DURGA II Laser Weapon

Source: TW

Why in News?

Recently, the **Defence Research and Development Organisation (DRDO)** has sought USD 100 million from the Ministry of Defence to develop a high-power laser weapon, named Directionally Unrestricted **Ray-Gun Array (DURGA) II,** a lightweight directed energy weapon (DEW).

- It is a 100-kilowatt lightweight DEW and can be used by armed forces.
- It aims to provide the Indian armed forces with cutting-edge technology capable of neutralising various threats, including drones, missiles, and artillery shells.

What are Directed-Energy Weapons (DEWs)?

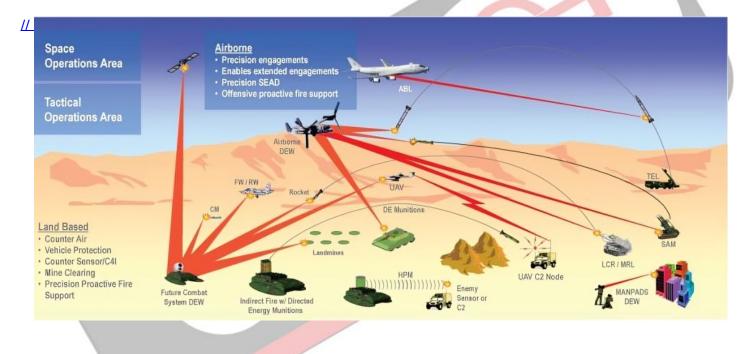
- About:
- Fision • It is a type of weapon system that emits highly focused energy, typically in the form of lasers, microwaves, or particle beams, to incapacitate or destroy targets.
 - Unlike traditional firearms or explosives which rely on kinetic energy (physical impact), DEWs use directed energy to achieve their effects.
- Types:
 - Laser Weapons: It uses a concentrated beam of coherent light to heat and damage the target.
 - They can be used for various purposes, including target destruction, missile defence, and disabling electronics.
 - Microwave Weapons: They emit electromagnetic radiation in the microwave frequency range to disrupt or damage electronic systems, such as **computers, sensors**, or communication devices.
 - Particle Beam Weapons: They accelerate charged or neutral particles to high velocities and direct them towards the target to cause damage through kinetic energy transfer or ionisation effects.
- Advantages:
 - It has advantages including precision targeting, rapid engagement, reduced collateral damage, and potentially lower costs per shot.
 - DEWs are believed to be the sole answer to virtually 'unstoppable' hypersonic missiles.
 - They have applications in military defence, homeland security, space exploration, and law enforcement.
 - It transmits lethal force at the speed of light.
 - These weapons are not affected by the constraining effects of gravity or
 - atmospheric drag, making them **extremely precise**.
- Challenges:
 - Limited Range: Most DEWs have limited range, and their effectiveness decreases with **increasing distance** between the target and the weapon.
 - **High Cost**: It **can be expensive** to develop and manufacture, and the cost may not be justified by their effectiveness in some situations.
 - Countermeasures: It can be countered by using reflective materials which can reduce

their effectiveness.

- Its effectiveness can be influenced by factors such as **atmospheric conditions**, **including fog, rain, and dust**.
- Arms Race: The development of DEWs may lead to an arms race among nations.
 - Examples such as the current nuclear race among nations.
- Significance for India:
 - The application of this technology in the **defence industry** can transform the way wars will be fought enabling India to produce **cutting-edge platforms**, weapons, sensors, and networks essential to fight and win a future war.
 - DEWs could act as a **deterrent against hostile nations** such as China, and Pakistan by increasing India's defence capabilities.
 - Other Countries with DEWs:
 - Russia, France, Germany, the United Kingdom, Israel, and China are reportedly among the countries that have programmed to develop DEWs or Laser Directed Energy Weapons.
 - Earlier, the US also accused Cuba of carrying out sonic attacks <u>(Havana</u> <u>Syndrome)</u>.

Note:

 The global DEW market was worth USD 4.1 billion in 2020 and is forecasted to reach USD 15.5 billion by 2027, with a CAGR of 19.63%.



UPSC Civil Service Examination, Previous Year Questions(PYQs)

Prelims:

Q1. With reference to Agni-IV Missile, which of the following statements is/are correct? (2014)

- 1. It is a surface-to-surface missile.
- 2. It is fuelled by liquid propellant only.
- 3. It can deliver one-tonne nuclear warheads about 7500 km away.

Select the correct answer using the code given below:

(a) 1 only
(b) 2 and 3 only
(c) 1 and 3 only
(d) 1, 2 and 3

Ans: (a)

Q2. What is "Terminal High Altitude Area Defense (THAAD)", sometimes seen in the news? (2018)

(a) An Israeli radar system

- (b) India's indigenous anti-missile programme
- (c) An American anti-missile system
- (d) A defence collaboration between Japan and South Korea.

Ans: c

PDF Refernece URL: https://www.drishtiias.com/printpdf/durga-ii-laser-weapon