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**STANDING COMMITTEE ON DEFENCE
(2024-25)**

(EIGHTEENTH LOK SABHA)

MINISTRY OF DEFENCE

[Action Taken by the Government on the Observations/Recommendations contained in the Forty-Second Report (17th Lok Sabha) of the Standing Committee on Defence on the subject 'A Review of the Working of the Defence Research and Development Organisation (DRDO).']

FIFTH REPORT



**LOK SABHA SECRETARIAT
NEW DELHI**

December, 2024 / Agrahayana 1946 (Saka)

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Presented to Lok Sabha on 17.12.2024

Laid in Rajya Sabha on 17.12.2024



LOK SABHA SECRETARIAT

NEW DELHI

December, 2024 /Agrahayana 1946 (Saka)

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COMPOSITION OF THE STANDING COMMITTEE ON DEFENCE (2024-25)

SHRI RADHA MOHAN SINGH

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CHAIRPERSON

Lok Sabha

| | |
|----|--|
| 2 | Dr. Rajeev Bharadwaj |
| 3 | Shri Karti P Chidambaram |
| 4 | Shri Adhikari Deepak Dev |
| 5 | Shri Ranjit Dutta |
| 6 | Captain Viriato Fernandes |
| 7 | Shri Rahul Gandhi |
| 8 | Shri Mohmad Haneefa |
| 9 | Shri S. Jagathratchakan |
| 10 | Ms. S. Jothimani |
| 11 | Shri Ravindra Shukla Alias Ravi Kishan |
| 12 | Shri Shashank Mani |
| 13 | Shri Lumba Ram |
| 14 | Shri Bishnu Pada Ray |
| 15 | Shri Jagannath Sarkar |
| 16 | Shri Jagadish Shettar |
| 17 | Shri Virendra Singh |
| 18 | Shri Kesineni Sivanath |
| 19 | Dr. Thirumaavalavan Tholkappiyan |
| 20 | Com. Selvaraj V. |
| 21 | Shri Richard Vanlalhmangaiha |

Rajya Sabha

| | |
|----|------------------------------|
| 22 | Shri Naresh Bansal |
| 23 | Shri N. Chandrasegharan |
| 24 | Shri Shaktisinh Gohil |
| 25 | Shri Prem Chand Gupta |
| 26 | Shri Naveen Jain |
| 27 | Shri Muzibulla Khan |
| 28 | Shri Praful Patel |
| 29 | Shri Dhairyashil Mohan Patil |
| 30 | Shri Sanjay Singh |
| 31 | Dr. Sudhanshu Trivedi |

SECRETARIAT

1. Dr. Sanjeev Sharma - Joint Secretary
2. Shri Tirthankar Das - Director
3. Smt. Preeti Negi - Executive Officer

INTRODUCTION

I, the Chairperson of the Standing Committee on Defence (2024-25), having been authorized by the Committee, present this Fifth Report (18th Lok Sabha) of the Committee on Action Taken by the Government on the Observations/Recommendations contained in the Forty-Second Report of Standing Committee on Defence (17th Lok Sabha) on the subject 'A Review of the Working of the Defence Research and Development Organisation (DRDO)'.

2. The Forty-Second Report (17th Lok Sabha) was presented to the Lok Sabha and laid in Rajya Sabha on 20th December, 2023. The Report contained 16 Observations/Recommendations. The Ministry of Defence furnished Action Taken Replies on all the Observations/Recommendations in July, 2024.

3. The Report was adopted at the Sitting held on 12 December, 2024.

4. For facility of reference and convenience, Observations/Recommendations of the Committee have been printed in bold letters in the Report.

5. An analysis of Action Taken by the Government on the Observations/Recommendations contained in the Forty-Second Report (17th Lok Sabha) of the Standing Committee on Defence is given in Appendix II.

**New Delhi;
17 December, 2024
26 Agrahayana, 1946 (Saka)**

**RADHA MOHAN SINGH
Chairperson
Standing Committee on Defence**

REPORT

CHAPTER – I

This Report of the Standing Committee on Defence deals with Action Taken by the Government on the Observations/Recommendations contained in the Forty-second Report (Seventeenth Lok Sabha) of the Committee on the subject '**A review of working of Defence Research and Development Organisation (DRDO)**', which was presented to Lok Sabha and laid in Rajya Sabha on 20 December, 2023.

2. The Forty-second Report (17th Lok Sabha) of the Committee contained 16 Observations/ Recommendations on the following aspects:-

| Recommendation Para No. | Subject |
|----------------------------|--|
| 1 | DRDO : An Accomplished Research & Development Organisation |
| 2 | Sphere of Activities |
| 3 | The Technology Cluster Laboratories |
| 4 | Budget and Expenditure |
| 5 | Human Resource Management |
| 6 | Training of Personnel |
| 7 | Working of DRDO |
| 8 | Status of Ongoing Projects |
| 9 | Participation with Academia and Industry |
| 10 | Ongoing Major Programmes/Projects/Systems |
| 11 | Drone / Anti Drone Capabilities |
| 12 | Delay in the Projects / closed projects |
| 13 | Self Reliance and Indigenisation |
| 14 | Technology Development Fund (TDF) Scheme |
| 15 | The Kalam Vision: Dare to Dream Scheme |
| 16 | Technology Demonstration (TD) projects |

3. The Action Taken Replies have been received from the Government in respect of 16 Observations/Recommendations contained in the Forty-second Report (17th Lok Sabha) in July 2024. Replies to these Observations/Recommendations have been examined and categorized as follows:-

(i) Observations/Recommendations which have been accepted by the Government (Chapter II):

Para Nos. 1,2,3,4,5,6,7,8,9,10,11,12,13,14,15 and 16

(Total - 16)

(ii) Observations/Recommendations which the Committee do not desire to pursue in view of the replies received from the Government (Chapter III):

Para No. Nil

(Total - 0)

(iii) Observations/Recommendations in respect of which replies of Government have not been accepted by the Committee and which require reiteration and to be commented upon (Chapter IV):

Para No. Nil

(Total - 0)

(iv) Observations/recommendations in respect of which final replies of the Government are still awaited (Chapter V):

Para No. Nil

(Total - 0)

4. The Committee desire that the Action Taken Notes in respect of comments of the Committee contained in Chapter I of the Report should be furnished to them at the earliest and in any case, not later than six months of the presentation of this Report.

5. The Committee will now deal with the action taken by the Government on some of the Observations/Recommendations made in the Forty-second Report (Seventeenth Lok Sabha) in the succeeding paragraphs.

A. THE TECHNOLOGY CLUSTER LABORATORIES

Recommendation (Para No. 3)

6. The Committee had recommended as under:

“The Committee note with satisfaction that DRDO’s laboratories/establishments, regional centres, field stations etc. spread all over the country from Jodhpur to Tejpur and from Leh to Kochi. The Committee understand that there are seven Technology Clusters headed by Cluster DGs located all over the country: Naval Systems & Materials at Vishakhapatnam; Armaments & Combat Engineering Systems at Pune; Electronics & Communication Systems and Aeronautical Systems, both at Bengaluru; Missiles and Strategic Systems at Hyderabad; Microelectronic Devices & Computational Systems and Life Sciences, both at New Delhi.

The Committee also understand that DRDO has touched every aspect of Defence Research and development of technology concerning the country’s critical defence needs though their technology cluster laboratories. However, they would like to urge the DRDO to focus more on new and emerging areas of technology applications such as Artificial Intelligence (AI) and Robotics for furthering their research-base and also exploring the possibility of AI’s application in various systems & sub-systems developed by them. They are also of the opinion that DRDO should establish their research laboratories in premier institutes of technologies such as the IITs and IIC, Bengaluru so that students having interest in defence & military technology can be motivated to undertake further research in the area. This, the Committee feel, will enable DRDO to tap young scientists at an early stage.”

7. The Ministry in its Action Taken Reply has stated as under:

“DRDO has instituted various DRDO Industry Academia- Centre of Excellence (DIA-COE) in various IITs, IISC and Central Universities across the country for research engagement with academia & industries.”

Comments of the Committee

8. The Committee recall that they had, in their Forty- second Report (Seventeenth Lok Sabha), opined that Defence Research and Development

Organisation (DRDO) should establish their research laboratories in premier institutes of technologies such as the IITs and IISc, Bengaluru so that students having interest in defence & military technology can be motivated to undertake further research in the area. In this regard, the Ministry have submitted that in response to the recommendation of the Committee, DRDO has instituted various DRDO Industry Academia- Centre of Excellence (DIA- COE) in various IITs, IISC and Central Universities across the country for research engagement with academia & industries. The Committee express their satisfaction at the extant mechanism in DRDO for research engagement with academia & industries.

The Committee in their Original Report had also urged DRDO to focus more on new and emerging areas of technology applications such as Artificial Intelligence (AI) and Robotics for furthering their research-base and also exploring the possibility of AI's application in various systems & sub-systems developed by them. Further, the Committee feel that the ongoing conflict in the international arena has revealed, to a great extent, the hazards of a hybrid warfare, with both kinetic and non-kinetic operations. Keeping in view such drastic transformation in the warfare technology, the Committee feel that there is a need for fervid focus on Research and Development in the field of hybrid warfare, especially kinetic and non-kinetic warfare. Therefore, the Committee recommend that DRDO, in collaboration with academia and industries, should further broad-base their R&D efforts to include areas such as hybrid, kinetic and non-kinetic warfare as well as anti-drone capabilities including sea drones and interceptive drones by according highest priorities in order to enhance our combat readiness against any non conventional warfare and security threats.

B. BUDGET AND EXPENDITURE

Recommendation (Para No. 4)

9. The Committee had recommended as under:

“The Committee note that the Department of Defence R&D was allocated Rs. 3.14 crore in 1961-62 out of the total budget allocation of Rs. 313.00 crore to Ministry of Defence, which was about one per cent of Defence Budget. Over the years, this allocation has enhanced and touched Rs. 23,263.89 crore for the Financial Year 2023-24, which is 5.38 percent of the total Defence Budget with a corresponding increase in the number of projects/ programmes. Presently, DRDO is spending approximately 36 percent of its Annual Budget on the development of strategic systems required by the country and many strategic systems developed by DRDO have been inducted into Services.

The Committee while looking at the budgetary provision made to the Department of Defence, R&D during the last two years, note that there has been a decrease in the Budget estimation and the Budget approved or allocated. In the year 2021-22, the projected amount was Rs. 23,460 crore and the allocated amount was Rs. 20,457.44 crore which was Rs 3002.56 crore less than the projection. Later, at the stage of Revised Estimate, the allocation was reduced to Rs 18,337.44 crore. Likewise, in the year 2022-23, the projected amount was Rs. 22,990 crore and the allocated amount stood at Rs. 21,330.20 crore which was Rs. 1659.80 crore less than the projection. Since providing a budget to an organization is a conscientious exercise envisaging R&D activities in a year, making a cut at the last stage will have an adverse impact on the performance of the organization. The Committee, therefore, recommend that the Ministry should undertake all out efforts and impress upon the Ministry of Finance to provide sufficient budgetary support as near as possible to the projections of DRDO. They also recommend that in future it should be ensured that no cuts are made in the Defence Budget pertaining to DRDO while allocating the finances.

In respect of the Defence Expenditure of the Country comparing with Defence R&D Expenditure, the Committee learn that a trend is emerging which is registering a continuous decline in DRDO expenditure percentage-wise. To be precise, they would like to point out that the Defence R&D Expenditure as a percentage of Defence Expenditure was 6.59 per cent in the year 2010-11, which was reduced to 5.79 percent in the year 2011-12. It was again reduced to 5.39 percent in the year 2012-13 and this percentage further declined to 5.34 percent in 2013-14. The share had slightly improved to 6.6 percentage in 2014 -15 but was again reduced to 5.89 percentage during 2015-16. In the year 2019-20, the percentage share enhanced and stood to 6.23 per cent of the Defence Expenditure but after that, it had an incessant decline and in the last three financial years 2021-22, 2022-23 and 2023- 24, the share was merely 5.89, 5.53 and 5.38 percent respectively. The Committee also learned from the data supplied to them that the exclusive Research and Development budget is Rs. 5,000 crore only, out of which 25% i.e. around Rs. 1300 crore is

earmarked for the private sector. Hence, it is inferred without any doubt that the amount actually left for DRDO is under constraints. The Committee observe that R&D is a prerequisite for a robust modern Defence mechanism and the Government has to take care of funds for in-house projects of DRDO along with outsourcing defence R&D. The Committee, therefore recommend that adequate funds for R&D activities should be provided to DRDO for its ongoing and future projects.

Drawing a comparative analysis of the budgetary spending on R&D in India with that of developed countries, the Committee take note that with the current percentage of funding, our country can only aspire to become atmanirbhar and protect ourselves. However, to have aspirations to become a global leader, this percentage will not be sufficient. Keeping this objective in the mind the Committee desire that R&D expenditure with respect to the percentage of defence budget should be increased in subsequent years so that DRDO can achieve and accomplish their well defined objectives and render technical deliverance through their ongoing projects.

The Committee find that 8 to 10 per cent of the total DRDO budget is being spent on fundamental research. The Committee have reservations about the existing state of affairs regarding the utilization of fund for existing R&D activities in DRDO. The Committee, while noting that DPSUs and erstwhile Ordnance Factories approach DRDO for requisite upgrades, in their Ninth Report (14th Lok Sabha), have emphasized that Defence Public Sector Undertakings and Ordnance Factories should have their in-house R&D centers for such purposes. At the same time, the Committee expect from DRDO to extend all possible assistance to 16 DPSUs including newly formed DPSUs in setting up necessary infrastructure and technical know-how to strengthen their R&D Centres in advisory capacity.

The Committee understand that the mandate of DRDO is to develop cutting-edge technologies and to equip Services with internationally competitive systems and platforms through the transfer of such technologies. They also find that DRDO has proven its competence to produce state-of-the-art strategic and tactical military hardware and related technologies in diverse disciplines such as Aeronautics, Armaments, Combat Vehicles, Combat Engineering, Electronics, Missiles, Life Sciences, Materials and Naval Systems. Reckoning the fact that when the budgetary allocations are consistently going down, it would be difficult for DRDO to attain developmental goals, and to attain an edge over adversaries. The Committee, in this regard feel it onerous duty to recommend that budgetary grants of DRDO should be suitably enhanced so that India could become a global leader in the field of armament and new tech weapon systems and DRDO also be able to make first-of-its-kind products. Keeping this in mind the Committee can state with certitude that the time would not be far when India would become a major exporter of arms and

ammunitions and would also indulge in technology export to our friendly nations/countries.”

10. The Ministry in its action taken reply has stated as under:

“Details of projections and allocations of DRDO (including both Revenue and Capital Heads) at Budget Estimates (BE) stage from FY 2019-20 are as under:

(₹ in Crore)

| Financial Year | Projections (A) | BE (B) | Projection-BE (A-B) |
|----------------|-----------------|-----------|---------------------|
| 2019-20 | 23,704.63 | 19,021.02 | 4,683.61 |
| 2020-21 | 24,040.82 | 19,327.35 | 4,713.47 |
| 2021-22 | 23,951.67 | 20,457.44 | 3,494.23 |
| 2022-23 | 22,990.00 | 21,330.20 | 1,659.80 |
| 2023-24 | 23,790.00 | 23,263.89 | 526.11 |
| 2024-25 | 24,508.00 | 23,855.61 | 652.39 |

Note:- BE figure for FY 2024-25 is subject to approval of the Parliament.

It may be seen from the above that there is a gradual decrease in the deficit between the projections of DRDO and the allocations thereof during the last three financial years. In addition to this, it is also evident from the table that there is continuous increase in budgetary allocation to DRDO and during current financial year, BE 2024-25, an amount of ₹ 23,855.61 Crore has been allocated to DRDO i.e. an increase of ₹591.72 Crore over BE 2023-24. Further, the Committee may be apprised that Budgetary allocations to Defence Services, including DRDO, are made during the beginning of the FY based on projections made by the Services, expenditure pattern during previous years, absorption capacity, committed liabilities & pre-budget discussions held with MoF. The allocations and pace of expenditure are reviewed at regular intervals by FADS, Defence Secretary & Hon'ble RM and re-appropriation of funds is done if needed with/without consultation of MoF as per the rules on this subject. At RE stage, based on overall analysis of expenditure and future requirements, projections are made which are considered by MoF. If required, additional funds are sought in consultation with MoF at an appropriate time during the Financial Year. The resource allocations are made on need basis and duly considering the other priorities of the country. Further, it may be affirmed that rationalization of the allocation and expenditure is the prime objective of the Government which may get compromised if a certain percentage of Defence Budget is fixed for DRDO. It is also added that there is no shortage of funds for the Defence Forces, including DRDO, and as and when fund is required the same is met in consultation with Ministry of Finance either through seeking additional funds or through re-appropriation/reprioritization. Constant review of the budget is done throughout the year and suitable decisions are taken at an appropriate time.”

Comments of the Committee

11. The Committee, in their Original Report, had recommended that adequate funds for R&D activities should be provided to DRDO for its ongoing and future projects. The Committee learn from the budget documents that in Budget Estimates 2024-25, the budgetary allocation to DRDO has been increased to Rs. 23,855.61 crore in FY 2024-25 from Rs 23,263.89 crore in FY 2023-24. Out of this allocation, a share of Rs. 13,208 crore is allocated for capital expenditure for FY 2024-25. The Committee, during examination of Demands for Grants of the Ministry of Defence for the year 2024-25, will examine the matter of budget allocation to DRDO in detail. At this stage, the Committee express their satisfaction that the gap between projection and allocation of funds to DRDO at Budget Estimates stage has been significantly reduced from previous years. The Committee would also like be apprised of the funds earmarked exclusively for R&D activities out of the amount of Rs. 23,855.61 crore allocated to DRDO in FY 2024- 25.

C. WORKING OF DRDO

Recommendation (Para No. 7)

12. The Committee had recommended as under:

“The Committee’s examination has revealed that DRDO undertakes various types of major projects. One of the types of such project is Mission Mode (MM) Project which include Medium Range Surface to Air Missile (MRSAM) system for Indian Air Force, LCA Mk-II, LRSAM, Quantum Communication for Metropolitan Cities (QMAN), Airborne Early Warning & Control System Mk – II (AEW&C Mk-II) for IAF and Advanced Light Weight Torpedo (ALWT). Besides MM Projects, there are Technology Demonstration (TD) Projects, encompass Active Electronically Scanned Array (AESA) Radar, New Generation Anti-Radiation Missile (NGARM), Supersonic Missile Assisted Release of Torpedo (SMART), Beam Combined Fiber Laser Source (BCFL) and Digital Fuel Flow Controller amongst the others.

The Committee further note that another category of project, i.e. Science & Technology (S&T) Project, which is undertaken for basic or applied research activities i.e. Enhanced Blast Polymer Bonded Explosive Formulations, Pulsed Fiber Laser Sources, Double walled single crystal parts from advanced super alloy, Advanced Warhead Technologies, Enhanced Efficiency of Thermoelectric

Generator and Peltier Cooler (EETG) and Technology development for SiC Fiber (TDSiCF). Few more categories in regard to Infrastructure & Facilities (IF) Development Projects are National Open-Air Range (NOAR), Mission System Integration Rig (MSyIR), Advanced HILS facility, Multi Petaflops Computing System, Creation of Automotive and Weapon Systems Testing Center (AWTC) and Infrastructure for Testing of Expendable Turbo Propulsion System (IT-ET).

User trials (UT) Projects are yet another category that has come to the notice of the Committee. Major projects in this category are development of 5.56 mm Joint Venture Protective Carbine, Modification of Six Aircraft (Su-30 MKI) for Astra, Quick Reaction Surface to Air Missile - (QRSAM-UT), Air Defence Fire Control Radar, ASTRA Mk – I and Multi Influence Ground Mines.

The Committee also note that DRDO not only develop systems but also provides product support for its major systems and to efficiently support the same, it has Product Support (PS) Projects and the major projects in this category are Post Development Support of AEW&C System (PDSAS), Product Support for Arjun MBT, Upgraded Digital Flight Control Computer (DFCC) for LCA Mk-1A, Product Support & Product Upgrade for Akash Weapon System and Akash-Prime and Astra Product Support.

The Committee earnestly feel that diversified projects that are undertaken by the DRDO have enabled India to achieve competitive technological and military edge vis-à-vis our immediate neighbours. The Committee appreciate the mammoth work undertaken in the field of development of critical and strategic systems by DRDO. While commending the role played by the Organisation in the last 65 years in the areas of scientific, technological and armament development, they desire that DRDO should be encouraged to further expand the existing research-base and venture into new areas of development keeping in view the country's future military needs. They hope that Govt. will extend all out support to enable DRDO to withstand any kind of eventualities in future.”

13. The Ministry in its action taken reply has stated as under:
“DRDO plan to expand its research activities in the areas of Quantum Technologies, Artificial intelligence, Cognitive Technologies, Smart materials, Asymmetric Technologies, Terahertz, Directed Energy Systems, High Power Electromagnets etc. DRDO established a network of DRDO Industry Academia-Centres of Excellence (DIA-CoEs) for collaborative directed research in developing critical and futuristic technologies for defence and security applications. So far 15 DIA-CoEs have been established at various IITs, IISc, Central and State Universities.”

Comments of the Committee

14. **The Committee recall that while commending the role played by DRDO in the last 65 years in the areas of scientific, technological and armament**

development, they had desired that DRDO should be encouraged to further expand the existing research-base and venture into new areas of development keeping in view the country's future military needs. From the Action Taken Replies of the Ministry, the Committee note that DRDO plans to expand its research activities in the areas of Quantum Technologies, Artificial intelligence, Cognitive Technologies, Smart materials, Asymmetric Technologies, Terahertz, Directed Energy Systems, High Power Electromagnets etc. DRDO established a network of DRDO Industry Academia- Centres of Excellence (DIA-CoEs) for collaborative directed research in developing critical and futuristic technologies for defence and security applications.

The Committee have been given to understand that the Armed Forces personnel face certain difficulties in the remote and far-flung border areas owing to their dependence on conventional sources of energy only. The Committee feel that DRDO, being one of the most advanced research organisation, should explore avenues for tapping new and renewable sources of energy such as solar and wind in those far-flung areas to ensure energy security for the Armed Forces personnel deployed in the remotest border areas for meeting their obvious daily needs. The Committee would like to be informed of the measures undertaken in this regard.

CHAPTER – II

OBSERVATIONS/RECOMMENDATIONS OF THE COMMITTEE WHICH HAVE BEEN ACCEPTED BY THE GOVERNMENT

DRDO : An Accomplished Research & Development Organisation

Recommendation No. 1:

The Committee note that the DRDO as the premier agency under the Department of Defence Research and Development in the Ministry of Defence in the Govt. of India is charged with the Military's research and development. Though DRDO primarily takes projects based on the specific requirements in Long Term Integrated Projects (LTIP) or their immediate requirements, it also undertakes certain small value projects to enhance science and technology base to support future projects, which will be required by Armed Forces. The Committee have been informed that since the technologically advanced countries do not share their critical technologies to developing countries and offer only 'Buy' category of systems to India, therefore, it became imperative for DRDO to develop not only each system, sub-systems and components, but also infrastructures and testing facilities at their respective laboratories. The Committee, while appreciating DRDO's endeavor in this direction also hope that through their ongoing research and development drive, they will enable India to acquire the cutting edge technology and expand their research-base to be not only parallel but ahead with the emerging trends in the field of science and technology development. Here, it goes without saying that Government should provide all facilities required for our scientists in their research and development initiatives.

Reply of the Government

In order to provide research support, DRDO has undertaken many infrastructure initiatives with the due approval of Government. Some of them are as follows:

- Creation of five DRDO Young Scientists Lab (DYSLs) to provide R&D environment in emerging engineering fields and advanced technologies
- Setting up of Defence Technology & Test Centre (DTTC), Lucknow,
- Creation of Integrated Simulator Complex (ISC) 'Dhruv', Kochi
- Creation of Submersible Platform for Acoustic Characterisation and Evaluation (SPACE), Idukki, Kerala.

As a part of HR initiatives, Government has also provided many monetary as well as non-monetary benefits to DRDO Scientists. Some of them are as follows:

- Professional update Allowance (PUDA)
- Merit based Flexible Complementing Scheme (FCS) is provided for promotions of scientists in DRDO.
- Sponsored for higher studies viz. M.E., M.Tech. & Ph.D Programme at premium Institutes likes IITs and IISc.

Sphere of Activities

Recommendation No. 2:

Sphere of activities of DRDO is yet another milestone, which came to the notice of the Committee during examination. The Committee find that while on the one hand, the DRDO render advice to Raksha Mantri and the three Services and inter-services organizations on all scientific aspects of weaponry, weapon platform, military operations, surveillance, support and logistics, on the other hand, they apprise, assess and advise him on the influence on National Security of the emerging developments in science and technology. They also note that DRDO inter-alia functions as the nodal coordinating agency of the Ministry of Defence on all matters relating to Instruments of Accord with foreign Governments relating to the acquisition of technologies where Export to India is the subject of their national security related controls of foreign Governments. They also deal with matters relating to relations with Research Organisations of other countries and with inter-governmental agencies particularly those relating to scientific and technological aspects of national security. Committee's examination also revealed that the DRDO also overseas arrangements with Universities, educational and research-oriented institutions to provide for foreign scholarships and the training of Indian scientists and technocrats under the administrative control of the Department. The Committee have been given to understand that because of the wide gamut of activities, the clients-base of the organization is also very wide. Ministry of Defence (MoD), Ministry of External Affairs (MEA), Ministry of Home (MHA), Army, Navy, Air Force, R&D Centres of other Govt. Departments, Public and Private Sectors, Academic Institutions, Ordinance Factories, Public Sector Undertakings and Industrial Partners, Citizens of the country and other Ministries which have been identified as stakeholders/clients of the DRDO in varying degrees. The Committee also understand that a wider organizational set up of DRDO provides the 45 administrative, infrastructure and academic back-up in pursuance with its multifarious activities. The Committee reiterate in expressing their deep sense of appreciation for the wide gamut of activities that are being undertaken by the DRDO, being the premier R&D Wing of the Ministry of Defence with a vision to empower India. The Committee while specifically appreciating DRDO's arrangements with foreign Universities & Research Institutions recommend that DRDO should also enter into MoUs with these

Universities/Research institutions on a long-term basis so that more number of Indian scientists will get the opportunity to get acquainted with latest development in science and technologies on a regular basis, which will ultimately benefit the country. The Committee would like to be informed of the actions taken in this regard. In addition to the existing sphere of activities of the organization, the Committee are of the view that in view of the problems created by Climate Change and Green House effect and their impact on environment, DRDO may also branch out its research wing to focus on environment pollution so that the health hazards created by such eventualities can be curbed.

Reply of the Government

In this regard, it is humbly submitted that subject Climate Change, Green House effects and their impact on environment etc. are not mandated to DRDO.

The Technology Cluster Laboratories:

Recommendation No. 3:

The Committee note with satisfaction that DRDO's laboratories/establishments, regional centres, field stations etc. spread all over the country from Jodhpur to Tejpur and from Leh to Kochi. The Committee note with satisfaction that DRDO's laboratories/establishments, regional centres, field stations etc. spread all over the country from Jodhpur to Tejpur and from Leh to Kochi. The Committee understand that there are seven Technology Clusters headed by Cluster DGs located all over the country: Naval Systems & Materials at Vishakhapatnam; Armaments & Combat Engineering Systems at Pune; Electronics & Communication Systems and Aeronautical Systems, both at Bengaluru; Missiles and Strategic Systems at Hyderabad; Microelectronic Devices & Computational Systems and Life Sciences, both at New Delhi. The Committee also understand that DRDO has touched every aspect of Defence Research and development of technology concerning the country's critical defence needs through their technology cluster laboratories. However, they would like to urge the DRDO to focus more on new and emerging areas of technology applications such as Artificial Intelligence (AI) and Robotics for furthering their research-base and also exploring the possibility of AI's application in various systems & sub-systems developed by them. They are also of the opinion that DRDO should establish their research laboratories in premier institutes of technologies such as the IITs and IIC, Bengaluru so that students having interest in defence & military technology can be motivated to undertake further research in the area. This, the Committee feel, will enable DRDO to tap young scientists at an early stage..

Reply of the Government

DRDO has instituted various DRDO Industry Academia- Centre of Excellence (DIA-COE) in various IITs, IISC and Central Universities across the country for research engagement with academia & industries.

Budget and Expenditure

Recommendation No. 4:

The Committee note that the Department of Defence R&D was allocated Rs 3.14 Crore in 1961-62 out of the total budget allocation of Rs 313.00 Crore to Ministry of Defence, which was about one per cent of Defence Budget. Over the years, this allocation has enhanced and touched Rs 23263.89 Crore for the Financial Year 2023-24, which is 5.38 percent of the total Defence Budget with a corresponding increase in the number of projects/ programmes. Presently, DRDO is spending approximately 36 per cent of its Annual Budget on the development of strategic systems required by the country and many strategic systems developed by DRDO have been inducted into Services. The Committee while looking at the budgetary provision made to the Department of Defence, R&D during the last two years, note that there has been a decrease in the Budget estimation and the Budget approved or allocated. In the year 2021-22, the projected amount was Rs. 23,460 crore and the allocated amount was Rs. 20,457.44 crore which was Rs 3002.56 less than the projection. Later, at the 47 stage of Revised Estimate, the allocation was reduced to Rs 18,337.44 crore. Likewise, in the year 2022-23, the projected amount was Rs. 22,990 crore and the allocated amount stood at Rs. 21,330.20 crore which was Rs 1659.80 crore less than the projection. Since providing a budget to an organization is a conscientious exercise envisaging R&D activities in a year, making a cut at the last stage will have an adverse impact on the performance of the organization. The Committee, therefore, recommend that the Ministry should undertake all out efforts and impress upon the Ministry of Finance to provide sufficient budgetary support as near as possible to the projections of DRDO. They also recommend that in future it should be ensured that no cuts are made in the Defence Budget pertaining to DRDO while allocating the finances. In respect of the Defence Expenditure of the Country comparing with Defence R&D Expenditure, the Committee learn that a trend is emerging which is registering a continuous decline in DRDO expenditure percentage-wise. To be precise, they would like to point out that the Defence R&D Expenditure as a percentage of Defence Expenditure was 6.59 per cent in the year 2010-11, which was reduced to 5.79 per cent in the year 2011-12. It was again reduced to 5.39 in the year 2012-13 and this percentage further declined to 5.34 percent in 2013-14. The share had slightly improved to 6.6% in 2014 -15 but was again reduced to 5.89% during 2015-16. In the year 2019-20, the percentage share enhanced and stood to 6.23 per cent of the Defence Expenditure but after that, it had an incessant decline and in the last three financial years 2021-22, 2022-23 and 2023 24, the share merely 5.89, 5.53 and 5.38 per cent respectively. The Committee also learned from the data supplied to them that the exclusive Research and Development budget is Rs. 5,000 crore only, out of which 25% i.e. around Rs. 1300 crore is earmarked for the private sector. Hence, it is inferred without any doubt that the amount actually left for DRDO is under constraints. The Committee 48 observe that R&D is a prerequisite for a robust modern Defence mechanism and the Government has to take care of funds for in-house projects of DRDO along with

outsourcing defence R&D. The Committee, therefore recommend that adequate funds for R&D activities should be provided to DRDO for its ongoing and future projects. Drawing a comparative analysis of the budgetary spending on R&D in India with that of developed countries, the Committee take note that with the current percentage of funding, our country can only aspire to become atmanirbhar and protect ourselves. However, to have aspirations to become a global leader, this percentage will not be sufficient. Keeping this objective in the mind the Committee desire that R&D expenditure with respect to the percentage of defence budget should be increased in subsequent years so that DRDO can achieve and accomplish their well defined objectives and render technical deliverance through their ongoing projects. The Committee find that 8 to 10 per cent of the total DRDO budget is being spent on fundamental research. The Committee have reservations about the existing state of affairs regarding the utilization of fund for existing R&D activities in DRDO. The Committee, while noting that DPSUs and erstwhile Ordnance Factories approach DRDO for requisite upgrades, have in their Ninth Report (14th Lok Sabha), emphasized that Defence Public Sector Undertakings and ordnance factories should have their in-house R&D centers for such purposes. At the same time, the Committee expect from DRDO to extend all possible assistance to 16 DPSUs including newly formed DPSUs in setting up necessary infrastructure and technical know-how to strengthen their R&D Centres in advisory capacity. 49 The Committee understand that the mandate of DRDO is to develop cutting-edge technologies and to equip Services with internationally competitive systems and platforms through the transfer of such technologies. They also find that DRDO has proven its competence to produce state-of-the-art strategic and tactical military hardware and related technologies in diverse disciplines such as Aeronautics, Armaments, Combat Vehicles, Combat Engineering, Electronics, Missiles, Life Sciences, Materials and Naval Systems. Reckoning the fact that when the budgetary allocations are consistently going down, it would be difficult for DRDO to attain developmental goals, and to attain an edge over adversaries. The Committee, in this regard feel it onerous duty to recommend that budgetary grants of DRDO should be suitably enhanced so that India could become a global leader in the field of armament and new tech weapon systems and DRDO also be able to make first-of-its-kind products. Keeping this in mind the Committee can state with certitude that the time would not be far when India would become a major exporter of arms and ammunitions and would also indulge in technology export to our friendly nations/countries.

Reply of the Government

Details of projections and allocations of DRDO (including both Revenue and Capital Heads) at Budget Estimates (BE) stage from FY 2019-20 are as under:

(₹ in Crore)

| Financial Year | Projections (A) | BE (B) | Projection-BE (A-B) |
|----------------|-----------------|-----------|---------------------|
| 2019-20 | 23,704.63 | 19,021.02 | 4,683.61 |
| 2020-21 | 24,040.82 | 19,327.35 | 4,713.47 |

| | | | |
|---------|-----------|-----------|----------|
| 2021-22 | 23,951.67 | 20,457.44 | 3,494.23 |
| 2022-23 | 22,990.00 | 21,330.20 | 1,659.80 |
| 2023-24 | 23,790.00 | 23,263.89 | 526.11 |
| 2024-25 | 24,508.00 | 23,855.61 | 652.39 |

Note:- BE figure for FY 2024-25 is subject to approval of the Parliament.

It may be seen from the above that there is a gradual decrease in the deficit between the projections of DRDO and the allocations thereof during the last three financial years. In addition to this, it is also evident from the table that there is continuous increase in budgetary allocation to DRDO and during current financial year, BE 2024-25, an amount of ₹23,855.61 Crore has been allocated to DRDO i.e. an increase of ₹591.72 Crore over BE 2023-24. Further, the Committee may be apprised that Budgetary allocations to Defence Services, including DRDO, are made during the beginning of the FY based on projections made by the Services, expenditure pattern during previous years, absorption capacity, committed liabilities & pre-budget discussions held with MoF. The allocations and pace of expenditure are reviewed at regular intervals by FADS, Defence Secretary & Hon'ble RM and re-appropriation of funds is done if needed with/without consultation of MoF as per the rules on this subject. At RE stage, based on overall analysis of expenditure and future requirements, projections are made which are considered by MoF. If required, additional funds are sought in consultation with MoF at an appropriate time during the Financial Year. The resource allocations are made on need basis and duly considering the other priorities of the country. Further, it may be affirmed that rationalization of the allocation and expenditure is the prime objective of the Government which may get compromised if a certain percentage of Defence Budget is fixed for DRDO. It is also added that there is no shortage of funds for the Defence Forces, including DRDO, and as and when fund is required the same is met in consultation with Ministry of Finance either through seeking additional funds or through re-appropriation/reprioritization. Constant review of the budget is done throughout the year and suitable decisions are taken at an appropriate time.

From the table mentioned in reply to para no. 4(i) above, it is evident that Budgetary allocation to DRDO at BE stage has been consistently increasing in absolute terms for the last five financial years and there is a gradual decrease in the deficit between projections made by DRDO and allocations made to DRDO. Further, it may be stated that this Ministry submits the requirements projected by Services to Ministry of Finance for favourable consideration and while allocating funds Ministry of Finance also analyses past absorption capacity of the Services and the pace of expenditure in the current Financial Year. In addition to this, based on the overall ceilings conveyed by MoF, Ministry of Defence allocates funds among the Services, including DRDO, based on Inter-Services priorities, committed liabilities, allocation/earmarking for critical projects etc. On the basis of additional requirement, funds are sought at Supplementary/RE stage. Also, if required, through reprioritization, it is ensured that urgent and critical capabilities are acquired. Further, it is added that DRDO supports all

industries (both Public and Private) on level playing field in all endeavours of industries towards Atmanirbhar Bharat and provides technologies, hand holding support, technical consultancy, test facilities, etc to them. The Committee may also be assured that all efforts are made to ensure optimum utilization of available resources without any compromise to developmental goals of DRDO.

Human Resource Management

Recommendation No. 5:

The Committee note that DRDO being a premier Defence R&D Organization follows a dynamic system of manpower management which is issued by way of authorized Regular Establishment (RE). The RE is reviewed every two years to meet the contingent requirements on account of workload and new projects undertaken by the laboratories. The Organization optimally utilizes manpower through dynamic manpower management system. In order to keep the Organization young and energetic and also to fill deficiencies created on account of retirement and superannuation, approximately 100 fresh scientists are recruited by Recruitment and Assessment Centre (RAC), DRDO every year as per functional requirements of the laboratories. The Committee are happy to learn that this year under the aegis of Mission Mode Recruitment 2023 (MMR-23) more than 850 over 2200 Group 'A' posts (Scientists) are under recruitment by RAC and vacancies of Group 'B' & Group 'C' posts (Technical Cadre and Admin & Allied Cadres) are under recruitment by Centre For Personnel, Talent Management (CEPTAM), DRDO. The Committee recommend that the above recruitment process should be completed at the earliest but essentially within the prescribed time lines under intimation to the Committee. As technical manpower availability is backbone of any research institution specifically for an establishment like DRDO, top level management should continuously monitor the vacancies which needs to be filled, in near future.

Reply of the Government

It is kindly submitted that selection process for around 3500 vacancies has been accomplished.

Training of Personnel

Recommendation No. 6:

The Committee also note that DRDO is continuously incorporating new training modules to enhance the organizational effectiveness by augmenting its resources and capabilities through training of personnel in R&D and Engineering skills, exposure to allied technologies and focus on strategic planning and leadership. DRDO ensures

training to all cadres of personnel through training institutes like Defence Institute of Advance Technology (DIAT), Pune (for technical courses); Information Technology and Management (ITM), Mussoorie (for techno-managerial programmes); and Training Institute, Jodhpur (for technical, administrative and allied cadres) so that they are professionally equipped to take further responsibilities. They have also been informed that every year some scientists are deputed to undergo ME/M.Tech & PhD at IITs, IISc Bengaluru and other reputed universities under the sponsorship programme. Targeted Training Centre (TTC) has been set up at Dr. Raja Ramanna Complex, Bengaluru which is used to plan and conduct Targeted Training for DRDO Scientists/Technologists to keep pace with the rapid advancement of technology and develop competence in state-of-the-art –cutting-edge technologies. 51 The Committee are of the considered view that since training helps in expanding the knowledge-base and acquaints oneself with the emerging trends in research and technology, DRDO should look into all available possibilities to tie up with various Universities, Institutions and Workplaces for its officers to undergo training and experience at regular intervals for expanding the knowledge-base and acquainting themselves with emerging and new technological knowhow. The Committee would like to be apprised of the tangible developments in this regard.

Reply of the Government

DRDO deutes all cadres of personnel to various technical, techno-managerial and administrative trainings regularly. Every year new institutes/universities are identified for training & qualification upgradation of DRDO personnel [viz. IITs, for course on Artificial Intelligence & Machine Learning (AI&ML); new IITs & NITs for M. Tech; new IIMs (IIM Amritsar & IIM Kashipur) for management trainings].

Working of DRDO

Recommendation No. 7:

The Committee's examination has revealed that DRDO undertakes various types of major projects. One of the types of such project is Mission Mode (MM) Project which include Medium Range Surface to Air Missile (MRSAM) system for Indian Air Force, LCA Mk-II, LRSAM, Quantum Communication for Metropolitan Cities (QMAN), Airborne Early Warning & Control System Mk – II (AEW&C Mk-II) for IAF and Advanced Light Weight Torpedo (ALWT). Besides MM Projects, there are Technology Demonstration (TD) Projects, encompass Active Electronically Scanned Array (AESA) Radar, New Generation Anti-Radiation Missile (NGARM), Supersonic Missile Assisted Release of Torpedo (SMART), Beam Combined Fiber Laser Source (BCFL) and Digital Fuel Flow Controller amongst the others. The Committee further note that another category of project, i.e. Science & Technology (S&T) Project, which is undertaken for basic or applied research activities i.e. Enhanced Blast Polymer Bonded Explosive Formulations, Pulsed Fiber Laser Sources, Double walled single crystal parts from advanced super

alloy, Advanced Warhead Technologies, Enhanced Efficiency of Thermoelectric Generator and Peltier Cooler (EETG) and Technology development for SiC Fiber (TDSiCF). Few more categories in regard to Infrastructure & Facilities (IF) 52 Development Projects are National Open-Air Range (NOAR), Mission System Integration Rig (MSyIR), Advanced HILS facility, Multi Petaflops Computing System, Creation of Automotive and Weapon Systems Testing Center (AWTC) and Infrastructure for Testing of Expendable Turbo Propulsion System (IT-ET). User trials (UT) Projects are yet another category that has come to the notice of the Committee. Major projects in this category are development of 5.56 mm Joint Venture Protective Carbine, Modification of Six Aircraft (Su-30 MKI) for Astra, Quick Reaction Surface to Air Missile - (QRSAM-UT), Air Defence Fire Control Radar, ASTRA Mk – I and Multi Influence Ground Mines. The Committee also note that DRDO not only develop systems but also provides product support for its major systems and to efficiently support the same, it has Product Support (PS) Projects and the major projects in this category are Post Development Support of AEW&C System (PDSAS), Product Support for Arjun MBT, Upgraded Digital Flight Control Computer (DFCC) for LCA Mk-1A, Product Support & Product Upgrade for Akash Weapon System, Akash-Prime and Astra Product Support. The Committee earnestly feel that diversified projects that are undertaken by the DRDO have enabled India to achieve competitive technological and military edge vis-à-vis our immediate neighbours. The Committee appreciate the mammoth work undertaken in the field of development of critical and strategic systems by DRDO. While commending the role played by the Organisation in the last 65 years in the areas of scientific, technological and armament development, they desire that DRDO should be encouraged to further expand the existing research-base and venture into new areas of development keeping in view the country's future military needs. They hope that Govt. will extend all out support to enable DRDO to withstand any kind of eventualities in future.

Reply of the Government

DRDO plan to expand its research activities in the areas of Quantum Technologies, Artificial intelligence, Cognitive Technologies, Smart materials, Asymmetric Technologies, Terahertz, Directed Energy Systems, High Power Electromagnets etc. DRDO established a network of DRDO Industry Academia-Centres of Excellence (DIA-CoEs) for collaborative directed research in developing critical and futuristic technologies for defence and security applications. So far 15 DIA-CoEs have been established at various IITs, IISc, Central and State Universities.

Status of Ongoing Projects

Recommendation No.8:

The Committee also note that DRDO currently has 328 ongoing projects (excluding strategic projects) amounting to approximately Rs.99,898 Cr (including User share) out of which 55 projects are Mission Mode, 197 Technology Demonstration (TD), 34 are Infrastructure & Facilities (IP), 19 are Science & Technology (S&T), 20 Product Support (PS) and 3 User Trial (UT) projects. The Committee has every reason to believe that the category-wise details of the ongoing projects eloquently speak of the success story of the Organisation. The Committee further note that DRDO has already handed over to the users various systems such as High Strength Steel for 'INS Vikrant', Main Battle Tank (MBT) 'Arjun' Mk-1A', Shakti : Electronic Warfare System, Light Combat Aircraft (LCA) 'Tejas Mk – 1A', Medium Range Surface-to-Air Missile (MRSAM) for IAF, Medium Range Surface-to-Air Missile (MRSAM) for Navy, Satellite guided Smart Anti Airfield Weapon (SAT-SAAW), Beyond Visual Range Air-to-Air Missile 'Astra', Multi-Mode Hand Grenade (MMHG), Bund Blasting Device (BBD) Mk-II, Drone, Detect, Deter and Destroy (D4 System), Chaff Technology for Indian Navy, 46m Military Load Class (MLC-70) Modular Bridge, Fire Fighting Suit, Helmet and pressure breathing Mask and Indigenous Filters for P-75 Submarines. The Committee's attention was also drawn towards major systems which were inducted/being inducted into Services. They include Akash Prime, 18Anti-Tank Guided Missile (NAG), Arjun Armoured Repair & Recovery Vehicle (Arjun ARRV), Armoured Engineer Reconnaissance Vehicle (AERV), Short Span Bridging System-10m, 120mm Tandem warhead system for anti tank application, 81 mm anti-thermal, anti-laser smoke grenade, Joint Venture Protective Carbine (JVPC), Light Machine Gun (7.62X51 mm - LMG), Trawl Assembly for T-72/T-90 Tanks, Qualification and Certification of DMR249 and 54 DMR301 Grade Steels, Plates, Bulb Bars and Weld Consumables, Digital Radar Warning Receiver (Dhruti), Nayan, Software Defined Radio (SDR), High Data Rate HD-VLF-HF Receiver, Laser Ordnance Disposal System (LORDS – N), Chaff Technologies for Indian Air Force, Magazine Fire Fighting System, ARNAV Naval Wargaming and NBC Haversack Mk-II. The Committee are happy to note about the efforts undertaken by DRDO in establishing high technology infrastructure facilities. Most of these facilities have been established with the active participation of Indian Industries. These facilities have become National Assets and have also proved beneficial in accelerating subsequent developments undertaken by DRDO. The Committee appreciate that DRDO has made these Test Facilities available to the Industries, which would definitely result in future development of weaponry at a faster pace. The Committee appreciate the hard work put forth by DRDO in the development of armaments, critical and strategic systems, Extreme Weather clothing and equipment, food items for High Altitude Terrain and other innovations during its journey which started in the year 1958 with an objective to build up science-based capability towards making improvements in existing weapon systems including imported equipment. DRDO has come a long way since then and has developed many import substitution products besides innovating superior weapon systems for the forces. The Committee at this juncture can only recommend that DRDO should put in place the arrangements to tie up with a consortium of Industries for creating widespread infrastructure so that the systems created by the organization can become future-ready. The initiatives taken in this regard and the road map/timeline drawn to accomplish the same must be intimated to the 55 Committee at the earliest but definitely at the time of furnishing the Action Taken Notes.

Reply of the Government

DRDO supports all industries (both Public and Private) on level playing field in all endeavours of industries towards Atmanirbhar Bharat. DRDO provides and will continue to support them by offering technologies, hand holding support, technical consultancy, test facilities etc.

Participation with Academia and Industry

Recommendation No. 9:

The Committee are happy to note that DRDO has been exploring the knowledge and expertise that exist within the country in various academic institutions and research organizations by providing research grants for faculty driven projects through External Research & Intellectual Property Right (ER&IPR) and various Research Boards, namely, Aeronautic Research & Development Board (AR&DB), Armament Research Board (ARMREB), Life Science Research Board (LSRB), Naval Research Board (NRB) etc. The Committee have also come to learn that the objective of these grants has been to foster knowledge-based growth in science and advanced technologies, catalyze cross-fertilization of ideas and experience between DRDO and academic experts. The Committee note that during the last five years, DRDO has given impetus to collaboration with academia for DRDO requirement-driven research in the identified futuristic technology thrust areas. The Directed research is managed by the Directorate of Futuristic Technology Management (DFTM) and DRDO has established eight Advanced Technology Centers (ATCs) at the premier institutes for carrying out research in the niche technology areas related to defence & security. The ATCs conduct steers the basic & applied research to offer solutions for technological or engineering challenges to raise the technology readiness level. The Committee feel that DRDO's research collaboration with 155 institutes and the present IPR portfolio speak eloquently of its own success stories. The Committee hope that this will surely help in making India self-reliant in real sense of the term. Here, the Committee would like to recommend the DRDO to further encourage and support Research and Development in private industry by 56 identifying systems and sub-systems to be developed by the private industries. They would also recommend to expand their outreach to include and associate with more and new upcoming industries by way of adopting inclusive approach. This, the Committee feel, will help achieve the goal of 'Atmanirbhar Bharat'.

Reply of the Government

DRDO conducted series of sessions on AnusandhanChintanShivir during May-July 2023. The sessions were attended by participants from Industry, Academia and Armed Forces. Subsequent to ChintanShivir event, **1295 development tasks identified to be pursued by academia** were uploaded on DRDO website.

During Director Conclave in Jul 2023, Chief of Defence Staff (CDS) released the 2nd list of 75 items with the objective of capitalizing the capabilities of Indian Industry for design, development of Defence system, in addition to the previous list of 108 system/subsystem which will not be taken up for design and development by DRDO.

In year 2023, 150 LAToTs were handed over to the Indian industries. Till date around 1800 LAToTs have been handed over to industries.

During 2023-24, 140 Grant-in-Aid projects costing ₹139.184 Cr were sanctioned to 121 institutions across the country through ER & Research Boards. 113 patents were also filed during the financial year 2023-2024.

113 Industry partners (25 Development cum Production Partners (DcPPs) and 88 Production Agencies (PAs)) have been identified for the development and/or production of DRDO designed systems.

Acceptance of Necessity (AoN) for 04 systems worth over ₹14,694 Cr has been accorded for induction during the year 2024 (till date).

The Production value of DRDO developed systems, both inducted and approved for induction, today stands at over ₹5.1 Lakh Cr.

Complementing and integrating the strong technological foundation of DRDO with solid geo-political foundation of Think-Tank institutions on strategic issues, DRDO has been organizing regular engagements with various reputed think-tank institutions. MoUs between DRDO and think-tanks such as CENJOWS, ISpA and USI is signed in year 2023.

Ongoing Major Programmes/Projects/Systems

Recommendation No.10:

The Committee note that the major Systems Undergoing User Evaluation include Quick Reaction Surface-to-Air Missile (QRSAM), Third Generation Helicopter Launch Anti-Tank Guided Missile ('HeliNa'/Dhruvastra), Medium Range Surface – to – Air Missile (MRSAM) for IA, Advanced Towed Artillery Gun System (ATAGS), Pinaka Mk-I (Enhanced Range) Rocket System, 125mm Fin Stabilized Armour Piercing Discarding Sabot (FSAPDS), Multi Influence Ground Mine (MIGM), Advanced Light Weight Torpedo (ALWT),s Portable Diver Detection Sonar (PDDS), Air Independent Propulsion (AIP) System for Submarines, Air Defence Fire Control Radar (ADFCR), Air Defence Fire Control Radar (ADFCR) – Atulya, GaN Technology Development, Tele-operated Dozer, Oxygenated Shelter and Extreme Cold Weather Clothing System (ECWCS). DRDO has also provided information on Major Systems Undergoing Developmental Trials, which include BrahMos, Stealth Wing Flying Testbed (SWiFT), Very Short Range Air Defence System (VSHORADS), Vertical Launch Short Range Surface to Air Missile (VL-SRSAM), Solid Fuel Ducted Ramjet (SFDR) Technology for Air Launched Tactical Missiles, Akash New Generation (Akash NG) and Man-Portable Anti-Tank Guided Missile (MPATGM). The Committee are of the opinion that DRDO being a premier development agency for conduct of all types of research, has the onus

of responsibility for creating credible deterrence capabilities for the Indian Armed Forces by developing technologically superior weapon systems. The Committee in this regard recommend that DRDO should leave no stone unturned and concentrate by focusing on augmenting the level of research and technological output to superior strata in order to be at par with the other developed countries. The Committee also desire that DRDO may explore the idea of having joint venture/collaboration with foreign partners to attain the capability to design and develop state-of-the-art future-centric weapon systems which can later be passed on to Indian Industry for manufacturing.

Reply of the Government

(i) **Support to DPSUs:** DRDO through Directorate of Technology Development Fund is mandated to indigenize the defence technology requirements from DPSUs as one of the stakeholders through TDF scheme. Currently, TDF is pursuing 5 project requirements of indigenization from BDL. All DPSUs through DDP have been informed to submit more project requirements for indigenization of components, sub-assembly, sub-systems level for improving supply chain for bigger platforms and systems.

(ii) **Collaboration with foreign partners:** DRDO has entered into a Bilateral Innovation Agreement (BIA) with Department of Defence, Israel and TDF is engaging with DoD, Israel for identification of projects by engaging startups/industries for development of technologies for defence and dual use. It has also been proposed to enter into such bilateral innovation agreements with other friendly foreign nations.

(iii) **DTDF status:**As on date, TDF has sanctioned 70 projects worth ₹290 Crore for indigenization of various components, LRUs and subassemblies against project requirements from various tri-services, DPSUs and DRDO Labs including ADA and futuristic requirements too. Currently, total 14 technologies and products have been developed successfully. TDF is constantly striving to make endeavours to support industries and mentoring and providing necessary technical handholding for realizing defence technologies. Seeing the potential of the scheme, Hon'ble RM has enhanced the project cost from INR 10 Crore to INR 50 Crore per project.

Drone / Anti Drone Capabilities

The Committee understand that drones are increasingly becoming very important in warfare, as is evidenced in the recent ongoing wars. The Committee have been given to understand that DRDO is developing drone based systems and anti-drone systems based on the requirements of User Agencies. DRDO has developed a comprehensive integrated Anti-Drone System which comprises of detection, identification and neutralization of a drone. After developing the technologies, the Committee can see that in the fitness of things and as a natural course of event that these are handed over to established Private industries as well as the budding ventures coming up under the new start ups umbrella under the Transfer of Technology (ToT) vertical. Three services (IA, IAF & IN) have already placed 23 orders on M/s BEL for DRDO developed technology. While developing the drone/anti drone capabilities the Committee would also

recommend that DRDO must look into all the pragmatic angles of developing “Interceptive Drone” and Sea Drone capability. The Committee have been informed that the older generation of drones were using Ni Cad and Silver Zinc batteries which were available in India. Notwithstanding the fact, the Committee find that owing to advancement in battery technology, Lithium Ion chemistry is now being used, which is not hitherto available in India. Although ISRO and DRDO are working on Lithium Ion 58 59 Cell, yet the activity is still in nascent stage of development. The Committee have further been informed that ADE, DRDO has proposed to work with FFC on the development of Lithium Phosphate cells with its Battery Management System. They, therefore, recommend that DRDO should take up this as a mission mode project to develop the required battery cells so that the new generation of Drones and Anti-drones be developed in a time bound manner to cater to the needs of our military capabilities.

Li-ion battery technology developed by DRDO is transferred to M/s HBL Power Systems, Hyderabad and M/s BEL, Pune. Batteries are being manufactured and supplied to DRDO by these industries for usage in underwater systems.

Development of Li-ion battery based on Lithium Iron Phosphate cells with battery management system for Drone applications will be undertaken by DRDO through these industries. Development of these batteries for Drone applications is being processed under “Future Energy Storage Technology (FEST)” project proposal.

Delay in the Projects / closed projects

Recommendation No. 12:

The Committee note with concern that out of 55 projects, 23 were not completed within the stipulated time. Although, 571 projects worth Rs 34161.58 Cr have been successfully completed and closed during the last 10 years (01 Jan 2012 - Till date), with respect to projects which were partially successful or unsuccessful, 8 such projects worth Rs 770.31 Cr were stage closed during this period. On an earlier occasion also, the Committee observed that scores of projects with DRDO were plagued by time and cost overruns and several projects were short closed due to change in the General Staff Qualitative Requirements (GSQRs) by the user or due to technological obsolescence. In the instant case, the reasons put forth by DRDO for closure of projects are, unanticipated technical complexities, technological denials and price inflations in capital equipment to be sourced from foreign Original Equipment Manufacturers (OEMs) and related feasibility issues etc. The Committee also note that project proposals are extensively reviewed by Peer Review Committees and Design Review Committees to identify possible risks and to draw risk mitigation plans accordingly. The Committee are surprised to find that despite the projects being reviewed by peer review and design review committees at various stages, certain projects have been stage closed due to the above mentioned risk factors. Keeping in view the above facts the Committee are of

the firm opinion and therefore in consonance recommend that all review mechanisms must be revisited by DRDO as they themselves may be the cause of delays in some cases. The Committee are also of the opinion that review mechanism should be inclusive of technical personnel (if not in place already) which can effectively guide the research projects towards their timely accomplishment. This can be staffed by senior scientists from different research/educational organisations who have experience and expertise in the relevant fields. Even the retired scientists from ISRO and Atomic Energy Commission etc. can also be associated with the review committees. The Committee also recommend that the reviews should have standard yardsticks so that when there is a deviation from it, corrective measures can be taken at the earliest and unnecessary delay/cost overrun can be avoided.

Reply of the Government

A heterogenous composition of technical experts drawn within DRDO, other scientific organizations, academia & industries are involved during Peer Review Committee, Preliminary Design Review, Detailed Design Review & Critical Design Review Committees.

Time Estimation Committee: A composition of technical experts drawn within DRDO, other scientific organizations, academia & industries are involved.

Senior Officers of User Services and Director General and senior scientists from DRDO are involved in the Apex Board, Executive Board and Project Monitoring & Review Committee. Status and milestones are reviewed in all the three tier monitoring committees.

Self Reliance and Indigenisation

Recommendation No.13:

The Committee are happy to note that DRDO is contributing immensely in taking the country towards self-reliance and indigenization. The Committee have also been informed that DPSUs are one of the major Industry partners involved in the production of DRDO-designed and developed systems/platforms/equipment. Contracts for D&D projects are entered with DPSUs for the development of systems/platforms/equipment. Under the Development cum Production Partner (DcPP) policy for DRDO developed systems, industries including both public sector entities (DPSUs, erstwhile OFBs etc.) and private sector entities, as the case may be, are involved from the beginning of the development cycle, thus facilitating hand-holding throughout the development phase which in turn helps them in achieving the goal of self-reliance. The Committee appreciate the measures taken by DRDO for helping DPSUs and Ordnance Factories in achieving the goal of self-reliance i.e. Licensing 60 Agreement for Transfer of Technology (LATOT), Test Facility support to Industries, Technology Development Fund (TDF), Export Support etc. The Committee are happy to note that DRDO takes up

activities and projects for development of new technologies and systems based on the evolving threat perception and other inputs from the environment. However, the Committee are concerned to note that the country is still dependent on foreign countries with respect to military platforms. The Committee have been informed that with the current rate of indigenization, DRDO is hopeful that the country may achieve 80 to 90 percent indigenization in the next 10 years. The Committee are of the considered view that long and continued dependence on imported weapon systems may act as a discouraging phenomenon to our renewed saga of 'Make in India' initiative. Therefore, the Committee recommend that there should be greater professionalism in integrated defence capability planning, management of Research and Development and priority should be given to self-reliance, thereby nurturing the nation's industrial capability in defence sector.

Reply of the Government

The planning in DRDO is managed through long term Roadmap which is reviewed on periodic basis for obsolescence and addition of new projects.

Technology Development Fund (TDF) Scheme

Recommendation No.14:

The Committee learn that Government of India has set up the 'Technology Development Fund (TDF)' scheme under Make in India initiative to create an eco system for enhancing cutting edge technology capability by inculcating R&D culture in Industry for building indigenous state-of-the-art systems for defence applications. Technology Development Fund (TDF) Scheme aims for the development of defence and dual use technologies that are currently not available with the Indian defence industry, or have not been developed so far. The Committee have been informed that the funding is provided through provision of grants to public and private sector industry especially MSMEs & 61 Startups that may work in collaboration with the academia or research institutions to carry out innovation, research and development with a limit of Rs 10 Crore per project. While appreciating the spectacular achievements of awarding 18 projects under the TDF scheme, the Committee desire that DRDO should ensure that the funding so provided must focus on development of technologies that will form the components which, in turn, will be used to develop defence equipment/systems/sub-systems/platforms.

Reply of the Government

As on date, TDF has sanctioned 70 projects worth ₹290 Crore for indigenization of various components, LRUs and subassemblies against project requirements from various triservices, DPSUs and DRDO Labs including ADA and futuristic requirements

too. Currently, total 14 technologies and products have been developed successfully. TDF is constantly striving to make endeavours to support industries and mentoring and monitoring and providing necessary technical handholding for realizing defence technologies. Seeing the potential of the scheme, Hon'ble RM has enhanced the project cost from INR 10 Crore to INR 50 Crore per project.

The Kalam Vision: Dare to Dream Scheme

Recommendation No.15:

The Committee note with appreciation the Kalam Vision: The Dare to Dream Scheme, which aim at creation of an ecosystem to foster innovation and technology development in Defence and Aerospace by engaging Start-ups and individual innovators and engage them to carry out R&D development which has good potential for future adoption for Indian defence and aerospace needs. The Committee have been informed that the core objectives of setting up the The Kalam Vision: Dare to Dream Scheme are to facilitate rapid development of new, indigenized, and innovative technologies from ideation to production for the Indian defence and aerospace sector, to meet needs for these sectors in shorter timelines and create a culture of engagement with individual innovators, innovative startups, to encourage co-creation for defence and aerospace sectors. The Committee feel that this also empowers a culture of technology co-creation and co-innovation within the defence and aerospace sectors. The Committee are of the view that this is certainly a step forward in achieving the prime objective of 'Make in India' initiative and furthering the goal of 'Atmanirbhar 'Bharat'. The Committee, therefore, desire that the Govt. should encourage and promote potential start-ups and prototypes coming for innovators where, they are sure that such ventures have utility and impact on the Indian defence and aerospace set up.

Reply of the Government

The Government has taken various steps to promote innovation for defence purpose. Two such initiatives are enumerated below:-

- **Technology Development Fund (TDF) Scheme**:- Technology Development Fund Scheme is a program of MoD (Ministry of Defence) executed by DRDO under Make in India initiative. The Government has approved TDF Scheme to encourage industries especially MSMEs and Startups to design and develop various Defence technologies. A green propulsion system developed under TDF scheme was successfully demonstrated in orbit functionality on a payload launched by the PSLV C-58 mission on 01 February 2024. At present there are 39 ongoing projects under the scheme & 2 successfully completed for Indian Navy and Indian Air Force.
- **Dare to Dream Pan India Innovation contest**:- Dare to Dream is a Pan India Innovation Contest to **support start-ups** & innovators to contribute in defence ecosystem. Through this contest, DRDO invites innovative ideas and

best ideas are selected and awarded. Three versions of Dare to Dream (D2D) Contest have already been successfully conducted. Dare to Dream (D2D) 4.0 is at present going on.

Technology Demonstration (TD) projects

Recommendation No. 16

The Committee note that during the last 03 years (since January, 2020), 122 TD Projects worth Rs.8946.39 Cr were sanctioned. During this period, 84 TD Projects worth Rs.2743.36 Cr, which were sanctioned in earlier years, were successfully completed. It is understood that post successful development, DRDO transfers the technology to industries by signing the Licensing Agreement for Transfer of Technology (LATOT). DRDO has entered into 1532 Licensing Agreement for Transfer of Technology (LATOT) with industries for mass production. Out of which, 106 LATOTs have been signed with DPSUs. The Committee appreciate the efforts made by DRDO in executing the Licensing Agreement for Transfer of Technology for mass production. They also appreciate DRDO for 106 LATOTs that have been signed only with DPSUs, which, they feel, will certainly empower the industries, albeit the DPSUs in enhancing production and galvanizing their efforts towards achieving greater self-reliance. The Committee would like to be informed of the updated status in this regard.

Reply of the Government

Till date, DRDO has entered into 1700 Licencing Agreement for Transfer of Technology (LATOT) with industries for mass production. Out of which, 122 LATOTs have been signed with DPSUs.

Key recommendations of the Committee are as follows:

- Bifurcation of the Post of Secretary DD(R&D) & Chairman DRDO
- Creation of Defence Technology Council (DTC)
- Apex DRDO Board consisting of CTO, CFO, CAO and CAFO
- Reorganisation of Laboratories and their functions.
- DRDO to focus on Fundamental Research and Futuristic and emerging technologies
- Financial Framework to Encourage Risk taking in research
- Digitization of DRDO
- Making DRDO attractive to the Brightest and the Best Talent (New Recruitment Mechanisms)
- Laboratory Partnerships with External ecosystem – Green, Amber & red zones (opening up Labs to Industries)
- Evaluating projects and Scientists
- Stimulating Critical Research in 'Deep Tech' Areas and ISR
- Maximise Industry, MSME and Academia participation in Defence Technologies.

CHAPTER – III

**OBSERVATIONS/RECOMMENDATIONS WHICH THE COMMITTEE DO NOT
DESIRE TO PURSUE IN VIEW OF THE REPLIES RECEIVED FROM THE
GOVERNMENT**

-Nil-

CHAPTER – IV

OBSERVATIONS/RECOMMENDATIONS IN RESPECT OF WHICH REPLIES OF GOVERNMENT HAVE NOT BEEN ACCEPTED BY THE COMMITTEE

-Nil-

CHAPTER – V

**OBSERVATIONS/RECOMMENDATIONS IN RESPECT OF WHICH GOVERNMENT
HAVE FURNISHED INTERIM REPLIES/REPLIES AWAITED**

-Nil-

NEW DELHI;

17 December, 2024

26 Agrahayana, 1946 (Saka)

RADHA MOHAN SINGH,

Chairperson,

Standing Committee on Defence.

APPENDIX I

STANDING COMMITTEE ON DEFENCE (2024-25)

MINUTES OF THE FIFTH SITTING OF THE STANDING COMMITTEE ON DEFENCE (2024-25)

The Committee sat on Thursday, the 12th December, 2024 from 1500 hrs. to 1515 hrs. in Committee Room No. '53', Samvidhan Sadan , New Delhi.

PRESENT

Shri Radha Mohan Singh - **Chairperson**

MEMBERS

Lok Sabha

- 2 Dr. Rajeev Bharadwaj
- 3 Shri Karti P Chidambaram
- 4 Shri Ranjit Dutta
- 5 Captain Viriato Fernandes
- 6 Shri Mohmad Haneefa
- 7 Ms. S. Jothimani
- 8 Shri Ravindra Shukla Alias Ravi Kishan
- 9 Shri Shashank Mani
- 10 Shri Lumba Ram
- 11 Shri Jagannath Sarkar
- 12 Shri Jagadish Shettar
- 13 Shri Virendra Singh
- 14 Shri Kesineni Sivanath
- 15 Com. Selvaraj V.
- 16 Shri Richard Vanlalhmangaiha

Rajya Sabha

- 17 Shri Naresh Bansal
- 18 Shri N. Chandrasegharan

| | |
|----|------------------------------|
| 19 | Shri Shaktisinh Gohil |
| 20 | Shri Dhairyashil Mohan Patil |
| 21 | Dr. Sudhanshu Trivedi |

SECRETARIAT

1. Dr. Sanjeev Sharma - Joint Secretary
2. Shri Tirthankar Das - Director

2. At the outset, the Chairperson welcomed the Members of the Committee and informed them about the agenda for the Sitting. The Committee then took up for consideration the following draft Reports:-

- (i) **Demands for Grants of the Ministry of Defence for the year 2024-25 on 'General Defence Budget, Border Roads Organisation, Indian Coast Guard, Directorate General Defence Estates, Defence Public Sector Undertakings, Welfare of Ex-Servicemen and Defence Pension (Demand Nos. 19 and 22)';**
- (ii) **Demands for Grants of the Ministry of Defence for the year 2024-25 on 'Army, Navy, Air Force, Joint Staff and Ex-Servicemen Contributory Health Scheme (Demand Nos. 20 and 21)';**
- (iii) **Demands for Grants of the Ministry of Defence for the year 2024-25 on 'Capital Outlay on Defence Services, Procurement Policy and Defence Planning (Demand No. 21)';**
- (iv) **Demands for Grants of the Ministry of Defence for the year 2024-25 on 'Directorate of Ordnance (Coordination and Services–New DPSUs) and Defence Research and Development Organisation (Demand Nos. 20 and 21)';**
- (v) **Action Taken by the Government on the Observations/ Recommendations contained in the Forty-Second Report (17th Lok Sabha) on the subject 'A Review of the Working of the Defence Research and Development Organisation (DRDO)'; and**
- (vi) **Action Taken by the Government on the Observations/Recommendations contained in the Forty-Seventh Report (17th Lok Sabha) on the subject 'A Review of Functioning of Zila Sainik Boards in the Country'.**

3. After some deliberations, the Committee adopted the above reports without any modifications.

4. The Committee, then, authorized the Chairperson to finalise the above draft Reports and present the same to both the Houses of Parliament on a date convenient to him.

5. ***Does not pertain to the Report***

The Committee then adjourned.

APPENDIX II

ANALYSIS OF ACTION TAKEN BY THE GOVERNMENT ON THE OBSERVATIONS/RECOMMENDATIONS CONTAINED IN THE FORTY-SECOND REPORT OF STANDING COMMITTEE ON DEFENCE (17TH LOK SABHA) ON THE SUBJECT 'A REVIEW OF WORKING OF DEFENCE RESEARCH AND DEVELOPMENT ORGANISATION (DRDO)'

1. **Total number of Observations/Recommendations**
16

2. **Observations/Recommendations which have been accepted by the Government (please see Chapter II):**
Recommendation Para Nos. 1,2,3,5,6,7,8,9,10,11,12,13,14,15,16.
Total : 16
Percentage: 100%

3. **Observations/Recommendations which the Committee do not desire to pursue in view of the replies received from the Government (please see Chapter III):**
Recommendation Para No. –Nil-
Total : 0
Percentage: 00 %

4. **Observations/Recommendations in respect of which replies of Government have not been accepted by the Committee, which require reiteration and commented upon (please see Chapter IV):**
Recommendation Para No. –Nil-
Total : 0
Percentage: 00%

5. **Observations/Recommendations in respect of which Government have furnished interim replies/replies awaited (please see Chapter V):**
Recommendation Para No. –Nil-
Total : 0
Percentage: 00 %