



# DRDO



India : The Emerging Defence Manufacturing Hub

**DEFEXPO 20**

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Ministry of Defence

**Defence Research & Development Organisation**  
**Ministry of Defence, Rajaji Marg, New Delhi-110 011**  
**[www.drdo.gov.in](http://www.drdo.gov.in)**



# DRDO AT A GLANCE

**D**RDO is the R&D wing of Ministry of Defence, Govt of India, with a vision to empower India with cutting-edge defence technologies and a mission to achieve self-reliance in critical defence technologies and systems, while equipping our armed forces with state-of-the-art weapon systems and equipment in accordance with requirements laid down by the three Services. DRDO's pursuit of self-reliance and successful indigenous development and production of strategic systems and platforms such as Agni and Prithvi series of missiles; light combat aircraft, Tejas; multi-barrel rocket launcher, Pinaka; air defence system, Akash; a wide range of radars and electronic warfare systems; etc., have given quantum jump to India's military might, generating effective deterrence and providing crucial leverage.

“Balasya Mulam Vigyanam”—the source of strength is science—drives the nation in peace and war. DRDO has firm determination to make the nation strong and self-reliant in terms of science and technology, especially in the field of military technologies.

## Vision

Empowering the nation with state-of-the-art indigenous defence technologies and systems.

## Mission

- Design, develop and lead to production state-of-the-art sensors, weapon systems, platforms and allied equipment for our Defence Services.
- Provide technological solutions to the Services to optimise combat effectiveness and to promote well-being of the troops.
- Develop infrastructure and committed quality manpower and build strong indigenous technology base.



# Message



**Dr G Satheesh Reddy**  
Secretary, Department of Defence R&D  
& Chairman DRDO

**D**RDO is committed to design and development of indigenous weapon systems and equipment comparable with the best in the world. Keeping pace with the development of newer weapon systems, the defence manufacturing sector is partnering for supply of defence equipment worth more than 2.79 lakh crores. Cooperation between DRDO, Industry Partners and Indian Armed Forces is driving a sea of change in the Nation's industrial manufacturing base. Satisfactory induction and operationalisation of complex weapon systems has been made possible with the evolving synergy between DRDO and Industry. The time has come for us to collectively demonstrate the capability to turn around the nation from a net importer of weapons to a net exporter of weapons.

The establishment of Chennai-Tiruchirappalli and Aligarh-Lucknow industrial corridors for defence manufacturing should give an impetus to the growing indigenous defence industrial base. This is a welcome and far sighted policy initiative of in-line with the "Make in-India" mission of Hon'ble PM.

Active participation from several public, private industries and academia have matured in their association with DRDO. They have become strategic partners in DRDO's mission of innovation and indigenisation. The depth and breadth of DRDO's scientific, research and technical capabilities will be available to support prospective entrepreneurs and industry partners engaged in manufacturing defence systems and platforms.

DefExpo 2020, has aptly chosen the theme as 'The Emerging Defence Manufacturing Hub' with focus on 'Digital Transformation of Defence'. This is an opportunity for young entrepreneurs as well as industry partners to collectively engage and collaborate to realise the vision of a "shaktishali" and "atmanirbhar" nation.









## AERONAUTICAL SYSTEMS



ADE, ADRDE, CABS, CEMILAC, and GTRE form the aeronautics cluster of DRDO. ADA a society under DDR&D also contributes extensively to the Aeronautics portfolio of DRDO. With the incredible array of products and technologies generated by these labs, DRDO can boast of high degree of self-reliance. Some of the key systems of the cluster are:

- ❖ **LCA Tejas:** World's smallest, supersonic, multirole light combat aircraft with digital fly-by-wire flight control system and advanced structural composites. Inducted into IAF
- ❖ **AEW&C System:** Indigenously built Airborne Early Warning and Control System with multi target surveillance & reconnaissance features. Inducted into IAF
- ❖ **TAPAS-BH:** Medium Altitude Long Endurance (MALE) Unmanned Aerial Vehicle (UAV) for aerial surveillance, electronic & communication intelligence
- ❖ **Heavy Drop Systems:** Drop systems for para dropping equipment upto 16 tons
- ❖ **Nirbhay:** Long range subsonic cruise missile capable of carrying 300 kg warhead
- ❖ **Small Turbofan Engine:** STFE successfully demonstrated at high altitude and low temperatures











## MISSILES & STRATEGIC SYSTEMS



The glorious story of 'Guided Missiles' in India started at the Defence Research and Development Laboratory (DRDL) in Hyderabad leading to development of strategic and tactical missile systems. The country has achieved full self-reliance in the area inspite of technology denial regimes. In the process, a large number of cutting edge technologies have been indigenously realized. The cluster comprises ASL, DRDL, ITR, RCI, and TBRL. Flagship products are:

- ❖ **Long Range Ballistic Missile 'Agni':** Missile with advanced navigation & guidance systems
- ❖ **Ballistic Missile Defence System:** Multiple variants for intercepting of ballistic missiles at different altitudes have been developed and demonstrated as part of the BMD Programme
- ❖ **Akash:** A short range surface-to-air missile system. The system has been inducted into the Indian Air Force and Indian Army
- ❖ **BrahMos:** Supersonic cruise missile for land, air and naval platforms
- ❖ **Tactical Missiles:** Comprise various surface-to-air missiles like LRSAM, MRSAM, QRSAM and anti-tank guided missiles, like Nag, HeliNa, & SANT
- ❖ **Astra:** Beyond visual range air-to-air missile









## ELECTRONICS & COMMUNICATION SYSTEMS

DRDO has developed family of state-of-the-art Communication Systems, Radars, Electronic Warfare and Electro-optical systems. Significant achievements in the area of signal/image processing and laser systems have also been made. The ECS labs include: DEAL, DLRL, DARE, IRDE, LASTEC, LRDE and CHESS. Some of the systems developed by these labs are:

- ❖ **Radars:** Battle Field Surveillance Radar (BFSR-SR), 3D-TCR, Bharani Mk-1, Weapon Locating Radar for Army; Rohini, Aslesha, Medium Power Radar 'Arudhra' for Air Force, Revathi for Navy
- ❖ **Electronic Warfare (EW) Systems,** viz., Samyukta, Sangraha, Varuna, Samudrika
- ❖ **Electro-optic Systems:** Integrated Multi-Function Sights, Laser Target Designators, Holographic Sights, Optical Target Locator
- ❖ **Communication Systems:** Software Defined Radios, Data links, Troposcatter Communication System
- ❖ **Laser Systems :** Laser Fence, Laser Ordnance Disposal System, Preemptor – Explosive Identifier, Cloud Lidar









## ARMAMENTS AND COMBAT ENGINEERING SYSTEMS

The success of military operations is largely determined by the effectiveness of armaments, combat vehicles and engineering equipment. CVRDE, VRDE, R&D(E), ARDE, DTRL, HEMRL, PXE and SASE, form the Armaments and Combat Vehicles & Engineering (ACE) cluster of DRDO engaged in empowering defence forces with the required punch. Some of the products developed by the cluster are:

- ❖ **Arjun MBT:** State-of-the-art tank with superior fire power, high mobility and enhanced protection of crew from enemy fire
- ❖ **Bridging Systems:**
  - **Bridge Layer Tank (BLT-T72):** Prefabricated MLC72 class bridge on T72 tank
  - **Sarvatra:** MLC 70 class prefabricated, multi-span mobile bridging system on wheeled carrier vehicle
- ❖ **Pinaka MBRLS:** Multi Barrel Rocket Launcher System, 'Pinaka' is an all weather, indirect fire, free flight artillery rocket system
- ❖ **Artillery Guns:** 155 mm x 52 Cal Advanced Towed Artillery Gun System developed jointly with Indian industries
- ❖ **Small Arms & Ammunitions,** viz., Joint Venture Protective Carbine (JVPC), Air Burst Grenade, Under Barrel Grenade Launcher (UBGL), Corner Shot Weapon System (CSWS)







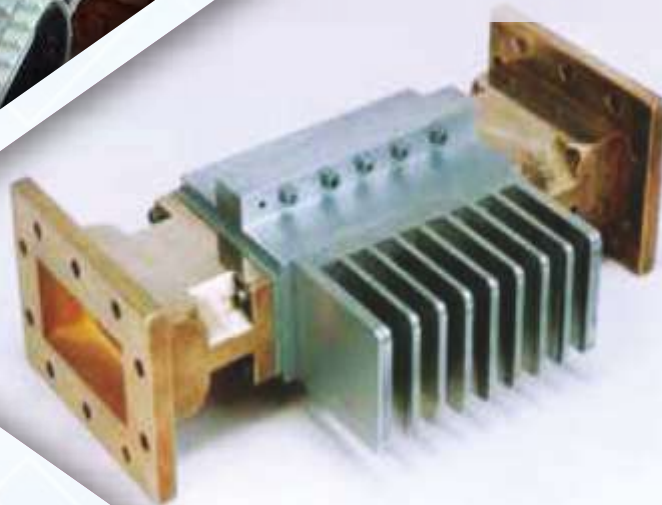
## NAVAL SYSTEMS AND MATERIALS

The naval cluster laboratories of DRDO namely, NPOL, NSTL, and NMRL are ensuring self-reliance in underwater sensors and weapon systems for the Indian Navy. The cluster also includes 3 Materials labs, viz., DMRL, DMSRDE and DLJ. The following major systems have been developed by the cluster.

- ❖ **Varunastra-Anti-submarine Torpedo:** Long range with multi manoeuvring capabilities, acoustic homing with wide look angle, capable of tracking silent targets
- ❖ **Torpedo Advanced Light (TAL):** Anti-submarine torpedo, high power; launched from ship or helicopter
- ❖ **Sonars:** Different sonars like Hull Mounted Sonar HUMSA-NG; Advance active-cum-passive integrated sonar, 'Abhay for shallow watercrafts', integrated submarine sonar USHUS-2 & Advanced Light Towed Array Sonar (ALTAS)
- ❖ **Mareech:** Advanced Torpedo Defence System comprising sensors & decoys
- ❖ **Materials for Aero and Land applications:** Speciality Steels for Naval applications









Significant advances have been made in the area of advanced computing, microprocessors, microwave tubes, solid-state materials and devices, etc. The materials, devices and components are being used in various systems developed by DRDO. The cluster includes ANURAG, CAIR, MTRDC, SAG and SSPL. Some of the products developed by the cluster are:

- ❖ **Wearable Computer:** Compact, power-efficient, high performance computer
- ❖ **Pulsed Coupled Cavity TWTs:** key component for indigenous radars
- ❖ **System-on-Chip:** Used in the indigenous missile systems and platforms
- ❖ **Hexapod:** Intelligent mobile robots for defence & civilian applications
- ❖ **e-Nasika:** GC SAW based e-nose for detection of chemical warfare agents





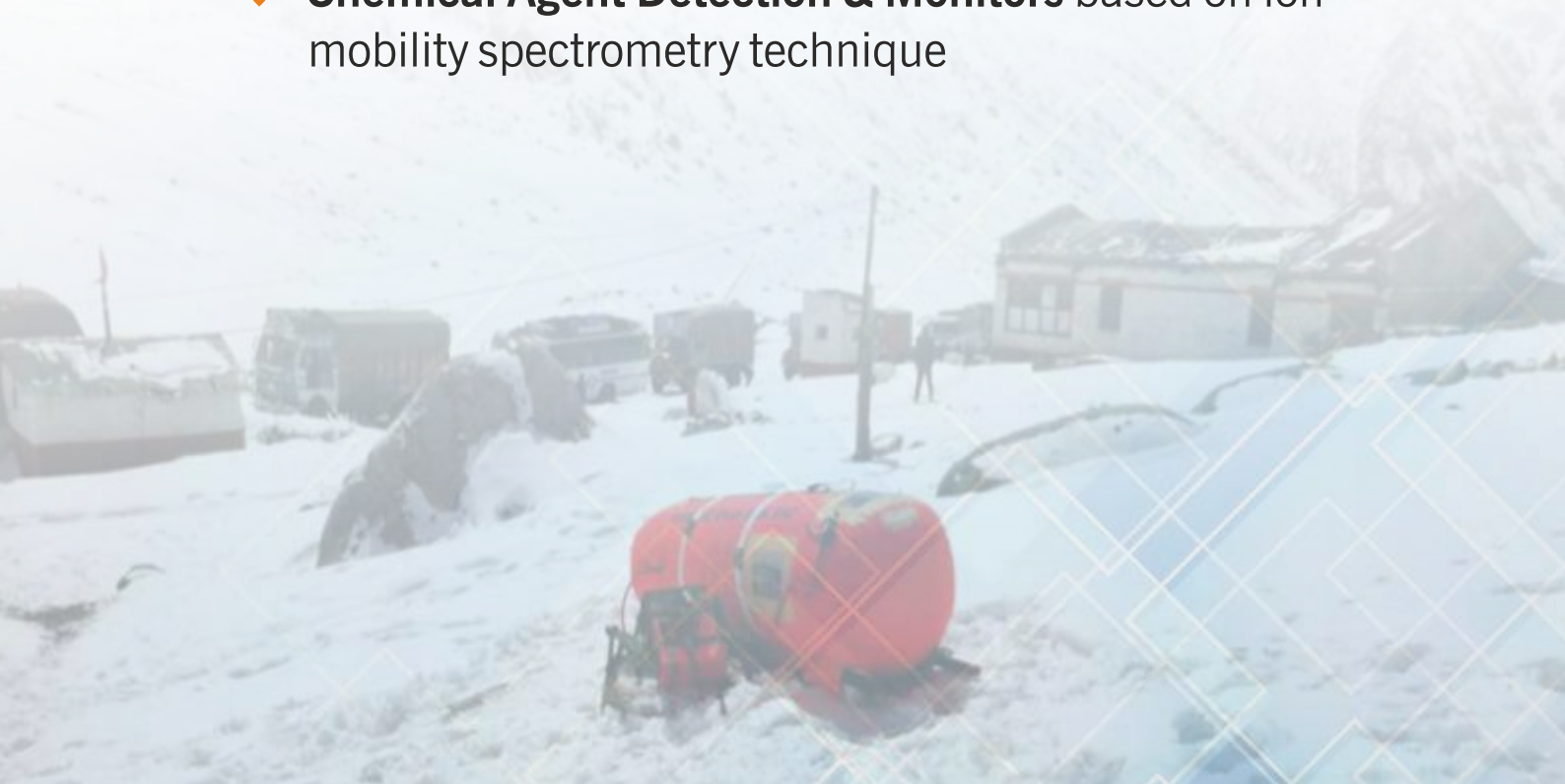




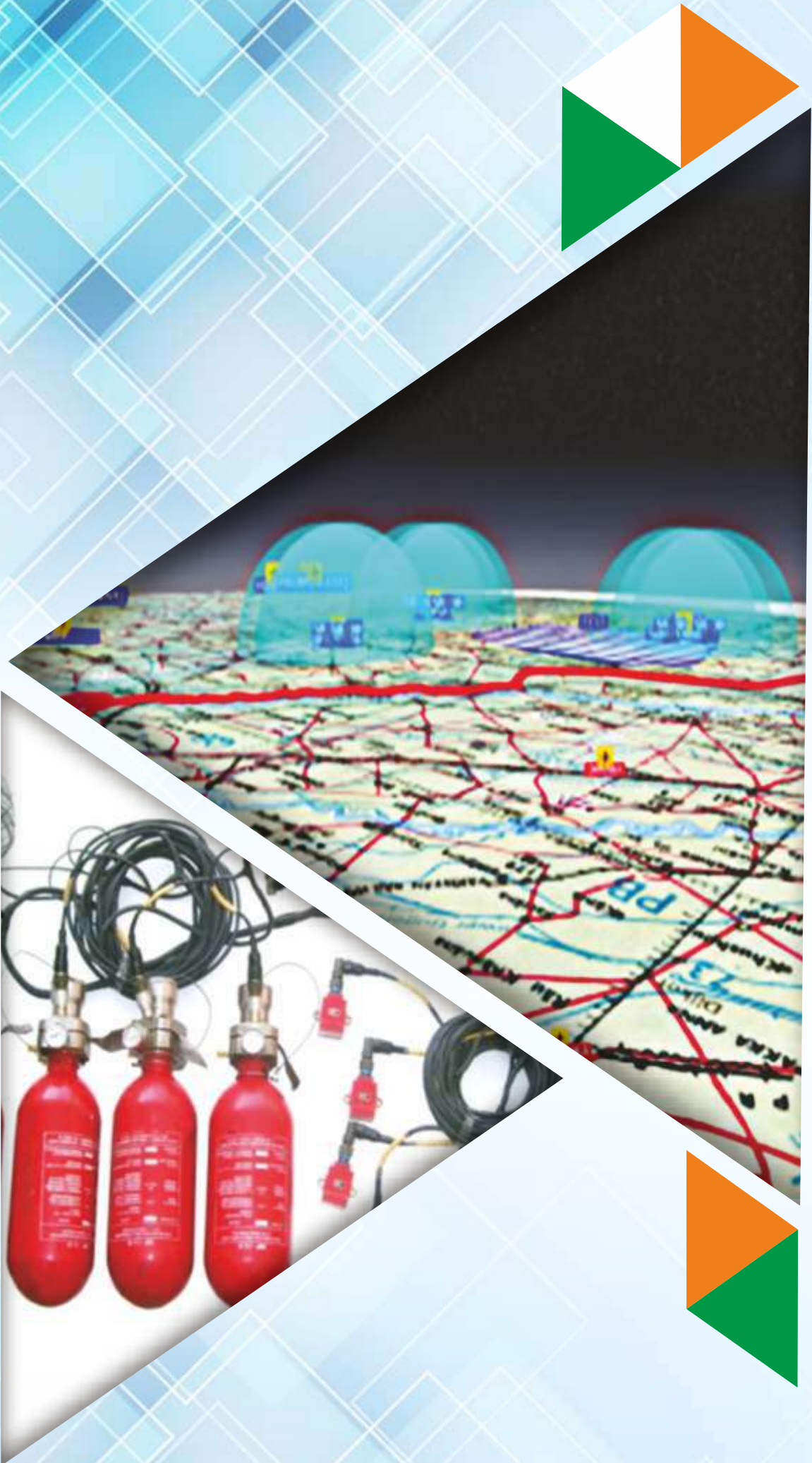


The Life Sciences laboratories, viz., DEBEL, DFRL, DIBER, DIHAR, DIPAS, DIPR, DRDE, DRL and INMAS are engaged in innovatively employing science and technology to serve the nation's protectors, the soldiers so that they can perform with highest efficiency and least possible stress under the extremes of climates and battlefield environments. Some of the key products of the cluster are:

- ❖ **Telemedicine System:** Remote acquisition of bio-medical data and its diagnosis from shore-to-ship
- ❖ **Biodigester:** Eco-friendly disposal of human waste, especially at high altitude cold regions
- ❖ **High Altitude Pulmonary Oedema Bag (HAPO):** Life saving device at high altitude regions
- ❖ **NBC Systems** such as shelters, suits, casualty bags, detection system, Recce vehicle, NBC drugs
- ❖ **Chemical Agent Detection & Monitors** based on ion mobility spectrometry technique









## OTHER IMPORTANT AREAS & CENTRES

### ❖ **System Analysis & Wargaming**

- Integrated software package for tactical training & wargaming for Services

### ❖ **Fire & Explosive Safety**

- Fire detection & suppression systems
- Safety structures for explosive storage

### ❖ **Centre for Military Air-worthiness Certification (CEMILAC)**

- Internationally recognised Air-worthiness Certification Centre for state-of-the-art military airborne platforms & stores

### ❖ **Defence Institute of Advanced Technology** for post graduate & doctoral research



