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DRDO INITIATES DEVELOPMENT OF NEW AGE DEW SYSTEMS

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The Indian armed forces are poised to harness the technology to bolster their military strength and war waging capabilities in the decades to come. While government, in consultation with armed forces, is making all efforts to modernise and provide a cutting edge to its land, maritime and air forces, it is well aware that outcome of future conflicts would be driven by the development of new age weapon systems, unique in their conceptualization and application capabilities in conduct of warfare.

The major world powers namely the United States, Russia and China have invested and progressed considerably in research and development of directed energy technologies that would contribute to their futuristic weapon programmes. Directed Energy Weapon (DEW) technology makes use of High Powered Lasers (HPL) and High Powered Microwaves (HPM) to generate high power electromagnetic beams that provide for delivery of scalable destructive power over diverse distances in support of

tactical and strategic operations. Additionally, efforts are also on to exploit Charged Particle Beams (CPB) and to replicate Electromagnetic Pulse (EMP), a known by-product of otherwise a nuclear explosion as new age weapons. These technologies integrated on a weapon platform will prove to be strategic game changers in the eventuality of future conflicts.

India had made forays in the field of directed energy technology towards the end of 20th century¹, when it initiated development of Kilo Ampere Linear Injector (KALI) in the 1990s followed by a proposal to develop Directionally Unrestricted Ray-Gun Array (DURGA). KALI happens to be a linear electron accelerator that would open up the possibility of developing a high power beam gun while DURGA is being developed as laser gun.

In India, research facilities and laboratories like Laser Science & Technology Centre (LASTEC), Defence Electronics Research Laboratory (DLRL) and Defence Research &



Development Laboratory (DRDL) under the functional control of Defence Research and Development Organisation (DRDO) carry out research and development in the field of lasers, electronic warfare and strategic systems, however, India lacked an infrastructural set up or a laboratory dedicated towards converting directed energy technologies into weapon systems.² To bridge this gap, Centre for High Energy Systems and Sciences (CHESS) was established a few years back at Hyderabad.³

Development of directed energy weapons has gained momentum after the government, in February 2014, sanctioned Rs 115 crore for development of "experimental technology modules for directed energy laser systems".⁴ As per available reports⁵, CHESS has initiated development of a prototype 10 kilowatt laser weapon which was tested for a range of 800 meters in one of the test facilities. The report also confirms demonstration of this weapon system to the armed forces at the Terminal Ballistics Research Laboratory's firing range at Ramgarh in Haryana in September 2015.⁶ In addition, LASTEC is already continuing its research on array of laser technologies using chemical oxygen iodine lasers (COIL) to high-power fibre lasers. These lasers are being developed for strategic uses and include a 25-kilowatt laser to take on a ballistic missile during its "terminal phase" at a distance of 5-7 km.⁷

Laser weapons are now part and parcel of military inventories of advanced countries like the United States and demonstration of laser weapons with power in excess of 500 kilowatts has already been carried out. While demonstration of laser weapon by DRDO is a welcome step, it may be noted that for weapon effectiveness, a laser weapon system should be able to generate power in excess of 100 kilowatt. Even though India has made a beginning, it needs to consolidate and fast track its efforts to put in place DEW capabilities to benefit the security needs and deterrence posture by 2035. The real challenge for DRDO will be to indigenously improve the laser efficiency while reducing the size of weapon equipment. Thus, it will have to work simultaneously on developing and improving various laser generation techniques using solid state, fibre and chemical lasers for diverse capabilities in defensive and offensive operations.

At this juncture, it is well known that no nation will share the critical technologies related to new concept weapon systems. It is for this reason, that it becomes imperative for India to invest and concentrate on research and development in technologies related to new concept weapons like DEW and charged particle beams. India should also work in the field of generating non-nuclear Electromagnetic pulse (EMP) and continue in its efforts to improve generation techniques of particle beams on similar lines. The testing and evaluation of

microwave and laser weapons are not governed by any International agreement and on successful testing, the endeavour should be to integrate these weapons in a phased manner on ground based, ship based and airborne platforms while keeping options open to use them on space based platforms.

(Disclaimer: The views and opinions expressed in this article are those of the author and do not necessarily reflect the position of the Centre for Air Power Studies [CAPS])

Notes

¹ "KALI (electron accelerator)", at [https://en.wikipedia.org/wiki/KALI_\(electron_accelerator\)](https://en.wikipedia.org/wiki/KALI_(electron_accelerator)) accessed on Mar 28, 2016

² Saurav Jha, "Interview with the Chief of DRDO, Avinash Chander -Part II", at <http://www.news18.com/blogs/india/saurav-jha/interview-with-the-chief-of-drdo-avinash-chander-part-ii-10879-748576.html> accessed on Mar 28, 2016

³ DRDO Laboratories at <http://pib.nic.in/newsite/PrintRelease.aspx?relid=101899> accessed on April 12, 2016

⁴ Rajat Pandit, "DRDO working on Star Wars-like weapons", at <http://timesofindia.indiatimes.com/india/DRDO-working-on-Star-Wars-like-weapons/articleshow/51577689.cms> accessed on Mar 28, 2016

⁵ ibid

⁶ Ibid, No 4.

⁷ Ibid, No. 4.