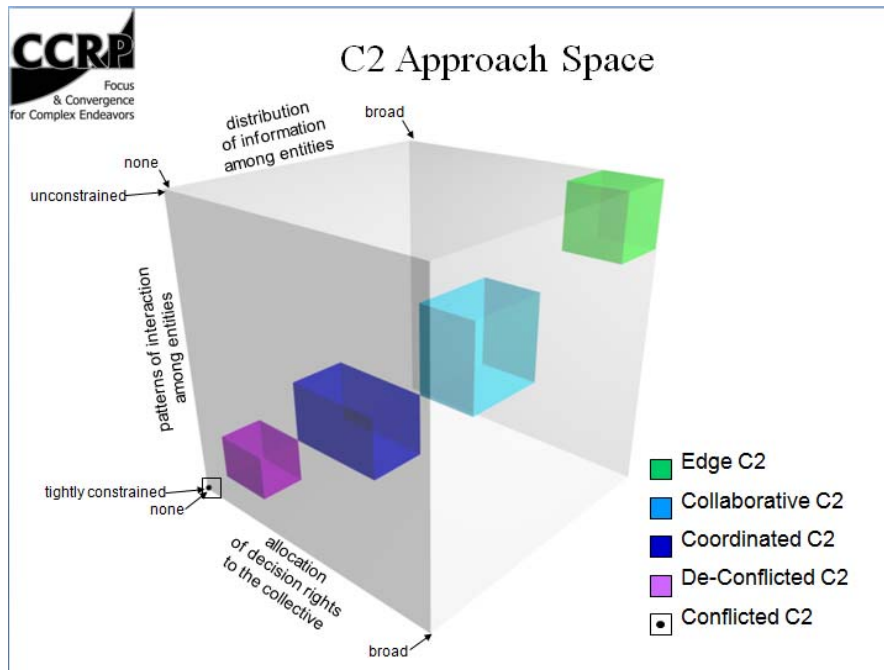


Figure 2: C2 Approach Space

One way to validate the existence of the concept of C2 agility is to look for evidences of C2 agility in past or current operations. Based on the C2 agility definition proposed by NATO SAS-085, evidences of C2 agility in real military operations can be constituted of the following sequence of elements:

- A C2 approach being used;
- A change of circumstances;
- An existing or anticipatory unsatisfactory state, or an unacceptable level of performance;
- A different C2 approach;
- An activity or event that is being made possible by the use of the new C2 approach;
- A satisfactory state or acceptable level of performance obtained in an acceptable period of time.

The identification of C2 approaches can be done using:

- The dimensions of the C2 approaches: Allocation of decision rights, Patterns of Interaction, Distribution of Information;
- The C2 tasks required for a specific C2 approach;
- The capabilities required to implement a C2 approach.

Section 3: Case Study

SAS-085 conducted a set of case studies to find out evidences of C2 Agility. United Nations (UN) Assistance Mission for Rwanda (UNAMIR) was one of them. This case

study begins on the 5th of October 1993 with the establishment, by the Security Council, of the UNAMIR. It ends on the 18 July 1994, by the Rwandese Patriotic Front (RPF) victory which ended genocide by the Hutu extremists.

The analysis of UNAMIR was done using different sources of documentation (Castonguay 2005, Dallaire 2003, Dallaire 2000, Human Rights 1999, LaRose 1994, McCann and Pigeau 1994, Off 2011, UN 1999, UN 1996, UN web site, CF Staff college 2001).

Overview of UNAMIR

The Security Council established UNAMIR on the 5th of October 1993, with Brigadier General Dallaire as the Force Commander of the military component. This mission intended to help implement the Arusha Peace Agreement signed by the Rwandese parties on **4 August 1993**. UNAMIR's mandate (Security Council Resoluton 872) was: *“to assist in ensuring the security of the capital city of Kigali; monitor the ceasefire agreement, including establishment of an expanded demilitarized zone and demobilization procedures; monitor the security situation during the final period of the transitional Government's mandate leading up to elections; assist with mine-clearance; and assist in the coordination of humanitarian assistance activities in conjunction with relief operations.”* (UN b)

The United Nations sent a lightly armed peace-keeping force to Rwanda to assist in implementing peace accords between the Rwandan government (controlled by Hutus, the country's largest ethnic group) and the RPF. Commanded by Canadian General Roméo Dallaire, UNAMIR comprised 2500 troops who were forbidden to use force except in self-defence. Brigadier General Dallaire arrived in Kigali on 22 October, 1993 with an advance party of 21 personnel. The Secretary General's Special Representative (SRSG), who was to have overall responsibility for UNAMIR, arrived on 23 November, 1993.

On April 6, 1994, the president of Rwanda was killed when his plane was shot down. This event set off a **100-day “tidal wave of violence”**. On the first night of the war, Rwandan government forces were murdering Tutsi and Hutu moderate politicians. Dallaire dispatched one unit of ten Belgian peacekeepers to secure the home of Rwanda's prime minister. The Belgians, thet were by far the most experienced of his soldiers, were ambushed, taken prisoner and later tortured, mutilated and murdered. On April 9-10, 1994, France and Belgium sent troops to rescue their citizens. American civilians were also airlifted out. On April 14 1994, one week after the murder of the ten Belgian soldiers, Belgium, a key contributor to UNAMIR, withdraws its forces from UNAMIR. On April 21, 1994, the UN Security Council voted unanimously to withdraw most of the UNAMIR troops, cutting UNAMIR back to 270 troops. The mandate of UNAMIR was adjusted by Security Council [resolution 912 \(1994\)](#) of 21 April 1994, so that it could *act as an intermediary between the warring Rwandese parties in an attempt to secure their agreement to a ceasefire; assist in the resumption of humanitarian relief operations to the extent feasible; and monitor developments in Rwanda, including the safety and security of civilians who sought refuge with UNAMIR.* (UN b). So, while the slaughter

goes on, UN peacekeeping forces stand by since they are forbidden to intervene, as this would breach their “monitoring’ mandate”.

After the situation in Rwanda deteriorated further, UNAMIR's mandate was expanded by Security Council [resolution 918 \(1994\)](#) of 17 May 1994, *to enable it to contribute to the security and protection of refugees and civilians at risk, through means including the establishment and maintenance of secure humanitarian areas, and the provision of security for relief operations to the degree possible.* (UN b) On May 17, 1994, the UN finally agrees to send 55000 troops (UNAMIR II) to Rwanda.

UNAMIR II was authorized in May, 1994, but, due to disputes over costs delayed the troops’ deployment, only a tenth of the authorized troop strength was made available by UN member states as late as July 1994. On June 22, 1994, the U.N. Security Council authorized France to deploy 2500 troops (Operation Turquoise) to Rwanda as an interim peacekeeping force, with a two-month U.N. mandate. The war ended on July 18, 1994, when the RPF took control of a country ravaged by war and genocide. On 19 July, the RPF succeeded in occupying the whole of Rwanda except for the zone controlled by the French. The RPF victory ended genocide by the Hutu extremists.

Level of analysis

Even if the UN C2 structure and processes are well defined as a single organic structure, the diversity of the different components coming from different continents, countries and cultures lead us to do the analysis as if it is behaving as a set of collective entities. Accordingly, the collective of this case study is considered to be composed of the following collective entities:

- UN Security Council;
- Triumvirate of UN DPKO (Department of Peacekeeping Operations) in New York city : General Maurice Baril (Head of military component of UN DPKO), Kofi Annan (under-secretary-general), Iqbal Riza (chief of staff of DPKO);
- UNAMIR HQ in Rwanda
 - o General Roméo Dallaire (Commander of UN forces in Rwanda); and
 - o Booh Booh (Secretary General’s Special Representative (SRSG);
- Belgium Contingent;
- Ghana Contingent;
- Bangladesh Contingent;
- Operation Turquoise sent by France;
- Member states;
- Media.

Different sources of information coming from General Dallaire, United Nations, Human Rights, independent analysts (Castonguay 2005, Dallaire 2003, Dallaire 2000, Human Rights 1999, LaRose 1994, McCann and Pigeau 1994, Off 2011, UN 1999, UN 1996, UN web site, CF Staff college 2001) were reviewed to find out information describing evidences of C2 agility, as identified previously:

- The C2 approach that was being used;

- The change of circumstances;
- An existing unsatisfactory state, an anticipated unsatisfactory state or unacceptable level of performance;
- A different C2 approach that allowed this activity;
- An activity/event made possible by the new C2 approach;
- A satisfactory state or acceptable level of performance.

Our first example is related to the protection of the future prime minister of Rwanda. The C2 approach has been changed for a limited period time. After the announce of the death of the President of the Rwanda, UNAMIR HQ decided to protect the current as well as the future prime ministers of Rwanda. This was outside the mandate of the mission. This is an evidence of going from Collaborative C2 (initial approach) to Edge C2.

- A C2 approach: UNAMIR and UN DPKO used a collaborative C2 approach:
 - o Description:
 - Allocation of decision rights: Options and recommendations were developed mainly by UNAMIR HQ in consultation with DPKO, but they were approved by Security Council;
 - Patterns of Interaction: As required;
 - Distribution of Information:
 - UNAMIR to DPKO: All available and relevant information;
 - DPKO to UNAMIR: Information about collaborative areas;
 - o C2 Tasks: Development of common intent, shared understanding and trust, development of a single integrated plan;
 - o Capabilities: Dynamic IERs on a need-to-share basis;
- Change of circumstances:
 - o The death of the President of the Rwanda initiated a series of massacres of Tutsi and moderate Hutu;
- Unsatisfactory state or unacceptable level of performance:
 - o UNAMIR considered that the life of the current prime minister as well as the future prime minister were in danger. The death of these personalities would add to the instability of the situation;
- A different C2 approach: The C2 approach has been changed for a limited period time, just after the shot down of president plane. At that time, we can see an edge C2 approach:
 - o Description: UNAMIR and UN DPKO used a Edge C2
 - Allocation of decision rights: Distributed
 - Due to time constraints and urgency of the situation, the decision to protect the current as well as the future prime ministers of Rwanda, which was outside of UNAMIR mandate, has been made without consultation with DPKO;
 - Patterns of Interaction: Information was send from UNAMIR to DPKO. No time available to wait for information from DPKO;
 - Distribution of Information: All information available was shared;
 - o C2 Tasks: Leveraging on the shared intent, awareness and understanding that already exist;

- Capabilities: Self-synchronisation to achieve common intent , dynamic IERs on a need-to-share basis;
- Activity/Event made possible by the new C2 approach:
 - Due to time constraints and the urgency of the situation, UNAMIR made some decisions that were outside its mandate. These decisions were:
 - To protect the prime minister by sending in the Belgian contingent which led to the death of Belgian soldiers;
 - To extract the future prime minister Faustin Twagiramungu from his encircled home, bring him to his headquarter and protect him (He had been designated by an August 1993 peace accord to fill this position);
- A satisfactory state or acceptable level of performance:
 - While the prime minister has been killed with soldier of the Belgian contingent, the future prime minister was saved. He was then in position to take his role once the war ended.

This example shows that:

- Effective command under such complex and time constraints conditions requires leaders to maintain the intent of the mission and keep a view of the full breadth of the peace agreement, all while dealing with extremely uncertain and fluid circumstances;
- Lack of information sharing led to erroneous situation awareness which put UNAMIR in situation where he was not really able to cope with the overall situation:
 - General Dallaire was unaware of an existing report about the situation in Rwanda from Special Rapporteur of the Commission on Human Rights. This led to an erroneous situation analysis of the situation. Initial mission's mandate was based on an analysis of the peace process which proved erroneous;
- Lack of analytical capacity led to erroneous situation awareness which affect the capacity of UNAMIR to anticipate correctly the future:
 - The reconnaissance mission lacked the necessary political competence to make a correct in-depth analysis of the political situation and the underlying realities between the ex-belligerents of Arusha Peace Agreement.

A second example is related to the relationship between UNAMIR and the media community. The enablers of C2 agility may be functions that will lead to the identification of these different aspects:

- A C2 approach: Conflicted C2:
 - Description:
 - Allocation of decision rights: All decision rights remain within each of the entities;
 - Patterns of Interaction: very limited, sharply focused:
 - Use of public affair staff;
 - Distribution of Information: Limited information sharing;

- o C2 Tasks: no info;
 - o Capabilities: no info;
- Change of circumstances:
 - o The response of New York to General Dallaire's reports on the status of the situation was the modification of the mandate 872 into a monitoring mandate (resolution 912);
- Existing or a possibility of unsatisfactory state or unacceptable level of performance:
 - o Description:
 - The possibility of the genocide was considered serious by General Dallaire;
 - The response of New York to General Dallaire's reports on the status of the situation was the modification of the mandate 872 into a monitoring mandate (resolution 912). The monitoring mandate was not considered enough to stop the slaughters by General Dallaire;
- A different C2 approach: Coordinated C2:
 - o Description:
 - Allocation of decision rights: coordination of efforts;
 - Patterns of Interaction: As required:
 - Instead of only using public affair staff, General Dallaire decided to talk himself to all reporters requiring information about what was going on in Rwanda;
 - Anything in the realm of possible was done to permit a maximum of different media outfits and journalists in theatre in order to report what was going on in Rwanda;
 - Distribution of Information: All available and relevant information was made accessible:
 - General Dallaire considered the media as a new and positive instrument for communication;
 - o C2 Tasks: development of some shared intent;
 - o Capabilities: no info;
- Activity/Event made possible by the new C2 approach:
 - o Dallaire offers to a BBC reporter who was with the departing Belgian contingent, protection, food and sustenance as well as the means to get a story to the world every day if the reporter accepted to stay with them. This initiated incoming of reporters coming from other news agencies;
- A satisfactory state or acceptable level of performance:
 - o The result was that the media made the public (world) aware about what was happening in Rwanda (the fact that the massive murder activity continued). It led to a growing international outcry. In May 17, 1994, amid a growing international outcry, the UN finally agreed to send 55000 troops (UNAMIR II) to Rwanda. But disputes over costs delayed the troops' deployment. Accordingly, better public awareness influenced international political will which led UN to maintain UNAMIR.

From this example we have the following findings:

- The change of circumstance may be a confirmation that the situation will not be solved or will deteriorate if no action is being made;
- The capacity to accept risk (ex. Ability to cope with casualties) is key to be able to go outside one's zone of comfort. Here we see, that, even if there were risk to have the media representatives on the theatre, General Dallaire accepted that risk;
- Lack of analytical capacity led to erroneous situation awareness:
 - The Headquarters analysis made of General Dallaire's cable containing information indicating the existence of a plan to exterminate the Tutsi shows an institutional weakness in the analytical capacity of the United Nations.

Section 4: Discussion/Conclusion

The situation turned out to Massive Rwanda Genocide executed by Hutu extremists against Tutsi in 1994. The case study ends on the 19 July 1994, by the RPF victory which ended genocide by the Hutu extremists. This mission has been considered as a mission failure by his Commander as well as others organization such as Human Rights. In fact, it is the reason why the subtitled of General Dallaire's book is "Failure of Humanity." This is an example of where agile C2 does not guarantee mission success. However, it is definitively an enabler.

While the identification of C2 agility evidences using of the following sequence of elements appeared helpful, it was not without problems.

- A C2 approach being used;
- A change of circumstances;
- An existing or a possible unsatisfactory state or unacceptable level of performance;
- A different C2 approach;
- An activity or event that is being made possible by the use of the new C2 approach;
- A satisfactory state or acceptable level of performance obtained in an acceptable period of time.

First, it was very difficult to identify, without any doubt, which C2 approach was being used. This may be related to the fact that all information was not part of the documents consulted. However, it may also be related to the fact that information found about allocation of decision rights, patterns of interaction, distribution of information and/or C2 tasks and/or capabilities could be associated to different C2 approaches. Refinement of the definition of these three dimensions for different C2 approaches would be helpful. For example, the concept of situation understanding could be better characterized. Effectively, sometimes the situation is so complex that it is never fully understood. This was the case in our case study, when in 2006 (many years after the operation), Castonguay stated that it is not clear who shot down the plane of the prime minister (Castonguay 2005, UN 1996). While there was a shared understanding of the situation,

there was no complete understanding of the situation. So, it is very important not to mixed up shared understanding of the situation with complete understanding of the situation. The description of the different C2 approaches should better cover this nuance.

Second, the changes of circumstances are not always being done in the physical realm, which make it more difficult to identify them. For example, the change of people mind, which is done over a long period of time, may not be easily identified before concrete acts are committed, leading to disastrous consequences (ex. genocide). This is directly related to the difficulty to anticipate unsatisfactory states. Effectively, sometimes it takes an event to become aware of the existence of an unsatisfactory state. On another side, sometimes it is the event itself that will initiate or cause the changes in the situation such that the state is not satisfactory anymore. The identification of such event may facilitate the identification of a change in circumstances.

The identification of a satisfactory state or an acceptable level of performance is function of the achievement capacity of some collective intent. In complex situations, a collective intent is often difficult to identify/assess considering that different entities (organisations) will have their own set of goals. This collective intent may be a sub-set of goals that is being common to all entities. Such common sub-set of goals must have the highest priorities compared to other goals that may be in conflict with their other goals. This is in line with the difficulty to have a real cohesion amongst different entities. The unity of command, which is one of the tenets of many military doctrine, did not seem to be obvious in situation such as Rwanda, when some contingents received orders from their own countries not to take any risk.

Once the existence or the possibility of an unsatisfactory state has been identified, the time acceptable to modify the circumstances to a satisfactory state depends on the context/situation. The difficulty is to identify what an acceptable time is.

To identify a C2 agility evidence, there should be no doubt that it is the change of C2 approach that lead to effect, cope and/or exploitation of the circumstances. In complex situations, it is very difficult to be able to associate a change of circumstances to a specific element such as the change of C2.

The template developed to document C2 agility did facilitate the identification of C2 agility examples. As discussed previously, the main issue was the identification of the C2 approach being used. The problem was that the facts found did not always belong to a single C2 approach. This is even worse when having to distinguish De-Conflicted C2 from Coordinated C2 and Collaborative C2.

If C2 agility is about the capacity to change C2 approach, the capacity to handle different C2 Approach with different entities may also be considered C2 agility. In that case the proposed template would not be appropriate to document C2 agility evidences.

While we are conscious that evidences of non-agility may be easily challenged, many lacks of capability that could disable agility (in general) have been identified in

UNAMIR case study. These can be considered good candidates for further investigations related to future work on agility. They are:

- Sharing inappropriate information;
- Bad analytical capacity at all levels;
- Bad situation awareness;
- Bad risk assessment;
- Limited capacity to accept risk (to cope with casualties);
- Distributed or change of decision rights lacking unity of command;
- Lack of unity amongst actors;
- No clear communication process amongst actors (signification of no reply);
- No robust tactical communications;
- No real-time situation awareness;
- No continual validation of the mission mandate;
- No ability to deal with extremely uncertain and fluid circumstances;
- No trust between the entities of the collective;
- No accountability;
- No military cohesion;
- No communication;
- No commitment;
- No discipline.

Finally, this case study could be used as an example of the statement “C2 agility does not assure missions success”. Castonguay (Castonguay 2005, UN 1996) interviewed senior military officials of UNAMIR stating that, during that period, UNAMIR would not have had the physical capability and the means to do protect civilians. In this situation, we might believe that agility would have allowed to save more live, but could it really allowed to protect all civilian. This remains a question.

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The difficulty to document agility evidences from a C2 perspective

Micheline Bélanger



DRDC | RDDC

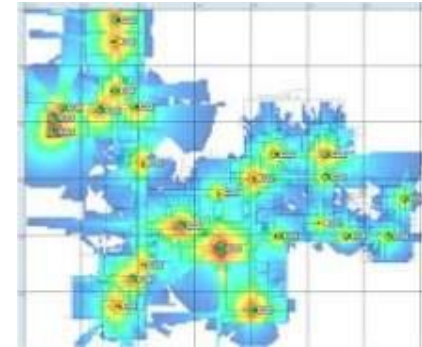
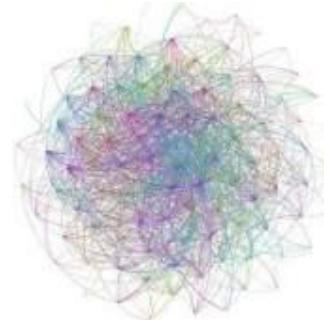
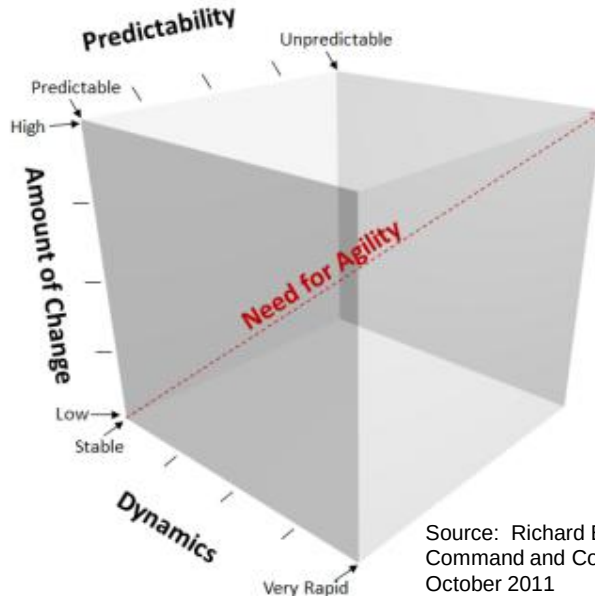
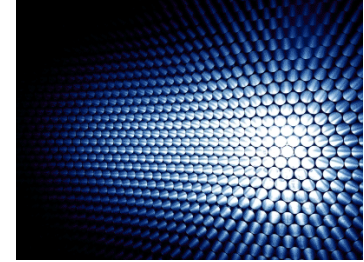
Outline

- Context
- Approach
- Examples
- Findings
- Future work



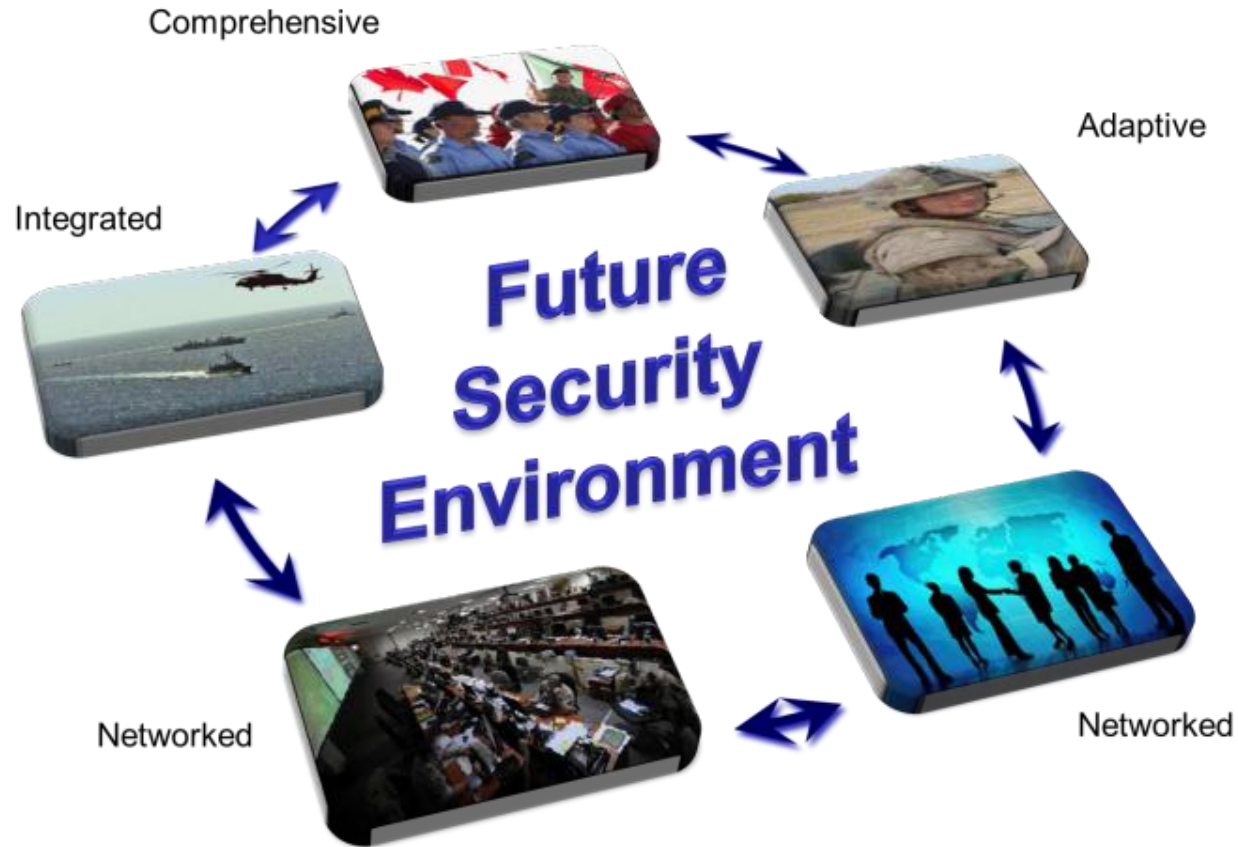
Operating Contexts

- Large numbers of interacting entities
- Rapid rates of change (dynamics)
- Irreducible uncertainty
- Limited information (insufficient)



Source: Richard E. Hayes, Agile
Command and Control. TIDE Sprint.
October 2011

Integrated Capstone Concept



SAS 085 - C2 Agility and Requisite Maturity



■ Objectives

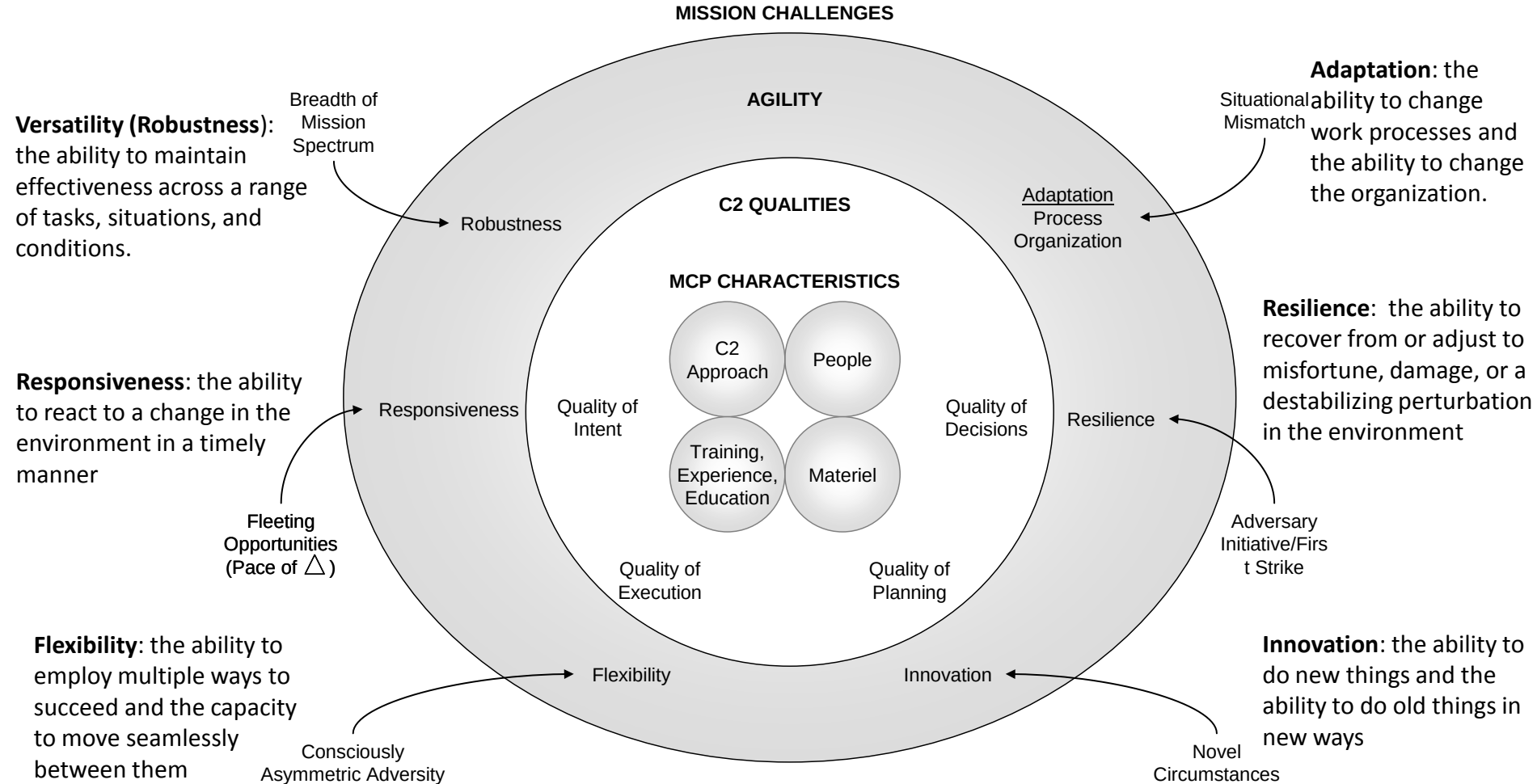
- Understand the implications and validate the need for C2 Agility for NATO missions
- Match the characteristics of C2 Approach options to situational attributes
- Support the dissemination and understanding of C2 Agility concepts

■ Leveraging

- SAS-050 C2 Conceptual Reference Model
- SAS-065 NEC C2 Maturity Model

**Agility is the capability
to successfully effect, cope with and/or exploit
changes in circumstances**

C2 Agility and Enabling Factors: Agility Significant Influences



Source: Alberts and Hayes, "Understanding Command and Control", CCRP. 2006.

C2 Approaches

C2 Approach	Description	C2 Tasks Required	C2 Capabilities Required
Edge C2	The entities are engaged to the collective effectiveness. - self-synchronisation of the collective - self-organisation of each entity to achieve common intent.	Development of shared intent, awareness, and understanding	Development of a rich, shared understanding of the common intent as well as the different entities. Self-synchronisation of the collective, self-organisation of each entity. Robust, secure, ubiquitous, interoperable, info-structure that extends to all participating entities
Collaborative C2	The entities are looking to maximize overall collective effectiveness. collaborative development of a shared single plan that will achieve common intent	Development of common intent, shared understanding and trust Development of a single integrated plan, and parallel development of entities' plans that are synchronized with the overall plan. The different entities' resources are being used for the benefit of the mission	Establishment of a set of collaborative processes, supported by a sufficiently robust and extensively distributed collaborative environment available to all appropriate individuals and organisations. A high degree of interoperability in all domains needs to be achieved in order to develop sufficient levels of shared awareness and understanding (dynamic IERs on a need-to-share basis)
Coordinated C2	The entities consider the increase of the overall collective effectiveness. development of some common intent leading to an agreement about linking actions in the various plans developed by the different entities;	Development of a limited degree of common intent and development of links between and among individual plans and actions	Establishment of a coordination process. Requires sufficient communications, information-related capabilities involving the appropriate individuals, and necessary information exchanges (fixed IERs on a need-to-know basis)
De-Conflicted C2	The entities of the collective C2 are trying to de-conflict their intents, plans or actions. The aim is to avoid negative impacts between and among the entities. Accordingly, they first need to recognize potential conflicts. Partitioning of activities, space, time and/or resources may be one approach to resolve the conflicts	Identification of potential conflicts and resolution of conflicts by establishing constraints and/or boundaries	Limited communications involving limited individuals and limited information exchanges restricted to constraints and seams (strict Information Exchange Requirements (IER) on a need-to-know basis)
Conflicted C2	There is no collective C2. Each entity is working independently of the collective	No specific C2 tasks	No specific capabilities

C2 Approach Dimensions

C2 Approach	Allocation of Decision Rights <i>to the Collective</i>	Patterns of Interaction Among Participating Entities	Distribution of Information (Entity Information Positions)
Edge C2	Not Explicit, Self- Allocated (Emergent, Tailored, and Dynamic)	Unlimited As Required	All Available and Relevant Information Accessible
Collaborative C2	Collaborative Process and Shared Plan	Significant Broad	Additional Information Across Collaborative Areas/Functions
Coordinated C2	Coordination Process and Linked Plans	Limited and Focused	Additional Information About Coordinated Areas/Functions
De-Conflicted C2	Establish Constraints	Very Limited Sharply Focused	Additional Information About Constraints and Seams
Conflicted C2	None	None	Organic Information

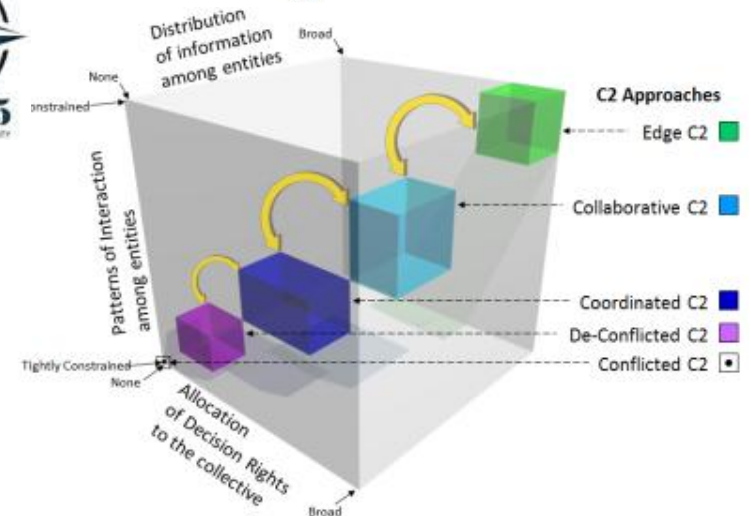
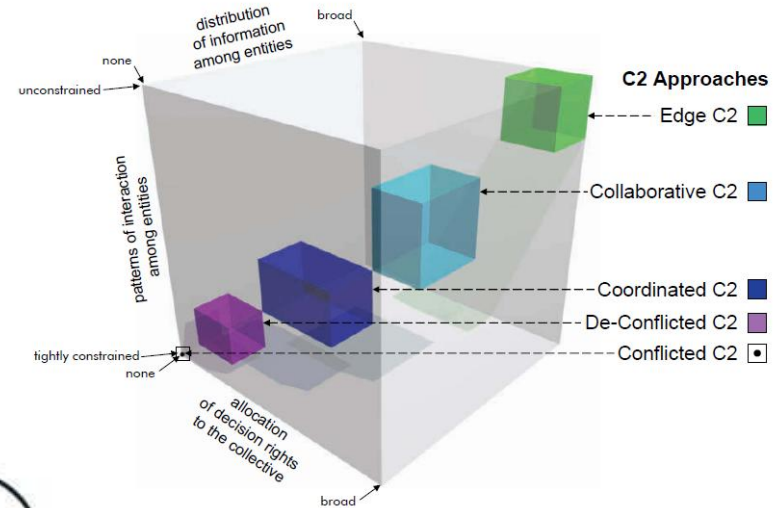
C2 and Agility

Agility of a C2 approach

the capability of a C2 approach to successfully effect, cope with and/or exploit changes in circumstances

C2 Agility

the capability to identify and applies the appropriate C2 approach to successfully effect, cope with and/or exploit changes in circumstances



Approach to Document Evidences of C2 Agility

Change of Circumstances



Unsatisfactory State



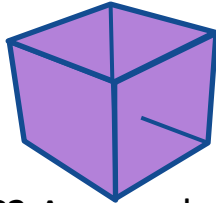
Activity/Event
made possible



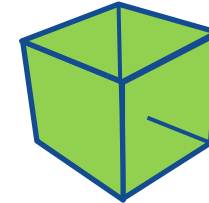
Satisfactory State



Timeline



C2 Approach A



C2 Approach B

■ Identification of C2 approaches can be done using

- The dimensions of the C2 approaches: Allocation of decision rights (ADR), Patterns of Interaction (Pol), Distribution of Information (DoI);
- The C2 tasks required for a specific C2 approach;
- The capabilities required to implement a C2 approach

Case Study – United Nations Mission for Rwanda (UNAMIR)

■ Event Analyzed

- Massive Rwanda Genocide executed by Hutu extremists against Tutsi in 1994

■ Location

- Central African State of Rwanda

■ Temporal boundaries of the study

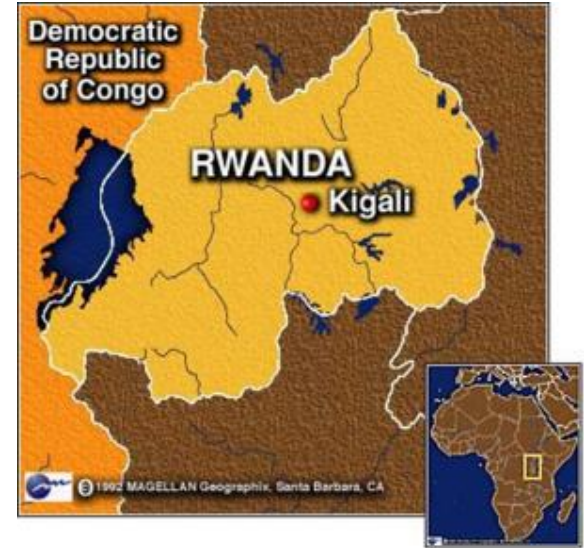
- 22 October, 1993 – 19 July, 1994

■ UN Mission

- To assist in implementing peace accords between the Rwandan government (controlled by Hutus) and the RPF.

■ Opposing Forces:

- Rwandan Armed Forces (FAR), the National Republican Movement for Development (MRND) Party and their allies on the one hand
- Rwandese Patriotic Front (RPF) and their allies on the other hand



- The United Nations sent a lightly armed peace-keeping force to Rwanda to assist in implementing peace accords between the Rwandan government (controlled by Hutus, the country's largest ethnic group) and the Rwandese Patriotic Front (RPF). Commanded by Canadian General Roméo Dallaire, UNAMIR comprised 2500 troops who were forbidden to use force except in self-defence.

- On **April 6, 1994**, the president of Rwanda was killed when his plane was shot down.
- **Belgium** – a key UNAMIR contributor- promptly **withdrew its forces**.
- Two weeks after the Belgian soldiers were killed, **the UN Security Council cut UNAMIR back to 270 troops, making no change in its mandate**. “They are forbidden to intervene, as this would breach their “monitoring’ mandate”.

- Not until May 17, 1994, amid a growing international outcry,
 - UNAMIR's mandate was expanded by Security Council *to enable it to contribute to the security and protection of refugees and civilians at risk, through means including the establishment and maintenance of secure humanitarian areas, and the provision of security for relief operations to the degree possible*
 - UN finally **agree to send 55000 troops** (UNAMIR II) to Rwanda. But disputes over **costs delayed** the troops' deployment.

- On June 22, 1994, the U.N. Security Council authorized France to deploy 2500 troops (Operation Turquoise) to Rwanda as an **interim peacekeeping force**, with a **two-month U.N. mandate**.

- **The war ended on July 18,1994,** The RPF took control of a country ravaged by war and genocide.

Result

- On a population estimated to 7.9 million before the war:
 - Up to 800,000 people had been murdered
 - Another 2 million or so had fled
 - Another million or so were displaced internally
 - 47,000 children had been orphaned
 - Over 250,000 women had been raped
- Operation fatalities
 - 3 military observers, 22 other military personnel, 1 civilian police , 1 local staff
- UNAMIR: Mission Failure according to Gen Dallaire
 - "I failed, yes. The mission failed. They died by the thousands, hundreds of thousands."
- Did Agility allow to save people life?
 - Saving of 30000 Rwandans from both sides that were under UNAMIR'S protection



Level of Analysis

■ Organizations Involved

■ Within Self

- UN Headquarters – in New York City
- UNAMIR HQ in Rwanda
 - Secretary General's Special Representative (SRSG)
 - Commander of UN forces in Rwanda: Gen Roméo Dallaire
- Contingents provided by Belgium, Ghana, Bangladesh, France
- Member states

■ Within the Collective

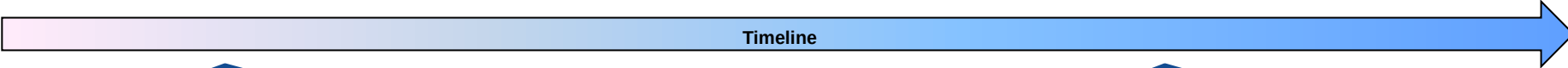
- UNAMIR HQ in Rwanda
- Media

Example 1 : UNAMIR HQ – UN DPKO



	ADR	PoI	DoI	C2 Tasks	Capabilities
Collabo- rative	Options/ Recommendations developed mainly by UNAMIR HQ in consultation with DPKO	As required	UNAMIR to DPKO: all available and relevant info DPKO to UNAMIR Info about collaborative areas	Development of common intent, shared understanding and trust, development of a single integrated plan	Dynamic IERs on a need-to-share basis
Edge 	Distributed: UNAMIR HQ decided to protect the current as well as the future prime ministers of Rwanda without consultation with DPKO	UNAMIR to DPKO	All info available	Leveraging on the shared intent, awareness and understanding that already exist	Self-synchronisation to achieve common intent , dynamic IERs on a need-to-share basis

Example 2 : UNAMIR HQ – Media




 Conflicted




 Coordinated C2

	ADR	PoI	DoI	C2 Tasks	Capabilities
Conflicted	All decision rights remain within each of the entities	very limited, sharply focused • Use of public affair staff	Limited information sharing	---	---
Coordinated	Coordination of efforts	As required: • General Dallaire decided to talk himself to all reporters • Anything in the realm of possible was done to permit a maximum of different media outfits and journalists in theatre	All available and relevant information was made accessible	development of some shared intent	---

Discussion

- Proposed template can be used to identify C2 agility examples but
 - Difficulty to identify the C2 approach used
 - Nuances between C2 approaches : ADR, PoI, DoI vs C2 Tasks / Capabilities
 - Shared Understanding vs Right Understanding
 - Difficulty to identify changes of circumstances
 - Different domain (Physical or not)
 - An Event may be required to notify the change of circumstances:
 - Ex. a confirmation that the situation will not be solved or will deteriorate if no action is being made
 - Difficulty to identify satisfactory state of acceptable level of performance
 - Related to the achievement of some collective intent vs unity of command
 - Difficulty to identify acceptable time of response
 - Did not consider handling multiple C2 approaches at the same time
- Is the satisfactory state is due to the change of C2 or something else?
- Agile C2 is an enabler to mission success
 - Agile C2 does not guarantee mission success
 - UNAMIR has been considered as a mission failure by his Commander as well as others organization such as Human Rights.

- DRDC | RDDC

Further Investigations needed

- Disablers of agility:
 - Sharing inappropriate information;
 - Bad analytical capacity at all levels;
 - Bad situation awareness;
 - Bad risk assessment;
 - Limited capacity to accept risk (to cope with casualties);
 - Distributed or change of decision rights lacking unity of command;
 - Lack of unity amongst actors;
 - No clear communication process amongst actors (signification of no reply);
 - No robust tactical communications;
 - No real-time situation awareness;
 - No continual validation of the mission mandate;
 - No ability to deal with extremely uncertain and fluid circumstances;
 - No trust between the entities of the collective;
 - No accountability;
 - No military cohesion;
 - No communication;
 - No commitment;
 - No discipline.

DRDC | RDDC

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