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Directed Energy Weapons as a Part of National Security Policy for the Three Indian Armed Forces as a Weapon by 2050

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Abstract: ***A country's growth is directly related to the political stability it has. Political stability is attained by ensuring both internal and external security. Internal security is governed by political ideals and mandates which has been accepted by the majority of the country's population in a democratic setup. The institutions like the parliament where the representatives of the population set rules and laws have to be responsible for providing the internal security. A mature democracy ensures that the country survives and grows.External security on the other hand depends upon different criteria. This involves more of diplomacy, political leadership its stand and vision, attitude of the neighbors, support in international forums, financial standing etc. An important factor which also governs the external environments is the reaction to a nation's military might. Though this is factor which in the present scenario of global peace, no nation wants to admit openly but it is a hidden fact that the respect for a country is also due its military capability. In the Indian context, we have been pursuing a 'Gandhian' philosophy right from the time we gained independence. We have been shy to project our military might even to countries inferior to us and allowed them to become troublemakers for us. This trend seems to change after seven decades after independence. Many prominent scientist of the yore like Shri Homi Bhaba, Shri Vikram Sarabhai, His Excellency Shri Abdul Kalam and many more eminent people have propagated that the country has to be ahead in defense technology so that an edge can be maintained over its enemies.The concept of DRDO and its labs were based on this philosophy. Today there are many private labs also who are engaged in providing superior technology for making our defence services more advanced in comparison to the other nations in the world. These technologies are commonly termed as the Revolutionary in military affairs 'RMA'. One such RMA is the Directed energy weapon being developed by all the progressing nation in the world. Each country that is in this race is at different levels of development based on its technical backbone and political will. This research has been done to bring to the fore the various agencies which are or should be involved in this race so that by a timeline of 2050 the Indian armed forces are possessing this technology in a fully operation form to ensure that the agents who want to disrupt the stability of the country and hinder its growth are put in place and prevented from doing so.***

Keywords: Directed energy weapons, Kinetic Energy weapon, Laser, Microwave, RMA

1. Introduction

It is a known fact that the future of weapons beyond that of the existing Kinetic Energy Weapon (KEW) lies in the development of Directed Energy Weapons(DEW). With greater use of electronic and wide dependence on the space-based assets of any nation, the most potent attacks can be administered on these by DEWs. The doctrine to undertake such operations also need to be developed parallel. This development normally lags the technological development and employment of new technology and tactics. In order to form a doctrine, the feedback must be obtained from joint exercises and operations conducted in consonance of the prevailing joint doctrines or the services doctrine. The time-tested principles get reconfirmed by conduct of such exercises and allows the aggressive exploitation of the enemy's venerability while enforcing our own strength.

It will be prudent in this background if we analyse, examine and assess the potential of DEW vis a vis our current policy and doctrine and define a set for developing policy and doctrine or blocks of the doctrine in context of the national security strategies, defence security strategy, strategic security review and the national space policy. An attempt has been made in this chapter to define the national common vision for DEW, by assessing the traditional global strike systems capabilities with limitations of defining and aligning the Dew policy with the existing policies. A study and analysis of the lesser understood aspects of DEW and the compelling reason for India to factor these weapons into the security equation, giving due political consideration for its induction, dovetailing them with the existing policy and doctrine of network centric operations and EW, training aspects, resource development and force modernization have been presented in this article

1) DEW-The future of modern warfare

Existing literature in the net reveals that the countries like USA, Russia, France and China are making developments in this field to cater for both defensive as well as offensive operations. The basic technology for Dew is already here and arrived in its form. They are being pursued for making the more widespread, more powerful, more available and more lethal for the battlefields of tomorrow. They will have the rarer distinction of being the first DEW to have both offensive as well as defensive capabilities.

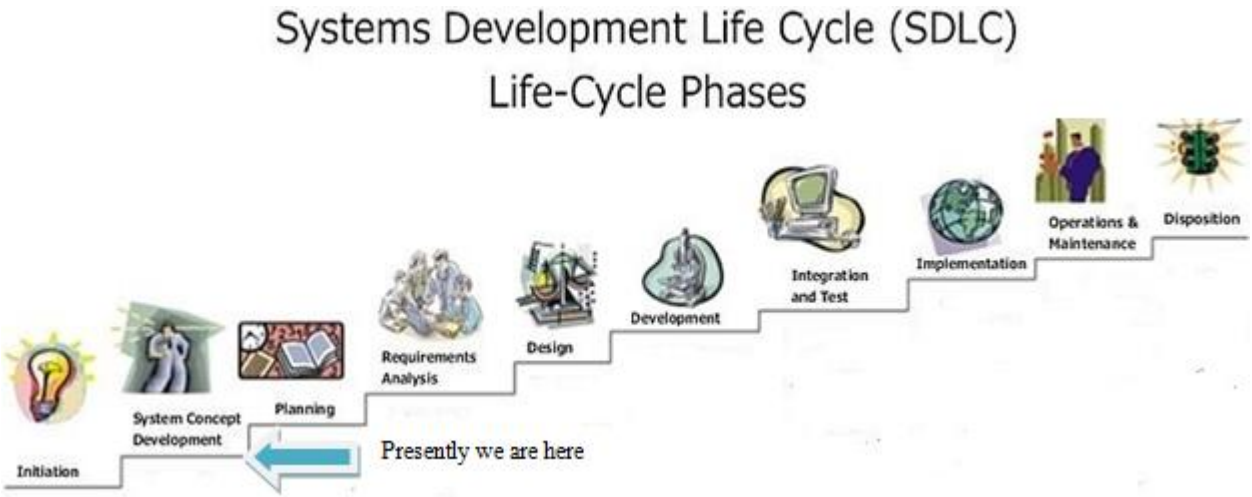
If we compare the properties of NBC and DEW, we observe that all the three NBC weapons can produce high casualties, at a very high rate and is indiscriminate in its application. Laser and microwave are somewhat different. They can both be used indiscriminately but cannot be classified as WMD. Microwave can be totally non-lethal while both laser and microwave can be aimed precisely to avoid collateral

damage. However, an indiscriminate use of both these DEWs can create a pseudo effect like a WMD. But keeping in mind the various principles of war in perspective they can- not be classified as WMDs.

During the time when nuclear weapons were inducted in the countries national strategy it had a very dramatic effect. Similar effect will be seen on the development of DEW which will enhance the military capability of the Indian armed forces for the 21st century war scenario. A era of new deployment method and tactics will be developed by all the three service. The induction will lead to the development of new innovative solutions to the missions faced by the operational community today due to the inbuilt lacunas of the existing KEW.

2) Life cycle spans for major defence systems development

Any new major weapon system takes about twenty years to come from conception to production. After being mass produced they remain in the services for operational functioning for a period of thirty years on an average. If we draw a simile to this life period than the developments in the US, France, China, Russia and may be other countries as far as DEW is concerned must progressed to a great extent to meet the deadline of 2050.Compared to this the lag in Indian development already may be a threat as far as our battle worthiness and safety against an attack by DEW is concerned. If we go by the traditional System Development Life cycle (SDLC) steps



We find that the initiation phase has already happened way ahead of the US (who had started in 1982 with the impetus to a 'Star War' project insisted upon by the then US president Ronald Reagen). The second phase also has been implemented by the BARC, ATI Indore, LASTEC and other educational institutes in small pockets. The third step of planning and the others step need to be thought about. Here is where we need to refine our policies and doctrines to adequately employ this technology. We need to plan for the general organisation, training, execution and support of the defence forces so that this can be incorporated as weapon for the joint forces' operations. Once this planning is put in place we can then move ahead to the next step of requirement analysis which will be an exercise based on the actual facts obtained from joint exercises and exercises done with other foreign armed forces in the pat were the results will judge the venerability of our forces. The modification in design will have to be carried out based on these results and then finally the development can proceed. To reach this phase a time period of 2035 will be adequate for reaching the final disposition stage by 2050.In case of the laser we need to think of better power, deeper magazine and lighter equipment's are needed. Microwave will also need to increase power output to be able to successfully replace existing weapons.

3) Opportunity and time envelop for India to develop DEWs

Assessing from the global development in the countries like USA, China, Russia, France and may be Germany also we find that they are far ahead than India. Some of these countries have already reached the induction phase in this technology. India lacks a meaningful beginning in this development, which in turn will pose a risk in timing itself out in DEW development envelop. We need to increase our pace and make attempts in catching up these nations. The most important aspect for increasing the pace is to create a potent defence against this DEW threat. For enabling this we need to give up the de-novo route of building scientific foundation, developing device technology then entering design and engineering phases serially and incrementally. The opportunity to do this has already passed us and DEW have already started entering military inventories. In this process the country may lack behind in offensive DEW, but we can no way afford to expose our network centric operations assets, national critical information and telecommunication infrastructure unsafe and unprotected against the emerging DEW threats from especially from China. This so called 'protection layer' needs to be established at the earliest on highest priority. Any oversight of this issue can have a detrimental effect on our national security. What emerges is that India as nation has to pool together and cross fertilize the basic knowledge from in-house or out of the country, seek technology through strategic industrial alliances o government to government tie ups and enter the DEW development phase in the shortest possible time. It may seem to be a very ambitious attempt right now but looking a t the complexity and wide dimensions of the DEW for all three services the

government will benefit if private sector participation is south on a mission mode.

The doctrine development usually lags the development and employment of any new technology and tactics. The essential feedback to the doctrine is obtained from joint exercises and operations which is essential for the continuing the effectiveness and pointed effect of deployment of forces who will use the new technology. This process of deliberate doctrinal change is vital for the effectiveness of the armed force for the present as well at the future operations. This incorporates a time-tested principle for successful military action as well as contemporary lessons which together would guide aggressive exploitation of our advantages against the enemies' vulnerabilities. Against this background it will be a great advantage for India if we can gauge the advantages for India in adopting the potential of DEW in comparison of our existing policy and doctrine and in turn define a set of developing policy and doctrine, fundamental blocks of the doctrine in the context of national security strategy, defence security strategy, strategic security review and the national space policy. This chapter will further discuss the National common Vision for DEW, assessment of the global strike systems capability with DEW, limitations of defining and aligning DEW policy and doctrine with the existing policy.

4) Necessity and relevance of Dew policy& doctrine in India

Technology gives an advantage on the battlefield provided proper integration, development, employment strategies are in place to exploit the advantage provided. Armed force needs to be organized, equipped and trained properly to adapt to the new technology. Doctrine and policy are mainly responsible for providing this framework in which these capabilities can be effectively deployed in the battlefield. In the absence of a doctrine or policy weapon system acquisition, deployment, employment and integration are generally done in a very temporary way which results in loss of synergy in effective utilization of this resource. The nature of warfare demands a continual process of evolution of innovations and the application of technology to military operations to provide the requisite advantage to the forces to gain superiority over the enemy. In today's world military resources are employed in various roles like peacekeeping or peace enforcement and conventional combat also. In these scenarios the operators and planners must be able to leverage technology in order to provide advantage over the enemy and simultaneously provide adequate cover to the forces. The point need not be retreated that the emerging technology of DEW is the next revolution in military affairs (RMA).These new weapons will provide the military planners a new spectrum of lethal as well as non-lethal capabilities to meet the new challenges posed by the new diverse spread of military operations. The other progressive nation in the world like US, Russia, France and China have already completed the building blocks for adopting this technology especially in the field of building blocks for developing the DEW in the fields of High power generators and projectors for EM wave energy , radio frequency and optronic. The new challenges faced by the armed forces is to counter terrorism, rouge nations, peacekeeping, peace enforcement and carry out humanitarian operations. These new types of operations demand precision strike capability with minimum collateral damage. The destruction of the enemies command and control system, picking out the key pins in a enemy formation and eliminating them, destroying or enabling the logistic chain to the enemy by conducting rapid and pinpointed attacks is something which can be very effectively provided by the use of DEW. This aspect will be a enabling factor for the national security strategy to be conducted very successfully. India has no option but to develop DEW as the emerging scenario in the world is changing with countries like USA and other developed countries changing their doctrine as well as strategy to suite the induction of such weapons. This chapter analyses the existing strategy, policies and doctrine to focus on the changes if required to provide the best frame work for DEW development, acquisition, deployment and employment in this country.

National security: India needs to nurture indigenous-technology driven policy focus

Policy- the Indian armed forces are totally new to DEWs. This will act as a game changer and the policies which will govern this has to be multi-faceted to be able to exploit the full spectrum of this weapon. This will form the plan of action which the government will follow for introducing the DEW in the services. The strategic question that needs to be answered is "What does the country want to do?" The ground rules will be defined to ascertain what actions need to be done and what need not be done in a situation. The national policy will thus define a broad guideline which needs to be adopted to achieve the national security objectives. This will also define our reaction to a crisis created by the economic clout caused due to a nuclear attack. The question 'Does the use of DEW equal a nuclear attack?', Do we consider an attack on our space satellite or information systems the same as an attack on our homeland? Policy will also focus the national instruments of power by communicating the priorities, vision, strategy and strategic perceptions of the governing body that produces it. The civilian leadership will have to set policy that guides military operations, and this policy would keep changing over time depending on the political and strategic environment.

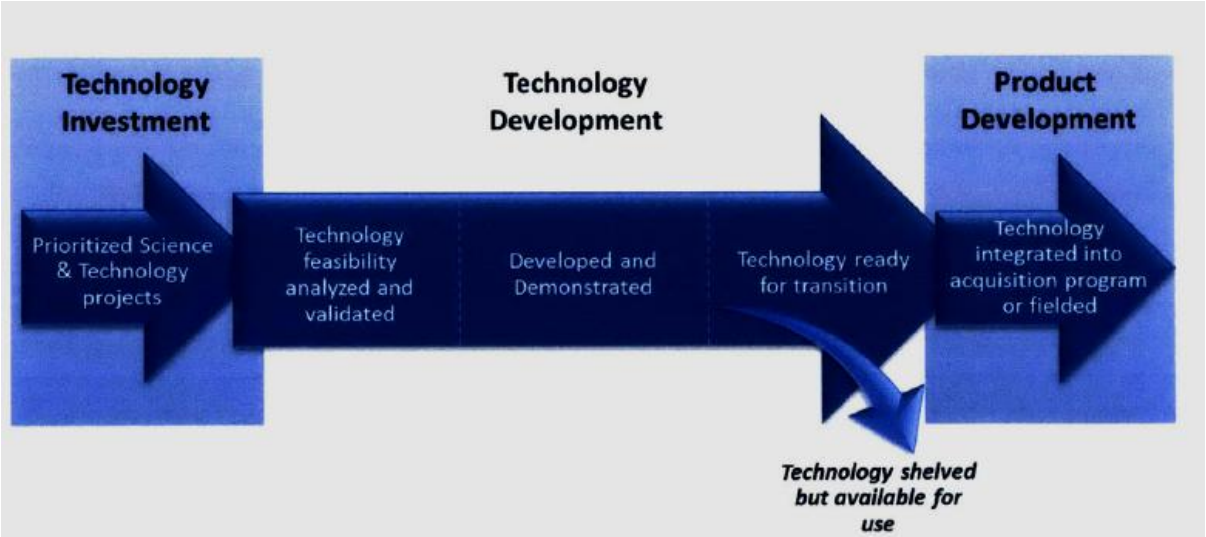
Doctrine-A Military doctrine presents the fundamental principles that guide the employment of forces. It provides the distilled insight and wisdom gained from experience in warfare and other operations requiring the use of the military instrument of national power. In the absence, of specific details available about our doctrine, the contents of this chapter have been taken from the open source. The literature brings out the importance of joint doctrine is the common perspective it promotes in which to plan, train and conduct military operations in combat and non-combat situation. Doctrine also fundamentally shapes the way in which the armed forces of country think to utilize the military instruments of national power. When all the services are joined in operation it becomes very necessary to have and joint doctrine. Though joint doctrine is neither a policy nor a strategy it ensures that a policy and strategy is effective in achieving national goals by the defence services. Joint

doctrine is to be followed mandatorily in most situations, but exemption can be made as per the situation arising depending upon the scenario appreciation of the commander who is charge of operations theatre. The precedence of joint doctrine always exists on individual service doctrine. In the context of DEW we will need to redefine out services, joint and national doctrine o ensure effective use of third type of weapon.

Development of policy- Both the houses in the parliament are the primary policy maker in the country. The national security policy id decided by the cabinet committee for security which is headed by the Prime minister. Through the NSA (National security adviser). Any policy is a guide to the nation as to how to approach crisis situation or emergency by the nation in case of a social, political, economic or defence issues. This is a clear action plan which is predefined by the policy maker to deal with situation which may arise suddenly. The national security policy (NSP) is published at the beginning of a government terms which is newly elected. The NSP serves to focus the economic, military and diplomatic initiatives which will be taken during the term of the government. The NSP is further clarified and refined by the subordinate government's agencies. As regard to the defence the NSA defines the National security strategy NSS and the Ministry of defence converts it into the Defence security policy. This defines the directive to the service HQ to form their actions and plans in order to meet the national objectives.

Development of doctrine-Joint doctrine formulation is the responsibility of the Chairman of chiefs of the staff committee. This is formed with the feedbacks from the operational commands and the three-service headquarters. This provided the conceptual path by which the services assess, review and revise their own individual doctrines. Once formulated it is utilized in training and forming leadership development programs which when executed provide feedback for redesigning and changing the issues in the joint doctrine. Any new or innovative idea is tested as part of the joint doctrine and changes in tactics, techniques and procedures suggested to improve capabilities. These feedbacks form a very important input for change in the doctrine and provide important lessons for exploiting the vulnerabilities o the adversaries. This is an essential process to ensure deliberate and experience based doctrinal changes for the present and future effectiveness of the armed forces.

Foundational blocks of Doctrine for DEW-India is fairly new to this type of weapon and it operational characteristics. Policies and doctrine as regard this need to understand and realized in order to have a seam less integration with the existing weapons in the armed forces. In order to clearly define the foundation blocks for the following diagram will prove to be appropriate.



5) National security strategy (NSS) in the context of DEW

In the recent URI army camp attack by the terrorist it came to light that India does not have a well defined strategy for the government as well the military in particular when it comes to the national strategy. It will be prudent here to quote Lt Gen Philip Campose "It is a strange paradox that India an emerging power aspiring to be a regional power, does not have a formal 'national security strategy'. Consequently, contingency driven ad-hocism, derived from individual inclinations of the leadership and the bureaucracy of the day, can describe India's response to most security crises."While drafting the National security strategy it has to borne in mind that the following issues are taken into consideration:-

a) The need to preserve the strategic autonomy of the country, territorial integrity and core values.

b) The security related developments in the global and regional environments
c) The external and internal threats which can impact the nation
d) Our capabilities as compared to that of our adversaries
e) The need for us to contribute to the global community and our strategic relationship with the other countries.

It should clear that India's capability and development agenda and goals will always be challenged by the budget constrains which as termed by Gen Philip Campose is the 'guns versus butter' debate at all stages. Not with standing this as an persisting factor it must be understood that the economic, development and inspirational goals of the nation can only be in an environment of peace, stability and security.

On the subject of external threats, it is well known that, as a consequence of issues related to India's independence and partition in 1947, we have inherited territorial disputes with two of our neighbours, that not only keep themselves militarily well endowed, but are also armed with nuclear weapons. What makes the matter more complex and raises the level of threat for India is that, since the last fifty years or so, both these neighbours, namely, China and Pakistan, have a thriving nexus between them, even to the point of China fathering Pakistan's nuclear weapons programme, which is solely targeted at India. Ignoring the Chinese military threat cost, us dearly in 1962, in the form of a catastrophic defeat. And being dismissive about the threat from Pakistan in the early years of independence, led to repeated wars, followed by its 'low cost' terror-based campaign, which has continued for more than quarter of a century. And now, by ignoring the possible manifestations of a future 'two-front threat', which is still evolving, the consequences can, indeed, be disastrous, to say the least. A superior weapon at the disposal of the defence forces can act as a game-changer here.

National Security Strategy Guidance: For Military-Related External Threats With regard to 'defence of India's national territory and resources from an external threat', the related national security strategy issues which must be addressed by a national defence policy, are as follows: *f*

Maintain credible military deterrence against potential adversaries.

Defend our national and territorial interests on land, sea, air, space and cyber space.

Physical guarding and/or surveillance of land, air and maritime borders, island territories, offshore assets and trade routes, especially disputed borders, for early detection of intrusions or threats, if any.

Maintain a tri-Service rapid response capability to respond to security challenges during war and peace.

Ensure a fool-proof and well coordinated intelligence mechanism to provide early warning of threats, both external and internal.

Prevent attacks in the cyber and information domains against own defence and civilian networks and capabilities.

Build up/ strengthen a strong military technology base and related indigenous capability for manufacture of arms/ ammunition/ equipment to enhance self-reliance and prevent external pressures during crises.

National Security Strategy Guidance: For Internal Security Threats Other aspects related to India's national security where the military is mandated to take necessary action are as follows:
Protect national interests against internal threats like terrorism (including nuclear terrorism), insurgency and militancy with a view to negate secessionist and related destabilising efforts.

Promote and protect the core values of democracy, secularism, freedom, unity and human rights as enshrined in our Constitution by value-based ethics and practices as well as providing aid to civil authority, when requisitioned.

Maintain close surveillance and monitoring of the internal security situation in areas of heightened threat.

Maintain rapid response capability against terror strikes/ hostage taking, involving multiple agencies, both police and military, including the National Security Guard (NSG) and Special Forces (SF).

Promote peace and stability in the region through cooperative economic development backed by diplomatic initiatives for resolution of disputes and conflicts. *f*

Promote regional cooperation and coordination for early detection of regional/transnational cross-spectrum threats, to neutralise the same in a timely and proactive manner.

Provide Humanitarian Assistance and Disaster Relief (HADR) support in the region, when required/requested.

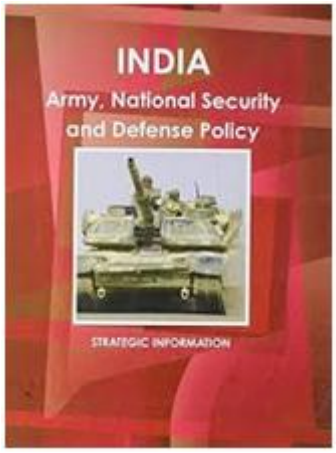
Contribute towards selective capacity-building in the military domain among neighbouring and other friendly countries.
Neutralise anti-Indian efforts/propaganda by potential adversaries/ inimical elements. *f* Promote/protect diaspora interests in the region and the world.

Establish strong and mutually beneficial relations/strategic partnerships with other countries, and regional/global security groupings, including the United Nations, through defence cooperation, anti-piracy, counterterrorism and peacekeeping activities.

Promote security interests at the global level, including coordination of security, intelligence and cyber issues.

6) National Defence policy
A 'national defence policy', in the Indian context, would majorly have to be a military sub-set of the national security strategy for dealing with external threats and challenges, taking into account the specific components of internal security which the military is mandated to deal with,

namely, counter-infiltration, counter-insurgency, anti-terrorism and disaster management. Thus, to start off with, one would have to look at strategic guidance for the possible formulation of India's national security strategy.



Primary Roles

Deterrence Against External Threats: Preventing war by maintaining credible military deterrence against potential adversaries is the primary role of the armed forces of a nation. This is achieved by ensuring a strong and modern military capability in the nuclear, conventional, counter-sub-conventional, cyber and space realms, backed by appropriate military and nuclear doctrines, combined with optimum preparedness to take to war at appropriate notice. The desired capabilities would take note of the existing and future military capabilities of potential adversaries, their doctrines and the likelihood and nature of conflicts. Actual preparedness would factor in prioritisation, based on budget allotment and related constraints.

Capability to Undertake Military Operations Successfully: In case so directed by the government, the armed forces must defend our national and territorial interests on land, sea, air, space and cyber space by waging war. In this regard, the armed forces should be always well trained and prepared to respond proactively, when directed, to any threat from our potential adversaries. War, if undertaken, must be prosecuted swiftly and terminated on terms favourable to our country and armed forces. This would entail defending our territorial integrity, capture of territory, and destruction of the war-waging potential of the adversary, as also capture of prisoners of war, for post-war negotiations from a position of advantage.

Guarding of Disputed Borders During Peace-Time: Physical guarding and/or surveillance, including technological surveillance of disputed land, air and maritime borders like the Line of Control (LoC), Actual Ground Position Line (AGPL) and Line of Actual Control (LAC), to detect intrusions, if any, at the earliest and take action to restore the status-quo ante. In case of war, the defence of other (undisputed) borders, if attacked or threatened, would automatically devolve on the armed forces.

Maintenance of Tri-Service Rapid Response Capability: India, as an emerging power, must maintain a tri-Service rapid response capability to respond to security challenges in the operational, internal securityand regional domains during peace and war, with capabilities to respond speedily to threats to our offshore island territories and other economic interests. Though it essentially entails better tri-Service preparedness for air and sea transported operations by Army/Special Forces' units and formations, it would also provide capability for Out of Area Contingencies (OOAC) and HADR in a peace-time scenario, when called upon to do so.

Effective Intelligence Mechanism: There has been several cases of serious intelligence failures, the most prominent being the fiasco in Kargil in 1999. A fool-proof and well coordinated military intelligence mechanism needs to be ensured, incorporating inputs of all the intelligence agencies and resources, to provide early warning of threats, both external and internal.

Cyber Security: Cyber threats are growing exponentially, both in terms of the numbers and sophistication of attacks. There is a need to maintain a dynamic, proactive cyber security capability to prevent cyber-attacks against own defence as well as civilian networks and capabilities, while cooperating with external agencies on the wider issues of cyber defence.

Self-Reliance in Defence: As long as we are dependent primarily on imports for our weapons, equipment and ammunition, we are vulnerable to being held hostage during times of war in terms of availability of items and spares, as also the cost of these items. Thus, it is of prime importance to our defence capability that we build up/strengthen indigenous capability for manufacture of arms/ ammunition/ equipment to enhance self-reliance and prevent related external pressures during crises.

Protection of Defence Establishments: In recent years, terrorist modules from across the border have attacked our defence establishments on a number of occasions, causing casualties, mostly among security personnel and innocent civilians. The primary responsibility for protection of defence establishments and a 'first tier' counter-terror response isof the unit/ establishment itself and the individual Service concerned. Specially trained Quick Reaction Teams (QRTs) and Defence Security Corps (DSC) units form the backbone of such response. The local Army formation, if available, is responsible for the second-tier response. Special Forces units are called upon as third/fourth tier responders. Military units are required to prepare adequately, in terms of training, equipping and periodic reconnaissance, to respond speedily and effectively against terror strikes.

Armed Forces at the Forefront of Harnessing Technology: The armed forces have the strategic need and the structural capacity to drive technology missions in a number of niche areas. Hence, there is a need to incentivise all the wings within the armed forces to remain at the forefront in harnessing technology with a view to achieve strategic advantage visà-vis our adversaries as well as optimisation in military capability. Service design bureaus and technology boards must be strengthened so that they can work in concert with our research and manufacturing agencies.

Secondary Roles

Internal Security: The armed forces, especially the Army, are required to play a substantial role in internal security matters, i.e. to protect national interests against internal threats like terrorism (including nuclear terrorism), insurgency, and militancy in various parts of the country, with a view to negate secessionist and related destabilizing efforts. Such threats could be externally sponsored or CLAWS Journal l Winter 2016 29 that the Army is relieved of its internal security duties and can return to training commitments related to its primary role.

Preserve Core Values: The armed forces play a crucial role in the promotion and protection of the core values of democracy, secularism, freedom, unity and human rights as enshrined in our Constitution by their value-based ethics and practices. They also assist in countering threats to these core values by providing aid to civil authority in times of need.

Restoration of Law and Order When Requisitioned For the Purpose: The armed forces are mandated to provide 'aid to civil authority' in case of breakdown of law and order or in case of a heightened threat. In such cases, if the local police, central armed police and paramilitary are not available or found to be incapable of regaining control of the situation, the Army may be requisitioned to restore public order. To that extent, military units need to maintain close surveillance and monitoring of the internal security situation in areas of heightened threat, so that they are able to intervene speedily and effectively. In the case of terror attacks in civilian areas, the Army, if available, can be requisitioned by the local civil authority for a counter-terror response.

Defence Cooperation with Friendly Foreign Countries: Military diplomacy and defence cooperation have been found to be effective tools for developing good relations with other countries. Training of military personnel conduct of combined exercises, gifting of weapons and equipment, provision of logistic support, visits by senior officers, etc are tools available to the military to promote or strengthen bonds with other countries as also for capacity building among friendly countries. The Indian military has proved very adept in this role and must be increasingly employed in defence cooperation activities and conduct of defence dialogues to build strategic partnerships with select countries, in pursuit of our national interests.

Humanitarian Assistance and Disaster Relief: Though the National Disaster Management Authority (NDMA) is the primary India's National Security Strategy: Imperative of Integrating Defence Policy 30 CLAWS Journal l Winter 2016 authority mandated for HADR in the country, the Indian armed forces invariably end up being the first responders, due to their geographical spread in the country and their expertise in the field. Provision of HADR support within the country and in the wider regional context, when required/ requested, has enabled India to project its military prowess in a benevolent and humane manner. It has also enabled building bridges with the affected population in militancy affected areas, as happened during the floods in J&K in 2014.

United Nations Peacekeeping Operations: Right from the initial stages, the Indian military has been at the forefront of United Nations peacekeeping activities. Indian peacekeepers enjoy a good reputation and are sought by the United Nations not only for their exemplary neutrality and high levels of professionalism but also for their high behavioural standards and people friendly approach towards the local population in the strife-torn areas of their deployment. The Indian Army has made major contributions towards capacity building in the field of UN peacekeeping by training military peacekeepers from other countries and providing instructors, when required. India must continue to participate in UN peacekeeping and remain a beacon for high professional and behavioural standards. All the agencies concerned must ensure proper administrative and equipment back-up so that the peacekeepers are able to carry out their duties in an optimal manner without having to keep looking over their shoulder all the time.

Role in Anti-Piracy Operations: The Indian Navy made a stellar contribution towards eradicating the threat of piracy along the global sea lanes of communication and trade routes by joining the regional and international collaborative effort in this regard. The Indian Navy will have to continue to participate in collective efforts, under the aegis of the United Nations, to secure the global commons, whenever required to do so. Evacuation of Beleaguered Diaspora: The Indian Air Force and Indian Navy have increasingly been playing a crucial role in evacuating Philip Campose CLAWS Journal l Winter 2016 31 our diaspora, who suddenly come under threat due to deteriorating security conditions, e.g. in Libya and Yemen in recent years. Safe and timely evacuation becomes a dire necessity, keeping in view the expanding numbers of Indians seeking employment all over the world, even in the strife-torn areas of West Asia and Africa. The Indian military will have to be prepared for such interventions/ evacuations at short notice.

Global Counter-Terror Response: Keeping in view the possible terror threats to the global commons, including the threat of nuclear terrorism, it is increasingly possible that the UN will have to play a more decisive role in dealing with the evolving threats in this domain. Given its rising profile in the global security arena, India will have to be prepared for requests for active participation in such collective efforts. The Indian military, with its vast experience in counter-terror operations, is ideally suited to play a participatory role in such efforts, in case the government perceives such participation to be in India's national interests.

7) Strategic Security Review

As per Atul Pant of IDSA[1]"National security refers to securing a nation's citizens, territory, resources, assets, ideologies, institutions, and interests against threats which may emanate from changing geopolitical state of affairs, changing relations between nations, groups, races, sects, advancing technology and changing ideology. In the prevailing complex geopolitical scenario, India's national security is facing new challenges and acquiring new dimensions with every passing year. India's security canvas needs to take into account the geopolitical and geo-economic manoeuvring, changing global equations, India's crucial centralised location in the Indian Ocean region, increasing capabilities of hostile neighbours, religious radicalisation, both internally and globally, and rapidly increasing role of high-end technology, among many others."*India's National Security: Annual Review* is a report published annually which covers all these aspects broadly, including the action which need o be taken by the government. This is published under the aegis of the Foundation for National Security Research, New Delhi. The chapter wise distribution covers topics like the security environment of the Country taking into consideration the various equations between the big global players who can affect the stand of the nation. In the latter chapters the discussion on technological improvements are put depending on the government priority in that particular year. This is the section where the induction of DEW in the defence forces needs to include for ensuring a yearly monitoring of the progress done. Many thin tanks are of the opinion that more emphasis will have to be paid to ensure that technological development necessary for the strategic stand of the country needs to be put in place here.

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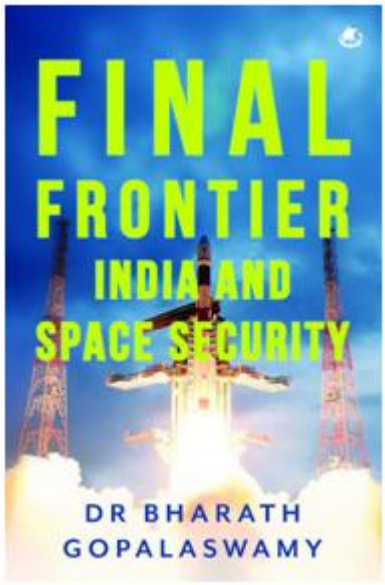
DEFENCE

8) National Space Policy

Space policy is the political decision-making process for, and application of, public policy of a state regarding spaceflight and uses of outer space, both for civilian (scientific and commercial) and military purposes. International treaties, such as the 1967 Outer Space Treaty, attempt to maximize the peaceful uses of space and restrict the militarization of space.Space policy intersects with science policy, since national space programs often perform or fund research in space science, and with defense policy, for applications such as spy satellites and anti-satellite weapons. It also encompasses government regulation of third-party activities such as commercial communications satellites and private spaceflight. Space policy also encompasses the creation and application of space law, and space advocacy organizations exist to support the cause of space exploration.



The Department of Space (DoS) is the Indian government department responsible for administration of the Indian space program. It manages several agencies and institutes related to space exploration and space technologies. The Indian space program under the DoS aims to promote the development and application of space science and technology for the socio-economic benefit of the country. It includes two major satellite systems, INSAT for communication, television broadcasting and meteorological services, and Indian Remote Sensing Satellites (IRS) system for resources monitoring and management. It has also developed two satellite launch vehicles, Polar Satellite Launch Vehicle (PSLV) and Geosynchronous Satellite Launch Vehicle (GSLV), to place IRS and INSAT class satellites in orbit.

[1]India'sNationalSecurity:Annual Review 2018 edited by Satish Kumar,NewDelhi,Pentagon Press 2018,pp416

Shift in India's space policy was demonstrated on March 27, when India conducted its first anti-satellite (ASAT) test. Code-named Mission Shakti, the anti-satellite interceptor ballistic missile covered 300 kilometres and hit and destroyed India's live satellite in low-Earth orbit within three minutes.

New Delhi has been historically wary to be seen as an assertive major power in outer space, yet the ASAT test saw India utilize its space program for demonstrating space power, defined by Brent Ziarnick in his book, Developing National Power in Space: A Theoretical Model, as "anything a nation can do in or through space."

The ASAT test demonstrated India's capability to hit adversary objects in space, a capability the DRDO has possessed since 2012 but showcased only now after years of restraint. Concerns that China could hold its critical infrastructure at risk prompted India to showcase its own retaliatory capability as a deterrent to any Chinese coercion. This was the first time that we have seen the DRDO involved in a space mission, and the first time that the Indian Space Research Organization[2] (ISRO) has participated in a weapons test.

The new global space competitive environment also seems to be forcing India to consider better regulation of its commercial space activities. The Indian Parliament is currently considering a draft Space Activities Bill.

The draft Bill is a welcome starting point in the context of building a regulatory framework for a future industry that is yet to reach critical mass. Many of the provisions are perhaps analogous to embryonic regimes governing the introduction of new technology of the time (think the car, the plane and more recently, the drone) and it's inevitable that such regimes will generally set out a requirement to license entities to undertake certain activities, with corresponding obligations to be observed so as to not endanger the public at large.

Parallel domestic legislation in other major economies generally contains provisions which give the state the discretion to refuse a license for space activities if it would violate international law, the health and safety of persons within the state concerned, or otherwise, is a threat to national security[3]. In this context, many of the analogous provisions in the draft Bill are perhaps no worse than general industry standard.

However, it's quite important that the government doesn't overly regulate the sector to the extent that it will potentially discourage the private sector from participating, or otherwise, prejudice foreign participation (whether it be public or private) in future space endeavours.

Care therefore needs to be taken in getting the balance right, in relation to intellectual property rights for new products or services developed in space, or otherwise, the rights to minerals or other substances mined from celestial bodies. Put otherwise, if the private sector isn't equitably rewarded for its innovation, the sector is unlikely to attract the investment that it so critically needs.

A final point for reflection: following the coming into force of any space law, the government will need to consider its stance on foreign direct investment in related technologies, whether it be launch technology, satellites or other vehicles that could potentially be launched into space. The more permissive this regime is, the more likely India will be able to attract capital and investment into this sector to develop not just its own space program, but essentially make India a hub for the international space industry in general, developing launch and space vehicles and their components in a potentially more cost effective manner[4].

India's most prominent private space company, the one that started it all, Team Indus (Orbit Beyond), which competed in the Google Lunar X-Prize, recently was selected as one of the companies able to provide Commercial Lunar Payload Service (CLPS) to NASA. The excitement generated by these gains and the activism of the NewSpace community have succeeded in getting the ISRO to engage more widely with youth and the populace, including setting up a visitor centre, allowing the public to watch rocket launches, and establishing space museums across the country.

In summary, we can observe significant shifts both in India's observed capabilities and policies since 2018. These include successful commercialization progress on both launch vehicles and satellites (and the introduction of a Space Activities Bill), a heavy lifter capable of manned missions to LEO and robotic missions to the lunar surface, an announced human spaceflight program, and perhaps the most critical shift, the involvement of the DRDO and ISRO in an ASAT test[5]. That test signifies that India's space program has entered the realm of military counterpace capabilities.

The ASAT test, coupled with India's recent cross-border air raid into nuclear-armed Pakistan, suggest that India has

[2]For a brief history of ISRO's operations, see: https://en.wikipedia.org/wiki/Indian_Space_Research_Organisation

[3]See for example, section 2(c) of the UK Outer Space Act, 1986.

[4]Dr. Namrata Goswami is a senior analyst and author. Her work on "Outer Space and Great Powers" was supported by the MINERVA Initiative Grant for Social Science Research. Currently, she is working on a book on "Great Powers and Resource Nationalism in Space" to be published by Lexington Press, an imprint of Rowman and Littlefield.

[5] Peter Garretson is Deputy Director of the Schriever Scholars Space Strategy and Policy Program at the Air Command and Staff College (ACSC).

undergone a shift in its strategic culture. Historically wary of being seen as an assertive major power, India's changing space policy suggests that India is quite willing to attend to its security interests even given normative costs, and willing to project itself as a technological power in an exclusive club, even if it means pursuing arms and prestige projects.

9) National common Vision for DEW

The national security council and the chief of defence staff committee joint vision should pave the way for the development of national vision, services vision of DEW, joint doctrine, force structure and weapon systems development and acquisition[6]. They jointly should attempt to predict what the threat environment will look like in the next 25 to 30 years and beyond with the intent of guiding the preparation of the armed forces, internal security agencies and national infrastructure protection agencies to meet these threats. They must predict in the next 25 to 30 years the technologies, geo –political and economic changes which will impact the national economic. Social, political and security interest providing more robust combat capabilities. As is being contemplated by other nations also, the DEWs in the foreseeable future may include long range precision strike capability, combined with a wide range of delivery systems, as an emergency key factor in future warfare. Specifically emphasis would be on GPS, high energy research, electromagnetic technology and enhanced standoff capabilities which will provide increased accuracy and a wider range of delivery options. These capabilities will increase the combat power available for use against selected objectives, resulting in enhanced economy of force and a higher tempo of operations. It would recognize the importance of being able to produce a broad range of weapons effects, from non –lethal to lethal, from sensor - fused to directed energy weapon, each with the ability to further enhance precision capability. It should signify the importance of creating the desired effects based or non-lethal precision engagements during all types of operations. Regardless of applications in combat or non-combat operations, the capability to engage precisely would allow commanders to shape the situation or battle space in order to achieve the desired effects while minimizing risk to friendly forces and contributing to the most effective use of resources.

Analysis and assessment of the policy and doctrine to integrate DEWs into existing asset base

There is no doubt that the changes in technology has brought about the US to be more advanced nation in gaining a decisive advantage in the battlefield. However, the proper integration, development and employment strategies are critical to exploiting any new system to gain that advantage. The creation of an effective military force depends upon more than the provisions of adequate resources, the building of advanced weapons, or the availability of manpower. Thus our armed forces must organize, equipped, and train personal properly. Doctrine is the substance that binds them together and makes them effective. Doctrine and policy provide the necessary framework to ensure our systems provide the required capabilities and necessary effects on the battlefield. If doctrine and policy are non –existent or lack proper clarity, it may prove impossible to balance the force mix, integrate missions across the services, or prioritize the acquisition of new systems. Instead, if weapon system employment, integration, deployment, and acquisition are done in an adhoc fashion, it would result in a piecemeal of systems that are unable to provide the necessary synergistic effects in the joint operations. This makes it necessary that both policy and the doctrine should e examined in the following light: -

- What are DEWs and why would they be an important component of joint warfare
- What is the purpose of policy and doctrine?
- What is the existing policy/doctrine concerning DEWs?
- Does current policy/doctrine meet the criteria for effective doctrinal/policy guidance for DEWs
- What modifications should be made to current policy and doctrine to accommodate development, induction and exploitation of DEWs

How would the armed forces conduct the operations in the future and the capabilities required to execute those operations would set the azimuth for doctrine development. The objectives is to produce sound doctrine that will enhance the ability of the armed forces to accomplish missions across the range of military operations. IT must be affective, acceptable, well researched, enduring, flexible, comprehensive, consistent and concise. The examination and of our current policy and doctrine must provide clarity about the following: -

[6]Dr Arvind Gupta, Director General IDSA: A national Security strategy Documents for India

- Does it effectively describe how we organize, train, fight and support DE weapons, thereby contributing directly to the successful execution of operations
- Does current doctrine incorporate lessons learnt from relevant history, exercises and recent operations, reflecting a solid understanding of the art and science of military operations by our own research, development and user teams or by other countries
- Does current doctrine account for current and near term anticipated realities and for force modernization and organizational evolution
- Does current doctrine/policy convey a common understanding of how to think about conduct of operations and provide a common language for discussion
- Does it use clear and well-defined terms and concepts and is written to the level of the target audience

Compelling reason for India to factor DEWs into national security

The emerging DEW technologies would play a extremely crucial role in future military operations. In making recommendations to the formulation of Dew policy and doctrine, severe considerations must be taken

DEW offers unique capabilities beyond the scope being considered when formulating the current doctrine and policy

Dew when fully developed and deployed may become a critical centre of gravity given the ability to impact military, economic, information and diplomatic instruments of power

Our ability to use DEWs and deny our adversaries the same abilities will require technological superiority. This superiority will be just as important to military operations as air and space superiority is today.

The capability to operate simultaneously at the strategic, operational and tactical levels of war will require the development of a single integrated architecture capable of integrating Dew capabilities into all operations, not limiting them to Information Operations and EW

Political considerations for DEW policy development.

The politically sensitive aspects of developing and deploying DEWs will be the requirement for India to address our national policy keeping following in mind

National policy must be addressed because of likely implications and international concerns with employing DEWs and

India has yet not articulated its national space policy regarding space control and force application.

Literature survey reveals that the use of DEW brings concerns over weather DEWs conform to the basic law of Armed conflict and principles governing weapons and hence will they conform to current international treaties governing warfare? The literature suggest that in order to address these concerns we must ensure DEWs comply with three primary principles when developing DEWs- unnecessary suffering, discrimination, treachery and perfidy.

The unnecessary suffering principle prohibits the use of weapons or means of warfare calculated to cause unnecessary suffering or superfluous injury (Hague regulations, article 23 (e), Protocol I article 35(2))

The discrimination principles prohibit the use of methods of warfare that cannot be directed against a specific military objective and are thus of a nature to strike military objectives and civilians or civilian objectives without distinction (Hagus Regulation, protocol article 51(4)

The treachery or perfidy principles prohibits certain perfidious uses of weaponry and may also prohibit weapons that are inherently perfidious (Hagus regulations, Article 23(b)

2. Conclusion

The national Security policy, National military strategy, National security strategy, National space policy and joint visions form the foundations for the development, deployment and employment of the new technologies, tactics and organizational structure in order to meet and defeat anticipated treats. Likewise, these national policy documents analyze the formation of doctrine. Thus the policy should predict strategic environment where the military must be “flexible, responsive and lethal” in order to support national objectives .Additionally these documents also remain as a guideline and reference for any situational change which need to be made for the tackling the future change in scenarios

References

[1] Welcome to a New Forum for Directed Energy Research and TechnologyP.M. Sforza and H. Zmuda, Editors
[2] High-Energy Laser Weapons for the FleetR.D. McGinnis and A. Skolnick
[3] Virtual Prototyping of Radio Frequency WeaponsK.L. Cartwright, A.D. Greenwood, P.J. Mardahl, T. Murphy, and M.D. Haworth
[4] Tactical High Energy LaserJ. Shwartz, J. Nugent, D. Card, G. Wilson, J. Avidor, and E. Behar
[5] Compact Pulsed Power for Directed Energy WeaponsD. Price, C. Bloemker, E. Goldman, D. Nett, S. Putnam, D. Weidenheimer, R. White, and T. Wynn
[6] Indian Space security policy a proposal by Ajay Lele IDSA.
[7] Indian National Defence policy
[8] National Security Strategy