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PLANNING FOR COMPLEXITY: OPERATIONAL PLANNING PROCESS, DESIGN, OR BOTH?

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JCSP 46

Solo Flight

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CANADIAN FORCES COLLEGE – COLLÈGE DES FORCES CANADIENNES

JCSP 46 – PCEMI 46
2019 – 2020

SOLO FLIGHT

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By Major Caitlyn Vos

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INTRODUCTION

In March 2020, the world shifted. A virus had reached pandemic proportions and world leaders were having to make hard decisions about how to protect their populations. While not an act of war, and not directly delivered by an adversary, the virus was a clear threat that necessitated action. Having been through situations similar with SARS and Ebola, governments had the start of a playbook ready to reassure the populace. However, COVID-19 was not playing by previous disease rules. It spread rapidly, similar to colds and flus, with no human herd immunity to ward it off¹. As much of the world experiences an informal lockdown, carefully called “social distancing,” governments, organizations, and alliances around the world are planning what to do next.

The current global situation is an excellent example for showing the complexities of the now and future operating environment. Within that environment, the Canadian Armed Forces (CAF), as a part of the Canadian Government response, must be able to understand and maneuver through the complexity to properly plan for operations. Doctrinally, the CAF uses the Operational Planning Process (OPP), which is a reductionist approach to planning. However, with all these added interconnections and complexities, such as what’s being seen during the COVID-19 pandemic, assuming away factors will create problems or unconscious follow on effects for the system moving forward. Instead, the CAF needs to use a tool that specifically addresses complex

¹ European Center for Disease Prevention and Control, “Q&A on COVID-19,” last modified 31 March 2020, <https://www.ecdc.europa.eu/en/novel-coronavirus-china/questions-answers>.

problems, helps to ensure the right problem is being solved, and accounts for all the interconnected factors.

Specifically, with the complexity of the future operating environment, incorporating design thinking tools into the CAF OPP will provide a better understanding of the problem to be solved, particularly when faced with new and dynamic situations. This paper demonstrates why the current and future operating environment should be considered a complex problem, then describes why the OPP, in its current iteration, has limitations when working through contemporary and atypical global situations. The last section argues that adopting a design thinking approach would be better suited for understanding and working through complexity, and further recommends augmenting the OPP framework with design tools to help Commanders and staff adapt their planning for tomorrow's conflict.

OPERATING IN COMPLEXITY

Complexity is defined as many dynamic elements that are richly interconnected, where affecting one element will cause a cascade of second and third order effects.² A complex problem is where there is “no recognizable cause and effect relationship, [subject matter experts] cannot necessarily provide the definitive solution, and the number of people impacted by decisions is unknown....”³ Complex problems are different from simple problems, which are recognizable and solvable through use of standard operating procedures, and complicated problems, which have manageable

² M. A. Thomas, "Spaghetti: systems thinking and the US Army," *Defence Studies* 19, no. 2 (2019): 151, 152; Huba Wass de Czege, "Systemic operational design: Learning and adapting in complex missions," *Military Review* 89, no. 1 (2009): 3.

³ David C. Ellis and Charles N. Black, *Complexity, Organization Blindness, and the SOCOM Design Way* (Florida: Joint Special Operations University, 2018), 6.

solutions and are usually solved by subject matter experts.⁴ For example, technical problems are usually complicated problems, where social problems are usually complex.⁵

Using these definitions, it becomes clear why the current and future operating environment has developed into a complex problem. To start, the current battle space can be divided into six different domains: land, sea, air, space, cyber, and information. The first three are considered conventional, and are physical, habitable spaces, that are well understood by military planners. Conversely, space, cyber, and information are relatively new, with yet undefined laws and boundaries. Conflict can occur in any one of these arenas and easily cross boundaries to involve multiple domains. Further, with the prevalence of adversaries engaging in conflict under the threshold of war, combined with an ever-changing physical environment, there are considerably more interconnected factors to consider when planning.

Unconventional Domains

In the space domain, operations can be classified as either enabling or hostile, where satellites can assist friendly forces, or be hostile against other satellites.⁶ Space contains a large number of actors and is commonly understood to be congested, contested, and competitive, where any one actor cannot have complete control.⁷ With global reliance on satellites, particularly for communications, global positioning systems, and sensing functions, planning for and using the space domain correctly has enormous implications on strategy, potential risks, and vulnerabilities.

⁴ Ibid.

⁵ Ibid.

⁶ Jerry V. Drew, "Visualizing the Synchronization of Space Systems in Operational Planning," *Military Review* 99, no. 1 (2019): 108.

⁷ Cassandra Steer, "Global Commons, Cosmic Commons: Implications of Military and Security Uses of Outer Space," *Georgetown Journal of International Affairs* 18, no. 1 (Winter, 2017): 12, 13.

Increases in cyber technology have likewise made some aspects of managing operations easier, such as multiple forms of instant communication, global connectivity, and overall access to information. However, like space, this adds potential risk and vulnerabilities because all new forms of communication can be compromised due to adversary actions. Realistically, cyber is still a nascent capability, where the CAF is working to build expertise and learn how to use and incorporate it into operations. As recent as 2014, there were arguments about how cyber should only be considered as a capability, rather than its own domain. The thought was that since cyber lacked physicality and could not be inhabited, it should not be considered the same as land, air, sea, and space.⁸ However, considering the prevalence of cyber technology, the rate of growth, the low barriers to entry, and ill-defined legal parameters, cyber has become a place where battles can be won or lost.⁹

Through cyber, conventional media, and social media, the information domain has equally become a battlefield.¹⁰ Narrative control has become an important tool for governments to win over their populace and discredit the adversary or opposition. A contemporary example of using the information domain is China's efforts to control the narrative surrounding COVID-19. The Communist Party has been using propaganda through journalists and social media to shift the focus on where the virus originated, how it was spread, and how China as a nation has handled the outbreak.¹¹ North American

⁸ Chris McGuffin and Paul Mitchell, "On Domains: Cyber and the Practice of Warfare," *International Journal* 69, no. 3 (09, 2014): 404, <https://search-proquest-com.cfc.idm.oclc.org/docview/1692525485?accountid=9867>.

⁹ Gian Piero Siroli, "Considerations on the cyber domain as the new worldwide battlefield," *The International Spectator* 53, no. 2 (2018): 114.

¹⁰ Ibid.

¹¹ Louisa Lim, "China is Trying to Rewrite the Present," *Foreign Policy*, 23 March 2020, <https://foreignpolicy.com/2020/03/23/china-is-trying-to-rewrite-the-present/>.

leaders have likewise been working to control the outbreak narrative, but unfortunately, some have also been spreading misinformation. President Trump, as one example, recently claimed that drugs used to treat other conditions, such as malaria or lupus, could treat the COVID virus.¹² His proclamation caused drug shortages for patients that need the drug for treatment, despite no definitive proof of efficacy.¹³ Public panic, hoarding, persecution, misdirection, and misguided optimism are all possible results of misinformation and narrative push through the information domain.

Grey Zone Conflict

Grey zone conflicts are activities conducted below the threshold of war, such as cyber activities, or economic or diplomatic actions meant to coerce or intimidate, that cause whole of government, or whole of nation, impacts.¹⁴ While adversaries are typically using non-military actions as pressure within the cyber and information domains, there does still remain conventional threats in land, sea, air, and space.¹⁵ However, adversaries are careful to remain within the grey zone to avoid military escalation or deterrence, theoretically to stay away from activities that could threaten or lead to nuclear activity.¹⁶ Canada is even considered to be actively engaged in a “global fight over values,”¹⁷ all occurring within that grey zone. With the COVID-19 pandemic, there are accusations of China trying to gain control and an economic advantage through

¹² Katie Thomas and Denise Grady, “Trump’s Embrace of Unproven Drugs to Treat Coronavirus Defies Science,” *The New York Times*, 20 March 2020, <https://www.nytimes.com/2020/03/20/health/coronavirus-chloroquine-trump.html>.

¹³ Ibid.

¹⁴ Lee Berthiaume, “Top Canadian general calls out Russia and China for ‘antagonistic actions,’” *The Canadian Press*, 4 March 2020, <http://a.msn.com/01/en-ca/BB10KzcE?ocid=se2>.

¹⁵ Ibid.

¹⁶ Dani Belo, “Conflict in the absence of war: a comparative analysis of China and Russia engagement in gray zone conflicts,” *Canadian Foreign Policy Journal* (2019): 87.

¹⁷ Berthiaume, “Top Canadian general....”

their medical supply chain, by manipulating which countries receive the “good” quality equipment versus countries that receive the “bad” equipment.¹⁸ Because Canada is on the receiving end of that supply chain decision, diplomatic relationships and foreign policies become important tools for this particular battlespace.

With the additional domains serving as new arenas, and adversaries actively engaging in grey zone conflict, planners will have to navigate through these intangible and unconventional threats. For some cases, that could mean simply supporting the Government of Canada’s response with CAF capabilities. However, regardless of the action, the CAF must be able to plan and respond within the same grey zone, without leading to escalation (unless otherwise directed). This necessitates a clear understanding of the problem set and what the anticipated follow on effects may be.

Changing Physical Environment

The effects of climate change are already noticeable in today’s weather patterns, and barring an immediate change, will only continue to intensify. While climate change is not the only reason why extreme events occur, it does cause more natural disasters.¹⁹ For example, overall global warming causes more water to be evaporated into the air, which affects water levels and flooding by increases in short duration extreme precipitation.²⁰ Although there will be increased precipitation, the hot, dry conditions caused by the warmer temperatures also leads to a higher fire weather index.²¹ Because the precipitation is not enough to offset the effect of the heat for fire risk, there will likely

¹⁸ Marcus Kolga, Kaveh Shahrooz, and Shuvaloy Majumdar, “How China weaponized its supply chain,” *Maclean’s*, 7 April 2020, <https://www.macleans.ca/opinion/how-china-weaponized-its-supply-chain/>.

¹⁹ Elizabeth Bush and Donald Stanley Lemmen, eds, *Canada's changing climate report* (Ottawa: Government of Canada, 2019), 183.

²⁰ *Ibid.*, 168, 172.

²¹ *Ibid.*, 172.

be more wild fires.²² Both fires and floods can cause damage to urban areas, forests, and agricultural land, which affects the population, local industries, and the region's economy.

More natural disasters may lead to additional Humanitarian Assistance (HA) and Disaster Relief (DR) type missions for the CAF, both domestically and internationally. While typically short duration, these missions rely heavily on interaction and interoperability with other government departments, militaries, or non-government organizations. Working with a diverse cross-section of agencies adds complexity to a HA/DR response, and although some aspects would get easier with multiple iterations of the HA/DR mission, each new response will inevitably bring different challenges.

Natural disasters and an overall increasing global temperature will also lead to resource competition throughout the globe. For example, warmer weather is leading to less snow cover, shrinking ice, and melting glaciers, which affects stream flow in the spring and summer.²³ Less outflow in the spring and summer will induce potential droughts, because as with the fire index, warming causes drier conditions that cannot be offset by the future higher levels of precipitation.²⁴ Overall, this could cause potential conflict as regions lose access to natural sources of fresh water, and agricultural challenges with droughts and dry soil. This conflict may result in more HA or stability type missions for the CAF if the conflict is escalated or results in mass migration, potentially destabilizing more regions.

²² Ibid.

²³ Bush and Lemmen, *Canada's changing climate report*, 267.

²⁴ Ibid., 268.

Resource scarcity and competition will also add complexity to CAF sustainment plans because deployed forces may not be able to rely on host nation resources or local food, water, and fuel contracts. Conversely, if the host nation is able to locally support these types of contracts, the cost of those resources will likely increase, making sustainment, and overall operations, more expensive. Further, there may be an added security challenge if the local populace is without food and water, but sees deployed camps having an excess of resources. This could lead to discontent with the local population and send a negative “have and have not” perception within the information domain.

Deployed forces will also have to be cognizant of any follow-on effects of damaging host nation resources or economy generating infrastructure. In Afghanistan, for example, decades of conflict have left a lasting impact on access to fresh water because of damage to streams, water bodies, and built-up water infrastructure.²⁵ For a region that is already experiencing water scarcity, having fighting destroy necessary infrastructure makes it difficult to live and exist in the region.²⁶ Fortunately, awareness of these types of considerations are already being discussed, particularly in military engineering schools, going so far as suggesting that forces avoid farmlands, prevent against hazardous spills, or ruining ditches and stream beds; essentially, anything that could hinder the host nation’s economy.²⁷ This can also connect back to narrative control and winning over the

²⁵ Agnieszka Pikulicka-Wilczewska, “War, drought, diplomatic rifts deepen Afghanistan’s water crisis,” *Al Jazeera*, 5 May 2019, <https://www.aljazeera.com/indepth/features/war-drought-diplomatic-rifts-deepen-afghanistans-water-crisis-190504203303668.html>.

²⁶ Ibid.

²⁷ Albert Vargenko, “Environmental Considerations as Part of the Military Decision-Making Process,” *Military Police*, 1 June 2019.

populace by helping ensure that the region in conflict is able to regroup, rebuild, and continue after the conflict has ended.

Operating within six concurrent domains, working in the unconventional grey zone, and anticipating the impacts of a changing physical environment are three examples why the world is becoming increasingly complex. Everyone is interconnected because of the internet, instant communications, and an instantaneous news cycle. As the globe is seeing now, any one action can cause a ripple effect across environmental, diplomatic, economic, or even medical arenas. Being able to anticipate, understand, and maneuver through these complex cause-and-effect relationships will be vital during future planning efforts, which suggests the CAF should assess if the OPP remains the correct tool to use.

OPP LIMITATIONS

The CAF uses the OPP as their tool to plan the military portion of a given government response. However, this approach may not be flexible enough given all the added domains, grey zone operations, resource considerations, and the variety of additional players integrated into the response. This section will examine how the OPP uses a reductionist approach to planning, which attempts to simplify complexity, discuss the effectiveness of the process in actual use, and argue that the OPP lacks consideration for follow-on effects caused by military intervention.

Reductionist Planning

The OPP uses a reductionist approach to planning, where planners only take the military element and develop a solution just for that part of the problem. This method is effective when the range of unknowns is bounded and manageable, through defined

objectives or time horizons.²⁸ However, this shows that reductionism is not suited to complex problems, because there are no predictable cause and effect relationships.²⁹ Another way to describe this is a “freeze the world” approach to planning, where “conventional problem-solving requires us to stop the world, isolate the problem, and come up with a one-off solution.”³⁰ Again, with the dynamic situations and unconventional threats, this is likely not an effective tool for working within the future operating environment.

The OPP is heavily reliant on the Commander and their assessment of the situation. The Commander is the one responsible to “freeze the world” and provide the boundaries and guidance from which the staff begins their analysis. While CAF doctrine does suggest that the Commander, with select staff, should start with a design-type process to understand the complexity of the situation, this recommendation is only reflected within the OPP doctrine manual and not within the widely used OPP flow chart.³¹ For this reason, it is difficult to assess whether or not this step is being used within the OPP process, prior to staff planning, when everything depends on the Commander framing the problem correctly at the start.³² Furthermore, any situation that involves social relationships are difficult to accurately freeze because humans and their relationships are inherently dynamic, which means the Commander selected boundaries likely will not hold up as the situation evolves.³³

²⁸ Ellis and Black, *Complexity, Organization Blindness*...61,62.

²⁹ Ibid., 44.

³⁰ Kees Dorst, *Frame innovation: Create new thinking by design* (MIT press, 2015), 15.

³¹ Department of National Defence, B-GJ-005-500/FP-000, *Canadian Forces Joint Publication 5.0 (CFJP 5.0)* (Ottawa: DND Canada, 2008), 3-10.

³² Steve L. Pettit and David M. Toczek, "Like Hugging Grandma: Introducing Design into a Military Organization," *Journal of Military and Strategic Studies* 17, no. 4 (2017), 171.

³³ Wass de Czege, "Systemic operational design..." 8.

Is OPP Effective?

Despite the OPP being the main planning tool for the CAF, there are limited statistics and studies on how frequently it is used and in what scenarios. For example, is the OPP being used during training and exercises, do certain types of operations lend themselves well to the OPP, and what is the OPP success rate for developing a comprehensive initial plan.³⁴ Without proper analytical data it is difficult to assess if the tool is actually effective, or simply effective as a basic framework where pieces can be skipped depending on time available. Granted, measuring the effectiveness of the process is difficult, because no plan will ever account for all factors and adversary response.

However, one of those rare functionality studies was conducted during a Brigade exercise in 2005 to observe how the OPP was applied compared against the doctrinally explained application.³⁵ The study noted that when conducted during this particular exercise, the OPP was usually abbreviated and relied heavily on intuitive decision making.³⁶ While this paper will not go in depth on intuitive decision making, in brief, intuitive decision making is basing decisions on experience and an internal information filtering process.³⁷ Essentially, this implies that the Commander, who primarily makes the critical decisions, was passing direction based on their experiential and judgement driven intuition. However, this method could lead to challenges as the operating environment increases in complexity, particularly with elements that the Commanders

³⁴ Aaron P Jackson, "The only problem with the operations planning process is that we don't use it!": Why this argument is invalid," *Small Wars Journal*, <https://smallwarsjournal.com/index.php/jrnl/art/only-problem-operations-planning-process-we-dont-use-it-why-argument-invalid>, 2.

³⁵ Lora Bruyn Martin *et al*, "Comparison of the CF Doctrinal and Applied Operational Planning Process," *Proceedings of the Human Factors and Ergonomics Society Annual Meeting*, vol. 50, no. 3 (2006), 401.

³⁶ *Ibid.*, 405.

³⁷ "The Head Vs the Heart," *Strategic Direction* 34, no. 8 (2018): 5, <https://search-proquest-com.cfc.idm.oclc.org/docview/2101245556?accountid=9867>.

have not been exposed to before. While there will be parts of the problem that are familiar, relying solely on a Commander's intuition and assessment of the situation may not provide the staff with all the information they need to develop a comprehensive strategy.

No Consideration for Follow-On Effects

Within the OPP, there is no step that considers the second and third order effects arising from military intervention. The closest existing steps to this type of analysis are sequel plans, which are follow on operations based on the probable outcome of the initial operation, and the COA war game, which should look at actions and counter actions with the enemy force.³⁸ However, neither really consider the potential follow-on effects arising from, or happening during, the overall mission. This means that after-effects caused by military action will either be left unaddressed, or handled through a reactionary, intuitive type decision making, rather than a deliberate planning process.³⁹ The danger of not deliberately planning and anticipating these effects become evident if the CAF is involved in resource scarce HA-type missions, where any actions or decisions taken could have follow on economic, sustainability, and stability repercussions in the region, such as the previously mentioned damaged water infrastructure in Afghanistan. Anticipating the effects in this case may have led to a stronger focus on preventing collateral damage or directing more of the military or government reconstruction effort on water infrastructure.

³⁸ Department of National Defence, *Canadian Forces Joint Publication 5.0...*, 3-10.

³⁹ Ellis and Black, *Complexity, Organization Blinders...*, 16.

Since the studies showing the effectiveness of OPP are so limited, judgement can only be made based on the doctrine and empirical evidence that currently exists.

Unfortunately, this evidence describes a scenario where intuitive decision making is widely used throughout the entire process. This approach, combined with reductionism and limited consideration for any follow-on effects, show that the OPP is not well suited to planning for or solving complex problems.

DESIGN THINKING ADVANTAGE

Design thinking is a popular alternative planning method, currently integrated into the United States Special Operations Command (SOCOM) and taught within institutions such as the Canadian Forces College. Design broadly encompasses a wide variety of methods which are typically used to frame or make sense of complex problems. Because of the specific value of understanding the problem, ensuring the right problem is being solved, and having a method to anticipate second and third order impacts of a plan, design should be considered as a replacement to the OPP.

Understanding the Problem

Arguably, the most important part of planning is ensuring the right problem is being solved. This is where it would be beneficial, in complex situations, to shift the perspective from doing planning, to doing design.⁴⁰ However, the reasonable question is at which level should a design approach be used in order to frame the problem correctly, and should it be assumed that the higher level has done the work to get the problem right.⁴¹ Although it can be murky deciding what is strategic versus operational versus tactical, a retired United States Army Brigadier General suggested that operational art

⁴⁰ Pettit and Toczek, "Like Hugging Grandma: ...," 172.

⁴¹ Ibid., 171.

should also be practiced at all levels because of the complexity currently faced within operations.⁴² Additionally, with missions conducted below the threshold of war, or with multiple other agencies or allied forces, integration and harmonization will have to be done at all levels during the operation, not just at the strategic level.

There are a variety of design methodologies that would suit the operational art. An example of two design methods currently in use by the United States Military, and briefly mentioned in Canadian OPP doctrine, are the integral futures method and systemic operational design. The integral futures method looks at internal and external dimensions from an individual and collective view, to add depth and create a holistic view of the entire situation.⁴³ The model considers the interaction of the elements and how they relate internally to the system, but also externally to other systems.⁴⁴ It can be further adapted at many different levels, depending on the frame of reference required for the analysis. Figure 1 demonstrates how the quadrants would look from an individual's perspective of personal security.

⁴² Wass de Czege, "Systemic operational design...", 2.

⁴³ Craig Perry and Andy Hines, "An Integral Futures Lens on Future Security Issues," In *Security by Design*, Springer, Cham, 2018, 46,47.

⁴⁴ Ibid., 48.

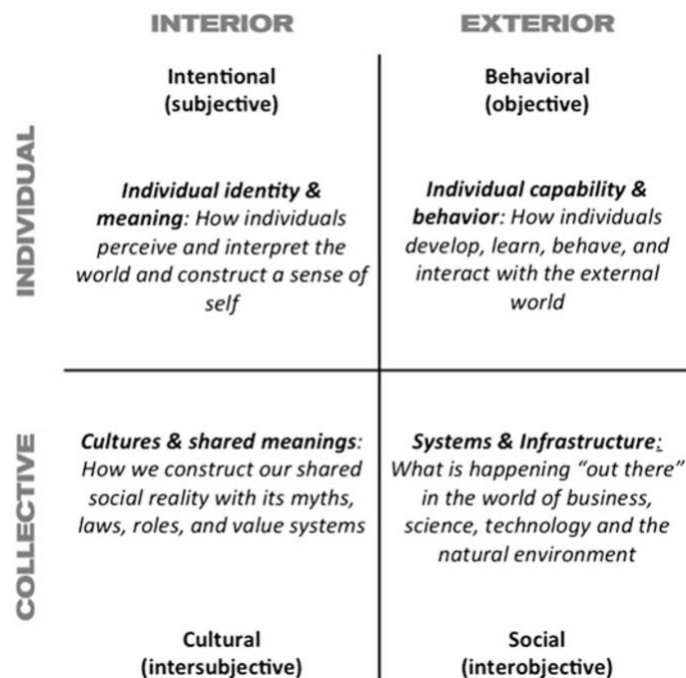


Figure 1 – Integral futures model, individual security

Source: Perry and Hines, "An Integral Futures Lens on Future Security Issues," 48. This is applicable for military planning because it would force a look at the military and security portion of the problem or situation, and study how it applies to and affects the larger, collective problem potentially facing the host nation.

Systemic operational design uses three different framing methods to determine the problem, understand the system, then develop the intervention strategy.⁴⁵ The benefit of this method is the time spent determining the logic and context of the problem during the system frame, then looking at the potentials, trends, and tendencies within that problem.⁴⁶ From the intervention frame comes a clear problem statement and a proposed whole of government strategy, from which the Commander's concept of design is derived.⁴⁷ What separates this from the integral futures method is that systemic operational design adds

⁴⁵ Wass de Czege, "Systemic operational design...", 8.

⁴⁶ Ibid.

⁴⁷ Ibid.

the step that leads to a defined problem statement that can be evolved into the start of the military's concept of operations.

Anticipating Follow-on Effects

As the overall operating environment becomes resource challenged, understanding the second and third order effects of military or government intervention should become a necessary step in planning. Conducting this type of analysis would help navigate through potential consequences, and ideally avoid those that are most undesirable.⁴⁸ An example of this type of foresight design analysis is the futures wheel, illustrated in Figure 2, which is “a structured brainstorming process to uncover multiple levels of consequences resulting from all types of change.”⁴⁹



Figure 2: Futures wheel diagram
Source: Bengston, “The Futures Wheel...,” 376.

⁴⁸ David N. Bengston, "The Futures Wheel: a method for exploring the implications of social–ecological change," *Society & natural resources* 29, no. 3 (2016): 374.

⁴⁹ Ibid.

The futures wheel method involves first finding the center, which is the change or intervention to occur, then define possible first order impacts.⁵⁰ After the first order impacts have been identified, participants will then identify the second order consequences from those first order impacts.⁵¹ The third order impacts will be conducted in the same method, using the second order impacts as the impetus.⁵² Usually, there are multiple second order effects for each first order impact, and multiple again third order effects for each second order.⁵³ After the wheel has been completed, the results have to be analyzed to identify items such as consequences that are highly desirable or undesirable, what might be surprising, and what could have catastrophic impacts.⁵⁴ The key to being successful with this method is ensuring diversity among participants, including specialists and non-specialists, with a variety of knowledge, cultural, and experiential differences.⁵⁵

Because the futures wheel requires a well-defined center point, this tool could be integrated into other design processes, such as the systemic operational design. For example, the third phase of systemic operational design is the intervention frame, which results in a whole of government strategy.⁵⁶ From there, the futures wheel could be used to determine the follow-on effects from the government strategy. However, if the whole of government response is too broad, then the futures wheel could instead be used for each segment of the response, such as a separate wheel for the military response, diplomatic response, and any others. A joint analysis of all the different wheels could

⁵⁰ Bengston, "The Futures Wheel...", 375, 376.

⁵¹ Ibid., 376.

⁵² Ibid., 374.

⁵³ Ibid., 376.

⁵⁴ Ibid., 377.

⁵⁵ Bengston, "The Futures Wheel...", 375.

⁵⁶ Wass de Czege, "Systemic operational design...", 8.

highlight areas of concern, overlap, or catastrophic failure, as well as potential successes of each part of the combined intervention.⁵⁷

With its specific focus on solving complex problems, design is a viable alternative to replace the OPP. Through different methods such as integral futures or systemic operational design, planners will be enabled to address the complexity of the overall situation and ensure the right problem is being solved. Further, using a foresight method would also help anticipate the impacts of those decisions on a variety of other factors, such as how a military intervention strategy could affect the region's economics if key infrastructure is destroyed.

SHOULD THE CAF SWITCH?

Better or Simply Different?

Some would argue that doing design is not actually a better planning tool, rather it is just another method, with its own faults, that will result in different planning issues.⁵⁸ One concern is that design will lead to false assumptions or theories about the overall environment, particularly if the planners use methods that create limitations or artificially structure the process, such as Political, Military, Economic, Social, Information, and Infrastructure (PMESII) mapping.⁵⁹ PMESII maps, while useful in complicated situations, are not well suited to complex situations because it is too rigid to account for the complexity that arises with human relationships and interactions.⁶⁰

⁵⁷ Bengston, "The Futures Wheel...", 375.

⁵⁸ Thomas, "Spaghetti: systems thinking...", 155.

⁵⁹ Wass de Czege, "Systemic operational design...", 7.

⁶⁰ Ibid.

In this same vein, design dissenters suggest that the elements of design thinking that make it credible, such as the use of experts, adherence to the scientific method, and mathematical analysis, are eliminated with some United States Military models like systemic operational design.⁶¹ Critics do concede that there can be value to the design approach if it is grounded in modelling, hypothesis testing, simulation, evaluation of alternatives, and risks.⁶² Ironically, that caveat is similar to the course of action (COA) evaluation, comparison, and war game portion of the OPP, which leads to the natural question of how it can be measured, or tested, that design will create a better product when compared with OPP. Other critics note that traditional military planning has always accounted for linear and non-linear thinking, as well as incorporating a holistic view of the situation, including non-military elements.⁶³ That acknowledgement suggests that the elements that make design attractive have always been a part of military operational planning, and therefore there is no requirement to switch methods.

Hybrid Model

Understanding that neither design nor OPP are perfect models, there can be an argument for a hybrid model to use both within a planning cycle. As CAF OPP doctrine alludes, the Commander, select staff, and subject matter experts should conduct a design analysis to fully understand the problem and operating environment. From that point, the rest of the planning staff could then continue with the OPP, which would allow for a more detailed analysis.⁶⁴ The benefit to starting with design is ensuring that the problem

⁶¹ Thomas, "Spaghetti: systems thinking...", 157.

⁶² Ibid., 165.

⁶³ Milan N. Vego, "A Case Against SYSTEMIC OPERATIONAL DESIGN," *Joint Force Quarterly: JFQ* no. 53 (Second, 2009): 74,73.

⁶⁴ Wayne W. Grigsby Jr *et al*, "Integrated planning the operations process, design, and the military decision making process," *Military Review* 92, no. 4 (2012): 30, 31.

set and operating environment is defined and understood, as well as helping add in the creativity needed to enact operational art. The design step may also help integrate other actors, such as other government departments, because they are likely more familiar with using design thinking. A factor to decide whether the Commander should conduct a design analysis prior to the OPP is the level of unfamiliarity with the problem.⁶⁵

Unfamiliarity should be a decisive factor, along with complexity, because that means the Commander is not able to rely on an intuitive planning process, such as they did during the studied Brigade exercise.⁶⁶

A proven example of a design and OPP hybrid is the SOCOM model, where it is emphasized to do design first, and operational planning second.⁶⁷ SOCOM has found that a necessary step for this method is to consciously find diverse perspectives to avoid cognitive bias for the operating environment and prevent linear thinking.⁶⁸ Like OPP is suggested to be, this process is iterative, and follows three elements; to first appreciate the context, then define the problem, and third, to develop an approach, with an emphasis on the first step.⁶⁹

A new way to integrate both design and OPP would be to add in a futures wheel during the operational design. The challenge with the current OPP method is identifying and mitigating the possible second and third order effects that could arise from any military intervention. These range from defensive or offensive actions within the cyber or space domain, to considering the economic and stability impacts on a region once the

⁶⁵ Ibid., 32.

⁶⁶ Ibid.

⁶⁷ Ellis and Black, *Complexity, Organization Blinders...*, 4.

⁶⁸ Ellis and Black, *Complexity, Organization Blinders...*, 5.

⁶⁹ Ibid., 7, 11.

intervening military or government organizations have completed their missions. Since the futures wheel generally works best with “relatively narrow, well-defined changes,”⁷⁰ this method would integrate well with operational design because the operation’s parameters will have been drafted and ready to use for this planning stage. The line of operation, or line of operation end state, could work as the center of the wheel. The resultant first, second, and third order impacts may provide insight into possible branch or sequel plans, as well as provide awareness to other agencies, such as those involved in humanitarian assistance, as to what may occur during a military intervention.

This would also be an ideal placement to affect how COAs are developed, be integrated into the operational risk assessment, COA evaluation criteria and war games. Doing this additional step, combined with a design analysis of the problem, will create a more holistic solution to the initial complex problem. Further, the additional time spent on the futures wheel may also help prevent actions that will create devastating effects on the host nation’s economy, or way of life post-intervention.

CONCLUSION

As the physical world and global connections continue to evolve, the current and future operating environment for the CAF will progressively increase in complexity. More adversaries are operating under the threshold of war, and with low barriers to entry for new actors in the space and cyber domains, grey zone conflict has become a tangible reality for Canada. Additionally, with the physical world becoming resource constrained and access to fresh water becomes more challenging, understanding the follow-on effects to any whole of government or military intervention will become increasingly important.

⁷⁰ Bengston, “The Futures Wheel...,” 378.

For those reasons, the CAF needs to consider fully incorporating design into any planning process. Design will help to better understand the problem, and more importantly, ensure that the right problem is being addressed. If the CAF remains fixed on maintaining the OPP for interoperability with other militaries, then using a hybrid solution of design and OPP will help ensure that the complexity is not unnecessarily simplified by reductionist planning.

Further, to appreciate what may occur because of the intervention, planners should consider using a futures wheel to identify possible second and third order effects stemming from the action. Using this method, incorporated into either a design, OPP, or hybrid method, will offer a much broader view of the impact of acting. It also may cause further iterations of either design or OPP planning cycles to try and achieve a better solution for the problem being faced. The current COVID-19 pandemic illustrates this foresight need perfectly. Each action carried out by the government has caused ripple effects through every facet of society, from economics with job losses or manufacturers pivoting to develop medical protective equipment, to foreign policy, with border controls, managing imports, and countering misinformation.

Ultimately, neither design nor OPP are the perfect method. As the operating environment continues to rapidly change, and Commanders face increasing novel or complex situations, the tools used for planning need to be re-examined and validated. If found lacking, the process should be updated to better suit, or retired for something more applicable. Since there are limited studies to the effectiveness of OPP or the design method within a military environment, a review into both could be future area of study. Conversely, developing or testing a more robust hybrid model, particularly with

consideration for follow-on effects, would also provide new perspectives into the CAF planning method.

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