INDIGENOUS INTEGRATED AIR DEFENCE WEAPON SYSTEM -DEFENCE

The Defence Research and Development Organisation (DRDO) successfully carried out the maiden flight-tests of the Indigenous Integrated Air Defence Weapon System (IADWS) off the Odisha coast. The tests mark a decisive step toward India's self-reliant, multi-layered defence shield, part

of Mission Sudarshan Chakra, announced by Prime Minister Modi on Independence Day.

Mission Sudarshan Chakra

Objective - To develop a fully indigenous air defence system by 2035 capable of neutralizing enemy aerial threats and retaliating effectively.

Coverage - Designed to protect strategic and civilian areas, including hospitals, railways, faith centres, and other critical infrastructure.

Inspiration - Named after Lord Krishna's Sudarshan Chakra, symbolizing a protective shield that defends and counterattacks adversaries.

Timeline - Aim to achieve complete operational capability within 10 years (by 2035).

Strategic Vision - Represents India's ambition to have a multi-layered, modern air defence network capable of defending the nation against contemporary and emerging aerial threats.

Indigenous Air Defence Weapon System (IADWS)

Definition - An indigenous, multi-layered air defence system developed to protect Indian territory from aerial attacks.

Key Components

1. Quick Reaction Surface to Air Missiles (QRSAM)
2. Very Short Range Air Defence System (VSHORADS)
3. High-Power Laser-based Directed Energy Weapon (DEW)

Control System - Centralized Command and Control Centre developed by DRDL, Hyderabad.

Testing - All components successfully validated during trials at Integrated Test Range, Chandipur, confirming operational readiness.

Quick Reaction Surface to Air Missiles (QRSAM)

Role - Provides short-range protection to Army's moving armoured columns against aerial attacks.

Platform - Highly mobile to match army mobility requirements.

Features - Capable of "search on move" and "track on move" using automated radars.

Range - 3 km to 30 km.

Developer - DRDO.

Components -

1. Automated command and control system.
2. Two radars: Active Array Battery Surveillance Radar & Active Array Battery Multifunction Radar with 360-degree coverage.
3. Missile launcher system.

Very Short Range Air Defence System (VSHORADS)

Type - Fourth-generation Man-Portable Air Defence System (MANPAD).

Role - Meets Army, Navy, and Air Force requirements for short-range aerial threat neutralization.

Capabilities - Neutralizes drones, helicopters, and other aerial threats.

Range - 300 meters to 6 km.

Developer - Research Centre Imarat (RCI), Hyderabad.

Directed Energy Weapon (DEW)

Developer - Centre for High Energy Systems and Sciences (CHESS), Hyderabad.

Type - Vehicle-mounted Laser DEW MK-II(A).

Performance - Can destroy fixed-wing UAVs and swarm drones by damaging structural components or disabling sensors.

Range - Less than 3 km.

Significance - Places India among a select group of countries with operational DEW capabilities.

Strategic Significance of IADWS

Coverage - Neutralizes aerial threats within a 30 km envelope, including high-speed jets, low-speed aircraft, helicopters, and drones.

Indigenous Capability - Entirely Indian-developed system combining command, control, and weapon systems.

National Asset - Enhances India's defensive shield and is a foundational step towards Mission Sudarshan Chakra.

Future Scope - Current tests at lower ranges serve as stepping stones for a comprehensive national air defence network by 2035.

Working Mechanism of Air Defence Systems

Detection - Radars emit electromagnetic waves that reflect off aerial objects, helping identify and locate targets.

Tracking - Continuous radar and sensor monitoring determines speed, altitude, and trajectory of the target.

Interception - Interceptors (SAMs or fighter aircraft) are launched to neutralize threats using real-time guidance from command centres.

Command, Control, and Communication (C3) - Ensures rapid decision-making, coordination, and response to evolving threats.

Key Components of Modern Air Defence

Surface-to-Air Missiles (SAMs) - Ground-based missiles capable of engaging targets at various altitudes and ranges; backbone of the system.

Anti-Aircraft Artillery (AAA) - Short-range guns serving as the last line of defence, effective against UAVs and low-flying aircraft.

Electronic Warfare (EW) Systems - Uses electromagnetic radiation to disrupt, deceive, or disable enemy detection and communication systems.

Global Comparison of Air Defence Systems

Russia - S-400 Triumf, S-500 Prometey

USA - Patriot (PAC-3), THAAD (Terminal High Altitude Area Defence)

Israel - Iron Dome, David's Sling

China - HQ-9, HQ-19

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