CLAWS SEMINAR REPORT

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NON CONTACT WARFARE (NCW)

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at Manekshaw Centre, New Delhi

The Centre for Land Warfare Studies (CLAWS), New Delhi, is an autonomous think tank dealing with contemporary issues of national securityand conceptual aspects of land warfare, including conventional and sub-conventional conflicts and terrorism. CLAWS conducts research that is futuristic in outlook and policy-oriented in approach.

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EXECUTIVE SUMMARY

- NCW may be defined as "warfare which involves the integrated application of all national capabilities, with technology playing a major role to degrade, disrupt or destroy systems/targets, while ensuring minimum physical contact of own forces". It aims at achieving a quick, decisive victory by disrupting, denying and destroying the enemy war waging potential by remote delivery of destructive kinetic energy and soft power through relentless information operations.

- NCW will coexist with conventional forms of warfare; however the balance between the two may change based on aims and goals.

- Doctrinal changes within the forces should occur before any organisational structures are altered.

- Peace time big data initiatives like the X Data program of DARPA aim to ease out the decision making process for military operations and reduce the element of surprise. The program lessons could be applied to India-specific data as the software is available from open source.

- In this kind of conflict, the difference between a combatant and a non-combatant is blurred. Non state actors are the biggest threat especially in the Cyber domain. The role of NCW is in defeating the enemy from within rather than physically neutralising the enemy. All military and civilian agencies need to get involved when it comes to the issue of NCW.

- One of the real concerns with respect to NCW is the safety and security of cyber information systems. A breach in such systems can cause significant damage to infrastructure/civic amenities and cripple nations/specific systems.

- The non-military application of unmanned systems like robots, autonomous and other artificially intelligent systems will be a key component of NCW. It is evident that future wars will see a growing trend of unmanned engagements. The defence mechanisms of these systems will need to be developed and implemented.

- "War is about forcing ones political will on the adversary". Information Warfare is a critical and visible component of the nation's war fighting capability, but it is not the only form of warfare and other conventional capabilities must develop simultaneously.

- The role of Non-Governmental Organisations is also important since their operations can not only highlight but also derail a number of issues/activities in a nation. Funding pattern and activities of these organisations which are constantly proliferating need to be monitored systematically.

- Social media has introduced a new dimension to NCW as it can mobilise a large target audience internationally. Coupled with media, this is emerging as a potent force which can be exploited to own advantage.

- The underlying principle of NCW is to degrade, disrupt or destroy the military capabilities, defence and industrial production, communications, finance, infrastructure, information resources or trade in an overt or covert conflict. Vulnerabilities of a networked society living in smart cities in the future become more worrisome since any disruption will have devastating effect on the psyche of the people at large. There is a need to bring accountability and sense of responsibility in the critical information infrastructure including military.

- Own Cyber Warfare capabilities need to be addressed with specific reference to development of network offense, indigenous operating system and search engine, create a resource pool of skills to develop cyber warfare tools and develop ASAT and DEW capability.

- At the operational and tactical levels, realistic training of all stakeholders is of primary importance. Targets should be identified in peace time for offensive actions during hostilities. Hardening, survivability and redundancy of networks, equipment, weapon systems and the inspection for 'bugs' needs to be done. Operating in hostile Cyber, EW and CBRN environments needs to be part of own training regimen.

DETAILED REPORT

"War is not a mere act of policy but a true political instrument, a continuation of political activity by other means" - *Clausewitz*

Introduction

1. The concept of war expands as technology provides new options and means. The induction of long range missiles, high precision smart weapons, unmanned systems, robots and satellites, has given military planners a new dimension in the prosecution of war. This kind of war, which is primarily driven by technology and aimed at achieving a quick, decisive victory by disrupting, denying and destroying the enemy war waging potential by remote delivery of destructive kinetic energy and soft power through relentless information operations is termed as "No Contact" or "Non Contact Warfare".

2. Knowledge and information based dominance of the adversary, collection of intelligence and denial of information are some applications of technology in vogue and under development. Terrorist and insurgents now use information technology and modern system to their advantage for propaganda, recruitment and operations. There has been increasing research in the field of prompt response systems, space, robotics, artificial intelligence and data science for development of technologies to be used in military operations both offensive and defensive.

3. With an aim to debate issues related to the subject, Centre for Land Warfare Studies conducted a Seminar on 23 Sep 2015 themed "Non Contact Warfare (NCW)". The seminar brought together experts related to different facets of the subject to include members of the strategic community, specialist officers from the three services, industry, relevant ministries and R&D organisations. The seminar was successful in bringing forth the intricacies of this relatively new concept of warfare.

4. The speakers who took part in the Seminar were as under:-

   - Lt Gen MMS Rai, PVSM, AVSM, VSM, Vice Chief of Army Staff

- Lt Gen Rakesh Sharma, UYSM, AVSM, VSM, Adjutant General
- Brig ND Prasad , MI Dte , HQ IHQ of Ministry of Defence
- Dr Yogesh Simmhan, Indian Institute of Science, Bangalore
- Mr T Ravinder Reddy, Accenture
- Maj Gen Ajeet Bajpai, (Retd)
- Dr S Chowdhary, Indian Institute of Technology, Delhi
- Dr Swagat Kumar, TCS
- Mr Rakesh Kharwal, Intel Security
- Dr J Bhattacharya ,C-DEP Delhi
- Col Rakesh K Pandey, HQ IDS
- Lt Col J Anand Kumar, MCTE Mhow

5. The salient observations and recommendations of the seminar are given in the following paragraphs.

Technological Aspects of NCW

6. The relevance of technology in NCW will grow rapidly with time. Presently the following aspects can be identified which are integral to NCW capability:-

(a) **Nano Technology, Robotics and AI.** Many conflicts of the future are going to be replaced with ubiquitous robots which will have the capability to undertake autonomous mission with precision. The development in the field of artificial intelligence (AI) has given capabilities in unmanned offensive weapon systems, remote attack capabilities, wearable technologies,

decision support systems, automated explosive disposal, mine clearance, medical and casualty evacuation. Future robotic developments are going to give us capabilities like scanning cyber space and unmanned strikes. In the field of C4ISR, some progress has already been made, but with AI and Neural network based equipments, the battle field will become more transparent thus challenging the existing methods of deception.

(b) **Cyber Technology**. In Cyber space, small nations like North Korea have demonstrated a capability to take on technologically superior nations like United States. Stuxnet and Flame attack against Iran and Estonia proves the power of cyber warfare to shift the focus from conventional to "virtual" domain. Doctored videos in the social media and manipulation of social media by vested interests can create social unrest. An unseen battle in the cyber space is already on and will become more complex in future with the increasing investments into cyber technology.

(c) **New Technologies**. High altitude EMP can be used to disable communication network and jam satellites. LASERs with capacity to deliver directed energy which is under development along with Particle Beam and High Power Microwave will be used in many innovative ways to destroy the enemy capabilities. With High Frequency Active Auroral Array devices, US is planning to have full spectrum dominance by 2020, by which it intends to modify weather, disable satellites and cruise missiles and disrupt global communication systems. Advanced research in the field of Extremely Low Frequencies, Flux Compression Generators and Virtual Cathode Oscillator is going to change the landscape of NCW.

(d) **Space Technologies**. The development in the field of drones, satellite technology, anti satellite technology, aircrafts including hypersonic vehicles, HEMP etc are so disruptive that a whole generation of technology is getting outdated in less than a decade. Space as a platform to fight future wars is a reality with capabilities being developed to disable or destroy satellites or other space based assets.

(e) **Stand off Capabilities**. Directed Energy Weapons (DEW), Ballistic Missiles and Ballistic Missile Defence, UAVs, UCAV and drones are going to reduce the standoff distance and will be able to strike with precision or intercept accurately.

(f) **Social Media.** It is emerging that "trolls" or robotic feeds and paid commentators are being used to sway social media trends and public opinion.

7. **Information Dominance**. The key to achieving ascendency in NCW would be the control of information. Hence programmes such as the X Data program of DARPA, part of the big data push of the US government are significant new initiatives. There is a need to develop tools for comprehensive and rapid processing, elegant analytical presentation of large imperfect data volumes. The results for the X Data program which are available on the open source could be applied to India-specific data. In this new generation warfare, technological tools are freely available to professionals and more importantly the general public. Transparent battlefields would require nations to achieve zero collateral damage and surgical precision.

Non Military Overview of NCW

8. The basic aim in the non military domain of NCW is to develop systems or ideas into a destructive weapon that has both direct and indirect impact on the rival nation's will. It may take many forms encompassing economic, diplomatic, and psychological dimensions, in addition to the earlier land, sea, air, space, and electronic spheres. The central premise in military thinking of certain advanced nations stipulates that they should be prepared to conduct "warfare beyond all boundaries and limitations". Beyond military spheres include diplomatic, data network, intelligence, psychological, technological, smuggling, drug, social simulated war, financial trade, resources, economic aid, legal, sanctions, media, and ideological war.

9. The non-military application of unmanned systems like robots can be categorised into industrial and non-industrial. In the industrial sphere, factories make use of such systems in areas where the nature of work is repetitive and working space is constrained or hazardous. In the non-industrial sphere, such systems like drones are primarily employed in dynamic operations. Robots are predominantly employed in the defence sector to carry out missions like reconnaissance, surveillance, mine sweeping etc. However in recent times there has been a significant leap in the application of robots in the civilian domain, which is driven by the service sector and not by the industrial sector. Robots are being used in disaster management (SAR), as mules to carry load, in warehouse logistics functions, in autonomous transport systems while drones are being used in aerial photography and in monitoring of oil pipelines.

10. A new dimension is the role of Non-Governmental Organisations (NGOs). NGO activities can not only highlight but also derail a number of issues/developments in a nation. They can cause social disharmony, religious discord and even financial panic. This would impact the said nations and is another form of NCW.

Military Overview of NCW

11. Maintaining contact with enemy and causing destruction, is the aim of battle. This contact can be maintained physically or digitally, and this digital means constitutes a part of NCW. As warfare increasingly turns network centric, the distinction between the military and non-military domains would become blurred. The development of offensive cyber capabilities is being pursued by most modern militaries. Computer controlled and GPS guided long range delivery systems like missiles and munitions are now an integral part of conventional force structures. In the military domain, the tools of NCW would address C4ISR systems, information systems, precision weapons, long range weapon delivery platforms, underwater platforms, navigation and tracking systems, robots and the defence industrial base amongst others, hence protection of own and disabling/ destruction of the adversary is a NCW requirement. Conventional militaries have evolved and are supported by extensive known infrastructure, hence there is a pertinent need to develop the same in the non contact domain.

12. **NCW in the Indian Context.** The following are the aspects of NCW application :-

(a) **C4ISR.** Within the services and at the operational level, lateral sharing of information is at a nascent stage. The problem is that each service wants an exclusive network, as they do not want secrecy to be compromised. HQ IDS and the defence communication network will now try bridge this gap. A secure and robust networked environment will protect against NCW.

(b) **New Technology Weapons.** New types of weapon systems needs to be devised such as directed energy weapons like charge particle beams, nuclear particle beams and high power microwaves.

(c) **Space Technology.** Whilst progress has been made in the fields of satellites and BMD, the military domain and offensive capabilities need enhancement. There is a need to have a military space doctrine at the national level.

(d) **Artificial Intelligence and Big Data Analytics.** Although there is no formalised road map in India in this domain, the government and the industry are progressing in a concerted manner to bridge the gap, which the military should absorb quickly.

(e) **Cyber Warfare.** The government has setup a monitoring system for the cyber domain and documents have been issued which gives clear directives to defence forces and to other national agencies. The National Cyber Coordination Centre (NCCC) will be operational in early time frame. Within the services, the Cyber Emergency Response Teams are functional. HQ IDS has been designated as the core agency which will coordinate the raising and functioning of the much anticipated Tri Services Cyber Command.

(e) **Missiles.** India has made significant advancement in its quest towards indigenous development of long range missile systems, thereby giving the nation a boost in its overall NCW capability.

13. **NCW Capabilities of our Neighbours**. China has achieved significant progress in the development of NCW capabilities, as highlighted by journal articles emerging from Chinese scholars. It emerged during the deliberations that the scale, reach and scope of their NCW capabilities is however limited, and China is still finding its way out in terms of weaponized drones.

Limitations of NCW

14. NCW is not the panacea for all our warfare related challenges. NCW will degrade, disrupt and destroy capabilities across all domains but cannot replace the physical occupation of territory. Conventional conflicts will continue and the requirement of *boots on the ground* cannot be understated. At the national level we need to address the robustness of economic and political systems, managing the perception of own people and that of the potential adversaries. Developing military and civilian educational institutions for augmentation of skill sets and problem solving

of issues related to integration and interoperability aspects need to be considered. Preparation for NCW will entail investment in R&D especially in science and technology.

Conclusion

15. Modern warfare includes politics, diplomacy, religion and ideology, social tools, infrastructure and financial systems in addition to the conventional war capability. Hence the knowledge of NCW is critical to gain an advantage in the fields other than conventional warfare. The domains of space, air, maritime, cyber, social media and technology are accessible to all adversaries which includes the non-linear and covert dimensions. Today the biggest challenge to national security is to tackle non-state actors who can range from private, non-governmental, multi-national multilateral and criminal syndicates, without any disruption of life in civil society. As a nation, we need to analyse, debate and discuss components of NCW, such as its stand-off capabilities, use of directed energy weapons, climate change, demography, migration patterns, climate change, corruption and resource control. We also need to evaluate the cost of security against NCW.

16. To counter the increasing frequency and intensity of NCW attacks, the armed forces need to fine tune the methods and art of warfare including doctrine, organization and training methodologies.

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