

# Defence Research and Development Organisation (DRDO)

DRDO stands for Defence Research and Development Organisation. It was established in **1958** by the Government of India, under the Ministry of Defence (Raksha Mantralay).

Defence is an important and dynamic segment in the [UPSC Syllabus](#). Since DRDO plays a major part in the country's defence mechanism, it is a very significant topic for IAS aspirants. The Commission has asked several questions related to missile launches, its types, etc. To tackle such factual questions in the [UPSC Prelims](#), it is essential to know about several facts and figures related to the topic.

## History of DRDO

Established in **1958** by the Government of India, it was instituted by combining three major defence organisations namely:

- Defence Science Organisation (**DSO**)
- Defence Technical Development Establishment (**DTDE**)
- Directorate of Technical Development and Production (**DTDP**)

With a project in 1960 on Surface-to-Air Missiles (SAM), the Project Indigo was the DRDO's first major defence project. This project was discontinued without any success.

DRDO started with just 10 different laboratories in the country and now has more than 50 labs across the nation researching in different sectors of technology and defence.



## List of DRDO Labs

Find all the laboratories that are administered by the Defence Research and Development Organisation below.

City	Labs	
Delhi	Defence Terrain Research Laboratory (DTRL)	Institute of Nuclear Medicine & Allied Sciences (INMAS)
	Centre for Advanced Semiconductor Technology (ASEMIT)	Institute for Systems Studies & Analyses (ISSA)
	Centre for Fire, Explosive and Environment Safety (CFEES)	Laser Science & Technology Centre (LASTEC)
	Defense Scientific Information & Documentation Centre (DESIDOC)	Scientific Analysis Group (SAG)
	Defense Institute of Physiology & Allied Sciences (DIPAS)	Solid State Physics Laboratory (SSPL)
	Defense Institute of Psychological Research (DIPR)	
Hyderabad	Advanced Numerical Research & Analysis Group (ANURAG)	Defence Metallurgical Research Laboratory (DMRL)
	Defence Electronics Research Laboratory (DLRL)	Defence Research & Development Laboratory (DRDL)
	Research Centre Imarat (RCI)	

<b>Chandigarh</b>	Snow & Avalanche Study Estt (SASE)	Terminal Ballistics Research Laboratory (TBRL)
<b>Bangalore</b>	Aeronautical Development Establishment (ADE)	Defence Avionics Research Establishment (DARE)
	Centre For Airborne System (CABS)	Defence Bioengineering & Electromedical Laboratory (DEBEL)
	Centre for Artificial Intelligence & Robotics (CAIR)	Electronics & Radar Development Establishment (LRDE)
	Centre for Military Airworthiness & Certification (CEMILAC)	Microwave Tube Research & Development Centre (MTRDC)
	Bangalore Gas Turbine Research Establishment (GTRE)	
<b>Pune</b>	Armament Research & Development Establishment (ARDE)	High Energy Materials Research Laboratory (HEMRL)
	Defence Institute of Advanced Technology (DIAT)	Research & Development Establishment (ARDE)
<b>Dehradun</b>	Instruments Research & Development Establishment (IRDE)	Defence Electronics Application Laboratory (DEAL)
<b>Agra</b>	Aerial Delivery Research and Development Establishment (ADRDE)	
<b>Nasik</b>	Advanced Centre for Energetic Materials (ACEM)	
<b>Chennai</b>	Combat Vehicles Research & Development Establishment (CVRDE)	
<b>Mysore</b>	Defence Food Research Laboratory (DFRL)	
<b>Haldwani</b>	Defence Institute of Bio-Energy Research (DIBER)	
<b>Leh Ladakh</b>	Defence Institute of High Altitude Research (DIHAR)	
<b>Jodhpur</b>	Defence Laboratory (DLJ)	
<b>Kanpur</b>	Defence Materials and Stores Research and Development Establishment (DMSRDE)	
<b>Gwalior</b>	Defence Research & Development Establishment (DRDE)	
<b>Tezpur</b>	Defence Research Laboratory (DRL)	
<b>Mussoorie</b>	Institute of Technology Management (ITM)	
<b>Ambarnath</b>	Naval Materials Research Laboratory (NMRL)	
<b>Cochin</b>	Naval Physical Oceanographic Laboratory (NPOL)	
<b>Visakhapatnam</b>	Naval Science & Technological Laboratory (NSTL)	
<b>Balasore</b>	Proof & Experimental Establishment (PXE)	Integrated Test Range (ITR)
<b>Ahmednagar</b>	Vehicle Research & Development Establishment (VRDE)	

## Integrated Guided-Missile Development Programme (IGMDP)

One of Dr. APJ Abdul Kalam's major works was the Integrated Guided-Missile Development Programme. The intention behind this innovation was to make Indian defence forces self-sufficient in the field of missile technology.

After the approval of IGMDP in 1983 from the Indian Government, DRDO brought together the country's scientific community, academic institutions, R&D laboratories, industries and the three defence services in giving shape to the strategic, indigenous missile systems.

## List of Indian Missiles by DRDO

Categories of Missiles developed by DRDO						
<a href="#">Surface - To - Air Missiles</a>	<a href="#">Air - To - Air Missiles</a>	<a href="#">Surface - To - Surface Missiles</a>	Defence Missile	Cruise Missiles	Submarine Launched Ballistic Missiles	<a href="#">Anti-tank Missile</a>

To get the detailed list of Missiles by DRDO [click here](#).

After the launch of Agni-III in 2008, the IGMDP announced its successful completion and declared India as a self-reliant country in the field of missile technology.

## DRDO's MARS

The Pune-based R&DE Lab of DRDO has developed a smart robust robot to handle land mines and Inert Explosive Devices (IEDs) which will help the Indian Armed Forces to disarm them from far distances despite hostile surroundings. This robot, named Mobile Autonomous Robot System (**MARS**), was developed by the Electro-Mechanical Systems Group of the R&DE Lab.

### Mobile Autonomous Robot System (MARS)

- The machine can operate on its own and has an in-built programme that guides the mechanical system.
- MARS can see, identify and then pick up the suspicious object which can then be transported to a designated location.
- With some add-ons, this system can even be used to dig the ground for the object and defuse the Improvised Explosive Device by various methods.
- MARS actually creates a 3-dimensional image of the object before it handles it.
- Scientists say that with basic mechanical additions, it can take several roles and can adapt to any terrain to operate in.

### Utility of MARS

- MARS was displayed at the Multinational Field Exercise that was held in Pune and had Humanitarian Mine Action (MHA) as one of its focus areas.
- Several countries in South East Asia have the problem of Explosive Remnants of War (ERW) and in such scenarios, MARS can be very useful.
- In India, several insurgency and terrorism affected areas, and regions affected by Left Wing Extremism, face the problem of IEDs. MARS can be a useful tool for paramilitary forces, central police agencies and the local police in these regions.
- MARS can be operated from very long distances once a telecommunications system is fitted on it.

The R&DE will transfer the technology of MARS to the industry for manufacturing.

## DRDO Sets Up World's Highest Terrestrial Centre in Ladakh

- DRDO's centre in Ladakh is at 17,600 feet above sea level at Changla near Pangong lake.
- It is intended to serve as a natural cold storage unit for the preservation of natural and medicinal plants.
- The centre will also act as a research unit for food, agriculture and bio-medical sciences that will benefit the soldiers deployed at high altitude.
- After its inauguration in 2018 by the Defence Institute of High Altitude Research (DIHAR), the centre has seen multiple activities related to Life Sciences.

Also read about the National Security Council Of India. [Click Here](#)

## Challenges faced by DRDO

The major challenges faced by DRDO are briefly described below.

- **Budget Issues**
  - The SCOD (Standing Committee on Defence) during 2016-17 put forward issues related to inadequate budgets that the ongoing DRDO projects faced.
  - This was resolved once the NDA government came in power and increased it. In 2018, the military expenditure was at its peak.
- **ISRO vs DRDO**
  - There have been times where [ISRO](#) has proven missions and projects to be successful like its Mars mission at costs less than some Hollywood films.
  - On the other hand, bureaucratic administration of DRDO and failure of the Ministry of Defence to evolve with time has left the part of specialized knowledge of the defence and strategic affairs vacant.
  - Due to this, ISRO is provided with greater support from the government compared to DRDO.
- **Lack of Manpower**
  - The DRDO also suffers from inadequate manpower in critical areas and a lack of proper synergy with the armed forces.
- Most of the defence equipment is imported impacting the economy.
- The organisation spends the most time in improving the previous technologies instead of working on innovative ideas and development of new cutting edge technologies

## UPSC questions related to DRDO

### What is the role of DRDO?

- DRDO was intended to fulfil the mission of designing, developing and leading the production of state-of-the-art weapon systems, defence equipment and sensors for Indian Defence Services.
- Its mission also includes providing technical solutions to the services for combat effectiveness optimization and encouraging the welfare of troops.
- Developing infrastructure, quality manpower and indigenous technological base for the defence systems and services of the country.

### Who can apply for DRDO?

- The candidate must be a citizen of India.
- Candidate's age should be less than 28. There are exemptions for OBC and SC/ST candidates with the age limit being 31 and 33 respectively.
- Candidates must have a first-class bachelor's degree in engineering or Technology.

### Where is DRDO India?

- The Defence Research and Development Organisation is headquartered in New Delhi and has its 50+ labs all across the country.

### Related Links:

<a href="#">Various Internal Security Forces In India and their Mandate.</a>	<a href="#">Central Intelligence And Investigative Agencies of India</a>
<a href="#">Indian Intelligence Architecture: An Overview</a>	<a href="#">Indian Polity Notes</a>
<a href="#">IAS 2020</a>	<a href="#">Government Exams</a>

