

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

UNSTARRED QUESTION NO.5299
TO BE ANSWERED ON THE 28TH MARCH, 2018

RESEARCH ACTIVITIES BY DRDO

5299. SHRI RAJESHBHAI CHUDASAMA:
SHRI MANSHANKAR NINAMA:

Will the Minister of DEFENCE j{k k ea=h
be pleased to state:

- (a) the details of laboratories / units of the Defence Research and Development Organisation (DRDO) and the areas of their research activities, location-wise;
- (b) the details of various products developed by the DRDO including food products for the use of defence personnels and for the use of the civilians during each of the last two years and the current year;
- (c) whether budgetary allocation for DRDO was reduced during the previous years due to which several research works / projects came to a standstill;
- (d) if so, the details of funds allocated for research works in DRDO during the said period; and
- (e) whether there are adequate number of scientists and other employees in DRDO and if so, the details thereof and if not, the reasons therefor and the corrective measures taken in this regard?

<u>A N S W E R</u>	
MINISTER OF DEFENCE	(SMT. NIRMALA SITHARAMAN)
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(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 two years and the current year for defence and civilian use is given at Annexure 'B'.

(c) & (d): Attached at Annexure 'C'.

(e) DRDO optimally utilizes the scientific manpower by following dynamic system of manpower planning.

Authorised Regular Establishment (RE) is reviewed periodically to meet the contingent requirements on account of workload and new projects undertaken by the laboratories of DRDO. Most of the labs follow a matrix structure of manpower allocation for projects. Each lab has multiple technology groups based on the area of the work of the lab. The project has a small core team and most of the technical activities associated with the project is assigned to the technology groups in the lab or even in other system labs.

Thus a scientist in a technology group may be working on multiple projects at the same time. Further, these projects can also be from other DRDO labs.

ANNEXURE 'A' REFERRED IN THE REPLY GIVEN IN PART (a) OF LOK SABHA UNSTARRED QUESTION NO. 5299 FOR ANSWER ON 28.3.2018

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	Defence Institute of Advanced Technology (DIAT)	Pune	<i>This is a Deemed University</i>
2	Centre for Personnel Talent Management (CEPTAM)	Delhi	Talent Management
3	Institute of Technology Management (ITM)	Mussoorie	Technology Management
4	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	Joint Advanced Technology Centre (JATC)	IIT, Delhi	Photonic Technologies, Plasmonics and Quantum Photonics
2	Centre of Propulsion Technology (CoPT)	IIT, Mumbai	Propulsion Technology
3	Jagdish Chandra Bose Centre for Advanced Technology (JCBCAT)	Jadavpur	Strategic Systems
4	Research and Innovation Centre (RIC)	Chennai	Sensors & MEMS
5	Advanced Centre for Research in High Energy Materials (ACRHEM)	UoH, Hyderabad	High Energy Materials
6	DRDO Bhartiya University (DRDO-BU), Centre of Excellence	Coimbatore	Life Sciences

Under Department of Defence Research and Development:

1	Aeronautical Development Agency (ADA)	Bengaluru	Society
2	BrahMos	Delhi	Joint venture

**ANNEXURE 'B' REFERRED IN THE REPLY GIVEN IN PART (b) OF LOK SABHA
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**Products developed by DRDO for defence and civilian use during last two
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)
- 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 Vetronics 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 (PCB) and Thermo-Baric(TB) Ammunition for 120 mm Arjun Tank
- Identification of Friend & Foe (IFF)
- New Family of Mines (NFM)
- Smart Anti Airfield Mines (SAAM)
- EW System - Himshakti
- 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 to 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.

**ANNEXURE 'C' REFERRED IN THE REPLY GIVEN IN PARTS (c) & (d) OF
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The total Defence Budget, Department of Defence Research & Development projection, final allocation and the percentage of Department of Defence Research & Development with respect to Defence Budget:

(Rs. in Crore)

Year	Defence * Expenditure	Projection	Budget allocated to R&D (actual)	%age of Defence Expenditure
2014-15	218694.18	18495.46	13257.98	6.06
2015-16	225922.98	19641.56	13317.12	5.89
2016-17	225899.59	18782.86	13382.05	5.92
2017-18 (BE)	274114.00	19935.60	14818.74	5.41
2018-19 (BE)	295511.41	22203.74	17861.19	6.04

Yes Madam, it is a fact that budgetary allocations are much less than the projections made by the Department of Defence Research & Development. However, the Department manages within the allocations by re-prioritising the project activities.
