

## Emerging Technologies in Defence

### Why in news?

Emerging technologies like artificial intelligence, cyber technology, etc. are vital for Indian military and defence organisations.

### What is emerging technology?

- **Emerging technologies** - It refers to innovative advancements or developments that have the potential to significantly change the way we live and work.
- These technologies arise from cutting-edge research and offer new opportunities for industries, economies, and societies.

**Examples of Emerging Technologies**

**Artificial Intelligence**

- It involves deployment of computer systems that can perform tasks that usually require human intelligence.

**3D printing**

- It allows for the creation of three-dimensional objects by layering materials according to a digital design.

**Nano technology**

- It explores the manipulation of matter at the nanoscale 1 to 100 nanometers, leading to development of new materials.

**Robotics**

- It involves design and creation of machines that can perform tasks either autonomously or under human control.

### What steps were taken to use emerging technologies in Indian defence sector?

- **Chanakya Defence Dialogue**- It was held in 2023 which serves as a forum to *enhance national and regional security* by discussing contemporary issues, including the impact of emerging technologies.
- **Integrated Unmanned Roadmap**- It is a comprehensive plan for the development and deployment of unmanned systems in the *Indian Navy* that aims to achieve standardization, interoperability and jointness.

- **Project Swavlamban**- It is an initiative to promote Atmanirbhar (self-reliance) in the defence sector by encouraging indigenisation of defence equipment and technology.
- **AIDef**- Artificial Intelligence in Defence is a symposium held in 2022 that showcased cutting edge AI enabled solutions developed by industry, start-ups etc.,
- It includes Defence AI Council and Defence AI Project Agency that facilitates AI integration in defence.
- **Defence Cyber Agency**- It was launched in 2018 to handle cyber security threats and to develop cyber warfare doctrine.
- **Defence Space Agency**- It is responsible for operating space warfare and satellite intelligence assets of India.

To know about the AI in defence sector click [here](#)



### What are the challenges in utilising emerging technologies in India?

- **Financial crunch**- India's defence spending is around **2.1% of GDP**, which is insufficient to meet the requirement of armed forces and the defence industry.
- **Lack of innovation**- India invests very little in research and development in emerging technologies compared to its global leaders.
- **Poor governance**- India's defence acquisition and procurement system is plagued by delays, corruption and red tapism.

- **Outdated-** The system is unable to cope with the fast paced and dynamic nature of emerging technologies, which require constant innovation and upgradation.
- **Lack of skills-** India faces a *brain drain* of its talent to foreign countries and industries and faces shortage of skilled and qualified personnel in emerging technologies.
- **Inefficiency-** India's armed forces operate in silos and lack interoperability among themselves and with the civilian sector.
- It hampers the effective integration and utilisation of emerging technologies, which require seamless coordination and collaboration across domains and platforms.
- **Lack of standardization-** India lacks a clear and coherent strategic vision and doctrine for the use of emerging technologies in defence.
- India has not articulated its objectives, priorities, and principles for the development and deployment of these technologies.
- It has not defined its thresholds, norms, and rules of engagement for their employment in conflict scenarios.

### What lies ahead?

- **Collaborative defence-** India needs to foster jointness and interoperability among it selves and with the civilian sector, for effective utilisation of emerging technologies.
- **Transparency-** India needs to reform its defence acquisition and procurement system to make it more agile, transparent, and efficient.
- **Disruptive Human Resource-** India needs to improve its education system, create more opportunities for training and learning to retain and attract talent.
- **Doctrinal changes-** India needs to articulate a clear and coherent strategic vision and doctrine for the use of emerging technologies in defence.
- **Promote investment-** India needs to allocate more resources for R&D, especially in emerging technologies, to develop indigenous and cutting-edge capabilities.

### References

1. [The Hindu- Renewed focus on Emerging technologies](#)
2. [PIB- Chanakya Defence Dialogue](#)
3. [IDSA- Technology development fund opportunities and challenges](#)