# LEADERSHIP OF FUTURE AI DEFENCE TECHNOLOGIES & STRATEGIES: INDIA SETTING BENCHMARK

IN THE SECTOR OF NATIONAL SECURITY, DO WE REQUIRE FULLY AUTONOMOUS DRONES TO ENGAGE WITH THE ADVERSARY AIRCRAFT IN A FIGHT OR DEPLOY AUTONOMOUS PATROLLING VEHICLES AT THE BORDERS FOR GETTING TECHNOLOGICALLY ADVANCED PATROLLING? HOW MUCH AUTONOMY SHOULD BE GIVEN TO THE MACHINES ON THE BATTLEFIELD? THE JOURNEY TOWARDS A SECURE & TECHNOLOGICALLY ADVANCED FUTURE DEMANDS A MULTIFACETED STRATEGY THAT ENCOMPASSES POLICY DEVELOPMENT, CYBERSECURITY FORTIFICATION & INTERNATIONAL COLLABORATION. BY EMBRACING THESE PRINCIPLES, INDIA CAN NAVIGATE THE COMPLEXITIES OF THE EVOLVING TECHNOLOGICAL LANDSCAPE, ENSURING THE RESPONSIBLE & ETHICAL INTEGRATION OF AI IN NATIONAL SECURITY FOR THE BENEFIT OF ITS CITIZENS AND THE GLOBAL COMMUNITY.

— MUGDHA MAHABAL-VAHALKAR

*Weapon Locating Radar Swathi*

In the month of January 2024, the Defence Research and Development Organisation (DRDO) organized a workshop on 'Next-Generation Communications and Networking', at DRDO Industry Academia Centres of Excellence (DIA-CoEs) with the Indian Institute of Science (IISc), Bengaluru. This workshop unfolded a vision of transformative advancements in military communication strategies.[1] During the workshop, a crucial point of discussion revolved around Artificial Intelligence (AI) and its significance in bolstering communication systems for the purpose of national security. AI presents both opportunities and challenges to national security. While AI technologies can enhance various aspects of defence, intelligence and security operations, they also pose potential threats. Hence, it is imperative to build dialogues through a number of multi-layered workshops that engage various stakeholders across industry, academia & state-entities working in the field of AI.

Artificial Intelligence (AI) refers to the simulation of human intelligence in machines that are programmed to perform tasks that typically require human intelligence. These tasks include learning, reasoning, problem-solving, perception, understanding natural language and even interacting with the environment. The ultimate goal of AI would be to create systems that can perform tasks autonomously without explicit programming, adapting and improving their performance based on experience.

India ought to factor AI as a critical component of its digital transformation journey, with efforts directed towards leveraging AI for inclusive growth, improving governance and enhancing the country's global competitiveness. Keeping in line

[1] https://drdo.gov.in/sites/default/files/newsletter-document/NL_December2023_0.pdf

with this thought, the NITI Aayog has published the 'National Strategy for Artificial Intelligence – #AIforAll: Technology Leadership for Inclusive Growth' in June 2018. This strategy document is premised on the proposition that India, given its strengths & characteristics, has the potential to position itself among leaders on the global AI map – with a unique brand of #AIforAll. Furthermore, the unique approach, factored in the aforementioned document, has focused on how India can leverage the transformative technologies to ensure social & inclusive growth in line with the development goal of the government.[2] In addition, India is also looking forward to replicate these solutions, through fostering a south-south interaction (collaboration) in other similarly placed developing countries, making India a geopolitically strong state to ensure strategic exchange of AI technologies.

On September 2017, the Russian President Vladimir Putin opined that "Whoever becomes the leader in the sphere of AI will become the ruler of the world".[3] This statement is enough to understand the need & importance of developing indigenous AI technologies and ensuring *Atmanirbhar Bharat* in this field as well. However, the absence of clarity on what is AI and 'what we intend to do with AI' is very prominent among policymakers. There is a limited understanding about the basic nature of AI. For example, in the sector of national security, do we require fully autonomous drones to engage with the adversary aircraft in a fight or deploy autonomous patrolling vehicles at the borders for getting technologically advanced patrolling? How much autonomy should be given to the machines on the battlefield? What


*Light Combat Aircraft Tejas*

is a measurement to decide something like this? Furthermore, a clear vision, further building the foundation for effective governance of the National AI Programme, is also necessary for a country such as India as to decide how much revenue can be spent on the initiatives such as AI advancement as it requires heavy investments. Another challenge in the AI advancement is that non-availability of the robust hardware & data banks within the country. AI is highly dependent on complex algorithms based on variety of data. Creating an AI with easy accessibility with utmost security at the same time is still questionable. Hence, it is imperative for any state to be aware about the potential ways in which the threats to the national security will knock on their doorsteps. The figure 1 discusses the variety of ways in which the national security of India can be threatened.


*Figure 1: Ways in which AI can be Perceived as a Threat to National Security*

In context of the above, the Indian Defence industry is taking prominent steps towards transforming the armed forces into one of the most advanced in the world. The adoption of technology based on AI is going to revolutionise the Indian Military. It also places India firmly in the constantly developing defence product market. The Indian Government is supporting & planning to modernise the military through AI, based on a strong data-


*Special Mobility Vehicle*

driven research coupled with years of groundwork. Bold policies, dedicated budgets, policy changes & the thrust towards indigenisation, have helped create an atmosphere of cutting-edge innovation & collaborations which are in favour of India. This joint effort among industry both public and private, research organisations, academic institutions, start-ups and innovators has helped create many unique technological products based on AI in the areas of data, logistics, surveillance, weapons and many more.

The introduction of autonomy in weapon systems, in ISR (Intelligence, Surveillance and Reconnaissance), data management, can be a huge asset in stopping terrorism, installing counter-terrorism measures, protecting soldiers. In fact, AI in defence can change combat and conflict at the deepest levels.

At the 75th Republic Day parade of India, DRDO has showcased India's strength, capacities & military preparedness with a respectful yet assertive tone. For example, the indigenously developed 'Swathi' weapon locating radar system was developed by a joint effort of DRDO and Bharat Electronics Ltd. (BEL). With this advanced radar system, India exemplifies its capability in developing state-of-the-art defence technologies. The system is designed to accurately locate enemy weaponry, enhancing the nation's strategic defence capabilities. The range of AI based defence technology showcased at the Republic day include Man Portable Anti-tank Guided Missile (MPATGM), Anti-Satellite (ASAT) Missile, Agni-5, Surface-to-Surface Ballistic Missile, Very Short Range Air Defence System (VSHORADS), Naval Anti-Ship Missile–Short Range (NASM-SR), Anti-Tank Guided Missile 'HELINA', Quick Reaction Surface-to-Air Missile (QRSAM), Astra, Light Combat Aircraft 'Tejas', 'Uttam' Active Electronically Scanned Array Radar (AESAR), Advanced Electronic Warfare System 'Shakti', Cyber Security systems, Command Control Systems and the Semi-Conductor Fabrication Facility and many more.[4] Anti-Satellite


*Anti Tank Guided Missile HELINA*


*Quick Reaction Surface-to-Air Missile (QRSAM)*

(ASAT) Missile used in Mission Shakti was a major breakthrough in demonstrating the nation's anti-satellite technology and precision strike capability.[5]

As the AI landscape in India is evolving, developing & achieving greater heights, continued collaboration between the government, industry, academia & the research institutes will be essential for sustaining impact and further development. Considering the aforementioned challenges & the development achieved by India in the defence sector, it is crucial to develop responsible AI policies, invest in cybersecurity measures and collaborate strategically to establish norms and standards for the ethical use of AI in national security contexts. These policies will not only address the complexities of integrating AI into the defence sector but also prioritize ethical considerations to ensure the responsible & accountable use of such powerful technologies. Furthermore, recognising the global nature of technological advancements, collaboration on an international scale is indispensable. Working collectively to establish norms & standards for the ethical deployment of AI in national security contexts will not only foster trust among nations but also contribute to a more stable & secure global environment. In this era of interconnectedness, cooperation is key to ensure the benefits of AI in defence are harnessed responsibly and ethically. The journey towards a secure & technologically advanced future demands a multifaceted strategy that encompasses policy development, cybersecurity fortification & international collaboration. By embracing these principles, India can navigate the complexities of the evolving technological landscape, ensuring the responsible & ethical integration of AI in national security for the benefit of its citizens and the global community.

[2] https://www.niti.gov.in/sites/default/files/2023-03/National-AI-Strategy-for-Artificial-Intelligence.pdf
[3] https://edition.cnn.com/2017/09/01/world/putin-artificial-intelligence-will-rule-world/index.html

[4] https://pib.gov.in/PressReleseDetail.aspx?PRID=1999044
[5] https://pib.gov.in/PressReleseDetail.aspx?PRID=1999044