THE ROLE OF GEOGRAPHICAL INFORMATION SYSTEMS FOR DECISION MAKING IN SRI LANKA ARMY NETWORK CENTRIC WARFARE

By

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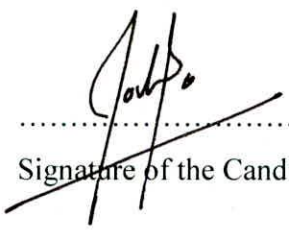
DECLARATION

The work described in this thesis was carried out by me under the supervision of Prof. Krishan Deheragoda, Department of geography, university of sri Jayawardanapura and Mr Prabath Malavige, Teaching faculty member of the M.Sc. degree in GIS and Remote Sensing at Department of geography, University of Sri Jayawardenepura. This has not been submitted in whole or in part to any University or any other institution for another Degree/Diploma.



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We certify that the above statement made by the candidate is true and that this thesis is suitable for submission to the University for the purpose of evaluation.

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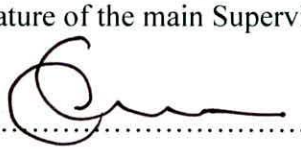

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ABSTRACT

Warfare today is of that Information age and is largely dependent on Information Technology. This has a great influence on correct decision making. Thus information fusion serves as a major component of the Military Decision Making Process (MDMP). The accuracy of the information and its rapid dissemination are the core pillars complimenting information fusion and thereby supporting the MDMP. This phenomenon brings to light that the MDMP is dependent on accuracy and speed. These factors are interrelated and should work in concurrence to achieve synergy in any operation if the desired results are to be achieved. This right combination of GIS over NCW is of course an added value in MDMP which supports it by thinning time out and preserving accuracy. As such it is the driving force in speeding up own Decision and Action Cycle thus providing a competitive advantage over the enemy Decision Cycle. This research discusses on these phenomenon and focus on its potentials to improve MDMP in Sri Lankan context by molding GIS over NCW.

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LIST OF ABBREVIATIONS

1.	Army Battle Command System	-	ABCS
2.	Battle Command Support Environment	-	BCSE
3.	Battle Damage Assessments	-	BDA
4.	Battle Management and Control Center	-	BMCC
5.	Battle Management Language	-	BML
6.	Center for Research and Development	-	CRD
7.	Command and Control	-	C2
8.	Command, Control, Communication, Computers and Intelligence	-	C4I
9.	Command and Control Warfare	-	C2W
10.	Commander's Support Environments	-	CSE
11.	Common Operation Picture	-	COP
12.	Communication and Information Systems	-	CIS
13.	Course Of Action	-	COA
14.	Department of Defence	-	DoD
15.	Digital Elevation Model	-	DEM
16.	Electronic Warfare	-	EW

17.	Geographical Information System	-	GIS
18.	Geoinformation for Static Defence Applications	-	GISDA
19.	Imagery Intelligence	-	IMINT
20.	Information Technology	-	IT
21.	Intelligence Preparation of the Battlefield	-	IPB
22.	Intelligence, Surveillance and Reconnaissance	-	ISR
23.	Military Decision Making Process	-	MDMP
24.	Network Centric Operations	-	NCO
25.	Network Centric Warfare	-	NCW
26.	Operations Security	-	OPSEC
27.	Precision Engagement	-	PE
28.	Psychological Operations	-	PSYOPS
29.	Remote Sensing	-	RS
30.	Tactics, Techniques and Procedures	-	TTPs
31.	Unmanned Aerial Vehicle	-	UAV

DEFINITION OF TERMS

Command and Control (C2). C2, in a military organization can be defined as the exercise of authority and direction by a properly designated commanding officer over assigned and attached forces in the accomplishment of the mission. Further, command and control refers more generally to the maintenance of authority with somewhat more distributed decision making.

Command and Control Warfare (C2W). C2W is integrated use of operations security (OPSEC), military deception, psychological operations (PSYOPS), electronic warfare (EW), and physical destruction, mutually supported by intelligence, to deny information to, influence, degrade, or destroy adversary C2 capabilities, while protecting friendly command and control capabilities against such actions.

Communication and Information Systems (CIS). The CIS is defined as assembly of equipment, methods and procedures and if necessary personnel organized so as to accomplish specific information conveyance and processing function.

Electronic Warfare (EW). EW refers to any action involving the use of the electromagnetic spectrum or directed energy to control the spectrum, attack an enemy, or impede enemy assaults via the spectrum. The purpose of EW is to deny the opponent the advantage of, and ensure friendly unimpeded access to, the EM spectrum. EW can be applied from air, sea, land, and space by manned and unmanned systems, and can target communication, radar, or other services

Geographical Information System (GIS). A geographic information system, geographical information system, or geospatial information system is the system that captures, stores, analyzes, manages, and presents data with reference to geographic location data.

Geoinformatics. Geoinformatics is the science and the technology which develops and uses information science infrastructure to address the problems of geography, geosciences and related branches of engineering.

Information Technology (IT). IT is the acquisition, processing, storage and dissemination of vocal, pictorial, textual and numerical information by a microelectronics-based combination of computing and telecommunications. The term in its modern sense first appeared in a 1958 article published in the Harvard Business Review, in which authors Leavitt and Whisler commented that the new technology does not yet have a single established name.

Military Decision Making Process (MDMP). The MDMP is a single, established, and proven analytical technique. MDMP helps the commander and staffs examine a battlefield situation and reach logical decisions. The commander can decide to use the complete or abbreviated version.

Military Deception. Military deception is an attempt to amplify, or create an artificial fog of war or to mislead the enemy using psychological operations, information warfare and other methods. As a form of strategic use of information (disinformation), it overlaps with psychological warfare. To the degree that any enemy that falls for the deception will lose confidence when it is revealed, he may hesitate when confronted with the truth.

Networking. Network, is a collection of computers, apparatus and devices interconnected by communications channels that facilitate communications among users and allows users to share resources. Networks may be classified according to a wide variety of characteristics. A network allows sharing of resources and information among interconnected devices with greater accuracy, speed and security.

Network Centric Warfare (NCW). NCW is a new military doctrine or theory of war pioneered by the US Department of Defense. It seeks to translate an information

advantage, enabled in part by IT, into a competitive advantage through the robust networking of well informed geographically dispersed forces. This networking, combined with changes in technology, organization, processes, and people may allow new forms of organizational behaviour.

Network Centric Operations (NCO). In common usage, NCO is an alternative explanation to NCW. However, NCO is more specifically focus of operations based on Network Centric Environments.

Operations Security (OPSEC). OPSEC is a process that identifies critical information to determine if friendly actions can be observed by adversary intelligence systems, determines if information obtained by adversaries could be interpreted to be useful to them, and then executes selected measures that eliminate or reduce adversary exploitation of friendly critical information.

Psychological Operations (PSYOPS). PSYOPS are planned propaganda operations to convey selected information and indicators to foreign audiences to influence their emotions, motives, objective reasoning, and ultimately the behaviour of foreign governments, organisations, groups, and individuals.

Remote Sensing (RS). Remote sensing is the small- or large-scale acquisition of information of an object or phenomenon, by the use of either recording or real-time sensing device(s) that are wireless, or not in physical or intimate contact with the object (such as by way of aircraft, spacecraft, satellite, buoy, or ship). In practice, RS is the stand-off collection through the use of a variety of devices for gathering information on a given object or area

Targeting. Targeting is the process of selecting targets and matching the appropriate response to them on the basis of operational requirements, capabilities and limitations.