

GOVERNMENT OF INDIA
MINISTRY OF DEFENCE
DEFENCE RESEARCH & DEVELOPMENT ORGANISATION
LOK SABHA

UNSTARRED QUESTION NO.1005
TO BE ANSWERED ON THE 21ST JULY, 2017

DRDO LABORATORIES

1005. KUMARI SHOBHA KARANDLAJE:

Will the Minister of DEFENCE जेके एच
be pleased to state:

- the details of laboratories / establishments functioning under Defence Research and Development Organization (DRDO) along with their areas of research and locations;
- the names of various products developed by DRDO including defence and food products for civilian use in each year during the last three years and current year; and
- the details of the funds allocation made for research work in DRDO during the above said period?

A N S W E R

MINISTER OF DEFENCE

जेके एच

(SHRI ARUN JAITLEY)

१/४ जे व.के. तसव्यह १/२

- (a) **Details of laboratories / establishments / units functioning under Defence Research and Development Organisation (DRDO) alongwith their areas of research and locations are given at Annexure 'A'.**

These labs cover a wide variety of technology domains from aeronautics to missiles and naval systems.

- (b) **A list of products developed by DRDO during last three years and the current year for defence and civilian use is given at Annexure 'B'.**

- (c) **Details of funds allocated to the Department of Defence Research & Development during the last three years are given below:-**

Year	Allocation of funds (Rs. in crore)
2014-15	13716.14
2015-16	13540.11
2016-17	13501.00
2017-18 (Budget Estimates)	14818.74

ANNEXURE 'A' REFERRED IN THE REPLY GIVEN IN PART (a) OF LOK SABHA UNSTARRED QUESTION NO. 1005 FOR ANSWER ON 21.7.2017

Areas of Research of DRDO Laboratories/Establishments/Units and their locations:

S. No.	Laboratories/Establishments/Units	Location	Area of Research
<u>Cluster Laboratories/Establishments:</u>			
1	Advanced Numerical Research & Analysis Group (ANURAG)	Hyderabad	Computational System
2	Advanced Systems Laboratory (ASL)	Hyderabad	Missiles & Strategic Systems
3	Aerial Delivery Research & Development Establishment (ADRDE)	Agra	Parachutes & Aerial Systems
4	Aeronautical Development Establishment (ADE)	Bengaluru	Aeronautics
5	Armaments Research & Development Establishment (ARDE)	Pune	Armaments
6	Centre for Air Borne System (CABS)	Bengaluru	Air-Borne Systems
7	Centre for Artificial Intelligence & Robotics (CAIR)	Bengaluru	Artificial Intelligence & Robotics
8	Centre for Fire, Explosives & Environment Safety (CFEES)	Delhi	Explosives
9	Centre for High Energy Systems and Sciences (CHESS)	Hyderabad	High Energy Weapons
10	Combat Vehicles Research & Development Establishment (CVRDE)	Chennai	Combat Vehicles
11	Defence Avionics Research Establishment (DARE)	Bengaluru	Avionics
12	Defence Bio-engineering & Electro-medical Laboratory (DEBEL)	Bengaluru	Bio-engineering
13	Defence Electronics Applications Laboratory (DEAL)	Dehradun	Electronics & Communication Systems
14	Defence Food Research Laboratory (DFRL)	Mysore	Food Research
15	Defence Institute of Bio-Energy Research (DIBER)	Haldwani	Bio-Energy
16	Defence Institute of High Altitude Research (DIHAR)	Leh	High Altitude Agro-animal Research
17	Defence Institute of Physiology & Allied Sciences (DIPAS)	Delhi	Physiology
18	Defence Institute of Psychological Research (DIPR)	Delhi	Psychological Research

19	Defence Laboratory (DL)	Jodhpur	Camouflaging and Isotopes
20	Defence Electronics Research Laboratory (DLRL)	Hyderabad	Electronic Warfare
21	Defence Materials & Stores Research & Development Establishment (DMSRDE)	Kanpur	Textiles, Polymers & Composites
22	Defence Metallurgical Research Laboratory (DMRL)	Hyderabad	Metallurgy
23	Defence Research & Development Establishment (DRDE)	Gwalior	Chemical & Biological Warfare
24	Defence Research & Development Laboratory (DRDL)	Hyderabad	Missile & Strategic Systems
25	Defence Research Laboratory (DRL)	Tezpur	Health & Hygiene
26	Defence Terrain Research Laboratory (DTRL)	Delhi	Terrain Research
27	Gas Turbine Research Establishment (GTRE)	Bengaluru	Gas Turbine
28	High Energy Materials Research Laboratory (HEMRL)	Pune	High Energy Materials
29	Institute of Nuclear Medicines & Allied Sciences (INMAS)	Delhi	Nuclear Medicine
30	Instruments Research & Development Establishment (IRDE)	Dehradun	Electronics & Optical Systems
31	Integrated Test Range (ITR)	Balasore	Missile Testing
32	Joint Cypher Bureau (JCB)	Delhi	Cypher Systems
33	Laser Science & Technology Centre (LASTEC)	Delhi	Laser Technology
34	Electronics & Radar Development Establishment (LRDE)	Bengaluru	Radars
35	Microwave Tube Research & Development Centre (MTRDC)	Bengaluru	Microwave Devices
36	Naval Materials Research Laboratory (NMRL)	Ambernath	Naval Materials
37	Naval Physical & Oceanographic Laboratory (NPOL)	Kochi	Sonar Systems
38	Naval Science & Technological Laboratory (NSTL)	Visakhapatnam	Underwater Weapons
39	Proof and Experimental Establishment (PXE)	Balasore	Armament Testing
40	Research Centre Imarat (RCI)	Hyderabad	Missile & Strategic Systems
41	Research & Development Establishment (Engrs) (R&DE[E])	Pune	Engineering Systems & Weapon Platforms
42	Scientific Analysis Group (SAG)	Delhi	Cryptology
43	Snow and Avalanche Study Establishment (SASE)	Chandigarh	Snow and Avalanche
44	Solid State Physics Laboratory (SSPL)	Delhi	Solid- State/ Semiconductor Materials

45	Terminal Ballistics Research Laboratory (TBRL).	Chandigarh	Ballistics
46	Vehicles Research & Development Establishment (VRDE).	Ahmednagar	Wheeled Vehicles

HR Institutions:

1	Centre for Personnel Talent Management (CEPTAM).	Delhi	Talent Management
2	Institute of Technology Management (ITM).	Mussoorie	Technology Management
3	Recruitment and Assessment Centre (RAC).	Delhi	Human Resource

Other Institutions:

1	Advanced Centre for Energetic Materials (ACEM).	Nasik	High Energy Materials
2	Centre for Advanced Systems (CAS).	Hyderabad	Advanced Systems
3	Centre for Military Air-worthiness & Certification (CEMILAC).	Bengaluru	Airworthiness & Certification
4	Defence Scientific Information & Documentation Centre (DESIDOC).	Delhi	Information System and Documentation
5	DRDO Integration Centre (DIC).	Panagarh	Systems Integration
6	Institute for Systems Studies & Analyses (ISSA).	Delhi	Systems Analysis
7	Mobile Systems Complex (MSC).	Pune	Missile Systems
8	SF Complex (SFC).	Jagdalpur	Propellant

Centres of Excellence:

1	DRDO Bhartiya University (DRDO-BU), Centre of Excellence.	Coimbatore	Life Sciences
2	Advanced Centre for Research in High Energy Materials (ACRHEM).	Hyderabad	High Energy Materials.
3	Centre of Excellence in Cryptology.	Kolkata	Cryptology
4	Centre of Millimeter Wave Semiconductor Devices and Systems.	Kolkata	Millimeter Wave and Semiconductor.
5	Advanced Centre for Excellence on Composite Materials (ACECM).	Bengaluru	Composite Materials.
6	Research and Innovation Centre (RIC).	Chennai	Sensors & MEMS.
7	Centre of Propulsion Technology (CoPT).	Mumbai	Propulsion Technology.
8	Jagdish Chandra Bose Centre for Advanced Technology (JCBCAT).	Jadavpur	Strategic Systems.
9	Joint Advanced Technology Centre (JATC).	Delhi	Photonic Technologies, Plasmonics and Quantum Photonics.
10	Centre of Excellence in Systems Design and Engineering.	Mumbai	Systems Design.

ANNEXURE 'B' REFERRED IN THE REPLY GIVEN IN PART (b) OF LOK SABHA UNSTARRED QUESTION NO. 1005 FOR ANSWER ON 21.7.2017

Products developed by DRDO for defence and civilian use during last three years and current year:

- Light Combat Aircraft (LCA) Tejas.
- Airborne Early Warning and Control (AEW&C) System.
- 155mm/52 Calibre Advanced Towed Artillery Gun System (ATAGS).
- Weapon Locating Radar (WLR) Swati.
- High Speed Heavy Weight Ship Launched Torpedo (Varunastra).
- Anti-Torpedo Decoy System (Maareech).
- Arudhra-Medium Power Radar.
- Akash Weapon System.
- Abhay Sonar.
- Hull Mounted Sonar (HUMSA).
- HUMSA UG
- Advanced Indigenous Distress Sonar System (AIDSS)
- Near field acoustic characterization system (NACS)
- NBC Technologies
- NBC Recce Vehicle Mk-I
- NBC Technologies.
- 120 mm FSAPDS Mk-II Ammunition for MBT Arjun.
- 120 mm FSAPDS Practice Ammunition for MBT Arjun.
- 250 Kg Pre-fragmented Bomb.
- 46m Inflatable Radome.
- Air Bursting Grenades for Individual Weapons.
- Anti Torpedo Decoys.
- Bar Mine Layer.
- CBRNe Remotely Operated Platforms.
- Commander's Non-Panoramic TI Sight for AFVs (T-90, T-72 & BMP-II).
- Computerized Pilot Selection System.
- Dual Colour Missile Approach Warning System for Fighter Aircraft.
- Electro-Optical Fire Control System for Naval Ships.

- Electro-Optical Sensors for Airborne Platforms.
- Enhanced Range Rocket (Pinaka Mk-II).
- EW Suite for Fighter Aircraft.
- Exotic and Indigenous Varieties of Vegetables under Protected Environment.
- G-band CC-TWT for Weapon Locating Radar.
- Heavy Drop System - 16T.
- Integrated Automotive Vetrronics Systems for AFVs.
- Ku-Band MPM based Transmitter for Airborne Radar.
- Laser Target Designator with Thermal Imager for Air Force.
- Medium Size Integrated Aerostat Surveillance System.
- Minefield Marking Equipment Mk-II.
- Mountain Foot Bridge.
- Multi Calibre Individual Weapon System.
- Multi-Influence Ground Mine.
- Penetration-cum-Blast.
- Sub-Munition Warheads for Pinaka.
- Synthetic Aperture Radar for UAV.
- Terrain Assessment System for Trans-border Deserts in Western Sector.
- Thermo-Baric Ammunition for 120 mm Arjun Tank.
- Upgraded Troposcatter Communication System for IAF.
- Vehicle Mounted High Power Laser Directed Energy System Against RPVs/UAVs/DRONES.
- Water Mist System Validation for Fire Protection in Naval Ships.

Defence Research and Development Organisation (DRDO) has developed various nutritious and protein-rich foods to cater the requirements of Service personnel deployed at high altitude and snow bound areas. The major food products developed by DRDO are: Chicken biscuits; Protein rich mutton bar; Composite cereals bars; Egg protein biscuits; Iron and protein rich food bar; Whey Protein based chocolate; Chicken Katti Rolls and Anti-fatigue Tulsi Bar.
