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IS NETWORK CENTRIC WARFARE ESSENTIAL FOR MANEUVER?

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Exercise Solo Flight

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IS NETWORK CENTRIC WARFARE ESSENTIAL FOR MANEUVER?

Introduction

Achieving information superiority using technology is supposed to procure an advantage on the battlefield. It will probably be required in future wars in order to achieve mission success. Network Centric Warfare (NCW) is an enabler that can create, a shared common situational awareness and support key capabilities such as maneuver by linking soldiers, platforms and systems together. A network centric troop should be able to maneuver to a specific target location and achieve success with unmatched precision. NCW procures a tactical advantage to lighter troop that are agile, versatile, effective, that can achieve multidimensional maneuver. NCW concepts are supposed to elevate the power of information by enabling self-synchronization amount the partners.

NCW is changing the way of thinking and "focuses on the combat power that can be generated from the effective linking or networking of the warfighting enterprise."¹ We can think that a military force who possess an effective network-centric approach is having an advantage on the adversary and that a NCW is needed to be effective. The essay argues that a NCW is essential to assure maneuver success in future warfare. The essay begins with a comparison of NCW and war principles. Then it shows how NCW can improve the ability to realize the principles of war. The last part of this essay demonstrates that NCW is an essential enabler to maneuver and that NCW can't alone guaranty success.

¹ David S. Alberts, John J. Garstka, and Frederick P. Stein, Network Centric Warfare: Developing and Leveraging Information Superiority (Washington, D.C.: CCRP Publication Series, 2nd Edition, February 2000), 88, <http://www.au.af.mil/au/awc/awcgate/ccrp/ncw.pdf>

What is NCW?

NCW is a concept introduced formally recently in military doctrine. In this concept, various actors involved in the operational environment aren't independent. They are interconnected, share information and are able to collaborate using highly advanced information technology hardware. NCW objective is to "develop a technologically-driven asymmetric advantage."² NCW should increase intelligence sharing, improve decision process and increase mission efficiency. NCW is about "employing Information Age concepts to increase combat power in war and mission effectiveness in operations other than war."³ NCW should help military forces obtain the flexible and agile posture desired for future success. There are nine guiding principles: "information superiority; shared awareness; speed of command; self-synchronization; dispersed forces; de-massification; deep sensor reach; alter initial conditions; and compressed operations."⁴ These principles best define NCW concept. Are they the same as the principles of war?

What are the principles of war?

Principles of war are different for every army corps. For example, United States military has nine principles of war: "objective; offensive; mass; economy of force; maneuver; unity of command; security; surprise; and simplicity."⁵ Meanwhile Canada military has 10

² Manabrata Guha, *Reimagining War in the 21st Century : From Clausewitz to Network-Centric Warfare* (London; New-York: Routledge, August 2010), 87.

³ Department of Defense, *Network Centric Warfare* (Report to Congress, Washington, DC: U.S. Government Printing Office, July 27, 2001), 3-1, http://www.dodccrp.org/files/ncw_report/report/ncw_main.pdf

⁴ Christopher M. Senenko, "Network Centric Warfare and the Principles of War," (master's thesis, Joint Forces Staff College, 05 April 2007), 9, <http://www.dtic.mil/dtic/tr/fulltext/u2/a468857.pdf>

⁵ Senenko, *Network Centric Warfare . . .*, 14.

principles: selection and maintenance of the aim; maintenance of morale; offensive action; security; surprise; concentration of force; economy of effort; flexibility; cooperation; and administration.⁶ Two armies may possess common principles while their definition differs. Also, it's possible that a principle is named differently but is referring to almost the same definition of another principle. For example, the principle of maneuver for United States is named, by Canada, flexibility.

Therefore, between Canada and United States armies there are eight principles in common and only simplicity, cooperation and administration aren't linked. International organisations such as NATO are using principles of war too for joint operations. Principles are important for armies because they "forms the fundamentals of military operations."⁷ In other words, military action should be established in accordance with these principles. Some of these principles were developed a long time ago and are still applicable today. This is the case for United States and Canada. For Canada we can link them to those "first put forward by Karl von Clausewitz in 1832."⁸ As we saw, principles of NCW and war are different but would it be preferable to have the same principles?

Why NCW and war principles differs?

As noticed before principles of war are relatively old and engraved in military culture. In other words, principles of war persist in time even when they face new concepts such as NCW, swarming, cyber-terrorism, information warfare, etc. These concepts are influencing

⁶ Department of National Defence, B-GJ-005-000/FP-001, CFJP 01 Canadian Military Doctrine (Ottawa: DND Canada, 2009), 2-4, 2-5, http://publications.gc.ca/collections/collection_2010/forces/D2-252-2009-eng.pdf

⁷ Department of National Defence, CFJP 01 Canadian Military . . . , 2-4.

⁸ *Ibid.*, 2-4.

how armies are conducting military operation and how weapon systems are developed. They are expanding the spectrum of conflict and are challenging the dividing boundary between unconventional and conventional warfare. These concepts are "force enablers and will assist the military of the future in the execution of its mission, they do not radically alter the classical principles of warfare."⁹ They are affecting the environment of warfare but they aren't dramatically changing the way of thinking in military affairs and the timeless nature of war, because if this was the case the principles of war would be outdated and would require changes. Therefore, each new concept could develop its own principles, ones that best define that concept. These principles should support those of war and each concept should be able to explain how it contributes to realize the principles of war. These concepts should not be the main reasons for future doctrinal changes but, does that mean that the principles of war would not change?

Why should principles of war change?

Principles of war are in a sense universally adopted. For example: liberty of action; political mobilization; effectiveness, interworking & coordination; etc. are used elsewhere.¹⁰ Principles of war are relevant and will probably remain so in the future, because they are of utmost importance. It's possible to keep the current terms while adjustments to their definition would pave the way to the future warfare. One could argue, that this would not be enough and that the principles of war should be definitely renamed and reinvented in order to reflect how nature of war has changed. Before deciding of any change, it would be necessary

⁹ Senenko, Network Centric Warfare . . . , 2.

¹⁰ Department of Defense, JFSC Pub 1 The Joint Staff Officer's Guide 2000 (Report to Congress, Washington, DC: U.S. Government Printing Office, 2000), D-1, www.bits.de/NRANEU/others/jp-doctrine/JSOfficersGuide%2800%29.pdf

to determine what changed in the nature of war and what could complicate future battlefields.

Fast improvement in technology and emersion of new capabilities are changing the way we fight and the way we plan and execute missions. Future conflicts are likely to involve many partners and will evolve in a operational environment where lines that separate conventional from unconventional warfare will probably become impossible to draw. Principles of war should be enough flexible, useful and capable of integrating future warfare realities. Brian Ettrich argued that the complexity of this century battlefield and the importance of unconventional warfare in future warfare aren't reflected in the actual principles. He mentioned that "cyber-warfare, information warfare, globally-networked adversaries, and the eroding distinctions between war and crime are becoming increasingly important factors for consideration."¹¹ He demonstrated that: mass; surprise; and simplicity should be replaced and he suggested to add: networking; flexibility; complexity; and cultural understanding instead.¹² His logic is, that actual principles of war don't reflect the continuous growing of unconventional means and the complexities that comes with them. Certain particular individuals would add other principles such as speed, which is required in order to keep initiatives while delivering a timely answer. Therefore, principles of war could require adjustments, but each concept will probably maintain their own principles. Theses principals should improve the ability to realize the principles of war.

¹¹ Brian B. Ettrich, "The principles of war: Are they still applicable?" (master's thesis, Army Naval Postgraduate School, June 2005), 35, <http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.894.5275&rep=rep1&type=pdf>

¹² *Ibid.*, 48-52.

How NCW can impact the realisation of principles of war?

NCW should dramatically improve the efficacy of applying the principles of war. This section will highlight what this concept is adding to the eight common principles of war between Canada and the United States armies. It shows that there are limitations to what this concept may achieve. First principle: objective (selection & maintenance of aim).

NCW is supposed to procure information superiority that is required in order to build an accurate, clear and common comprehension of political and military objectives. But the "possession of the same information by disparate forces and commanders can be interpreted and recognized differently by each element."¹³ This represents a challenge especially when working in coalition with soldiers that come from different countries and have different cultures or when dealing with actors that don't come from an army background. In those cases, NCW will not guarantee that the awareness level is the same throughout all the forces even if it successfully ensure that a common picture is achieved. Second principle: offensive (offensive action). By providing information superiority,

NCW should increase the abilities of military forces to surpass or obstruct adversary's decision cycle. It doesn't involve that decision taking by leaders would necessarily be better because the "correct decision might be delayed while the information is interpreted; at worst an incorrect decision could be made."¹⁴ Third principle: mass (concentration of force). NCW would improve abilities of precision strikes because all different platforms available would be linked. NCW will allow military forces to become more dispersed on the battlefield because they will be networked connected. NCW can "leverage information superiority to

¹³ Senenko, *Network Centric Warfare . . .*, 20.

¹⁴ *Ibid.*, 25.

achieve the requisite density of combat power based on effects when needed."¹⁵ Dispersed troops will further depend on the networked system reliability and would become isolated if said system would cease to perform properly. Fourth principle: economy of force. NCW would provide information superiority and therefore military force should be able to better understand what are the weaknesses, locations and capabilities of the adversary. Tangible presence of the troops on the ground could be reduced and allocated somewhere else.

A better understanding of the enemy will allow the use of more appropriate amount of manpower while increasing the saving of resources. Fifth principle: maneuver (flexibility). Military forces with information superiority should have better knowledge of the enemy and therefore should achieve better mobility throughout all operation phases. Sixth principle: unity of command (cooperation). By facilitating synchronization through the different level of entities that are operating in the environment, NCW is helping to achieve this principle. NCW should allow "rapid dissemination of plans, orders, and other key information which will facilitate the achievement of the military objective."¹⁶ In that same vein, the fast dissemination of information with the use of networked technologies would not guarantee that leaders would take advantage of these resources to promote a decentralised approach.

On the contrary, they could micromanage or centralize decision making. Seventh principle: security. NCW should help improve security of troops and equipments using deep sensor reach that can work under extreme conditions and can give advance warning to the troops. Troops relying on the network for their security would be in danger if data were compromised or if the network is corrupted. Information superiority is becoming crucial and "compromise of communication channels will not only imperil military success, but will

¹⁵ Ibid., 26.

¹⁶ Ibid., 31.

doom it to failure."¹⁷ Eighth principle: surprise. Almost all NCW principles are supporting the surprise principle. For example, de-massification will render troops more difficult to localize because their footprints would be smaller. As demonstrated above, NCW can impact positively the realisation of common principles of war used by Canada and the United States.

Maneuver implies more than just moving!

As noticed by Sun Tzu, maneuver is the most complicated aspect of warfare because it requires "turning the devious into the direct, and misfortune into gain."¹⁸ This sentence could be interpreted in various ways and it perfectly shows that the realization of maneuver isn't easily achieved. Maneuver involves more than moving. Maneuver implies the "dynamic and flexible application of various elements [and] can be a vital contributor to efforts specifically directed at keeping an adversary off-balance and in a largely reactive mode."¹⁹ Maneuver involves more than just the physically mobile elements of the military; it must also encompass in future warfare many components such as network, information, cyber security, etc. Maneuver is an agile and flexible way of thinking that is applicable to many elements. Flexibility isn't easy to obtain. It demands "good training, discipline, communications, initiative, and, above all, agility of mind and decisive commanders at all levels."²⁰ Flexibility is required in almost everything because it simplifies alteration of plans and it creates opportunities to benefit from unforeseen situations. With effective flexibility, military forces can become almost unpredictable, because adversaries will have higher difficulty to figure out what would be the next move and how to counter it. As

¹⁷ Ibid., 33.

¹⁸ Sun Tzu, *Sun Tzu on the Art of War*, trans. Gilles M.A. Lionel (England: Allandale Online Publishing, 2010), 25, https://sites.ualberta.ca/~enoch/Readings/The_Art_Of_War.pdf

¹⁹ Ettrich, *The principles of war*. . . , 46.

²⁰ Department of National Defence, *CFJP 01 Canadian Military* . . . , 2-6.

mentioned by William Owen the "purpose of manoeuvre is to gain a position of advantage relative to an opponent."²¹ Manoeuvrability is exploited in order to achieve political and military objectives.

Maneuver is important, it is central in some style of warfare such as maneuver warfare, etc. Maneuver warfare is defined as a "warfighting philosophy that seeks to shatter the enemy's cohesion through a variety of rapid, focused, and unexpected actions, which create a turbulent and rapidly deteriorating situation with which the enemy cannot cope."²² In this definition we can deduce that it's important to be better positioned than the adversary but what is more important is to surpass him with a superior tempo. In order to achieve better tempo, a military force must be able to create opportunities and exploit them. This will require to have elements and capabilities that possess the required flexibility that can adjust rapidly to new orders.

William Lind goes in the same direction when he mentioned that military culture of maneuver warfare is built "through decentralization and shared objectives, it is a culture that is comfortable with a disorderly world and can function effectively in that world."²³ The importance of maneuver in military culture will probably remain high in future warfare.

Maneuver will remain essential in 2040 future warfare?

As noticed previously maneuver is already present in all new concepts such as: cyber-warfare; NCW; information warfare; cyber-terrorism; etc. that are complicating the battlefield. Conversely, these concepts impact the realisation of maneuver. The department of National

²¹ William F. Owen, "The Manoeuvre Warfare Fraud," Small Wars Journal (September 5, 2008): 8, <http://smallwarsjournal.com/jrnl/art/the-maneuver-warfare-fraud>

²² Ibid., 4.

²³ William S. Lind, "The Theory and Practice of Maneuver Warfare", in *Maneuver Warfare: An Anthology* (edited by Richard D. Hooker. Novato: Presidio Press, 1993), 17.

Defence in a recent publication of three volumes on Canada's Future Army mentioned that the world of 2040 will be characterised by "disputes arising over territorial boundaries"²⁴ especially because of pressures resulting from increasing rarity of many resources and supplies. Also this will happen because of "continuing urbanization within most regions; and the growing influence of non-state actors, including inter alia warlords, local militias and gangs, terror and criminal entities, and private military companies."²⁵ Communication, information and robotic systems will continue to enhance abilities of soldiers equipments and will probably be part of soldier self body.

In this digital world where lots of objects such as weapon systems, sensors, etc. would be connected and networked together, "sophisticated science and technology may perhaps be the major enabling factor contributing to success in the future operating environment."²⁶ We can expect that unconventional warfare, information warfare, cyber warfare and low-intensity conflict are more likely to occur than conventional war because of their advantages regarding mobility.

As mentioned before, in 2040 future warfare, boundaries should be more blurred and continuous improvement in science and technology will allow non-state and state actors to act more easily anywhere using different capabilities. Therefore, soldiers will need to be able to maneuver effectively in full continuum of operations and the principle of maneuver, as an agile way of thinking, will be omnipresent. NCW will remain also an important enabler to maneuverability.

²⁴ Department of National Defence, B-GL-007-000/JP-007, Canada's Future Army, Canada's Future Army, Volume 1: Methodology, Perspectives and Approaches (Ottawa: DND Canada, 2015), 38, http://publications.gc.ca/collections/collection_2017/mdn-dnd/D2-354-1-2015-eng.pdf

²⁵ Ibid., 71.

²⁶ Ibid., 60.

NCW is an essential enabler to maneuver!

NCW is a concept that shouldn't disappear soon. The third volume on Canada's Future Army, specifies that in 2040 future warfare the "missions and tasks the Army would be expected to perform will undoubtedly vary in frequency and significance in each alternative world."²⁷ In the materialist gone mad world we could expect missions such as: humanitarian relief operation; counter cyber attack; and counter terrorist and in global quagmire world it should more likely be: border security; warfighting; and humanitarian relief operation.²⁸

In these two worst case scenarios, missions expected to be accomplished will require an excellent network of communication. Another important observation is that for "each of the four alternative worlds, most of the current Army capabilities will remain largely unchanged."²⁹ NCW will remain a key concept because it will be present to ensure that capabilities needed are networked together. For example, in 2040 future warfare, it will remain critical to possess networks that have the ability to: support, deployed and domestic operations; effectively be interconnected in coalition; be connected with civilian partners; rapidly analyse large amounts of data; improve decision and decentralising process; etc. NCW will remain an important enabler for maneuver because it will contribute to realize agile thinking.

NCW offers the: battlespace situational awareness; flexibility; freedom of action; and operational duration and distance required in order to operate on every operation levels simultaneously. Maneuver will not be as effective without NCW especially because "information

²⁷ Department of National Defence, B-GL-007-000/JP-011, Canada's Future Army, Volume 3: Alternate Worlds and Implications (Ottawa: DND Canada, 2017), 50, http://publications.gc.ca/collections/collection_2018/mdn-dnd/D2-354-3-2017-eng.pdf

²⁸ Ibid., 52-56.

²⁹ Ibid., 60.

will become more important than the weapons of war in future conflicts."³⁰

In other words, real-time situational awareness will be required at all operational levels. In order to achieve this, information pertinent and available, will need to be present on the network when and where needed. Military forces would have difficulties to maneuver efficiently if they cannot achieve information superiority and use it at their advantage. NCW gives "a military force the tools and capabilities needed to . . . dominat[e] the maneuver contest within the operational area."³¹

NCW can't alone guaranty maneuver success

NCW is a key concept that will remain essential in 2040 future warfare. It can't alone guarantee success in future warfare because it's a complex concept among so many. Networked system can be disrupted and even if everything is functioning normally decisions are made by humans which can interpret information differently. The vision of NCW depend on the "establishment of an information technology based network that will allow for the sharing of real-time, accurate information across the expanse of the operational environment."³² NCW contribute to achieve information superiority and will contribute to realize maneuver but also the remaining principles of war.

Information superiority is among many other factors which can improve flexibility. For example, anti-network capabilities such as electronic warfare and cyber capabilities such as satellite, unmanned vehicles, communication are factors that definitely will have deep impacts

³⁰ Senenko, Network Centric Warfare . . . , 39.

³¹ Bobbie L. Randall, Sun Tzu : The Art of Network Centric Warfare (USAWC Strategy Research Project, Carlisle Barracks: Pennsylvania, March 2001), 14, http://www.iwar.org.uk/rma/resources/ncw-sun-tzu/Randall_B_L_01.pdf

³² Senenko, Network Centric Warfare . . . , 46.

on maneuver when facing an adversary that possess also these capabilities. Maneuver success is thus dependant of many concepts, elements and capabilities. Each having a certain importance depending of the type of adversary faced. Another important point is that maneuver can't depend only on concept such as NCW because network is vulnerable and a "centralized network could be destroyed by targeting its node."³³ In fact, "networking of a myriad of sensors, satellites, platforms, and human users creates a complex technical environment that is far from simple."³⁴

Therefore, it is impossible to protect all the components of the networking system. Dispersed troops have to be able to maneuver when there is a problem with the network. Same thing applies to weapon system, logistic, command and control, etc. Relying too much on NCW to ensure shared understanding and maneuver can have huge consequences if an enemy disrupts it or if said technology cannot gather the information needed, when required.

Conclusion

This essay tentatively demonstrated that each new and innovative concept should have their own principles and that these principles could differ from the war principles. These principles should improve the ability to realize the principles of war. NCW impact in a positive way the realization of the principles of war. NCW is essential to ensure maneuver success in future warfare. NCW concept, if achieved, protected and maintained, is a force enablers that can drastically improve the capabilities of military forces. Information

³³ Manabrata, Reimagining War in . . .,102.

³⁴ Senenko, Network Centric Warfare . . ., 36.

superiority will continue in future warfare to occupy a central place.

NCW concept can definitely contribute to achieve information superiority by establishing an information technology based network. NCW can't alone guarantee maneuver success in future warfare. Indeed, it is a concept among many others which can influence maneuver. NCW is certainly a key concept that will impact most maneuver in future warfare. It isn't an infallible concept though. It requires backup systems in order to ensure that military forces will be able to conduct uninterrupted fight using all its capabilities. The importance of the human factor will remain essential in future warfare because even with the best system and concepts in place, human that build, maintain and use them will influence their global efficiency.

BIBLIOGRAPHY

Books

Alberts, David S., John J. Garstka, and Frederick P. Stein. *Network Centric Warfare: Developing and Leveraging Information Superiority*. Washington, D.C.: CCRP Publication Series, 2nd Edition, February 2000. http://www.iwar.org.uk/rma/resources/ncw/ncw_2nd.pdf

Guha, Manabrata. *Reimagining War in the 21st Century : From Clausewitz to Network- Centric Warfare*. London; New-York: Routledge, August 2010.

Tzu, Sun. *Sun Tzu on the Art of War*. Translated from the Chinese by Gilles M.A Lionel.

England: Allandale Online Publishing, 2010.

https://sites.ualberta.ca/~enoch/Readings/The_Art_Of_War.pdf

Chapter or Part of a Book

Lind, William S. "The Theory and Practice of Maneuver Warfare." In *Maneuver Warfare: An Anthology*, 3-18, edited by Richard D. Hooker. Novato: Presidio Press, 1993.

Periodicals

Article in a Journal (Electronic) Owen, William F. "The Manoeuvre Warfare Fraud." *Small Wars Journal* (September 5, 2008): 1-9. <http://smallwarsjournal.com/jrnl/art/the-maneuver-warfare-fraud>

Unpublished Materials

Thesis or Dissertation

Senenko, Christopher M. "Network Centric Warfare and the Principles of War." Master's thesis, Joint Forces Staff College, April 2007.

<http://www.dtic.mil/dtic/tr/fulltext/u2/a468857.pdf>

Ettrich, Brian B. "The principles of war: Are they still applicable? " Master's thesis, Naval Postgraduate School, June 2005.

<http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.894.5275&rep=rep1&type=pdf>

Public Documents

DND Doctrine Manuals and Publications

Canada. Department of National Defence. B-GJ-005-000/FP-001. CFJP 01 Canadian Military Doctrine. Ottawa: DND Canada, 2009.
http://publications.gc.ca/collections/collection_2010/forces/D2-252-2009-eng.pdf

Canada. Department of National Defence. B-GL-007-000/JP-007. Canada's Future Army, Volume 1: Methodology, Perspectives and Approaches. Ottawa: DND Canada, 2015.
http://publications.gc.ca/collections/collection_2017/mdn-dnd/D2-354-1-2015-eng.pdf

Canada. Department of National Defence. B-GL-007-000/JP-011. Canada's Future Army, Volume 3: Alternate Worlds and Implications. Ottawa: DND Canada, 2017.
http://publications.gc.ca/collections/collection_2018/mdn-dnd/D2-354-3-2017-eng.pdf

U.S. Doctrine Manuals or DoD Publications

United States. Department of Defense. Network Centric Warfare. Report to Congress, Washington, DC: U.S. Government Printing Office, July 27, 2001.
http://www.dodccrp.org/files/nw_report/report/nw_main.pdf

United States. Department of Defense. JFSC Pub 1 The Joint Staff Officer's Guide 2000.

Washington, DC: U.S. Government Printing Office, 2000. www.bits.de/NRANEU/others/jp-doctrine/JSOfficersGuide%2800%29.pdf

Other

Randall, Bobbie L. Sun Tzu : The Art of Network Centric Warfare. USAWC Strategy Research Project, Carlisle Barracks: Pennsylvania, March 2001.
http://www.iwar.org.uk/rma/resources/nw-sun-tzu/Randall_B_L_01.pdf