Drone Defence with Advanced Radars

Source: IE

Post-**Operation Sindoor,** the Indian Army plans to bolster **drone defence** by procuring **advanced radars** to detect and neutralise **low radar cross-section (RCS) aerial threats.**

- These radars will plug into the Army's **Akashteer air defence command-and-control network,** improving real-time tracking.
    - **Key Technological Features of Advance Radars:**
    - **Low Level Light Weight Radars (Improved)- LLLR-I:** AESA-based **3D radar** with the capability to track over **100 aerial targets within 50 km** across diverse terrains.
    - **Low Level Light Weight Radars (Enhanced)-LLLR-E:** Adds **Electro-Optical Tracking System (EOTS)** and passive RF detection for day-night and silent tracking of drones.
    - **Air Defence Fire Control Radar – Drone Detector-ADFCR-DD**: **Vehicle-mounted system** integrating radar, fire control, and IFF for coordinating gunfire and **VSHORADS (Very Short Range Air Defence Systems) missiles.**

DRONE TECHNOLOGY

Drone is a pilotless flying machine, using aerodynamics for lift, can operate autonomously or remotely, and may carry lethal or nonlethal cargo.

COMPONENTS

- Unmanned aircraft (UA)
- Control system (ground control station - GCS)
- Control link (specialized datalink)
- Other related support equipment

CLASSIFICATION

(as per Drone Rules, 2021)

- Nano: <250 gm
- Micro: 250 gm to 2 kg
- Mini: 2 kg to 25 kg
- Small: 25 kg to 150 kg
- Large: >150 kg

APPLICATIONS

- **Mapping & Surveying** (asset Inspection, roof inspections)
- **Agriculture** (bird control, crop spraying & monitoring etc)
- Multispectral/thermal/NIR cameras, **Aerial Photo/ videography** and Live streaming events
- **Emergency Response** (search and rescue, marine rescue, fire fighting)
- **Disaster** (zone mapping, disaster relief etc)
- **Mining**
- **Monitoring Poachers**
- **Meteorology**, Aviation, Payload carrying

DRONES IN DEFENCE

Purpose

- Surveillance and Reconnaissance
- Search and Rescue
- Maritime Surveillance
- Combat Drones
- Offensive (heterogeneous SWARM drones)
- Counter-Terrorism Operations

India's Counter-Drone System

- **Indrajaal** (India's inaugural autonomous drone-defense dome)
- Procurement of combat-capable **Heron drones from Israel**
- Acquisition of **MQ-9B Armed Drones from the US**

RELATED REGULATIONS

- Aircraft (Security) Rules, 2023
- Drones Rules, 2021 and Drone (Amendment) Rules, 2022

INDIA'S INITIATIVES

- Digital Sky Platform
- No-Permission-No-Takeoff (NPNT) framework
- PLI Scheme for Drones
- Drone Shakti Scheme

ISSUES

- Increased risk of armed attacks
- Data security
- **Cheaper cost** enables a larger population to procure drones
- Use of drones in warfare **(remote warfare)**
- **Procurement by non-state actors** can pose serious threats
- Ease in **delivering mass destruction weapons**

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