

**14**

**STANDING COMMITTEE  
ON DEFENCE  
(2006-07)**

**FOURTEENTH LOK SABHA**

**MINISTRY OF DEFENCE**

**'DEFENCE RESEARCH AND DEVELOPMENT  
ORGANISATION (DRDO)'**

**FOURTEENTH REPORT**



**LOK SABHA SECRETARIAT  
NEW DELHI**

*March, 2007/Phalguna, 1928 (Saka)*

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(2006-07)

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MINISTRY OF DEFENCE

'DEFENCE RESEARCH AND DEVELOPMENT  
ORGANISATION (DRDO)'

*Presented to Lok Sabha on 16.3.2007*  
*Laid in Rajya Sabha on 16.3.2007*



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NEW DELHI

*March, 2007/Phalguna, 1928 (Saka)*

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COMPOSITION OF THE STANDING COMMITTEE  
ON DEFENCE (2006-07)

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(iv)

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- \*30. Shri Lalit Suri

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5. Smt. Jyochnamayi Sinha — *Under Secretary*
6. Shri Rahul Singh — *Sr. Executive Assistant*

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\*Demised on 10.10.2006, consequently his seat remained vacant *w.e.f.* 10.10.2006.

## PREFACE

I, the Chairman, Standing Committee on Defence (2006-07) having been authorised by the Committee to submit the Report on their behalf, present this Report on the subject 'Defence Research and Development Organization'.

2. The Committee selected the above subject for examination during the year 2005-06. As the examination of the subject remained inconclusive, it was re-selected by the Standing Committee on Defence for examination during the year 2006-07.

3. The Committee, during their examination of the subject, took briefing and evidence of the representatives of the Ministry of Defence on 1 December, 2005, 31 January, 7 June and 22 September 2006. The Committee also heard the views of representatives of Confederation of Indian Industry (CII) on 10 October, 2005 and 2 January 2006 on the subject. The Committee also invited the then Hon'ble Minister of Defence, representatives of Ministry of Defence, representatives from Confederation of Indian Industry (CII), Federation of Indian Chambers of Commerce and Industry (FICCI) and Institute of Defence Studies and Analyses (IDSA) on 17 July 2006 on the subject 'Public Private Partnership on Defence R&D and Production'.

4. The Committee also benefited by the expert opinion of Shri Ajay Vikram Singh, Defence Secretary (Retd.), Gen. V.P. Malik, PVSM, AVSM (Retd.), Air Chief Marshal S. Krishnaswamy, PVSM, AVSM, VM & Bar (Retd.), Lt. Gen. S.S. Mehta, PVSM, AVSM, VSM (Retd.), Maj. Gen. Bikram Singh Kanwar (Retd.), Ex-M.P., Col. Sudhir Sawant (Retd.), Ex-M.P., Vice-Admiral K.K. Nair (Retd.) and Dr. Vijay L. Kelkar, Finance Secretary (Retd.) at their sittings held on 2 January, 23 and 24 March and 18 December 2006 on the subject.

5. Based on the background note, written replies to the list of points furnished by the Ministry of Defence on the subject, approach paper submitted and briefing/oral evidences tendered by the representatives of CII and non-official experts and the observations made by the members of the Committee during the sittings, the Committee finalised the draft Report at their sitting held on 26 December 2006 and considered/adopted it at their sitting held on 9 January 2007.

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6. The Committee wish to express their thanks to the then Hon'ble Minister of Defence, representatives of the Ministry of Defence, non-official experts, the representatives of the Confederation of Indian Industry (CII), FICCI for appearing before the Committee for evidence and for furnishing the material and information in a very short span of time which the Committee desired in connection with the examination of the subject.

7. For facility of reference and convenience, the observations/ recommendations of the Committee have been printed in thick type in the body of the Report.

NEW DELHI;  
1 February, 2007  

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12 Magha, 1928 (Saka)

BALASAHEB VIKHE PATIL,  
Chairman,  
Standing Committee on Defence.



## CHAPTER I

### INTRODUCTORY

1.1 DRDO is one of the premier scientific and technological organisations in the country formed in 1958 with a mission to design, develop and lead to production state-of-the-art weapon systems, platforms and allied equipment and also to provide combat support for meeting the current requirements of the Armed Forces. The Organisation is fully dedicated towards progressive enhancement of self-reliance in defence systems and state-of-the-art technologies and also to enhance Research & Development infrastructure and capability of the country. It was established with a vision to promote the corporate strength and to make the country independent of foreign technologies in critical sphere.

1.2 DRDO is working in frontier technologies, which are always a challenge. Considerable advancements have been made and tried in the field of aeronautics, armaments, missile systems, combat vehicles, advanced computing & networking, communication, secrecy system, electronics, electronic warfare systems, radar systems, military engineering, life sciences, advanced materials, composites, underwater sensors / weapons and warship technology, etc. and attempts are now being made to meet emerging challenges in these fields.

1.3 The developed countries with their planning and proper utilisation of funds human and natural resources clearly took an edge over developing nations in the fields of science and technology including the defence systems who were engrossed in multitude of problems related to provide basic necessities of their population. Then to show their military and economic superiority no developed country wanted any developing country to be at par with it. These countries insisted on only 'buy' category of weapons and transfer of complete technology was always denied to developing nations.

1.4 Despite handicaps, Defence R& D in India managed to mature well by the mid-1980s and embarked on R&D for major weapon systems as well as on creating core competence in defence-critical technologies. It makes interesting observation that its performance was rated way below the expectations of the user services in low-end technology areas where foreign suppliers were available. However, in

the strategically important areas such as radars, sonar, electronic warfare equipment, advanced ammunitions and missiles, the users were less critical of indigenous R&D. In most of these denied technology areas where user interest and stakes were high, therefore, role of the Defence R&D in India has become more responsive and sensitive due to the changing security environment.

1.5 The time period of war has direct bearing on the economy and resources of the country. The conventional wars always took their toll on the manpower also, sometimes wiping out almost half of the adult male population of a country. The consistent improvement in the weapon system and new ways to fight a war has changed the requirement from conventional systems to nuclear, biological and chemical (NBC) weapons of mass destructions where requirement of manpower changed drastically from numerical strength to technically qualified professionals who could operate and improve upon the sophisticated and high precision weapon systems. Therefore, all these factors led to a need of fundamental research and technological development in defence sector also.

Charter of DRDO detailing its original functions assigned to it is enclosed (Annexure 'A').

1.6 The Committee after interaction with the Ministry and information received from the Ministry, are informed that important projects namely Light Combat Aircraft (LCA), missile programme, Arjun Tank, Kaveri Engine etc. are far behind the schedule and showing time and cost overrun. Even after number of years and cost revision these projects could not be completed by the DRDO as envisaged by it, which in fact deprived the country of the intended benefits to be availed by the country after completion of these projects. Besides that even after 48 years of formation of DRDO, it has not been able to achieve its targeted mission of self-reliance in weapon system and other equipment.

1.7 The Committee also find that DRDO is spending only 8-10% of its budget on fundamental/applied R&D and rest of the Budget is being spent on DRDO's programme and schemes. Further, DRDO has not been able to spend the funds fully allocated for R&D. The Committee also have noticed some grey areas which are required to be addressed more adequately in a right direction like one man one post, effective use of collective wisdom, need to overhaul and restructure DRDO to perform, effective emphasis on critical scientific

research, joint ventures and partnership with the private sector and within the Government undertaking budget to be reviewed with performance and to give thrust to complete inordinate delayed projects indigenously or through collaboration without further loss of precious time.

1.8 A Self Reliance Review Committee, under the Chairmanship of Scientific Adviser to Raksha Mantri was constituted in 1992 to examine all issues related to self-reliance and formulate a long term plan. Accordingly a "10 Year Plan for Self Reliance in Defence Systems" was formulated through joint interactions between the various departments of the Ministry of Defence and the three Services. The plan envisages a major coordinated thrust for self-reliance in defence systems to enhance the level of self-reliance progressively from 1995 through 2005. The plan defines self-reliance Index as the ratio of the indigenous content of defence procurement to the total expenditure on defence procurement in a given financial year. The 10 year plan envisages raising the self-reliance Index value from 1992-93 estimation of 0.3 to possible 0.7 by the year 2005. This implies that the import content of the defence procurement would be brought down to 30% or less in the next 10 years.

1.9 As per the ten-year old Vision Plan of the Ministry of Defence, from 1994 to 2005, self-reliance index would have gone up from 30% to 70% which is at present hovering around 30-35%.

1.10 Keeping in view all these aspects the Committee on Defence decided to select DRDO as subject for detailed examination during the year 2005-06. As the examination of DRDO could not be completed in 2005-06, the Committee again selected this subject for examination during the year 2006-07. The Committee have held 10 sittings on the subject and examined this subject thoroughly. Important observations and recommendations of the Committee are given in the succeeding paragraphs.

#### **Recommendation No. 1**

*Need for Reorientation of Defence Research Policy and Private Participation in IT*

**1.11 The Committee note that the DRDO was formed in 1958 with an objective to provide Scientific and technological support to Armed Forces through design and development of new and sophisticated equipment to meet their operational requirements. The main objective of DRDO is the establishment of capability for**

indigenous production of equipment with a view to attain self-reliance in defence requirements. This mandate of DRDO is accomplished through 50 Laboratories / Establishments whose activities are organised through specific projects.

1.12 The Committee are not happy to be informed that during Xth Plan (2002-2007), against the target fixed to reach 70% indigenisation only 30-35% target could be achieved. This gives an impression to the Committee that the country is still largely dependent on imports of Defence products and the DRDO even after 48 years of its formation has not been able to achieve its targeted mission of self-reliance in Defence production. The Committee feel that there is an urgent need for a thorough review of its functioning and its organisational/structural set up, in order to identify the strength and weaknesses and to improve and strengthen this organisation to increase its efficiency to enable it to achieve organisational goals.

1.13 The Committee are of the view that in order to achieve the objective of self-reliance apart from Defence PSUs and Ordnance Factories, private participation should also be encouraged and re-oriented in the research and development areas, where they have expertise and capability in Defence production by funding the relevant organizations.

1.14 The Committee, keeping in view the future war scenario, strongly feel that it has become imperative to develop weapon systems not only on one-to-one basis but also as an integrated system. The Government should, therefore, take a holistic and flexible view towards Defence R&D and production agencies by providing them complete autonomy and accountability and re-orient their work according to the changes taking place world wide.

## CHAPTER II

### ORGANISATIONAL STRUCTURE OF DRDO

2.1 Defence Research and Development Organisation (DRDO) was formed in 1958 with an objective to build up science-based capability towards making improvements in the existing weapon systems, and also in other imported equipment. Today DRDO has emerged as one of the premier scientific and technological organisation in the country with a mission to design and develop state-of-the-art weapon systems, platforms, and allied equipment leading to production, and also to provide combat support for meeting the current requirements of the Armed Forces. DRDO has a mission-mode structure, headed by the Director General, Research & Development (DG, R&D), who is also the Secretary, Department of Defence R&D, and Scientific Adviser to Raksha Mantri (SA to RM). DG, R&D is assisted by Chief Controllers, Research and Development. The Organisation has two tier systems, viz. the Technical and Corporate Hqrs at New Delhi; and laboratories/ establishments located at different stations all over the country from Jodhpur in west to Tejpur in the east and Leh in north to Kochi in south.

2.2 In a note furnished to the Committee, the Ministry further submitted the Organisational Structure of DRDO as under :-

“DRDO Hqrs under the Department of Defence Research & Development, is organized in two different types of Hqrs Directorates. Technical Directorates which include Directorates of Aeronautics, Armaments, Naval Systems, Combat Vehicles and Engineering, Electronics and Computer Sciences, Missiles, Naval Research and Development, Life Sciences, Civil Works and Estates and Technical Examination Cell. These Directorates act as ‘single window’ to facilitate laboratories and establishments, functioning in particular areas, in obtaining approvals of new projects from the Government, facilitate in monitoring and review of ongoing projects and also to co-ordinate with other laboratories and directorates. Corporate Directorates, like, Directorates of Personnel; Human Resource Development; Materials Management; Planning & Coordination; Management Services; Rajbhasha and Organisation & Methods; Budget, Finance & Accounts; Security & Vigilance; International Cooperation, and Extramural Research & Intellectual Property Rights assist laboratories in improvement of their

infrastructure, creation of new facilities, induction of manpower, etc. and also in getting Government approvals for taking up projects in their respective areas. Recruitment & Assessment Centre undertakes fresh recruitments, and organizes assessment on periodic basis for the promotions of scientists for all laboratories & Hqrs. of DRDO under Defence Research Development Service (DRDS). Personnel Assessment Centre conducts assessment of performance for promotions for personnel of DRTC Cadres."

2.3 With regard to various Laboratories/Establishments in DRDO, the Ministry stated as under :—

"Various programmes/projects are being executed through a network of fifty laboratories/establishments, Field Stations, Regional Centres of Military Airworthiness (RCsMA), etc. located all over the country. They are engaged in R&D activities in the field of aeronautics, armaments, missiles, combat vehicles, advanced computing & networking, electronics, opto-electronics, military engineering systems, life sciences, advanced materials, composites and underwater sensors/weapons and warship technology. DRDO has two societies, namely Aeronautical Development Agency (ADA), and Society for Integrated Technology Applications & Research (SITAR). ADA was set up in 1983 at Bangalore and has mission to undertake design & development of advanced technology aircraft. SITAR designs digital components and devices required for various projects including high performance computing. Defence Institute of Advanced Technology (DIAT), earlier an establishment of DRDO, attained the status of Deemed University in 2005. DIAT organizes courses on wide spectrum of technologies including regular long, and short term courses, Induction Programmes for newly recruited scientists and Post Graduate Programmes to meet defence requirements in general and weapon systems in particular. These are also administered and funded by the DRDO. Gallium Arsenide Enabling Technology Centre (GAETEC) at Hyderabad is a foundry, set up for design, development and fabrication of critical microwave components for various programmes undertaken by DRDO and Department of Space. Hierarchical organisational structure of DRDO is given at Annexure "A" whereas list of DRDO laboratories/establishments is enclosed at Annexure-B."

2.4 On being asked about the proposal for restructuring DRDO, the Ministry in its reply submitted as under :—

"The structure of DRDO has been undergoing various changes depending upon the environment and the services expected of the

DRDO. For example, recently in order to improve our interface with the Defence Services, a new office of Chief Controller R&D (Services Interaction) has been set up which participates with the CIDS and the Defence Services on the Defence Acquisition Council Categorisation Committee and 'Make' or 'Buy' decisions. Further, interface issues with the Services will also be dealt with by this wing of DRDO."

2.5 On the issue of inclusion of independent professional experts to suggest restructuring of DRDO in order to improve its efficiency and professionalism, the Ministry replied as under :—

"A suggestion has already been made by Kelkar Committee to this effect. We are eliciting views of other scientific departments with respect to similar review of their organizations and its efficacy. We are looking at various possibilities and issues that need to be focused for the review. We may suggest a suitable committee for the purpose largely with external experts having familiarity with the working of scientific and industrial departments, experts in the areas of science, industry, finance and academic institutions so that the review is purposeful."

2.6 On being asked about the positions at present being held by SA to RM, the Ministry replied as under :—

- "(i) Secretary, R&D
- (ii) Director General Defence Research and Development Organisation
- (iii) Director General Aeronautical Development Agency"

2.7 On the issue of splitting DRDO into separate independent organization for undertaking R & D in their respective fields, the Ministry replied as under :—

"DRDO undertakes research projects to develop weapons and platforms for strategic requirements of our Armed Forces. Since majority of DRDO projects are interdisciplinary, systems and science laboratories are working in close coordination in a symbiotic manner to complete the ongoing projects. Splitting into various separate independent organisations will adversely affect the functioning and proper coordination among them, which, at present, is working very well. DRDO works on user driven mission mode projects or science and technology projects. Though it appears that Life Sciences related issues need not be addressed by DRDO, but

the subject has been repeatedly debated and discussed in conjunction with the user whether they are ready to take on the research in those areas either by themselves or through academic universities or other scientific departments. However, such attempts have not succeeded primarily because users are very keen to avail the services of Life Sciences laboratories as it meets their operational needs directly. Users also feel that the Life Sciences laboratories understand their requirement better. In spite of this, we are making conscious attempts to identify sources whether certain operations of such tasks can be outsourced."

2.8 The Committee wanted the views of the Ministry as to whether three separate research wings for Army, Navy and Air Force could be beneficial, the Ministry replied as under :-

"The science and technology is not specific to Army, Air Force and Navy. However, the products and systems are to be designed and developed to meet the specific requirements of the individual Services. This is being done in close coordination with individual Service. However, pure science and technology in R&D areas is not linked to any Service and the output of this R&D will be available to the products that will be development for the three Services".

2.9 As regards the autonomy to DRDO, the Ministry submitted as under :-

"DRDO is a dynamic organisation having flexibility to adopt to changes necessary for its role and functions. So, it is autonomous in functions and can not become static organisation. We intend examining the possibility of a structure similar to Space Commission/Atomic Energy Commission, Council of Scientific and Industrial Research (CSIR) to bring about greater autonomy in our functioning; particularly for teaming with industries. This may take some time to evolve conceptually, before we could seek Government approval for the same".

2.10 The Ministry was asked whether DRDO needs to have autonomy for taking financial decisions and establishing partnership with public-private sector. The Ministry replied as under :-

"Currently adequate autonomy exists for taking financial decisions and establishing partnership with public-private sector."



2.11 In another reply to restructure DRDO on the lines of Space Commission/Atomic Energy Commission, the Ministry stated as under :-

“DRDO internally keeps reviewing its structure for enhancing its effectiveness. Even under current dispensation, the Organisation is performing well and there is no such proposal to restructure on lines of the Space Commission/Atomic Energy Commission under consideration of the Government.”

2.12 On being asked whether more autonomy will help DRDO to achieve its goal in a realistic and time-bound manner, the Ministry replied as under :-

“Science and Technology Departments need greater functional autonomy and flexibility and yet be accountable. In order to achieve organizational goal in realistic and time bound manner. It is pertinent to execute high-end cutting edge technologies in frontier areas of technology projects and programmes with greater flexibility in operation. Enhancement of autonomy in lines with Space Research and Atomic Energy Departments will help in overcoming procedural delays and effective & efficient management of time and resources. This will enhance efficiency in execution of Science and Technology Projects and Programmes”.

2.13 The Ministry was asked as to whether DRDO is an autonomous body, the representative of the Ministry during oral evidence stated:-

“We are largely autonomous I would not say fully autonomous please appreciate that already the Government has initiated certain changes in the Defence procurement policy which will have an effect on us in the sense of future developments”.

## **Recommendation No. 2**

### *Organisational Structure of DRDO*

**2.14 The Committee express their displeasure to note that Scientific Advisor to Raksha Mantri has been assigned multifarious responsibilities. Besides this he is holding, the posts of Director-General of Defence Research and Development Organisation and Secretary (R&D). He is also the Director-General of Aeronautical Development Agency. The Committee strongly feel that any Officer who holds various posts simultaneously cannot be expected to devote**

adequate time and energy to visit R&D laboratories under him and to contact other scientific labs for motivational leadership purpose. This, in turn, dilutes the benefits of collective wisdom, different sets of mind sets give efficiency, accountability, proper planning and also efficacy of the organization. The Committee feel that one person should not be entrusted with a number of responsibilities by making him hold a number of posts simultaneously. The Committee also desire that the Government should fill all the vacancies urgently, so that the organisation will be more purposeful and productive. The Committee would like to be apprised of the progress made by the Government in this regard.

2.15 The Committee note with serious concern that DRDO in addition to fundamental research and development for developing weapons and platforms for strategic requirement of Armed Forces is also undertaking R&D on medical sciences, life sciences and other allied sciences. The Committee strongly feel that R&D work on medical, life and other allied sciences should be entrusted directly to the concerned organization relating to these subjects as it would give more and more opportunity to DRDO to concentrate on the fundamental and crucial Defence Research work. This would make the country self reliant in the field of weapon systems and force multipliers. For R&D on Medical and allied sciences, Government should create a separate R&D organization in their respective organisation, life science and medical science can merge as respective institutions.

2.16 The Committee are of the view that DRDO should concentrate on research work, primarily on Defence and Strategically important matters only and research activities in the field of Life Sciences i.e. food, agriculture, medicine, psychology, physical and allied sciences, be left to the manufacturers or the users or private organizations as the case may be. The Committee also desire that projects for applied research activities should be funded by the respective Services/Organizations.

2.17 The Committee have been informed that the Space Commission/Atomic Energy Commission enjoys greater autonomy in its functioning particularly for teaming up with the industry. The Committee, keeping in view the disappointing performance of DRDO strongly recommend to the Government the complete review of the structure and functioning of DRDO including providing greater autonomy by appointing an independent Committee of Experts/professionals, on the lines of Atomic Energy Commission and Indian Space Research Organization (ISRO) so that it could achieve its targeted mission of self-reliance in Defence sector.

## CHAPTER III

### BRAIN DRAIN IN DRDO

3.1 As regard the adequacy of laboratories and strength of scientists, the Ministry in a written note furnished to the Committee stated:—

“50 DRDO laboratories/establishments, field stations regional centres are sufficient to meet the requirement of DRDO.

The total authorized strength of DRDO is 33,442 distributed in the various categories *viz.* Defence Research & Development Services (DRDS)/Defence Research & Technical Cadre (DRTC) Admin. & Allied categories which is the upper limit of the number of employees up to Xth Plan period i.e. 2007. It is pertinent to mention that this is not the authorized strength in the conventional sense of the word, meaning thereby that Organisation must have the post filled up. DRDO is the project-driven scientific organisation and the manpower inducted in phases as per the requirement in Projects. Such requirements are analysed by the Organisation and number decided from time to time. There is no concept of deficient manpower merely because not all the manpower positions have been filled in the Organisation and the upper ceiling touched. The projects have not suffered on account of non-availability of manpower”.

3.2 The Committee desired to know about the salary structure and also number of scientists left DRDO in the last 10 years, the Ministry replied as under:-

“The scientists in DRDO apart from the Pay Scales as per the Vth Central Pay Commission (CPC), are also granted two additional increments to all the scientists (recruitees and promotees) in the pay scale of Rs. 10000-15200/-, Rs. 12000-16500/-. Rs. 14300-18300/- and 16400-20000/-, with effect from 01.01.1996 after their normal pay fixation. Special Pay of Rs. 2000/- per month to the scientists in the Pay Scales of Rs. 18400-22400/-. In lieu of separate higher Scale after Peer Review. Professional Update Allowance of Rs. 5000/- per annum to all scientists. A proposal for giving incentives for scientists is being processed for approval of the Government.

A total 1404 scientists have left the DRDO during the last ten years. The DRDO is taking all due care of tangible and intangible *viz.* accommodation to the scientists within campus & postings in the on-going projects to attract and retain talent in the Organization”.

3.3 The Committee further asked the Ministry to give specific reasons of brain drain and efforts to retain the scientists. The Ministry explained as under:-

“During the last 10 years, most of the scientists have left DRDO on their personal/domestic grounds.

DRDO employs highly qualified scientists in various disciplines. Some of the disciplines are in very high demand in open market, especially large number of electronics and computer science graduates are in great demand by the booming IT Industry for which India is developing as a big base. A number of MNCs are establishing R&D centers in India, many in the cities where DRDO has a cluster of laboratories and establishments. Preferential acceptance of various options of job offer available are exercised by talented candidates. DRDO also exercises option on these meritorious candidates for recruitment. Some of the scientists selected in DRDO through proper selection process, after training and R&D experience in the Organisation are offered much higher lucrative salary by MNCs and Private Companies. DRDO is striving to meet the rising expectations of scientists and technical personnel and attract and retain talent in the Organisation. A scheme of incentives proposed to the Government is pending with the Govt. since July 2001. In view of Parliamentary Assurance given in the 196th (2002) Session, a fresh proposal for giving the following incentives for scientists is being processed for approval and sanction of the Government:-

- Enhancement of professional update allowance.
- Authorization of additional increments to Scientists ‘B’ at the time of joining.
- Internet facility to all the scientists at home.
- Enhancement of Study Leaves for acquiring higher qualification *viz* PhD, M Tech, etc.
- Individual Consultancy & Collaborative opportunities.
- Fast track promotion policies.

- Grant of Sabbatical Leave for interaction with academia and R&D departments.
- Detailing scientists for Short Term/Long Term training courses in frontier areas within the country and abroad.
- Entitling all scientists for Air Travels on Official/Temporary Duty.
- Reimbursement of residential telephone and Internet expenses for young scientists also.
- Award Scheme to be augmented.
- Adjunct appointment.
- Sharing of monetary benefits of commercialization of products/processes developed by inventors.
- Augmentation of residential facilities, recreational, medical and educational facilities.
- Better social life in the DRDO living campus.

The above Incentives Schemes will help to ameliorate the problem of attrition and to attract and retain the best scientists for the Organisation.

The working environment is congenial and amenities are adequate in DRDO. The DRDO is taking all due care of tangible and intangible benefits *viz.* accommodation to the scientists within campus & postings in the ongoing projects to attract and retain talent in the organization”.

### **Recommendation No. 3**

#### *Brain Drain in DRDO*

**3.4 The Committee are constrained to note that DRDO has been facing problem of shortage of scientists to the extent of 1404 scientists, as they have left DRDO in view of the lucrative job opportunities available to them in the private sector and other organisations. The Committee take note of the fact that the organisation has been facing this serious challenge to retain its trained manpower.**

**3.5 The Committee note with serious concern that the proposal to provide incentives for scientists of DRDO has been pending for consideration with the Government since 2001 and despite all the Parliamentary assurances, the Ministry has not taken any action to**

implement the proposed incentives. The Committee therefore, desire that immediate steps be taken by the Ministry to clear the said incentive proposal and also think of providing other perks and facilities in order to attract best, talented employable technical manpower and to contain the existing brain drain to further strengthen the organization so that the research work should not suffer.

3.6 The Committee hold a view that scientists are the intellectual property of the country and their contribution to the nation is peerless which cannot be equated by providing only monetary benefits to them. The Committee, therefore, strongly recommend the Government to take suitable and firm measures for encouragement to scientists by providing adequate freedom to do research work. The Government should create an atmosphere of trust and have close interaction with them to address their problems/grievances so that they can concentrate on their research work.

3.7 The Committee, therefore, desire that a comprehensive national policy should be formulated to recruit and retain talented and experienced scientists who would make the pursuit of science a viable academic and commercial proposition.

## CHAPTER IV

### BUDGET & EXPENDITURE

4.1 When asked to furnish the break up of the funds allocated and utilized by DRDO on R&D and fundamental research activities during the last five years, the Ministry stated as under :—

“R&D budget to the total Defence budget, expenditure incurred on R&D activities, fundamental research for the last five years are as follows:

Year(s)	Allocations Defence R&D	Expen- diture	Defence Budget	R&D Budget as % of Defence Budget	Expenditure incurred	
					R&D Project, Programme, Scheme	Fundamental Research
2000-01	3359	3341	54461	6.17	2503.34	(Basic Research + Grant- in-aid)
2001-02	3173	3119	57000	5.57	2236.95	8-10% of DRDO Budget.
2002-03	3079	3006	56000	5.50	2043.02	-
2003-04	3458	3441	65300	5.30	2361.88	-
2004-05	3747	3712	77000	4.87	2480.80	-
2005-06	5356	-	83000	6.5	-	-

Budget allocations made to Defence R&D are quite adequate to progress the on-going projects, programmes and schemes and also for the new programmes sanctioned during the year.

4.2 The Committee desired to know about the details of Defence R&D budget in respect of neighbouring and developed countries during the last five years, the Ministry in a note furnished to the Committee submitted the following :-

Countries	Budget	Years				
		2000	2001	2002	2003	2004
1	2	3	4	5	6	7
India	Defence	11956	12513	12294	14336	16904
	R&D	737 (6.17)	697 (5.57)	676 (5.50)	760 (5.30)	823 (4.87)

1	2	3	4	5	6	7
USA	Defence	322309	324908	364819	414400	455304
	R&D	43415 (13.47)	44934 (13.83)	N. A.	52753 (12.73)	64653 (14.04)
UK	Defence	40725	41777	44068	51082	47401
	R&D	4861 (11.88)	5105 (12.22)	N. A.	N. A.	N. A.
Pakistan	Defence	2920	3125	3358	3602	3685
	R&D	N.A.	N.A.	N.A.	N.A.	N.A.
China	Defence	22200	26100	30700	33100	35400
	R&D	China's R&D Budget is around 15% of Defence Budget according to some rough estimates.				

Note: Figures in parenthesis are percentage of Defence Budget. Defence Budget of all the countries except India are in accordance with details available in DIPRI year book.

Allocation made to the Defence R&D are utilized for approved/sanctioned projects, programmes and schemes. Annual allocations made to Defence R&D are normally utilized in full for the approved projects. Minor portion of allocations at times remains un-utilised due slippages in delivery commitments by foreign suppliers and other reasons beyond control".

4.3 During oral evidence, on funding pattern on R&D, a non-official expert expressed his views as under:—

"It is necessary to identify portions of the Budget where there is a joint control with the three Services so that the basic and urgent requirement of the Services is met. Of course, the bulk of the Budget would be left to the DRDO to do green field and new projects to keep India in the development path in strategic areas. In the division of the cake of the DRDO's budget, there must be a portion earmarked for the three Services, which is controlled jointly. The balance of the Budget will, of course, go to the DRDO for new and basic research areas. These are areas in which there is not yet adequate development and we cannot trust other countries to do it for us".

4.4 During oral evidence, on the issue of decline in allocation of budget for R&D, the representative of the Ministry apprised the Committee :—

"About the budget, it is correct that in the initial years of this decade, in 2001-02, it was 5.8 per cent of the total budget of the



Defence Ministry. In 2002-03, there was a drop from 5.8 per cent to 5.4 per cent. In 2003-04, although in physical terms, the budget increased, in percentage terms, it was lower than what it was in 2001-02. It means, from 5.8 percent, it came down to 5.7 per cent. In 2004-05, it was at 4.9 per cent, though the total budget of the DRDO increased by about 300 crore over the previous year. In 2005-06, that is, in the current year, this has become 6.5 per cent. From Rs. 3,700 crore, straightaway there is a jump to Rs. 5,300 crore. We plan to keep the budget of the DRDO at over Rs. 5,000 crore”.

#### **Recommendation No. 4**

##### *Budget & Expenditure*

4.5 The Committee find that there is a steady decline in the percentage of R&D budget for DRDO out of the total Defence Budget which has come down from 6.17 per cent in 2002 to 4.87 per cent in 2004. The Committee also note that the amount allocated for R&D activities were not fully utilized during the years 2004-05 and 2005-06 because of non-materialisation of certain commitments against some projects/schemes. The Committee further find that the percentage spending on R&D activities to the Defence Budget is very low as compared to the advanced and neighbouring countries. The Committee are not satisfied with the reasons advanced by the Government for non-utilization of the allocated amount for R&D activities which is very meagre in comparison to the total Defence Budget and also very less in comparison to the budgets in other developed countries.

4.6 The Committee have also been informed that 8 to 10 per cent of the total DRDO budget is being spent on fundamental research. The Committee are not happy with the existing state of affairs of the utilization of fund for existing R&D activities in DRDO. The Committee feel that besides utilization of the budget allocated for R&D activities in DRDO, there is an urgent need for an increase in the total budget for R&D activities so that new and basic research work in DRDO could adequately be funded and the country's dependency on other countries in critical and high technology is minimized, thus enabling the country to become self-reliant in Defence production. The Committee, as recommended in their earlier Ninth Report (14th Lok Sabha), again emphasise that Defence Public Sector Undertakings and ordnance factories should have their in-house R&D centers so that the need to approach DRDO for small upgradation could be avoided. The Committee also desire DRDO to

facilitate DPSUs and ordnance factories to set up necessary infrastructure and technical know-how to establish and strengthen their R&D Centres in advisory capacity.

The Committee further desire that R&D budget should be at least 14 to 15% of the total defence budget of the country as more and more research and product development opportunities are likely to come India's way due to changed international scenario.

## CHAPTER V

### INDIGENOUS RESEARCH & DEVELOPMENT (R&D) ACTIVITIES

5.1 The Ministry of Defence promoting indigenous R&D in a written note submitted as under :—

“During last decade, advanced countries have instituted and progressively strengthened restrictive technology denial regimes. The idea behind these regimes and its successor Wassenaar Arrangement, is prolonging their technological superiority over developing countries. We are denied the newer technology till we develop it ourselves. It is imperative that we not only develop these systems and technologies indigenously, as per the requirements of our Armed Forces, but also effectively counter the attempts of the foreign arms vendors and their agents to disrupt indigenous R&D efforts.”

5.2 The Ministry was asked to give a list of projects which were developed on the request of user but after development, user refused to take the product. The Ministry supplied the following information :—

“Most of the major designed and developed systems by DRDO at the instance of users have been inducted into Services either through Limited Series Production (LSP) or direct order placement on PSUs to whom ToT was given by DRDO. Although in some cases the quantity ordered by the Services are not as per expected requirements. However, following are the projects, which were taken up but later refused by the user:-

Emergency Floatation System for MI-8 Helicopters:—

Project was sanctioned in 1994, at a cost of Rs. 75 lakh for MI-8 helicopters. IAF was negotiating with M/s FPT, UK for meeting its immediate requirement. Subsequently, as some airworthiness requirements were not being met by M/s FPT UK, IAF decided to import the system from M/s Kazan System, Russia. The development project was short-closed in the year 1998 at cost of Rs. 48 lakh. Presently, IAF does not have any requirement. The expertise and technology acquired out of the effort is being gainfully employed in development of Emergency Floatation System for the Advanced Light Helicopter (ALH).

#### Relocatable Balloon Barrage System:—

A mobile version of Balloon Barrage system for IAF was sanctioned in 1993 and was developed in March 1998 at a cost of Rs. 45.99 lakh. In June 1999, IAF informed that system was based on operational philosophy of 1980s. In 2002, IAF conveyed that the system would prove ineffective against attacking aircraft and due to changes in its operational philosophy/strategy, purchase of both the fixed as well as the re-locatable versions would have to be deferred/discontinued”.

5.3 The list of projects which developed on the specifications given by the user and later on user changed the specifications, resulting in delay and cost overrun in developing the defence items is as under:—

#### “Development of 30 mm Fair Weather Towed AD Gun System.

The project was sanctioned in Sept. 2000 at a cost of Rs. 17.70 cr. VCOAS in January 2001 said that the existing fleet of AD guns *i.e.* 40mm L/70 and 23mm ZU guns in the service are in good condition with a residual life of 10-15 years, further during 9th & 10th Plan these guns are proposed to be upgraded and after upgradation the characteristics of these guns will be superior than that specified in GSQR No.767. It was, therefore, decided that the QR for future AD gun should be reviewed as de-induction of the existing guns will start in 2015. Accordingly in May, 01 new draft GSQR was issued, which was entirely different from that issued earlier. In view of the change in GSQR, the project was short closed after spending Rs. 14.50 lakh.

#### Development of 30 mm Light Towed AD Gun System

The project was sanctioned in Aug. 1997 at a cost of Rs 9.85 cr. Since the scope of development work was entirely different as compared to what was planned for, if necessitated additional funds and extension of PDC to design/develop the system to meet the new QR in view of the change in QR decision was taken to close this project and Rs. 51.18 lakh was spent till the closure of the project”.

5.4 The Committee desired to know the reason behind several projects which were abandoned during the last 20 years after incurring substantial amount on them, the Ministry gave the reason as under:—

“DRDO analyses the reasons from time to time. Certain unforeseen circumstances like, technology denial, technological obsolescence,

change in operational requirements of the user, procurement of items by the user from other sources are some of the reasons for such events. However, we analyse the new project through Peer Review and Decision Aid for Technology Evaluation (DATE) Analysis before sanctioning of any project. Rich learning, facility creation, and skill upgradation happens even if for some reason the projects get delayed”.

5.5 On the Long Term R&D Planning and on Eleventh Five Year Plan, the Ministry has stated as under:—

“DRDO Plan *i.e.*, 11th Five Year Plan and Perspective Plan up to 2022 are under preparation. The first draft will be ready by Sep. 2006 and then interaction meetings will take place between CIDS, representatives from industries, officials from MoD and financial authorities. The final draft is expected by December 2006. The following parameters have been taken into account for DRDO Plan:

- (i) User requirements.
- (ii) Core competence of DRDO laboratories/establishments.
- (iii) Capability of participating industry.
- (iv) Interface with universities and academic institutions”.

5.6 DRDO is working through bipartite or tripartite Memorandum of Understandings. The current budget of DRDO for current year is sufficient to progress work on current projects and new projects being undertaken by DRDO. We have adequate expertise to carry out project activities. As regards progress on preparation of Perspective Plan of DRDO is concerned, we wish to state that initial inputs from Services have been received and all Chief Controllers are in the progress of finalizing discipline-wise plans in their respective areas. It may take about one year time to finalise the report. Budget will not be a constraint in our development.

5.7 In reply to a question whether it is necessary to set up R & D Centres in each Defence Public Sector Undertaking and Defence Ordnance Factory, the Ministry has stated as under :—

“It may be advisable for DPSUs/Defence Ordnance Factory to have their own Research and Development centres because of the following reasons :

- Interaction with DRDO may become easier when Transfer of Technology (ToT) is to be given to DPSUs/OFs.

- It may help in undertaking joint development by DRDO & DPSUs/OFs.
- It may help in “load sharing” for large volume of system support required by the Services in terms of minor upgradation & field support.
- It may also help DPSUs/OFs when they obtain ToT from Original Equipment Manufacturers (OEMs) of “Buy” Systems”.

5.8 On the question of what type of technical assistance is provided by DRDO, the Ministry stated as under :—

“DRDO provides technical assistance to DPSUs/OFs. They are having their own R&D centres. At present, DPSUs/OFs are concerned with producing 20-30% of their items indigenously developed by DRDO. BEL is having 30% of their turnover from DRDO items and spending 5% on R&D. Other DPSUs are also having their R&D units. They need to enhance this level”.

5.9 On the question how much time is taken for starting the production and constraints faced in terms of availability of funds after the completion of research, the Ministry stated as under :—

“The time for starting production of indigenously developed system depends upon the investment cost, user requirement and MoD policy for production by OFs/DPSUs and industries, so the time varies from case to case. In certain cases like Prithvi Missile system, it was a concurrent development and production. Presently DRDO is following policy of fabrication of Designed & Engineered (D&E) model jointly with PSUs. This reduces considerable amount of time required for production activities by Public Sector Undertakings”.

5.10 The Ministry was asked whether the DRDO is facing problem of co-ordination of various units involved in R&D work and the achievements of each unit/lab, the Ministry replied as under :—

“DRDO laboratories are having good co-ordination with other R&D establishments in the country. Research scientists share their knowledge, outputs and expertise through conferences, seminars, workshops and publications of research papers. As far as co-ordination within the DRDO is concerned, mechanism for knowledge management and knowledge sharing for various work centres has been started by implementing DRDO wide area Intranet “DRDO Rapid Online Network Access” (DRONA) with sufficient application software thereon. Moreover, the groups at various laboratories that deal with identical technologies have also been formed”.

5.11 On reply to a question pertaining to engineers in the Army who constitute approximately 15 percent of its strength and whether DRDO provides R&D support to develop the research capabilities, especially in base workshops and how these workshops can be developed as research centres for specific use of the respective forces, the Ministry replied as under :—

“Base workshops have been designed to provide maintenance services, which include repairing the defective equipment and machinery and install practices for preventive maintenance. These workshops are not equipped to undertake research work. One of the incidence of adding some innovative operational features is what at best can come from the Base workshop. Therefore, the workshop and laboratory should remain the separate entities”.

5.12 During oral evidence, a non-official expert expressed his views on use of base workshop as under :—

“.....It is perhaps not very well known outside the services that the Army itself, in the composition of its manpower, has over a lakh or one and half a lakh of Engineers in the Engineering corps, in the Electronic and Mechanical Engineering Corps; and in the Signal corps. This is true of other Services also. I want to make two points. First is a suggestion that it is necessary for the Services to do some Research and Development to explore the talent *i.e.* available with them. When you ask the Research and Development establishment to do some tasks, I think, you have to do a definition of quantity and quality. Instead of giving them 500 jobs to be done, many of which could well be done by the Services themselves, it would be appropriate if they concentrate on quality..... If a piece of equipment has already been inducted into the service, then its modernisation and upgrade must become the responsibility of the Service. With this the usable level of the force would be very high and a large number of things will be done to extend the in service life of the equipment”.

5.13 During oral evidence, on the question why there is non-availability of platforms and trial teams, the representative of the Ministry stated as under :—

“This must be understood in the right perspective. It is a problem that we face. For example, I am testing a Sonar on a particular ship platform. If certain modifications are asked for, I need time to do that. But, by that time that ship might have gone out on some exercise. So, I may have to transplant it on to another ship. Then, naturally you need some more time to handle that. It should be taken in that spirit. It is not an accusation”.

5.14 During oral evidence, non-official expert expressed his views regarding interaction of DRDO with other agencies as under :—

“After I came to the Parliament, I met Dr. Kasturirangan who is in Rajya Sabha now. Our ISRO is specialist in camera technology. However, he informed me that Armed Forces or the Ministry of Defence never approached them (ISRO) for any assistance in this field. I think when you are talking of intelligence required, then not only DRDO but they must cooperate with ISRO, BARC, etc..... About intelligence photography, ISRO is putting up satellites, and they are photographing it. But I do not think that this benefit is coming to the Armed Forces. I do not think that it is happening for them”.

5.15 During oral evidence, on the question of R&D by PSUs, the representative of the Ministry (BEL) stated as under :—

“.....In all our public sectors we spend a lot of money on our own research and development. For example, in Bharat Electronics, we spend every year 5 per cent of our annual revenue in our internal R&D. Out of our total revenues, if you see, in the last 5-6 years, 40 per cent of the revenue comes from products manufactured based on design and development done within Bharat Electronics. This year, *i.e.* 2005-06, 30 per cent of our revenue is coming from products manufactured based on design and development done in DRDO and the balance 30 per cent is coming from products manufactured based on Technology Transfers. We are increasing the manufacturing based on indigenous design and development”.

5.16 During oral evidence, on the question of R&D by DRDO for services, the representative of the Ministry (Navy) stated as under :—

“With the help of DRDO..... we have made a considerable progress on the electronic warfare systems. In Sonar systems from the last 5/10 years, we have stopped buying Sonar from abroad. Even in the ships we made in Russia, all those ships have been retrofitted with the Indian Sonar systems..... In all our aircraft which we have brought from outside, we have started putting Indian electronic warfare systems. In the Gorshkov Carrier, called Vikramaditya, which we are buying from Russia, we are sending many Indian systems there and we are retrofitting the Indian systems even on that ship”.



5.17 During oral evidence, on the question of R&D by PSUs , the representative of the Ministry (GRSE) stated as under :—

“In Garden Reach, we have started production of first anti-submarine warfare corbets. The steel has been developed by DRDO. We are now the first major users of this indigenous steel produced by SAIL. The entire electronics, weapons and sensors in that ship are going to be hundred per cent indigenous. The ship should be able to roll out in another 4 years’ time”.

5.18 During oral evidence, non-official expert expressed his views on ten-year old vision plan of DRDO on critical technology as under :—

“In 1992, the DRDO had worked out a 10 year old Vision Plan, which was ‘to transform the department into a leader of international class with mission to capture and retain commanding heights in critical technological area’. That 10 Year Vision Plan envisaged that in 2005, our self-reliance index will go up from 30 per cent to 70 per cent. We were importing 70 per cent so by 2005, the imports were to come down to 30 per cent. I do not know the amount that was sanctioned for this purpose. Those details would be available. Sir, after 10 years, the import and indigenous ratio has not changed”.

He also informed the Committee the adverse effects of import as under :—

“I want to give you a picture for tomorrow. We are spending 2.5 per cent of our GDP on defence today. Out of that, 18 billion dollars worth equipment is being imported. In 2050, if we continue to progress as we are doing now, 2.5 per cent of our GDP would mean 80 billion dollars expenditure on defence. It will mean 35-40 billion dollars of imported equipment. So, unless we take these steps on self-reliance, we shall be spending huge amounts on imports, with all other complications involved. If our country is to become a reasonably powerful state in terms of economy, technology and security, then we have to take steps right now to improve our self-reliance”.

5.19 During oral evidence, non-official expert expressed his views on the expected changing role of industry, as under :—

“The next is that currently we are organized like old Communist countries where R&D drives production. The DRDO designs and

give it to the industry to produce whereas it should be the other way – industry should be on the lead. Normally, in any other mature organisation, the contract is given to the industry to design and produce. They in turn call for certain research to be done and they ask the research organisation we will give you the funds to research and develop the industry since they have to deliver the research and develop for the industry since they have to deliver the users. Thus the user drives the industry and the industry drives the R&D designs an aeroplane and then the industry says, I know nothing much about it. The Industry today tells R& D to deliver the total proven design to them, when ready if the user has a complaint, the Industry expects R& D to fix it. Today, DRDO has already transferred LCA to the industry, regrettably HAL does not know much about the design of LCA. If there is any problem with the LCA, we, the Air Force ask the industry but they throw their hands up. The DRDO has washed its hands off by transferring the design to the industry and saying, 'here is the paper, you make it as per this'. So, it is only a half-mature aeroplane. Now, industry, very rightly, does not want to touch it because it is problem laden with the answers”.

5.20 On the production of Protective Clothing and Allied Technologies for High Altitudes, the Ministry stated as under :—

“DMSRDE, Kanpur based DRDO Laboratory developed textile items for Services like jackets, bags, trousers, rescue carrying bags; clothing systems and equipment for extreme cold/glacier region, like gloves sleeping bags; modernized tents/shelter for different uses and other heavy textile items, like shelter cook house, tent stations for missiles, mat and frame structure; and chiral materials.”

### **Monitoring of R&D**

5.21 About the existing mechanism available in the DRDO to monitor R&D Projects and assessment of work, the Ministry stated as follows :—

“DRDO has instituted several review mechanisms to monitor programmes and projects regularly right from their inception, with active participation of the Services, production agencies, academic/ research institutions, etc. There is an in-house apex level body called DRDO Research Council (DRC), chaired by the SA to RM to periodically review the progress of ongoing projects in all the labs / establishment Staff projects for Army are reviewed by the Vice Chief of Army Staff, twice a year. For all major programmes/

/ projects, there are multi-tier programme management boards, having representation from the Services, DRDO laboratories and in some cases from academic institutions and other national research laboratories.

Three-tier management and monitoring mechanism has been adopted for all the projects costing more than Rs. 100 cr. (CCS projects). In the case of mega programmes, inter-ministerial apex board has been constituted to manage and monitor it. We have apex management board, executive board, project monitoring & review committee and project review committee to monitor and review ongoing projects. These Boards and Committees are represented by the developers, users, production agencies, inspection agencies, financial authorities, senior scientists from similar organizations, etc. and they review and monitor projects periodically”.

5.22 The Committee wanted to know whether any scientific audit of the projects has been carried out in DRDO, the Ministry in a note stated :—

“There is no scientific audit of DRDO projects as such, however, we have the following mechanism in place.”

### **Feasibility Study**

The feasibility report precedes the sanction of Mission Mode (MM), Technology Development (TD) and Science & Technology (S&T) projects costing Rs. 2 crore and above. The report is prepared in a manner that it helps to identify and enable selection of suitable projects which can be successfully accomplished within the estimated cost and time and to promote self-reliance in critical defence technology.

### **Decision Aid for Technology Evaluation (DATE)**

DATE is a decision support tool for technology evaluation of R&D projects. The methodology incorporated into DATE specifically addresses the system development projects of DRDO. It facilitates systematic analysis of a project for its technology content and evaluation of feasibility in the context of technological expertise and facilities available in the country.

### **Project Peer Review**

All DRDO projects costing more than Rs. 2 crore have to be peer reviewed by an expert committee for their viability. The purpose of

the peer review is to tap the relevant expertise available outside the laboratory proposing the project within DRDO and elsewhere in the country. As far as possible, views of the perceived and beneficiary or the main stakeholder, in the outcome of the project are being incorporated prior to final formulation of the project. The Peer Review Committee (PRC) examines the necessity of the project and adequacy of the core competence of the laboratory proposing the project, proposed time, cost, other resources, approach, methodology, etc.

### **Post-Project Review**

Most of the DRDO projects are a response to a user need, and a key stage in concluding a project is to confirm that the project has, in fact, met the expectations of the user or all the requirements of TD/S&T. This step requires a mixture of process and communication, addressing the following questions :—

- Have all agreed outputs/deliverables been received by the client?
- Were they do the agreed quality?
- Are there any resulting obligations on the provider, such as warranties ?
- Are processes for handling intellectual property established and agreed, including for any future revenue ?
- Is there a clear communication channel for follow-up contact between the user and the lab/estt. This is particularly important if a dedicated project team had been established to run the project ?

Seeking this feedback as part of a broader structured assessment of user satisfaction”.

5.23 During oral evidence, non-official expert expressed his views on autonomy and R&D of Ordnance Factories as under :—

“..... Ordnance Factories do not have their own R&D and they cannot decide on their vendors. Hence, they are not efficient. They should have more autonomy. Give them more powers and make them autonomous. Like any modern organization, let them choose their own supplier and technology. Even with Rs. 10,000 crore of annual output they do not have R&D. Even small Indian firms have their own R&D. There is a genuine demand of ordnance factories to have more powers. Once you corporatise them, I think,

you should give them adequate powers. The total strength of the ordnance factories is two lakhs. A private sector is producing ten times more than what they are producing today. This is the kind of possible gains we can get in that case. They are not allowed to produce for civilian market and they do not know their strength. Unless you give them more powers, more autonomy, I think, situation will not be improving. I think, in ordnance factories there is very great technological power in India which is not exploited fully...."

#### **Recommendation No. 5**

##### *Indigenous Research & Development (R&D) Activities*

**5.24 The Committee understand that designing and developing defence weapons is perhaps the toughest task for DRDO. There are shortage of designers and engineers in DRDO. The Committee, therefore, recommend that DRDO should search for the technology and product within the country before conducting research on a new product, as it would not only save precious time and energy of DRDO scientists but also save lots of money to the Government, besides ensuring quick availability of product to the Armed Forces.**

**5.25 The Committee are given to understand among the three Services, only the Navy has design capability and it has due to this reason, the Navy is far ahead of the Army and Air Force in R&D and outsourcing, but they should have separate R&D of their own also. The Committee are confident after establishing their own R&D centers outsourcing will definitely increase. The Committee find it difficult to understand/analyse that DRDO or the Ministry of Defence could not initiate action to establish a separate in house R&D for each Army and Air Force. The Committee are of the view that Army and Air Force should also try hard to achieve the capability in design. The Committee note there is untapped source of large availability of technical manpower in the Army and its Base workshops, which are designed to provide maintenance services, including repairing the defective equipment and machinery and undertaking preventive maintenance. The Committee, therefore are of the view that the Ministry should explore the possibility of developing the base workshops as small research centres where talent of Engineers and technical staff could be utilized to modify the existing equipments and develop import-substitute products so that the precious time can be saved and this could lead to indigenization/outourcing.**

They should help in laying down users requirements as they are very well versed with the equipments/machines. They are concerned with the functional operation of the equipment.

5.26 The Committee note the problems faced by DRDO in the matter of non-availability of platform for trials of warheads for the Navy, as the ships go on exercises. The Committee feel that a better coordination between DRDO and Navy could easily solve this bottleneck and also cut short the time frame in development and testing of weapon system. The Committee, therefore, feel that Ministry should make concerted efforts in this direction so that testing and trial platforms may not be a problem any more.

5.27 The Committee note that surveillance equipments are being imported from Israel and other foreign countries. It shows dependency on other countries. Therefore, the Committee keeping in view the changed geo political scenario suggest that the Ministry/BEL must have an MoU with the private companies who have expertise in the area, or transfer of technology to produce these equipments in the country by Public Private Partnership in order to have self-reliance in this field. The Committee appreciate the measures taken by BEL in in-house R&D of its products resulting in large scale indigenisation of manufactured items. The Committee advice that other DPSUs will also follow the same model in the field of internal R&D product indigenization. It would be worthwhile for DRDO to tie up with other premier research organisations of the country like ISRO which have good expertise in camera technology.

5.28 The Committee also feel that, the country is heavily dependent on imported weapons systems for its armed forces which are some times disproportionately procured from a single country/vendor, which affects the budget. With changing geo-political scenario, the Committee feel that it will be prudent to take strategically firm steps towards ensuring greater production of weapons systems indigenously developed by DRDO/Defence Production Agencies and Indian private sector. The Committee are of the opinion that the Ministry of Defence should work out a firm and well planned scheme for providing viable economic incentives for manufacturing of indigenously developed products by the Defence PSUs, Ordnance Factories and Private Sector. For the success the Committee also desire that DRDO should closely co-operate with the universities and IITs in order to have skilled technical manpower and available infrastructure in furtherance of in house R & D for Defence products. The Ministry of Defence should directly fund as

per the requirement of the users to strengthen R&D in the private sector. The reason is that the fundamental research in sensitive areas is highly capital intensive.

5.29 The Committee feel that India should adopt model of R&D of developed countries like Russia, England, France, Germany and U.S., where any planned weapon system is developed concurrently by at least two private corporations and the U.S. Government pays them appropriate development cost. The products developed by these companies compete against each other and a production contract is signed with the successful company. The Committee desire that the Ministry should take steps for successful implementation of such a model, which not only provides private sector initiation participation in Defence R&D but also gives the country the latest and modern war gadgets.

5.30 The Committee understand that the country is spending huge amount of money to buy clothing for the use of Jawans in high altitude areas from foreign countries. Therefore, they recommend that DRDO should give more emphasis on design and production of clothing for our troops in high altitude areas, besides developing other weaponry. The Committee also feel that our military forces must be backed by an efficient industry, either from foreign suppliers or from the indigenous industry. The Committee feel that there is a lot of scope for private sector participation in this area. The research done by DMSRDE Kanpur should be passed on to the industry which in turn can do mass production for the services as well as civil and export markets. Mass production would in turn reduce cost also.

5.31 The Committee are given to understand that the ordnance factories do not have a system to prepare balance sheet in order to have an appraisal of their cost of products and materials etc. The Committee therefore, desire that Ordnance Factories should also prepare their Balance sheet on the line of Corporate. Total accounting system of DPSUs should go as per standard accounting system of Indian Council of Chartered Accountant. The Committee are also of the view that in order to make ordnance factories, more progressive, productive, competitive and financially viable, there is an urgent need to turn them into a Corporation and allow them to select vendors and to take decision in financial and R&D matters independently because in the competitive age they must have full autonomy in order to have level playing field.

5.32 The Committee are also given to understand that due to faulty production/certification of ammunition and incidents of fire, a large number of soldiers have died or been injured. The Committee, therefore, urge upon the Government to appoint a fact finding Committee to ensure to avoid recurrence of such incidents.

5.33 The Committee further note that DRDO has instituted several review mechanisms to monitor programmes and projects : like : DRDO Research Council, multilevel programme management boards, inter-ministerial apex board and project peer review etc. However, the Committee find that inspite of so many review mechanisms, a large number of projects get delayed leading to time and cost overruns. The Committee, therefore, feel that there is an urgent need to review the working of various scientific review mechanism themselves as they themselves may be the cause of delays in some cases. The Committee feel that review mechanism should have technical personnel which can really guide the research projects on technical matters. There can be staffed by senior scientists from different research educational organisations who have experience 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 feel that there is an urgent need to appoint R&D Council of DRDO from CSIR etc.



## CHAPTER VI

### EFFECTIVE INTERACTION WITH THE USERS

6.1 DRDO has created infrastructure and management structure to develop, manage and integrate high cost and high technology programmes and projects by pooling national resources and expertise available in academic institutions, R&D centres, public and private industries. DRDO has a strong partnership with about 40 academic institutions, 15 national S&T agencies, 50 PSUs, 39 Ordnance Factories (OFs) and 250 private sector industries. This has enabled the Organisation to minimize the effect of the sanctions and technology denials, which were imposed by the advanced countries from time to time.

6.2 On the question at what level the users interact with the research agencies at DRDO, the Ministry stated as follows :-

“Users interact with DRDO laboratories/establishments through the following mechanisms :

- Finalisation of GSQR.
- Joint funding of major programmes i.e. EW Programmes, Divyadrishti, Samvahak, etc.
- Multi-tier reviews at the top, middle and working levels.
- Trial of equipment/testing of systems, like flying of LCA by IAF pilots.
- Any change in GSQR or scope by users in consultation with DRDO.

Accordingly reasons for loss of time can not be fixed on one agency as such changes are dictated by threat perception”.

6.3 On providing the details on the involvement of the users, the Ministry stated as follows :-

“Various Boards/Committees have been constituted in major projects/programmes, which involve the users also. Like, DCAS is the member of Aero Engine Development Board; and VCOAS, VCNS and DCAS are the members of Guided Missile Board. LCA development programme is being closely reviewed by the

Governing Body and the General Body of Aeronautical Development Agency (ADA), CAS, CNS and CIDS are the members of General Body of ADA whereas CAS, VCNS, DCNS and DCAS are the members of Governing Body of ADA, DCOAS (P&S), DGQA, DGMF and ADGCV are the members of Steering Committee of MBT Arjun”.

6.4 On being asked about the difficulties being faced by DRDO while interacting with the users i.e. changing of GSQR midstream, long and extended trials etc., the Ministry in its reply mentioned as under:-

“After successful development and technical trials, the issuance of user trial directives, carrying out trials and final placement of indents/orders by users takes a long time.

- Often ASR/GSQRs are supersets of various latest technologies available in different foreign products combined together and, therefore, unrealistic for providing a complete or ultimate solution through development.
- Operational requirements drafted by user are in fluid state or open ended, therefore capable of multiple interpretations of specification. The same requires resolution through user participation.
- Indigenously developed product is subjected to prolonged exhaustive trial and evaluation, whereas imported products are not subjected to same evaluation but readily accepted, whereas performance of indigenously developed product may be as good. This can be corrected by intensive user participation in development and testing to enhance confidence in indigenous products.
- Change in user representatives during the development cycle, which sometimes result in changes in user perception.
- Changes in carrier vehicle platforms strategy and matching availability.
- Amendments to QR required by users during development stage”.

6.5 The Ministry also suggested the following measures to overcome the difficulties:

- “A select group of user rep may be nominated and associated with the project till induction of the equipment.

- Compulsory financial participation of users in projects will increase user involvement and end-use commitment.
- Amendments other than QR may be incorporated through improvement program on subsequent versions.
- Users should give indicative production number of the products being developed.
- There is need to identify a technical team of service people who could continuously interact and organize meetings at different regimental level with DRDO scientists.
- DRDO scientists should also be invited to participate in the technical seminars held at regimental level. This will help them appreciate the needs of the Services.
- Proper base lines and acceptance criteria including time frame to be decided between DRDO and Users at the stage initiation of project activities. Wherever the system is meeting the original GSQR, it should be accepted by the user and any further changes in GSQR/improvement in performance may be incorporated in next version of the system. Any substantial amendments to GSQR should be taken as Mark-II (and onwards) since it may amount to introducing new features in the product”.

6.6 During oral evidence, non-official expert expressed his views on users participation as under :-

“All Ordnance factories and defence PSUs must be given total freedom to upgrade their equipment, R & D etc. Secondly, DRDO needs to interact much more with the Services; more than what they are doing today. Ultimately, the Services only can tell them what is their requirement or acceptability of any equipment”.

6.7 On the question whether users should be involved in R & D, he informed the Committee :-

“Yes, certainly. Today, their interaction with the Services is very limited. It is not enough. A number of complaints I got from our officers were that they were being used by DRDO as administrative officers and not for development. Also, all GSQR for weapons systems should be done jointly by the Armed Forces and the DRDO together”.

6.8 During oral evidence, non-official expert expressed his views on users participation as under :-

“So, we have our own evolution process. We believe that we must come up with indigenous design of the next AJT. It is a matter of

perception. It is now possibly going through bureaucracy and the finance officials. Both are not experts. India is the only country in the World today where uniformed people are not in the Ministry, nowhere in the world you have a country where the uniformed people are not involved in decision-making chain of Ministry of Defence. Recently, the IDS has come in. But it is not a part of the Ministry. Minister leads the Ministry and you have the bureaucrats and the finance officials in the decision making chain of the Government. We, (Service HQ) are like a department working in a building elsewhere. Anything that we project they say, 'app chitti lik ke bejo'. This chitti gets into a file and it just remains there; it does not permeate further because that babu is busy with other files".

6.9 During oral evidence, on interaction with the user, the representative of the Ministry stated as under :-

"The problem is like this. It is there with almost every system. People get promoted, they get changed, and then the new persons come. This kind of problem is there in a live situation. Military officers who are involved in a trial team may get posted out or promoted. For DRDO, this kind of continuity is very much necessary because the person would understand the equipment better. With micro changes in pressure an aircraft would start behaving differently. It is only the pilot who has flown it earlier that would be able to notice whether there is any improvement. That is a kind of a problem. We have to live with it".

6.10 During oral evidence, also on the importance of interaction with the users, representative of the Ministry stated :-

"When DRDO came into existence, it was a must. Today the time has come that they need a re-look because end result of DRDO has been in spurts. Somewhere they have performed very well and somewhere they have performed well but the user satisfaction has not been that good, for which the user is also responsible. I say this because as on today we have 200 officers from the Army deployed and working with DRDO, but I am so sad about the performance of these 200 officers. The moment they go to DRDO, they forget the O.G. uniform and their performance is not satisfactory. Now in the Army Headquarters, we are wanting to change the system. We are wanting that all projects which are given by the user should be user-driven. A user must be the force which drives them. We will now nominate officers who will report

back to the user. They will work with DRDO, but they will continue to report back to user every quarter. Any modification, any injunction, any thought-process change in the equipment being developed or project being developed would be taken every three months to six months. Now, we are giving them a GSQR, and allowing them to produce equipment in which army officers are posted there on permanent basis for three years or four years. But their contribution has not been satisfactory. Therefore, the wrong end comes like the Arjun Tank. The wrong things are happening even after the user being there, and they have not contributed enough to ensure that they are pro-active. They do not take action before it happens. They also wait to let it go back, let it go to ranges and then come and tell us that: "Sir, we were thinking that it would go bad". We are also not happy with our own contributions to the DRDO. You are very right in saying that there is a need for DRDO to have a re-look at this, and re-look at the participation by the users".

#### **Recommendation No. 6**

##### *Effective Interaction with the Users*

**6.11 The Committee note the difficulties being faced by the DRDO while interacting with the user. Some of these difficulties are changing of GSQR midstream, long and extended trials which results in final placement of orders after very long time. The Committee also note that an indigenously developed product is subject to prolonged exhaustive trials and evaluation, whereas imported products are not subjected to the same evaluation but are readily accepted, whereas performance of indigenously developed product are equally good as the imported one. The Committee, therefore, recommend that users should promote the indigenously developed defence items in preference to the imported ones and there should not be major changes in GSQRs. DRDO should also follow concurrent engineering for development of the products on a case-to-case basis according to the circumstances or even they can have outsourcing to avoid the embarrassment and delay in production at all level. From day one users and manufacturers should be involved from top policy making decision to all other level.**

**6.12 The Committee note that the involvement of the users with DRDO/Private industry is very limited. Due to this, the final products lack the facilities and qualities as per technical and the requirement of the user. The Committee as recommended in their Ninth and**

Eleventh Reports of the Committee (14th Lok Sabha) further recommend that representative selected by the user, for a specific project should have adequate knowledge of the product to be produced and he must be involved at the conceptualization stage of the project on a permanent basis so that defects, if any may be rectified during production stage itself and delivery of the product to the user may not get delayed for a long time. In case, the user does not suggest corrective measures/improvement wherever necessary and the product is not developed as per GSQR, then the accountability may also be fixed on them in this regard. The Committee also desire that there should be compulsory financial participation of the users in the projects so as to increase user involvement.

6.13 For this purpose, the Committee recommend that the user should give its specification alongwith adequate project fund to DRDO for a system/product and the final or cut off date of development should be fixed by them. Manufactures should also be taken into confidence from the beginning for the success of the product. DRDO should create an environment more friendly with Indian Companies of loading their responsibilities. Usual research should be given to manufacturers – Government or private as the case may be. DRDO must off load a number of their responsibilities. DRDO should not think that private industry are not capable worthy of maintaining secrecy, lacking in integrity. They should shed their doubts. It should have certain supervisory responsibilities to monitor all major product developments as part of the service under their care and accountability. The Committee also feel that, as in other developed nations, a project management organisation or coordination Committee with representations from DRDO, user and production agency should be there and the funds should be provided in different stages after ascertaining the performance according to the parameters set up and agreed upon. The Committee, therefore, strongly recommend that it is essential to make fundamental changes in the organization, structure, monitoring method and in the funding pattern of DRDO with accountability to the user and to do work in time.

The Committee feel that once it has been decided to hand over a project to DRDO for development and production, care should be taken to avoid last minute major changes in its design etc and should invariable be inducted in the user service. While going in for any imports, it should be weighed as to what shall be the options available with the country in case of technology denial regime and in case of a war. Preference should always be given to indigenous development of technology.

## CHAPTER VII

### PROJECTS ABANDENED BY DRDO

7.1 The Ministry was asked to give the details of major projects which were undertaken by DRDO and later abandoned during the last 20 years. The Ministry replied as under :-

**“Airborne Surveillance Platform Project.** It was sanctioned in May 1997 at a cost of Rs. 10 crore with a PDC of 30 months as a concept demonstrator. Following the fatal accident of the AVRO aircraft on 11 Jan 1999 at Arrakkonam, the project was short closed in November 1999. The cost incurred at closure of the project was Rs. 2.145 crore.

**Cargo Ammunition.** The project was sanctioned in January 1998 at a cost of Rs. 16.35 cr. During the initial stages of development, it was felt that bomblet developed for Prithvi missile with certain modification can be adopted for Cargo system. However, this was not possible and design of bomblet and its fuze required total redesign and posted certain technological constraints. All the technological constraints were overcome and the design of 130 mm Cargo Shell, bomblet, bomblet fuze with SD element, packing system and ejection system were worked out. The project was short closed at the stage since PDC extension was not approved and expenditure of Rs. 2.78 crore was made.

**Technology Demonstration Programme for developing & GPS based system as an alternative to Fire Direction Radar.** The project was sanctioned in Aug 1999 at a cost of Rs. 12.20 cr. Two parallel methods, AGAPS and GPS, were worked out for Pinaka system, out of which AGAPS was found more suitable. Hence the project of developing GPS based system was short closed and Rs. 46.70 lakh was spent till that date.

**Development of 30mm Fair Weather Towed AD Gun System.** The project was sanctioned in Sept 2000 at a cost of Rs. 17.70 cr. VCOAS in Jan 2001 said that the existing fleet of AD guns i.e. 40mm L/70 and 23mm ZU guns in the service are in good condition with a residual life of 10-15 years, further during 9th & 10th Plan these guns are proposed to be upgraded and after upgradation the characteristics of these guns will be superior than

that specified in GSQR No. 767. It was, therefore, decided that the QR for future AD gun should be reviewed as deinduction of the existing guns will start in 2015. Accordingly in May 01 new draft GSQR was issued, which was entirely different from that issued earlier. In view of the change in GSQR, the project was short closed after spending Rs. 14.50 lakh.

**Development of 30 mm Light Towed AD Gun System.** The project was sanctioned in Aug 1997 at a cost of Rs. 9.85 cr. Since the scope of development work was entirely different as compared to what was planned for, if necessitated additional funds and extension of PDC to design/develop the system to meet the new QR in view of the change in QR decision was taken to close this project and Rs. 51.18 lakh was spent till the closure of the project.

7.2 The Ministry was asked to give details of projects in hand of DRDO, their status till date, and the projects running behind the schedule, the Ministry supplied the information as per Annexure – 'B'. The Ministry supplied the information on time taken for obtaining sanction in case of important CCS projects as per Annexure – 'C' and steps for sanction of CCS projects as per Annexure – 'D'.

#### **Recommendation No. 7**

##### *Projects Abandoned by DRDO*

7.3 The Committee note with concern that DRDO closed the major projects namely Airborne Surveillance Platform Project, Cargo Ammunition, Technology Demonstration Programme, Development of 30mm Fair Weather Towed AD Gun System and Light towed AD Gun System, after getting these sanctioned and incurring huge expenditure thereon. The Committee are not fully convinced with the reply of the Ministry that due to technological constraints, change in design and development and GSQR, the Projects sanctioned were abandoned, particularly in the case of Cargo Ammunition where the project was closed when all the technological constraints were overcome and the design of 130 mm cargo shell, bomblet, bomblet fuze with SD element, packing system and ejection system were worked out.

7.4 The Committee are of the view that before sanctioning of the project, at the formulation level itself, the Ministry with their users should have foreseen all the constraints scrupulously well in advance and all the techno, qualitative, design and development requirements of the project could have been completed. The



Committee are of the view that had the Ministry followed the concurrent engineering and development approach, the number of closed projects might have come down and infructuous efforts and expenditure made thereon could have been avoided. The project which has been overtaken by technical development elsewhere and not worth the extra efforts should not be undertaken by DRDO. The Committee, therefore, desire that there should be scientific, technical and concurrent audit of the ongoing project from an outside agency so that the kinds of situation that have come to the notice of the Committee do not recur. The Committee also desire that the Ministry should study the reasons, have a second look and take the advice of experts before closing down of any project in future so that the country may not be deprived of the intended benefits of the project envisaged.

## CHAPTER VIII

### PERFORMANCE OF PROJECTS

8.1 The Ministry was asked to furnish details of the major projects which have been plagued by long delays and are showing time and cost overruns. The Ministry furnished the following statement :-

“Major projects (with time & cost overruns) completed during the last ten years :

Project	Date of Sanction	PDC (Orig)	PDC (Rev)	Cost (Orig) (in cr)	Cost (Rev) (In cr)	Date of Closure
1. LCA (ADA) (Ph-I)	Aug. 83	Aug. 93	Mar. 04	560	2188	Jul. 05
2. Lakshya (ADE)	Sep. 80	Sep. 87	Jun. 94	17	30	Jul. 98
3. Nishant (ADE)	Oct. 91	Apr. 95	Mar 03	34	60.83	Oct. 05
4. Pinaka	Dec. 86	Dec. 92	Dec. 00	26.47	55.33	Feb. 05
5. MBT Arjun	May 74	May 84	May 95	15.50	305.6	Sep. 00
6. Panchendriya	Nov. 87	Nov. 93	Dec. 98	31.22	31.23	Feb. 00
7. Sagardhwani	Oct. 87	Jun. 91	Mar. 99	44.90	80.01	Dec. 00
8. AET	Sep. 87	Aug. 92	Oct. 99	12.51	24.43	May 02
9. Sarvatra	Dec. 92	Dec. 99	Dec. 00	17.58	22.80	Dec. 01

#### Ongoing major projects (with time & cost overruns)’

Sl. No.	Project	Date of Sanction	PDC (Orig.)	PDC (Rev.)	Cost (Orig.) (in Cr.)	Cost (Rev.) (in Cr.)
1.	LCA (Ph-II)	Nov. 01	Dec. 08		3301.78	
2.	Samvahak	May 99	Nov. 03	Sep. 06	108.90	
3.	Samyukta	May 94	Nov. 99	Nov. 07	1200.22	1336.00
4.	Sangraha	Jun. 95	Jun. 02	Dec. 06	491.97	
5.	IGMDP	Jul. 83	Jul. 95	Dec. 06	388.83	1771.43
6.	Kaveri	Mar. 89	Dec. 96	Dec. 09	383.00	2839.00

8.2 During oral evidence, when Committee desired to know what kind of mechanism should be there to make DRDO accountable, non-official expert expressed his views as under :-

“Sir, the Navy has best example. So why don’t we follow that? All major developments take place as part of the Service, under their care and accountability”.

8.3 During oral evidence, on accountability, the non-official expert informed the Committee :-

“The DRDO has a budget of about Rs. 3,000 crore. A decade ago, the budget to DRDO was allotted from the three services based on their projects with DRDO. Each service funded this project of DRDO. Through that process, they had a certain supervisory responsibility. The Chief could ask, ‘I gave the funds what about the product? Whereas for more than a last couple of years this has changed. DRDO draws their budget directly from the Government. So, they are answerable to nobody”.

8.4 During oral evidence, on the same issue of accountability of DRDO, representative of the Ministry expressed his views as under :-

“Whether it is MBT Arjun, whether it is going to be Akash missile or whether is LCA, for everyone of these projects, I am prepared to take the blame organizationally for the delay due to certain inability to assess in entirety all the technological complexities involved. But I also wish to assure this Committee that at the point of introduction it has a useful life appropriate to the product of this kind and the Services have appreciated this”.

8.5 During oral evidence, on various products, the non-official expert stated :-

“..... In a private sector, if your Indica car is not working properly then it will go off the market. He has to make it good. That is why, I do believe that the private sector, essentially because their work culture is a little different, has to be given some role in the Defence industry which, I believe, is happening today. It is a matter of survival for us. In the Government organisation, we have been trying for a long time.

8.6 The Committee enquired about the monitoring mechanism available with DRDO to check on projects delayed, the Ministry stated as under :-

“In early 80s, DRDO used to take projects which also involved *ab-initio* development of technologies and systems. The industry did

not have adequate infrastructure to support our programmes at that time. Such projects were getting delayed and since 1995, we have separated S&T projects from development of systems. Now the projects sanctioned after 1995 are not experiencing that kind of delay, which we experienced in case of high technology and high cost and complex systems. Our time estimates have also become more realistic now. We have regular review and monitoring mechanisms for periodically monitoring of our ongoing projects leading to checks in delay and cost over-runs. In this regard, many DRDO laboratories have also got ISO-9001-2000 certification for their quality systems. The slippages are due to technical problems and not because of negligence”.

**(i) Main Battle Tank (MBT) Arjun**

8.7 On MBT Arjun, the Ministry supplied the following information :—

“In March 1974, the Government of India accorded clearance for the development of an indigenous Main Battle Tank (MBT) in order to put India on the world map along with other countries capable of mastering the technology of designing and developing their own MBTs. DRDO was nominated to execute the mission.

The Chronology of Development is as under :-

Development of first prototype	—	November 1983
Development and production of next Series prototypes (12 Numbers)	—	November 1983 to 1992
Development and production of Pre-Production Series (PPS tanks) (12 numbers)	—	1992 to 1995
Production of another three PPS tanks	—	1995-1996
Rolling out of five Limited Series Production (LSP) tanks	—	07 August 2004
Five LSP tanks handed over to 43 Armoured Regiment	—	February 2005”

8.8 The Ministry was asked to give comparative table of production cost, features and capability of Arjun Tank with original and upgraded T-90 and T-72 Tank. The Ministry replied as under :—

“MBT Arjun is a 60 tonne class battle tank with state of the art optro-electronic power-packed control system, weapon management

system and high performance suspension. It is a product unique in its class specifically configured for Indian Army requirement. Unlike T-90 tank which was primarily built for Russian Armed Forces, adapted by Indian Army for certain specific roles, this T-90 is a 50 tonne class vehicle which does not have some of the advanced features of MBT Arjun. But it is an improved system over T-72 tank. A price comparison between the two tanks, therefore, will not be in order. However, it is important to know that MBT Arjun had a cost of Rs 17.20 crore per system from the production line and is Rs 6-8 crore cheaper than its contemporary system in the west. It is understood that T-90 tank is costing approximately Rs. 12 crore and is yet to be indigenised. Some of the salient features of the three tanks are given below :

*MBT Arjun :*

- Four men operated crew.
- 120 mm gun.
- 60 tons weight.
- Powered by 1400-1500 hp engine.

*T-90 and T-72 Tanks:*

- Three men operated crew.
- 125 mm gun.
- 50 tons weight.
- Powered by 780-1000 hp engine.

MBT Arjun firing accuracy is far superior to other two tanks. It has a second generation thermal imager and can engage targets at 2500 meters. Its 1400 hp engine ensures excellent mobility performance. It has capability to fire Laser Homing Anti Tank (LAHAT) missile from the barrel of the gun. Only T-90 tank has such capability. MBT Arjun has good export potential in African countries due to its superior features *vis-a-vis* contemporary MBTs."

8.9 The Committee desired to know the reason behind the cost escalation as the original cost of MBT project was Rs. 15.50 crore in 1974 which escalated to Rs. 306 crore in 2005. The Ministry submitted the following reason :—

"The original scope & requirement of 15 pre-Prod tanks was enhanced. 15 Pre-Production Series (PPS) tanks involving production cost of Rs. 110 cr. is included in the development cost. Accuracy of fire has been enhanced".

8.10 The Ministry was asked to provide the latest status and import content in MBT Arjun. The Ministry supplied the information as under :—

“Main Battle Tank Arjun is currently under production at Heavy Vehicles Factory, Avadi under the aegis of Ordnance Factory Board, Users have placed an indent for 124 tanks, out of which the production for the year 2005-06 is expected to be 15 Nos. The entire quantity of 124 Nos. is planned to be produced by March 2008. Power pack, Gunner’s Main Sight and Track are imported items, which work out to 58% of the cost per tank. The import content can be progressively reduced with increased production orders”.

8.11 The Ministry was again asked when the import content of the tank is 58%, how increased indigenous production can reduce import contents. The Ministry was also asked to give price comparison of Arjun Tank with T – 90 Tank.

The Ministry replied as under :—

“Indigenous Gunner’s Main Sight (IGMS) is an integrated gyro-stabilized sight consisting of thermal imager, laser range finder, and day sight with inbuilt fire control computer for ballistic computation. This system enables the crew of the tank to engage targets under static and dynamic conditions by day and night with enhanced hit probability.

Suitable indigenous power Packs are not available for application in MBT. Indigenous production of power pack through license production is feasible with enhanced production order for MBT Arjun considering the economy of scale. A project for development of indigenous power pack is planned in XI Five Year Plan. There are few vendors in the world who can manufacture gunner’s main sight. DRDO is developing indigenous gunner’s main sight. It is likely to mature and be available beyond 124 tanks. Indigenous track is in advanced stage of development. It will be available for Arjun production tanks beyond 124 Nos. Licensed production of the above items may be feasible with enhanced order quality for Arjun tanks and may result in reduction in import contents. T-90 is a forty-ton class tank. It cannot be compared with MBT Arjun in terms of lethality power and protection. The present cost of MBT Arjun is 16.80 crore. The production cost of T-90 is being ascertained from Ordnance Factory Board”.

8.12 During oral evidence, on the quality of Arjun Tank, the non-official expert informed the Committee :—

“..... I am afraid our quality control is very poor I have heard that fives tanks were presented before the media, however, when the media and other people went away, the tanks were put back in the factory because still some quality checks had to be made. The biggest problem in India in respect of defence production is quality control. If China can do it, why can we not do it ?”

8.13 During oral evidence, on the certification of MBT Arjun, the representative of the Ministry informed the Committee :—

“..... Arjun is certified by DGQA. The responsibility of Arjun certification is not with DGQA and still it is with DRDO themselves”.

“These 124 tanks which have been ordered for production by the Army, are produced in the Ordnance Factory. We have given clearance for the Ordnance Factory to do internal QC. This is only quality control. Then, the overall AHSP, that is, Authorised Holder of the Sealed Particulars continues to be with DRDO till certain maturity level is reached in production. Now, DGQA is participating throughout in the inspection. They are not AHSP. They will become AHSP only after DRDO gives the documents to them. Then, they become the ultimate authority for the sealed particulars. Today, sealed particulars are held by DRDO. DGQA is fully involved in inspection”.

8.14 During oral evidence, on the production of MBT Arjun, the representative of the Ministry informed the Committee :—

“After we took over the production from the DRDO first year we decided to deliver five tanks. These tanks were delivered last year. This year we are delivering 15 tanks more. Now 14 tanks which we had promised are ready. But while the tanks were handed over to the Army, they went for an extensive user trial. Now in the user trial some minor defects were noticed and these defects are being rectified one-by-one. Now the corrective actions which are required are expected to be completed by January this year. After this corrective action, further trials will take place. Now these are very small defects”.

8.15 Regarding the snag, he further stated :—

“Sir, we have driven them and for over 60,000 kms and fired more than 8,000 rounds. There was no problem. What happens is that in the gun control system, there are power amplifiers which are used in the fire control system. Some temperature settings were not properly done by the parent company. These were tucked inside. As you know, now-a-days, the deck is packaged so densely even to get access to that you have to take out the whole module. So, when this type of settings get disturbed, the rule says that one has to go through the whole qualification process again. There is no change in the design. It is a temperature re-setting which was got done. That has been rectified. Now the tanks would be there by the middle of January”.

8.16 During oral evidence, on the problems faced by MBT Arjun during trials, the representative of the Ministry apprised the Committee :-

“In the Arjun, we got into a little bit of a problem because certain temperature-setting switches were not tuned properly. They had to be returned. Yes, this was a problem of the Defence Research Scientists who have not seen that 60 degree setting was not kept at 60, but at 55 which is a normal standard of that company which supplied those parts follow. But we had in the prototype modified that for the 60. so, this had to be done. Once this got done, now we are ready. So some of these productions hiccup if they do take place in the initial phase, they should not dispirit us because whenever we do new products like that, we may face these kinds of problems”.

8.17 During oral evidence, on the status of MBT Arjun, the representative of the Ministry informed the Committee :-

“.....The MBT Arjun started off with a 110 mm gun but at the point of delivery it is already featuring 120 mm gun the state-of-art. We started off a rifled gun for which there was no missile which could be pushed through that. But we have now identified that missile which can be fired through that. Similarly, we have built in certain electronic package as part of our processing, computing power within the tank which will allow us to network into the future”.

8.18 During oral evidence, on the production of MBT Arjun, the representative of the Ministry informed the Committee :-

“.....I want to tell you the roadmap of MBT Arjun as an hon/ Member had asked about this issue. I want to assure you



that after these 15 tanks are tried by the Army, the DRDO will be involved only for 15 more tanks. As soon as the Ordnance Factory produces these 30 tanks, the DGQA will take over the responsibility for giving technical clearance – which DRDO is doing today – and the links will be broken. Thereafter, it will be entirely the Ordnance Factory production, and the DGQA will be responsible for its certification. Hopefully, this situation will remain till DRDO does some more research and makes a Mark II of Arjun Tank. If they decide to do that, then, again, the Government will start, but that will be only after producing 124 Tanks and not before that. We will produce 124 Tanks, as the Army has accepted and told us to produce these Tanks”.

8.19 The Ministry further stated :-

“As of now all the 124 MBT Arjun production tanks is planned with M/s MTU engine integrated with M/s Renk Transmission of Germany as a power pack. The cost of MTU power pack (Engine & Transmission) was Rs. 5.2 crore, as per the last ordered price during mid-nineties. The features of MTU engine are as follows :-

- Built on modular concept.
- 1400 hp with V 90, 10 cylinder.
- Turbocharged and water cooled.
- Made of light weight aluminum alloy with built in safety features.
- State of art cooling system and Air cleaning system to withstand hot and desert environmental condition.

T-90 Tank is fitted with 1000 hp Engine. The cost of T-90 (engine and transmission) is Rs. 2.15 crore as ascertained from Ordnance Factory Board (OFB).

It is proposed to take up a project on “Development of 1500 hp Engine” in the XI Five Year Plan. Preliminary design work has already commenced.”

8.20 On the requirement of Tanks by the Army and the present position of orders received from the Army for Arjun Tank and also time schedule to deliver the same, the Ministry replied as under :-

“Total requirements of Army is about 3500 tanks. Army has placed an indent for manufacture of 124 MBT Arjun. Heavy Vehicle Factory (HVF)

Avadi, a constituent unit of Ordnance Factory Board (OFB), has set up exclusively for Main Battle Tank (MBT), Arjun an assembly bay that has just started functioning. Once the activity picks up speed in this facility, HVF is confident to produce 50 Arjun tanks per year from the year 2009 onwards subject to continuous requirement by the user. T-90 tank is also being produced in the same factory under a separate production line."

### **Recommendation No. 8**

#### *Performance of Projects*

8.21 The Committee note that scores of projects with DRDO were plagued by time and cost overruns and several projects were short closed due to change in the GSQR by the user or due to technological obsolescence. Some of the projects are showing significant time and cost overrun. The Committee are of the view that the delays in development of weapon systems, MBT Arjun, LCA II, Samvahak, Samyukta, Sangraha, Integrated Guide Missile Development Programme *i.e.* Prithvi, Akash, Trishul, Nag and Agni, Kaveri Engine for LCA etc not only has caused significant loss of revenue but also delayed the timely procurement of weapon systems from foreign sources that were needed to keep the forces fighting fit and modernised. The delays cause suspicion on the capability of DRDO in the eyes of the users, the common man and intelligentsia. The Committee do understand that not every equipment can be developed by DRDO. The Committee, however, desire that prior to taking a decision on the development of a weapon system, DRDO should sharpen its foresight, whether it could develop it within a fixed time frame and with available financial and technical resources or not.

8.22 The Committee feel that DRDO should lay more stress on the Project Management as in the Western industrialized countries, where the R&D agencies only design and develop armaments technologies and the military, as the user agency, has the highest stakes in such weapon development projects, because it contributes directly to their operational capabilities.

8.23 The Committee are of the opinion that DRDO being the prime development agency for almost all type of research, cannot absolve itself from the responsibility for inordinate delay in the important project like LCA and Kaveri Engine and also of creating credible deterrence capabilities for Indian Armed Forces by developing technologically superior weapon systems. The Committee

keeping in view of the fact that weapon system face obsolescence very fast, desire that DRDO must concentrate and focus on augmenting basic science and technological out put to be at par with the other developed countries. The Committee also desire that DRDO should enter into joint venture/collaboration with Indian Private Industry or the foreign partner where it does not have capability to design and develop. The Committee also desire that Ministry must ensure to minimize the gap between the project initiated and sanctioned.

#### Recommendation No. 9

##### *Main Battle Tank (MBT) Arjun*

8.23 The Committee are perturbed to note that the Government of India accorded clearance for the development of an indigenous Main Battle Tank (MBT) Arjun in May 1974. Even after the lapse of more than 32 years, the nominated agency of DRDO could not execute the mission so far. Inordinate delay has escalated the original cost of MBT project from Rs.15.50 crore in 1974 to Rs. 306 crore in 2005. The Committee are surprised to note that neither the execution agency of DRDO or the certifying agency Director General Quality Assurance (DGQA) are taking responsibility for the inordinate delay and quantity in production of MBT Arjun. Out of 124 ordered for tanks by the users, only 15 tanks have been produced by the Heavy Vehicle Factory, Avadi.

8.24 Total requirement of Army is about 3500 Tanks. Army has placed an indent the manufacture 124 MBT Arjun and Arjun assembly has just started functioning. The Factory will produce 50 Arjun Tanks per year from the year 2009 onwards subject to continuous requirement of the user. Users should be empowered to certify the products produced by the ordnance factories. The Committee also like to be apprised how they will comply the demand of the user.

8.25 From the foregoing the Committee are very much concerned and strongly feel that over the last 40 years, DRDO has put efforts on R&D and also in manufacturing but still it has not been capable of mastering the technology to fulfil the goal of self reliance designing and developing their own MBT Arjun. It has not been able to deliver the goals of self-reliance as promised by it to the nation. It seems that DRDO can deliver successful results only when it enters into joint venture/collaboration with a reliable partner.

**8.26 The Ministry of Defence should think seriously as to how to comply Arjun's requirement in a time bound manner with the help of private Industry – joint ventureship or otherwise.**

**8.27 The Committee, therefore, stress that DRDO must concentrate on augmenting in technological output to be ahead with the other developed countries and in order to put India on the world map capable of mastering the technology.**

**(ii) Design and Development of Kaveri Engine for Light Combat Aircraft (LCA)**

8.28 Light Combat Aircraft (LCA) is a multi-role fighter aircraft being indigenously designed and developed to meet the requirements of the Indian Air Force. It is being designed as a light weight aircraft incorporating advanced technologies such as unstable aerodynamics to provide higher agility. All the state-of-art technologies such as digital fly-by-wire flight control system, advanced avionics, multimode Radar, composite materials for primary structures including wing and high performance engine are incorporated to meet the long term operational requirements specified by the IAF. The Programme is managed by the Aeronautical Development Agency (ADA).

8.29 The Ministry was asked to give details about the likely date of induction of LCA in the Forces and whether the delay in induction of LCA has adversely affected modernisation process of the IAF, the Ministry replied as under :—

“LCA Phase I of Full Scale Engineering Development was completed in March 2004 whereas, LCA Phase II of Full Scale Engineering Development is progressing and would be completed by Dec. 2008. It has about 25-30% import content. The LCA features very advanced concepts of combat warfare systems and avionics.

LCA is expected to be inducted into Service in the Initial Operational Configuration (IOC) by 2008 and the Final Operational Configuration (FOC) is likely to be achieved by 2010. Delay in the LCA development programme is being closely reviewed by various review committees, like Governing Body of Aeronautical Development Agency (ADA) and the General Body of ADA. The General Body of ADA is presided over by the Hon'ble RM and has various Secretaries, Chiefs of IAF, Indian Navy, etc. as members. The last meeting of General Body of ADA was held in Dec. 2005. IAF only can state the possible impact of delay on modernization exclusively due to LCA”.

8.30 Not satisfied with the reply of the Ministry, the Committee enquired further and desired to know precisely the reasons for delay and whether any responsibility fixed for this, the Ministry stated as follows :—

“The original PDC of LCA (Phase I) was not 1983. Sanction was accorded in August 1983. The original cost estimates of Rs. 560 crores was prepared with a clear understanding that cost would be revised after Project Definition Phase (PDP). PDP was completed in 1988. Full Scale Engineering Development (FSED) Phase-I was sanctioned in 1993 with a PDC of 1998. The scope of FSED Phase-I was revised in 1998 with 2 additional aircrafts with a PDC of 2000. FSED Phase-I was completed in 2004 with no cost overrun. The reasons for delay involve a complex interaction between various factors that are listed below:—

- Revision of development strategy by increasing indigenous content in aircraft and ground facilities due to lack of FE.
- US sanctions imposed in 1998.
- Re-designing of composite wings to cater for weapon definition changes specified by Indian Air Force (IAF) during January 2004.
- Extensive on-ground evaluation, simulation and testing of indigenous equipment, systems, software and aircraft.
- Extensive Independent Verification & Validation (IV&V) of complex air borne software to ensure flight safety.
- Coordination and integration effort by many work centres to type certify indigenous equipment/system”.

8.31 The Ministry further stated:—

“FSED Phase-II of Tejas Programme is progressing satisfactorily. The following activities are being pursued:

- Manufacture of three Prototype Vehicles (PVs) (including Trainer Variant)
- Development activity leading to Initial Operational Clearance (IOC) and Final Operational Clearance (FOC).
- Transfer of Technology (TOT) to production agencies.
- Manufacture of 08 Limited Series Production (LSP) standard aircraft.

- Creation of 08 aircraft per annum LSP facilities at production agency i.e. HAL.

As on 24th May 2006, 530 flight tests (289 hrs: 05 minutes) have been completed utilizing 02 Technology Demonstrators (TDs) and 02 Prototype Vehicles (PVs). As of date, Initial Operational Clearance (IOC) is expected in 2008 and Final Operational Clearance (FOC) in 2010.

On 31st March 2006, 'Go-ahead' for initiating Production Phase of LCA Programme (concurrently with FSED Phase) has been accorded, with the signing of a Contract (between IAF and HAL) for initial induction of 20 Tejas (IOC) aircraft into operational service. The lead-time for production of first induction standard Tejas (IOC) aircraft is 37 months from 'Go ahead' and production of 20 Tejas (IOC) aircraft will be completed within 69 months of 'Go ahead'. Further orders for additional LCAs will be processed after completion of IOC".

8.32 During oral evidence, on LCA, the non-official expert informed the Committee :—

"DRDO, as an organisation, is fine, but the main problem is project management. For example, you have very rightly pointed out about the user's problems. Users are complaining. Why is the user complaining? It is because the user does not participate in the project. Now, LCA project is run by a committee system and the head of the committee is the Minister of Defence. When does the Minister have time to get into the technical aspects. The Technical Committee is headed by SA to RM. He is the boss of that programme and he himself is the chairman of the technical committee and he takes all the decisions himself. In other countries, for example, America they have 200 years of experience in running projects. A project management organisation must be formed by the users. For example, for LCA or for Arjun Tank for the Army, they should be user-driven where the user get the funds and he passes the money and say: 'within so much time you must perform and here is the money'. Then, the money flows in stages on proving at each stage: The cash flow stops if it fails at any stage. There should be review as to where they had gone wrong or whether they have expanded beyond the capability or whether the design is wrong. Therefore, the review should be done by the users who funds the project. Thus, the user should be a part of the programme the user is a part of the programme then how could they complain to the Government?"

8.33 During oral evidence, on LCA, the representative of the Ministry informed the Committee :—

“In the case of LCA, we brought a newer management concept. So, each one of these major programmes had slightly varying concept of management. It is a three tier management. One at the apex level, depending upon the value, it is headed by the Secretary or myself or sometimes by the Minister. In the case of ADA as an agency for the LCA, we have the Minister chairing the bigger Committee. Then, there is a middle level committee with the Vice Chief of the Service, then we have the working level committee with the Programme Director. Inherently, there is nothing wrong. These Committees are pretty sound. As I said, there is some amount of handing over because of the long gestation period. But I am sure, we have to necessarily go through these graduation for the first off systems. For example, the SP BHIM project of the self-propelled gun on Arjun, the whole project got executed in a matter of about 30 months. When you are in a position to execute a project in less than three years, there is absolutely no problem because people from all the three constituent units remain together because they are there as a part of development. It is only when change occurs, perceptions could differ. But, I am sure, all of us have matured over the years. We have understood the complexities involved and you will find this synergy taking shape better not only within the Ministry but even with our partners or vendors outside. Sometimes, they are impatient that they have developed some part and it is yet to be accepted”.

8.34 The Ministry supplied the following information on Kaveri Engine :—

“The project on ‘Design and Development of Kaveri Engine’ was originally sanctioned in April 1989 to Gas Turbine Research Establishment (GTRE), Bangalore at a cost of Rs. 382.81 crores with a PDC of 93 months. Government had approved revision of cost to Rs. 1386 crores and extension of PDC as Dec. 2004, which was further revised to Rs. 2839 crores with PDC Dec. 2009. While revising the cost, it was decided to execute the project in two phases, first phase for interim flight trials and to demonstrate reliability of the engine and second phase to demonstrate full performance of the engine.

The scope of the project is to design, develop, test and type certify the Kaveri engine to meet the specific needs of the LCA. Kaveri engine is an advanced technology, 80k thrust class, twin pool, low bypass (ratio) augmented turbofan engine.

The engine incorporates flat rated concept in order to compensate for thrust drop due to high ambient and high forward speed conditions. The engine will have Full Authority Digital Electronic Control Unit and a dedicated engine accessory gear box. Design of the engine, sub systems, and components have been completed and sixteen Kaveri engines have been fabricated with equivalent sets.

The basic light-up characteristics, aero-mechanical integrity, vibration signature of the engine have been established. The flat rating concept and wind milling starts have been demonstrated. Kabini (Kaveri Core Engine) has also been tested on the high altitude test bed in Russia where it was established that the thrust and fuel consumption performance were close to the design intent. As on date a total of about 1425 hour of testing has been carried out on these prototype engines. Jet Fuel Starter (JFS) systems for starting Kaveri engine has been indigenously developed with assistance from GTRE, Bangalore by HAL and is being integrated with Kaveri engine at GTRE, Bangalore.

Two version of engines are envisaged namely, K-9 standard engines for integration of first flight with LCA and K10 standard engines for final production and integration on LCA”.

8.35 The Ministry was asked how much amount was spent on the Kaveri Engine till date and the reasons for cost escalation, the Ministry replied as under:—

“The project has incurred an expenditure of Rs. 1459.79 Crore till date against the sanctioned cost of Rs. 2839 Crore. The reasons for cost escalation are changes in specification as a result of pre-review conducted by three reputed engine houses in the world, change in scope of work, redesign of component system, sanctions imposed by the United States, cost estimates was carried out in 1985 which is obviously non-realistic in today’s scenario, denial of testing time and slot by agencies abroad as per the requirement, lack of infrastructure for manufacturing and testing of engine in the country.”

8.36 When asked about the reasons for delay in development and integration of Kaveri engine and carrying out the mid-term review regarding development of Kaveri engine, the Ministry replied as under:—

- “Challenges of ab-initio engine development,
- Incorporation of cutting edge technologies,



- Effect of post 1998 US Sanctions coupled with delays in delivery of critical engine components,
- Design review of all critical systems by leading engine house in the world,
- Emergence of enhanced number of Hours of engine testing before first flight on aircraft, etc.”

Regular Monthly, Quarterly & Six monthly reviews are being done by Project Management Board, Programme Management Board and the Apex Board (AEDB) chaired by SA to RM. In addition special monthly review by SA to RM & CC R&D (AMS) and review by Dr. Kota Committee on integration on LCA are being carried out.

8.37 The following challenges were faced in the development of the Kaveri engine:—

- Decision of the overall thermo dynamic cycle of the engine to match required performances over the complete flight envelop.
- Decision on the overall lay out on various engine modules.
- Aerodynamic, aero-mechanical, combustion, structural integrity and related design procedures in each of the engine sub-systems.
- Conversion of the design intent into appropriate manufacturing processes and technologies and related quality control aspects.

All these aspects interact with each other in very complex ways to determine the success of the programme. The project was also delayed by sanctions and export control of critical components at various phases of the programme. However, DRDO in the past sought to utilize expertise from well-known engine houses through consultancy and testing agreements. As a consequence of improvements in indigenous design, materials and manufacturing capability and input from various consultancies, GTRE has demonstrated the operation of an engine which has performed at 100% of the design engine RPM and at about 80% of intended design thrust. The engine has also undergone simulated altitude testing and various aspects of its performances at altitude up to 15 km have been tested and demonstrated”.

8.38 When asked about the opinion of the users on credibility design and present performance of Kaveri Engine, the Ministry replied :—

“With the level of understanding thus developed for the design and manufacturing technology of the aero engine, it has been decided that a joint venture with reputed engine house could be attempted to hasten the pace of development of the engine to the full operating performance and safety requirements of the LCA. As a consequence, the engine has been evaluated by reputed engine houses in response to DRDO’s request for proposal and 3 reputed engine houses have submitted proposals for joint development based upon the existing Kaveri engine. These proposals are being technically evaluated”.

8.39 The Ministry was further asked to clarify how a joint venture with reputed engine house could hasten the pace of development of the Kaveri engine. The Ministry clarified as under :—

“The proposal in respect of consultancy on Kaveri engine has gone through technical evaluation. Consequent to technical evaluation, a reiteration of issues arising, has been raised to the companies. The clarifications are expected in one month’s time after which the projects negotiation committee can be conducted.”

#### **Recommendation No. 10**

*Design and Development of Kaveri Engine for Light Combat Aircraft (LCA)*

**8.40 The Committee also express their displeasure in the delay in development of LCA (rechristened as Tejas) which started in 1983, which is still showing time and cost overruns. The Committee note that even after 530 flight tests the LCA is years away from induction into IAF. The Committee also note that contract between IAF and HAL has been signed for initial induction of 20 Tejas aircraft into operational service. However, it could not be turned into reality so far due to delay in development of indigenous Kaveri Engine.**

**8.41 The Committee note the inordinate delay in the development of indigenous Kaveri engine to meet the LCA requirement. The project on design and development of Kaveri Engine was originally sanctioned way back in 1989 to Gas Turbine Research Estt. (GTRE) at a cost of Rs. 382.81 crore with PDC in December 1996. However, after spending 15 years, it has revised the PDC to Dec. 09 with an approximate budget of Rs. 2839 crore. The Committee also note that**

now DRDO is adopting concurrent engineering and joint venture approach in order to develop the Kaveri Engine. The Committee deprecate the delayed approach of DRDO to enter into joint venture with other company or Defence Public Sector Undertakings for development of this engine. Had it taken this decision earlier, till now the LCA would have become a reality with Kaveri engine and the inordinate delay and huge escalation in the revised cost could have been minimized. The Committee, therefore, recommend that the Ministry should take immediate steps to avoid further delay in the development of Kaveri Engine and time bound schedule for completion of this project may be fixed.

8.42 The Committee note that non-development of the engine and the long list of slip-ups in domestic production programmes has strengthened the need for a thorough assessment of the functioning of both the Defence Research & Development Organisation and the production agencies. The Committee also desire that Ministry of Defence and DRDO should address these problems seriously and take firm steps for development of Kaveri Engine for LCA by giving full autonomy to Aeronautical Development Agency (ADA) or by entering into collaboration/joint venture with the public private limited company which is favourable to avoid future loss with foreign partner without further loss of time.

8.43 Finally, the Committee are of the view that HAL and ADA may be allowed to develop their own leadership and separate organisation/institution/company independent of DRDO.

**(iii) Integrated Guided Missile Development Programme (IGMDP)**

8.44 During the Study Visit to Hyderabad when asked about the status of missiles being developed by DRDO, the Bharat Dynamics Limited replied as under :—

“Integrated Guided Missile Development Programme to design, development leading to limited series production of Prithvi, Akash, Trishul, Nag and a technology demonstrator Agni was undertaken in July 1983. Nag, Akash and Dhanush, naval version of Prithvi missile system are part of the Integrated Guided Missile Development Programme. The total investment under Integrated Guided Missile Development Programme is of the order of Rs. 1341.2 crores. Agni-I & II and Prithvi 150 Km range, 250 km range and naval version Dhanush have already been inducted into the Indian Armed Forces.

The missiles being developed under Integrated Guided Missile Development Programme are as accurate as contemporary missiles available in the world armoury. The flight testing during the development phase is a continuous process depending on the mission objective set for the particular flight test. Quantifying the success rate during the development phase may not be possible even when the mission objectives are met 100%.

The enormous data generated during the flight trials is used for the further improvements and flight tests. BrahMos missile system has established 100% accuracy to hit and destroy the target ships with high kill energy, during the trials”.

**(a) Akash**

8.45 Akash is medium range surface-to-air missile having range of 25 km. It has a multiple target handling capacity with digitally coded command guidance system. 35 flight trials have been conducted including guided flight against Electronic/Parabarrel/Nishant/Lakshya unmanned air vehicles as target. During last 7 flight trials, Command Guidance has been proved for the full duration. Multi-target engagement capabilities of Akash have been demonstrated in recently conducted flight trials. Akash missile system in Group Mode and Combat Configuration has been demonstrated and proved.

8.46 On being asked by the Committee, the major reasons for delay with respect to Akash, the Ministry supplied the following information :—

- "Akash Missile System uses state-of-art command guidance system using a multi-function phased array radar and against multiple targets. This, being developed for the first time, took much longer than anticipated.
- Realization of rocket ramjet propulsion system.
- User trials of Akash to be conducted only on T-72 based radar system from production agency.
- Non-availability of critical components, devices and sub-systems from import due to embargos”.

**(b) Nag**

8.47 Nag is a third generation anti-tank missile having ‘top-attack’ and ‘fire and forget’ capability. So far, 56 developmental flight trials have been carried out including 11 guided flights with Imaging Infra

Red (IIR) seeker in 'top-attack' and 'fire and forget' mode. Flight trials with day and night Imaging Infra Red (IIR) Seeker in top attack mode have been undertaken in Feb. 2003 and June 2004 successfully. All the mission objectives were met. These flights have established 'top attack' and 'fire and forget' capability of NAG missile system. Desert trials have been completed. Army has issued Acceptance of Necessity (AON). User trials phase – II are planned in December 2006/Jan 2007 and user trials for helicopter version (ALH) are planned in June 2007 to December 2007.

8.48 When the Committee asked the major reasons for delay with respect to Nag, the Ministry supplied the following information :—

- “Unforeseen technological problems encountered in development of IIR Seeker as homing seeker technology with real time image processing was realized for the first time.
- Realization of IIR seeker in adequate numbers as per the NAG development schedule.
- Major modifications in NAMICA configuration based on User feedback (after field trials).
- Non-availability of critical components, devices and sub systems from import due to embargo”.

8.49 The Ministry was also asked to elaborate realization of rocket propulsion system and the effect of import embargos on the availability of critical components etc. of Akash and Nag Missiles, the Ministry replied :—

“The propulsion system of Akash missile is based on solid fuel rocket ramjet, which has both booster and sustainer integrated. Only Russia and France are two other countries which have mastered such an efficient propulsion system and flown successfully. This engine has been perfected and successfully flown more than 30 times at all attitudes and manoeuvring conditions. The system is 100% indigenous with all raw materials, fabrication and integration processes being developed within DRDO and know how transferred to industries for serial production.

The missile system has performed excellently and all events starting from surveillance through detection of air targets, tracking them, assigning to launchers, evaluating the threat, identifying optimum launch automatic checkout of missile and auto launch. Multiple missiles have been guided to multiple targets simultaneously and

successful guidance followed by target destruction demonstrated a number of times. The development work on Akash missile system has been completed, the problems regarding realization of Rocket propulsion system have been overcome. System is ready for serial production and induction by Army and Air Force.

Nag missile system is the 3rd generation fire and forget anti-tank guided missile system which has hit targets accurately at various ranges both during day and night. System is ready for serial production at BDL and induction by Army”.

8.50 During oral evidence, on missiles, the non-official expert informed the Committee:—

“Look at our missile programme. There is not a single Air Defence missile as yet entered the Service other than the Prithvi”.

8.51 During oral evidence, when Committee desired to know what kind of mechanism should be there to make DRDO accountable, representative of the Ministry expressed his views as under:—

“There has been a delay but even with that delay, our Akash, our Nag, our Trishul have done pretty well in the recent trials. Yes, we have a problem. We have a problem because testing this missile is not easy. You need a kind of target and organizing for the target. So, repeatability and consistency is what Services want to be demonstrated. I am sure we will be in a position to do that. We will do a couple of more trials and demonstrate this consistently. They have not questioned basic performance and they want to be reassured that it is capable of being repeated. Once we do this, I am sure they will accept the Akash and Nag Missiles and we will get going. In fact, Nag has already been accepted”.

**(iv) Brahmos Missile**

8.52 The Parliamentary Standing Committee on Defence visited BrahMos Aerospace Complex and reviewed the concept and progress of Joint Venture BrahMos. JV is responsible for design, development, production and marketing of a most advanced Supersonic Cruise Missile. This Joint Venture between India and Russia signed in 1998, has resulted a technology collaboration between two leading research organization, DRDO from India and NPO Mashinostroyenia from Russia with 50.5% and 49.5% respectively as equity share and with sharing of

technology. The flexibility provided to the JV to perform and take decisions fast as a private company with same management culture, helped to put the scientific minds together to realize this system in a very short time. The BRAHMOS missile thus realized is the fastest operational cruise missile existing in the world today and can be launched from any type of platform—land, sea, sub-sea and air and precisely reach the targets either on land or at sea with high lethal effect. The missile has undergone twelve successive successful flight trials and has been inducted by the Indian Navy. Production is in progress for multiple ships of Indian Navy and in mobile launchers for the Army. The Air Force version has just been taken up for development.

8.53 Integration of multiple scientific institutions, industries, user services and inspection agencies of India and Russia from beginning of the project enabled the product to come to the global market as a BRAND item, well ahead of other countries. Superior product performance, cost effectiveness and availability in quantity attracted many countries to demand this product. Aggressive marketing is essential to take advantage of the competitiveness of the product.

**(v) Concurrent Engineering**

8.54 The Ministry was asked to state the projects where DRDO has resorted to concurrent approach in development and efforts being made by DRDO to encourage concurrent engineering. The Ministry replied as under:—

“Concurrent engineering leads to simultaneous progress of activities required in getting new products out to the users as quickly as possible. It has been identified as simultaneous engineering, parallel engineering, multi-disciplinary team approach and integrated product and process development. At present, DRDO involves industry during product development. For many complex products, DRDO follows concurrent engineering approach where industry is a major partner from the early stage of R&D and product development. DRDO has well-established procedure for Limited Series Production (LSP) where Indian companies are fully associated in various stages of product development. These companies are selected for the potential for absorption of technology, for the capability to carry out design and modification in design to suit the specific requirement, if necessary. During this process vendors get qualified through the process of evaluation and testing.”

**Recommendation No. 11***Integrated Guided Missile Development Programme (IGMDP)*

8.55 The Committee note that Integrated Guided Missile Development Programme (IGMDP) was sanctioned in 1983 to develop four missile systems, namely, Prithvi, Akash, Trishul and Nag in addition to the technology demonstrator—Agni. The Committee are constrained to note that the original cost of the project was Rs. 388.83 crore which has been now revised substantially and their probable date of completion which was 1995 has also been revised to 2007. The reasons furnished to the Committee for delay were—non-realization of state-of-art technology and non-availability of components and sub-systems. However, the Committee hope that DRDO will make all out efforts to overcome all the obstacles coming in the way of developing and completing these projects. The Committee again stress that DRDO must concentrate on fundamental R&D work and retain and augment its scientific knowledge based industry and simultaneously enter into joint venture with a capable company and also follow concurrent engineering approach where industry is a major partner from the early stage of R&D and product development. The Committee also note that DRDO has well-established procedure for Limited Series Production (LSP) where Indian companies are fully associated in various stages of product development. The Committee feel that the Ministry should give more emphasis on concurrent engineering in the R&D and product development, as the DRDO has adopted concurrent engineering approach only during the development of the project. The Committee hope that in future most of R&D projects would not get delayed and the country would get the benefits of the projects in time.

8.56 The Committee note that there is no scientific audit at any point of time of DRDO and its projects as such. However, the DRDO has the mechanism of feasibility study, design and technology evaluation, project peer review, post project review. The Committee observe that inspite of that, a large number of projects are showing inordinate delay and escalation of huge cost. The Committee, therefore, recommend that in addition to existing audit system, DRDO's projects must also be audited by external and independent audit group of experts duly approved by the Government of India. The Committee are of the view that this will facilitate the Government to understand the scientific environment, fundamentals in delays and to check the real growing cost and their over runs of the projects and contains the accountability of the DRDO and Ministry of Defence.



8.57 The Committee appreciate the Joint Venture model of BrahMos signed between India and Russia in 1998 which has resulted a technology collaboration between two leading research organisations of Russia, DRDO from India and NPO Mashinostroyenia. The Committee feel that this remarkable achievement in technology collaboration between two countries putting together their core competencies has given the message that DRDO can develop and lead to production of defence equipment in time satisfying the requirements of the Armed Forces, with less cost, if they resort to collaborative efforts in the form of Joint Ventures. BrahMos is a model joint venture, which needs to be followed by the Ministry of Defence to achieve competitiveness in the world arms market.

## CHAPTER IX

### RESEARCH ON STRESS MANAGEMENT

9.1 The Committee enquired about the facilities available for stress management and treatment of psychological problems of soldiers and officers. The Committee was informed:—

“All Command and Zonal military service hospitals have psychiatric treatment, both OPD/indoor. Further, Psychiatric Centres are located in the hospitals in the area of CI Operations like:

92 Base Hospital in Srinagar

155 Base Hospital in Tejpur

151 Base Hospital in Guwahati

Primary prevention is done by:

- (a) Stress management lectures given by Regiment Medical Officers (RMO) in the units in the field.
- (b) Officers, Non-commissioned Officers (NCO) and Religious teachers are trained as resource persons in separate batches at the psychiatric centres on short capsule course of one week to train them in identifying & managing stress in field.
- (c) Psychiatrists in the above hospitals conduct lectures on Stress Management on induction of troops for the first time in Counter insurgency operations.
- (d) Once the personnel are identified to be suffering from stress related psychological disorders they are removed from the work place and admitted in psychiatric centres for observations and management.

#### Secondary Level

- (a) After proper evaluation & diagnosis, psychiatrists attend to these patients with
  - Modern drug therapies
  - Psychological forms of therapy like psychotherapy sessions/Relaxation Techniques/Behavioural therapy/Religious therapies

- Sick leave to facilitate recovery
- (b) Re-evaluation and return to unit under sheltered employment.
- (c) Only those patients who do not recover after sufficient length of observation in sheltered employment are discharged from service.
- (d) More serious psychiatric illnesses like insanity are offered the best available treatment with modern drugs in the psychiatric centres and put under sheltered employment. They are retained in service as long as possible but discharged from service only when sheltered employment cannot be provided or the relapses are so frequent that they become a liability to service."

9.2 On further query on the soldiers released/retrrenched due to psychological disorders, the Ministry furnished the following data:—

Year	No. of admissions in Psychiatric Centres of Military Hospitals services	No. of Pers. invalidated out of	Percentage
2000	2709	457	16.87
2001	2763	345	12.49
2002	4514	522	11.56
2003	4432	538	12.14
2004	4982	443	08.89

9.3 On use of yoga/ayurveda/mediation and other Indian systems of medicines like the Kerala therapy in case of such problems, the Ministry stated:—

"Stress management techniques such as breathing exercises, mediation and yoga are actively being studied in the prevention of heart disease alongwith diet control and life-style modifications. The personnel who appear to be at high risk of heart diseases who are detected during annual medical exam are advised life style modifications to prevent the occurrence of such diseases. The modifications known to have positive effect are weight reduction for obese personnel, stopping of tobacco use, dietary changes, encouragement of exercises and stress management techniques described above. However, the role of yoga/ayurveda/mediation and other Indian systems of medicines including Kerala Therapy in curing heart disease has not been fully established."

9.4 During oral evidence, on the issue of treatment of personnel in border areas, representative of the Ministry informed the Committee:—

“Sir, I must humbly submit that the DRDO and our laboratories are too small an entity to look after the entire Armed Forces requirements. We are basically focused on such technologies or science which can be help to meet their need. Scaling up is the responsibility of the concerned Department”.

9.5 During oral evidence, on DRDO’s involvement in medical research and life sciences, the representative of DRDO informed the Committee:—

“In DRDO there are two aspects. One is the weapon system development and the other is to look into the needs of the men behind the weapon. So, the DRDO is mandated with these two charters. Our soldiers have to operate in extreme conditions, like high altitude, cold, desert, underwater, aerospace, low intensity conflict environments, NBC environments, etc. The DRDO is also mandated to see how to take care of the health of the normal soldiers, whereas the DGAFMS looks into the diseases and health care delivery. So, there is a clear demarcation. The hon. Chairman asked about the system in other countries. In the US, for example, they have Walter Reid Army Research Institute. Similarly, they have an Institute of Chemical Defence. Then, U.K. earlier had Defence Evaluation Research Agency, the DERA. In the weapon system the human factors have to be built into. Human factors, right from anthropometry, ergonomics, noise, vibration, toxic fumes, the safety of the soldiers are built into. So, it is not only for the medical. We are not doing pure medical research. It is a human factor research applied to the weapon system development. For example, if you want to design MBT Arjun we need to look at the coupola, what should be the dimension of the coupola, what should be the seat design, etc. Similarly if the soldiers have to operate in high altitude conditions, we have to develop ethnic population standards and how will they get acclimated.

He further stated that the next point is about high altitude. Take for example, in US they have altitude up to Pikes Peak, Alpine. So, we have signed an MOU with the US Army Research Institute of Environmental Medicine NATIC. The other Institute is in Kirghizstan. They have high altitude. So, we have already undertaken a study there to see the Hans Chinese population which is the Kirghiz. How do they match with our soldiers when they

are inducted to high altitudes ? So, we have taken both the groups after studying physiological, biochemical, psychological and clinical profile. Then we take them to high altitude.”

9.6 The Ministry was asked whether collaboration with foreign countries also being done in the above field, the Ministry supplied the following information :—

“India-UK Workshop on Stress Management during Military Operations was held in March 2000 in India and based on the deliberations, two areas were identified for collaborative research but they have not yet been implemented. The UK side has been requested to re-examine the areas and to explore the possibility of initiation of collaborative research. The proposals identified for research are as follows :

- Optimization of human work performance during military operations using ergogenic aids such as creatine, Composite Indian Herbal Preparation, dichloroacetate and glutamic acid.
- Evaluation of physiological effects due to sleep deprivation during military operations and amelioration of these effects through pharmacological and non-pharmacological intervention measures.”

#### **Recommendation No. 12**

##### *Research on Stress Management*

**9.7 The Committee are concerned to learn about the growing incidents of violence, suicide and killings by the overstressed Jawans particularly in J&K and North East. The Committee understand that human resource is not the job of DRDO, therefore, to manage the highly stressed environment, the Committee, desire that the Ministry of Defence should assigned this job to specialised association/bodies/organizations who have expertise in this area, and these organisations may be allowed to use the facilities created by DRDO. The Committee also urge the Government to implement at the earliest the recommendation of this Committee on Armed Forces Tribunal Bill, 2005 which in the opinion of the Committee would definitely help to reduce the stress among the Jawans and Officers of the Armed Forces.**

## CHAPTER X

### PRIVATE SECTOR PARTICIPATION IN DEFENCE R&D

10.1 It is mandatory that in a long term our country gets its defence needs, as much as possible, from within the country. The country should progressively graduate towards maximum Indigenisation and aim for total self-reliance with regards to the defence production. This will only be possible if we manufacture at least 70% of major defence requirements within the country. And, this will not be possible unless we develop our own manufacturing base and create our own technology bank.

10.2 Technology is to Industry what tonic is to the body. Without technology Industry cannot grow and cannot become self-reliant. No foreign business organisation would like to part with a critical technology because there is money in it and no country would like to part with a strategic technology because it has power in it. Even if they do part with it, there is a heavy cost attached. Further, there are embargoes and technology denials, which many nations impose and many nations face. We have been part of latter group many a times and the examples are not being put down here. Coupled with this is the whole issue of Technology management to include technology development, technology procurement, keeping a record of technologies available within the country, segregating technologies under heads like strategic/critical/general, segregating them under various industry groups, co-ordination, financing and similar other actions.

10.3 The fact is that the Technology particularly in defence industry is a national resource. It needs to be controlled, developed, coordinated and funded by a national body. Another fact is that no meaningful Indigenisation in defence can take place without a coordinated R&D effort in this direction. The country needs homegrown technologies for development.

Confederation of Indian Industry (CII) was asked how private sector participation can help DRDO achieving self-reliance in Defence production, they submitted the following information/suggestion:—

1. The private sector must be involved at the stage of conceptualization of the equipment itself by the Armed Forces and Ministry of Defence. This would enable the

Private Sector to put across the capabilities, which already exist in the industry or could be acquired by them through national or international Joint Ventures and Technology Tie-ups and consortium with DPSUs/OFs. The DRDO, therefore, can avoid reinventing the wheel. Once, the item has been decided to be developed in the country, DRDO as policy must associate select private sector companies at the initial stage itself as its R&D partners. This would eliminate the current difficulties faced by DRDO, while transferring the technology for bulk production. What is imperative here is identification of industry as 'System Integrators' by the Ministry of Defence based on their capabilities. These system integrators could be private sector, DPSUs or OFB or consortiums between them. Once these industries have been recognized and officially accepted as Systems Integrators (Champions) by the MoD, the DRDO must be given the freedom to select its R&D partners who have the competency to take on the project with DRDO.

2. The current practice of nominating a production agency such as a DPSU or OFB only by the Ministry of Defence must be dispensed with immediate effect. There were several cases wherein a private sector company developed equipment in partnership with DRDO but after successful development of the project, the Ministry of Defence nominated a DPSU or OFB as its production agency for bulk production of the equipment. This has resulted into discouraging involvement of private sector in Defence production in general and R&D in particular. As a policy, after successful development of the project by Private Sector with DRDO, the Ministry of Defence must treat the System Integrator as the production agency and orders must be placed on them.
3. The user involvement in the development of R&D projects is a necessity. While development of several large systems has taken place, over a period of time, the User's involvement has not been to the extent required. There is an urgent need to put in place a system, which could be based on the idea of 'Integrated Project Team' where all stake holders are brought on board.
4. In order to ensure continued commitment. Each stakeholder should contribute to the funding in the ratio of 75:15:10 among DRDO, Industry and User respectively. In case of development of products based on spin offs, the Industry

will be willing to partner with DRDO by contributing to the funding in the ratio of 50:50 between DRDO and Industry.

5. In case of Transfer of Technology for bulk production, DRDO as the nodal agency for development could have the IPR on the technology and charge royalty from Industry as per the existing Government procedures. Alternatively, DRDO and the company can form a new Joint Venture company wherein DRDO could have an equity participation to the extent of 26%. The objective is to convert DRDO Labs as profit centres.
6. With 30% direct offset of imports above Rs. 300 crores, announced in the offset policy by the Ministry of Defence recently, several technologies for defence production are expected to pass on to Indian Industry by the foreign suppliers, DRDO and System Integrators from the Private Industry should also be involved in any technology transfer which results out of the offset policy so as to ensure that relevant technologies are acquired, co-ordinated and managed for future development/upgradation of the equipment.
7. DRDO and the Systems Integrators (including private sector) should be involved in consultation while categorizing 'Buy', 'Buy and Make' and 'Make'.
8. The DRDO must have the freedom to associate with the Industry in developing technologies/products, which have great export potential. This must be enabled through a proper framework/guidelines. This would facilitate the optimum usage of the existing infrastructure held by the DRDO for development of various defence equipment, which could take India into the global defence market.
9. The Small and Medium Scale companies are the second and third tier, who provide raw materials and components to Systems Integrators. At present around 45% of the production work is outsourced to SMEs. The SMEs, because of their size do not have the funds to invest in the R&D. DRDO should take upon itself to provide the R&D backing to these SMEs. This could be done firstly by providing funds for development of the components for the project and thereafter ensure commitments of orders during bulk production stage. Secondly DRDO should acting as a



technology bank for SMEs in supporting their R&D requirements.

10. The DRDO at present interacts with more than 400 companies, however there is no formally published framework/guideline for partnership between the private sector and DRDO. CII recommends that DRDO must stipulate/publicise guidelines for industry participation in Defence R&D project to attract more Indian companies.

10.4 The Ministry was asked to explain the role of private sector and foreign company in Defence R&D Sector, the Ministry replied as under:—

“The role of private sector in the activities of DRDO has increased tremendously over the last 15 years. From being simple fabricator, nearly 300 private industries in the country are now able to carry out independently design, development and testing of sub-systems, modules and products. Within next few years, some of the industries will become even capable of integrating systems and delivering to users directly. We do not have policy of FDI in R&D but we can have joint ventures”.

10.5 The Ministry was asked how DRDO is coordinating/ synergizing the R & D efforts of public and private sector, the Ministry replied as under:—

“Under the Integrated Guided Missile Development Programme, wherever possible, public and private sector have been involved in the development. The integrated team is working for design and development of the various missile systems being developed by DRDO under the command of Project Director and Project Managers working at various work centres”.

10.6 The Ministry was asked further how private industry can help DRDO in speedy completion of projects and how DRDO can reciprocate in development of private industry as a whole in Defence Sector to make it larger player in the world arms market. The Ministry replied as under:—

“Development of defence systems is a multi-disciplinary activity. It involves active interaction among teams having expertise in specific technological domains. Besides coordinating and orchestrating the activities of various teams, one needs to have the wherewithal to physically realize the designs evolved. Here the infrastructure available with industry and their manufacturing

expertise would be of immense advantage. Involvement of industry at the development stage itself would speed up the subsequent up-scaling for production. Some of the other activities like job farm out are being assigned to private industry by the DRDO and assembly/fabrication of components are also being done by the private industry. This point has also been addressed by the Kelkar Committee which has been accepted by the Government.

Many industries, today have graduated into design and development houses. DRDO intends to outsource modules and subsystems to such certified (by DRDO) industries so that DRDO laboratories will develop only those, which cannot be done by industries. Such private firms become so versatile and professional that they can compete in global market and get international orders. Astra Microwave Products Ltd. and MTAR technologies are examples to quote”.

10.7 During the deliberations before the Committee, representatives of CII stated that they want to tie up with DRDO directly. In this connection, the Ministry replied as under:—

“Industries which would like to tie-up directly with DRDO for taking up R&D and product development activities including systems integration and check out, can register with DRDO as certified vendors, discipline wise. Some of them may be allowed to fund R&D so that eventually they get assured orders.

DRDO is already involving Private Sector by way of fabrication and development of contracts. Tie-up with CII will improve the availability of information on Private Sector to DRDO”.

10.8 The Ministry was also asked whether DRDO has made efforts to invite the private sector abroad for research work or for requisite technology transfer, it replied as under:—

“Many industries abroad have been associated with DRDO for product development, system integration, limited supplies and know-how transfer. For examples, NPOM of Russia for BrahMos missile system, AGAT of Russia for RF seekers, ELTA of Israel for radars, Sagem of France for Inertial Measurement units, etc. We have invited IMI, Israel for Trajectory Correction System (TCS) for Pinaka”.

10.9 During the oral evidence, on outsourcing, the representative of the Ministry informed the Committee as under:—

“As I mentioned to you, almost 60 per cent of our work is outsourced. It is not given as a direct grant. When it comes to

giving a direct grant, we are going through the Universities and all that, which roughly accounts for two to three per cent of our budget”.

10.10 On shareholding pattern, he stated:—

“All shareholders must invest in R&D. This is primary in areas where commercial technologies are not available. We have recommended later on that DRDO should really confine itself to those cutting edge technologies which are not commercially available already. In such projects, when they are undertaken, whereas we have proposed a model, where DRDO contributes 75 per cent, the industry contributes 15 per cent and the user also must have a stake and we have just given a recommendation that he should also contribute about 10 per cent so that there is a joint stake in success of these projects and a joint monitoring.

The other point we want to make is the DRDO labs which are really phenomenal in their width of technology available, they should operate on a commercial basis with the industry where the industry can get the advantage of laboratories and pay for the services”.

10.11 On export promotion he stated:—

“We propose the DRDO should have total freedom to select industry partners for exports. Here I am talking about a different topic altogether. That is for defence exports. We believe that when even very small countries, insignificant-sized countries like Israel can become major defence export powerhouses, we can do many times that much. But DRDO should, therefore, have a freedom to select the partners and this can be a selection out of the Ministry recognized system integrators and there need to be guidelines or a framework established for selection of such partners”.

“We need to have a global outlook which will provide sufficient scope for the public and private sectors. Often this fear has been expressed that if private sector comes in what will happen to the established capacities. We plead with you that look at the total scenario. As you mentioned, more than 50 per cent of imports are starting to be in place. Let us look at that as a major opportunity to give this country a very much bigger involvement in the defence sector – both private and public”.

10.12 During the oral evidence in involvement of private in fabrication, design and integration of system, the representative of the Ministry informed the Committee as under:—

“The general points have been brought out very clearly in the presentation made. He has presented a road map with which we agree. But I would like to highlight certain points before this august Committee. Today, our industries have grown in the defence sector. In 1980s, there were no defence industries from the private sector. The participation of the private sector started because of certain programmes launched by the DRDO. We not only started involving them for fabrication including design, but we also treated them as system integrators in certain areas like for engineering products, etc. All the bridges, combat vehicle products, super components of electronic warfare, many of the launchers, some parts of the Sonar Array, etc. are coming from the private sector industries.

We are involving nearly 400 industries from India for the DRDO programmes. But the main problem is we do not know the exact numbers to be produced after development. Nobody knows about it, and this is the crux of the problem. The private sector that participates with us in the development process is given a development contract, and they do not know the exact numbers that they have to produce once the contract is over. This is a big question before them. On the other hand, in other countries they generally specify the likely production at the time of formulating the project itself. It means that all the planning is done concurrently, so that the industry absorbs the technology along with development. This gives them the flexibility to produce as and when the demand is made to them. This sort of a situation has not been created in many of our programme. Therefore, this is one of the problems that we have to face today.....we have opened up eight laboratories to the CIL, we have told them that these eight laboratories belong to them”.

10.13 During the oral evidence, on involvement of private sector at conceptualization stage, the representative of the Ministry stated as under:—

“There are certain issues. It is very difficult to involve the industry or even the PSUs at the stage of conceptualization. When we come to the feasibility stage, definitely, we look at the capability of the industry to undertake development. It is the second stage where the industry comes in and not at the conceptualization stage”.

“The point was about the current practice of nominating production agencies such as DPSU or OFB only with the Ministry of Defence, must be dispensed with immediate effect. The policy in this regard is, whenever there are capabilities and facilities, that should be used. It is not a reality whether it is the Defence Public Sector Undertakings or the ordnance Factories, the capabilities which have been developed must be used keeping in mind the Government investments that have been in this direction. If the capability exists in the private sector, that would be used. There is nothing that the orders will not be given to the private sector if the capability exists there”.

10.14 During the oral evidence, on involvement of private sector in production, the non-official expert stated as under:—

“Besides ISRO and BARC, IITs can be called. They have got tremendous technological inputs which we are using.

How do you think PPP can be helpful for indigenisation of defence procurement? The big think is quality in the private sector. Normally, the quality of goods manufactured by private sector is better than that of Government as private sector has to sale its good in the market”.

10.15 During the oral evidence on financial involvement of private sector, the representative of the Ministry stated as under:—

“..... Now that there are a hosts of industries who have been groomed to a certain level of capability, the question is whether there is a possibility of a future development. We can look at the model where the DRDO invests 70 per cent, 20 per cent can be invested by the lead industry, whether a PSU or an ordnance factory and ten per cent from the services. It is not that we need money, but that brings in a focused attention of participation. Therefore, there is a greater sense of commitment in all the three to sit together and see through the success of the programme”.

10.16 During the oral evidence on the involvement of private sector in Defence R&D and Production, the representative of CII stated as under:—

“The first point is about the level playing field with respect to foreign suppliers. Today, there are three points, namely, payment terms, duties, taxes and tariff and no cost and no commitment. On payment terms, for foreign contracts, these are against line of

credit. Normally, payment is made against the bill of lading of FOB. In case of Indian vendors, payments are made on production of an inspection note and the confirmation that the customer has received the goods. This not only delays the payment by four to six weeks but also brings an additional agency into the picture. There are a number of instances when payments have either been delayed or denied for various procedural gaps.

Coming to duties and taxes, Indian vendors are loaded with excise, sales tax, octroi, as applicable whereas the foreign vendor is generally exempted from all the duties. Customs duty is exempted in all cases for defence imports, including for Indians. Further, no cost, no commitment favours the foreign vendors as they have ready-made products available. So, our recommendation is that to offer a level playing field, it is essential that either the Indian vendor's price should be taken without the duties during the tendering stage or foreign vendor should be loaded to the extent of the excise, sales tax and octroi as applicable. Further, as we discussed this morning, no cost, no commitment should be replaced by shared development cost.

My second point is that we have been requesting this. The Defence Department has a lot of training institutes. It is also the time for some integration between the industry and the armed forces. If our people or our officers could also be trained and if they can learn the experiences of the National Defence College or something like that through one-year course, it would be very helpful in understanding each other."

10.17 He further stated:—

"The other point is that if there is a company with a licence available for a particular equipment, it should be allowed to import items for R&D. Currently, after an RFP is given, it may be allowed to import those items. But in case of R&D, you need to do the R&D much earlier than the RSP comes out. So, if this point could be taken that once a licence has been given for an equipment, then for R&D's sake, sub-assembly should be allowed to be imported."

"We have had discussions in the past that on the Categorization Committee where decisions on buy, buy and make and make or made are taken, we wanted representation from the industry associations. The DPSUs and DRDO already represented on that Committee. But we were told that industry associations would not

be on that highest level Committee. The reason that we wanted to be on it was that to establish that if there was a decision to buy, we feel that the understanding of the knowledge of what private sector is capable of, is not there. There could be instances when a buy decision could be converted into a buy and make decision. Therefore, our recommendation is that if we cannot be on that committee, then at least let us have an option of hearing after a decision is taken so that there is still a possibility of private sector saying that they have the capability to do that.”

10.18 During the oral evidence on the involvement of private sector in Defence R&D and Production, the representative of BEML stated as under:—

“Sir, basically we are in three businesses. One is defence equipment making. We are in Metro and Rail including wagons and military rail. We are in the earth-moving and construction equipment. Today almost 60 per cent of our parts and aggregates are bought out through vendors, sub-contractors and sub-players. The critical components that we are really seized of, we are finding it difficult even to import where the private sector can work with us on a long-term basis because there are huge orders of about Rs. 4,000 crore on our kitty. We supply wheel sets for both Metro and Rail wagons and rail coaches. It is a great demand. We have ended up paying almost double the rate of what the Indian Railways could make. So, it is a great opportunity. Somebody can look at it. We are going to partner with them.

10.19 During the oral evidence on the involvement of private sector in Defence R&D and Production, the representative of Institute for Defence Studies and Analyses (IDSA) expressed his views as under:—

“I was emphasizing the point of having a perspective plan or at least long-term assured commitments. These are equally important or public sector and private sector without which they cannot amortise or recover their R&D costs. I would add that if this is not possible, then, of course, there is no choice to sharing the risk and cost of R&D expenditure because nobody can be expected, either public sector or private sector, to operate only on basis of national sentiment or charity.

10.20 During the oral evidence on the involvement of private sector in Defence R&D and Production, the representative of the Ministry of Defence expressed his views as under:—

“Currently roughly 55 or 50 per cent is the indigenous manufacture, that which is made by Ordnance Factories, Defence PSUs who in

turn outsource quite a lot to the private sector; and a little less than 50 per cent is what is imported to meet the requirements of the Services. ....It is a very highly interdependent world today. In fact the word self-reliance as used in the 1960s is no longer applicable today. It has undergone a paradigm shift. When we say a mechanical system is entirely built in India, it will still have somewhere between 16 to 30 per cent import content depending upon the degree of sophistication. I think we should not grudge that because that is the best way to get going. Initially it could be even lower at the prototype stage but at the production time it comes to 15 to 25 per cent or something of that kind. This way we can put systems quickly and efficiently into production."

### **Recommendation No. 13**

#### *Private Sector Participation in Defence R&D*

**10.21 The Committee note that DRDO develops weapons and equipment in response to the Qualitative Requirements (QRs) projected by Services based on their threat perceptions. However, at times, the QRs are formulated by incorporating/selecting the 'best features' of various systems available in the world, at that point of time. Many times, it is not possible to include these 'best features' in a single system, which are sometimes conflicting due to technology-compatibility problems. The reasons for this vary. These are : changes in threat perception, consequent strategy and tactics, advancing technology and introduction of new weapon systems, force the Services to make changes in the QRs, mid way in the project work etc. This necessitates redesign and redevelopment of some of the key sub-systems, causing time and cost overruns. Another related factor is the unexpectedly long time taken in extensive and extended user trials, which consequently increases the development time.**

**10.22 Though an endeavour is made by the Government to harness nation's best available expertise and infrastructure, this effort has proved to be inadequate in many cases. Moreover, indigenous industrial capacity does not exist for critical micro/nano electronic components and super components and advanced materials essential for development of a world-class weapon system, whereas, these inputs are available off-the-shelf in most of the advanced countries. Non-availability of critical components, delay in supply or additional time taken in indigenous development of such inputs, is another cause of "time-over-runs" in many state-of-the-art systems."**



10.23 The Committee, therefore, feel that it is high time to create an environment where both public and private sector grow together and the R&D effort should be synergized and coordinated in a big way to obtain and absorb capital investment or high technology from international partner outside. The Committee also desire that Ministry of Defence should provide level playing field to Indian private industry and allow Private industry to tie up with original manufacturers abroad to develop certain basic science and technologies based on requirements of the users as delay in production of indigenous defence items, extend benefits only to the foreign suppliers.

10.24 The Committee, therefore, recommend that DPSUs, Ordnance factories and private industry must work closely as a partner of each other and for the success of this DRDO should facilitate them. Even unexploited resources of IIT and his tech scientific universities knowledge based should be utilized to build-up defence capabilities. DRDO should allow these organisations to function independently if they so desire in collaboration with the user. For this purpose the Ministry, DPSUs and DRDO should sign bipartite and tripartite Memorandum of Understanding and enter into joint venture with Indian and International Partners in R&D and also in manufacturing to make use of already established industries in the world or basic components for designing and realization of hardware. The Committee also desire that DRDO should take initiative to provide greater role for IITs and Universities in the field of Defence R&D.

10.25 The Committee are also of the opinion that over the years the private sector has also graduated in capabilities and reach. Therefore, there is a need to emphasize on building an effective and fruitful public-private partnership in defence R&D and production on sharing basis. In order to ensure continued commitment, each stockholder should contribute to the funding in the ratio of 70:20:10 among DRDO, Industry and user respectively. In the case of development of products based on spin offs, the industry will be partner with DRDO by contributing funds in the ratio of 50:50 between DRDO and the Industry. The Committee, therefore, recommend that the Ministry of Defence should try to make provisions for direct funding of R&D activity in the industry, both public and private, apart from the provisions made for DRDO.

10.26 The Committee also endorse their views with the CII that inspite of the fact that DRDO interacts with more than 400

companies, there is no formally published framework/guidelines for partnership between the private sector and DRDO. The Committee, therefore, recommend that Ministry of Defence must stipulate/publicise guidelines for industry participation in Defence R&D in order to attract more Indian Private Companies. These guidelines should be flexible and change progressively as per the need of the hour.

10.27 The Committee note that the extent of investment made by the private industry as well as public sector in the R&D activity is very low and this has been a major factor restricting the country from acquiring sophisticated technology. Since R&D activities in defence requires heavy investments and the private sector does not have the capacity to invest, there must be a substantial government support for making the industry technologically more capable. It is disheartening to note that while most advanced countries are spending at least two per cent of the GDP on basic science and technology in universities and research institutions and the industries both in public and private sector across the globe are investing between 4 and 15 per cent of their turnover towards R&D. The private industry in India today has developed very high capabilities in engineering and has a reasonable capability in design; but its contribution to R&D activities is very low. Therefore, the Committee recommend that the Government must take initiative to encourage private sector to spend more on Defence R&D activities.

10.28 The Committee are of the view that to engage private industry, it would also be necessary to adopt the principle of acquiring minimum order quantity for technically and economically feasible viable proposals and it is also the responsibility of private sector to ensure quality as required by our defence forces. For the purpose the Committee are of the view that there is a need to get the demands of user services vetted through the Defence Acquisition Committee (DAC) so that users are committed to place purchase orders after the product has been developed.

10.29 The Committee are of the considered view that long and continued dependence on imported weapon systems can lead to the country supporting all legal and illegal actions of the importing country as crucial supply of spares and ammunition could be in jeopardy in future. Therefore, the Committee strongly recommend that there should be greater professionalism in integrated defence capability planning, management of Research and Development and more emphasis should be given to self-reliance, thereby nurturing the nation's industrial capability in defence sector.

10.30 The Ministry of Defence should take into confidence all highly performing scientific institutions in the country including DRDO, the future projections and requirement of the armed forces. It will help the Research Organisations and industry to plan their investment in research and infrastructure. Looking to the new and the changing warfare systems, some scientific organisations can work out how to reduce manpower and the marketing can take place. Till now we are working in conventional warfare. There is a need to make big shift in policy from conventional to strategic weapon system, from manufacturing to marketing and all nuclear and biological protecting environment. This will only happen after the strengthening of research organisations through appropriate investment, full autonomy and research should be decentralized. So, specialised laboratories should be established in the public private partnership. The Committee are fully aware of the budgetary constraints. With the limited sources how the capability of man and machinery can be efficiently used by developing basic science, fundamental technology or by analyzing the fundamentals.

NEW DELHI;  
09 January, 2007  

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19 Pausa, 1928 (Saka)

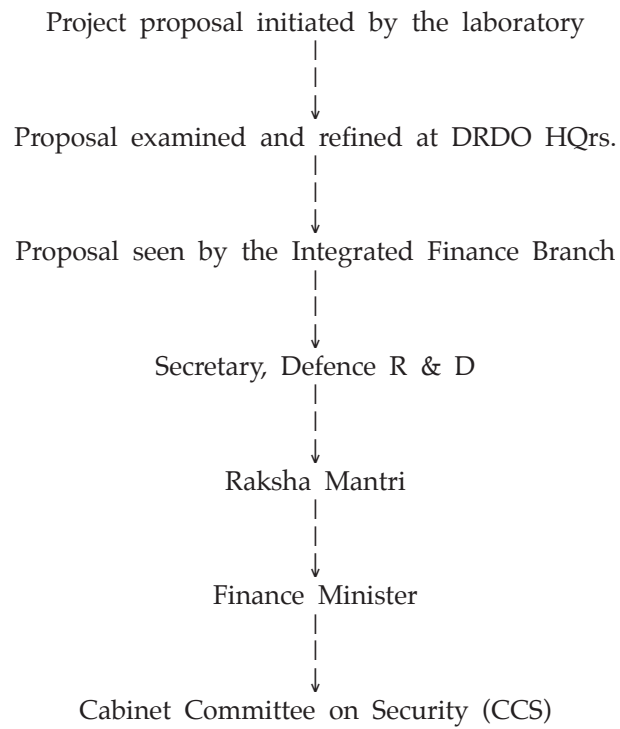
BALASAHEB VIKHE PATIL,  
Chairman,  
Standing Committee on Defence.

CHARTER OF DRDO

- Apprising, assessing and advising Raksha Mantri on the influence on National Security of emerging developments in Science and Technology.
- Rendering advice to Raksha Mantri and to the three Services and inter services organizations on all scientific aspects of weapons; weapon-platforms; military operations; surveillance; support and logistics in all likely threats of conflict.
- To function, with the concurrence of the Ministry of External Affairs, 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 whose export to India is the subject of national security related controls of foreign Governments.
- Formulation and execution of programmes of scientific research and design, development, test and evaluation, in fields of relevance to national security.
- Direction and administration of agencies, laboratories, establishments, ranges, facilities, programmes and projects of the Department.

ANNEXURE 'D'

STEPS FOR OBTAINING SANCTION OF CCS PROJECTS



## APPENDIX

### MINUTES OF THE FIFTH SITTING OF THE STANDING COMMITTEE ON DEFENCE (2005-06)

The Committee sat on Monday, the 10 October, 2005 from 1500 hrs. to 1700 hrs. in Committee Room No. 'C', Parliament House Annexe, New Delhi.

#### PRESENT

Shri Balasaheb Vikhe Patil — *Chairman*

#### MEMBERS

##### *Lok Sabha*

2. Shri Churchill Alemao
3. Shri A.V. Bellarmin
4. Shri Suresh Chandel
5. Shri Milind Deoa
6. Shri Ramesh Jigajinagi
7. Shri Suresh Kalmadi
8. Dr. K.S. Manoj
9. Shri Raghuraj Singh Shakya
10. Shri Manvendra Singh
11. Shri Balashowry Vallabhaneni

##### *Rajya Sabha*

12. Shri R.K. Anand
13. Smt. N.P. Durga
14. Shri Janardan Dwivedi
15. Shri Anand Sharma
16. Shri Lalit Suri

#### SECRETARIAT

1. Shri R.C. Ahuja — *Joint Secretary*
2. Smt. Anita Jain — *Deputy Secretary*
3. Shri D.R. Shekhar — *Under Secretary*

**Representatives of Ministry of Defence**

1. Shri Shekhar Dutt, Defence Secretary
2. Shri Dhanendra Kumar, Secretary (DP)
3. Shri Ranjit Issar, Addl. Secy. (I)
4. Smt. Sheela Bhide, FA (DS)
5. Shri Anup Mukerji, AS (DP)
6. Shri S. Banerjee, Additional Secretary (Acquisition)
7. Shri A. Sivathanu Pillai, CCR&D (MNS) Offg. Secy. (R&D)
8. Shri S.C. Narang, CCR&D (R&M)
9. Shri Alok Perti, JS (S)
10. Shri Ranjan Chatterjee, JS (HAL)
11. Smt. Rita Menon, JS (SY)
12. Shri Raj Kishore Mukhi Bhattacharya, JS (Coord.)
13. Shri R.K. Chauhan, Dir. (P&C)
14. Shri D.C. Bajaj, Adviser (COST)

**Representatives from CII**

1. Mr. Atul Kirloskar, Chairman, CII National Committee on Defence
2. Mr. Abhay Firodia, Member, CII National Committee on Defence and Chairman and Managing Director, Force Motors Limited
3. Brig. K.A. Hai (Retd.), Member, CII National Committee on Defence
4. Mr. Joseph Alexander, Vice President, Tata Services Limited
5. Mr. Rahul Chaudhry, Member, CII National Committee on Defence and Chief Executive Officer, Strategic Electronics Division, The Tata Power Company Limited
6. Mr. M.V. Kotwal, Member, CII National Committee on Defence and Senior Vice President, Larsen & Toubro Limited
7. Mr. S. Sen, Deputy Director General, CII
8. Mr. Vikram Badshah, Senior Consultant, CII
9. Mr. Suhith Haridas, Director CII
10. Mr. Rakesh Verma, Consultant, CII
11. Mr. N.B. Mathur, Director, CII

At the outset, the Chairman welcomed the members to the sitting of the Committee and informed them that the representatives of the Ministry of Defence and CII were present to tender oral evidence on the subject 'Public Private Partnership in Defence Production & its relationship with DRDO.'

2. The Chairman then welcomed the Defence Secretary, Chairman, CII National Committee on Defence and their colleagues to the sitting of the Committee and invited their attention to Directions 55 and 58 of the Directions by the Speaker, Lok Sabha regarding maintaining confidentiality of the deliberations of the sitting.

3. The representatives of CII gave a presentation before the Committee on the subject 'Public Private Partnership in Defence Production & its relationship with DRDO'. The representatives of CII stressed on the optimum utilisation of huge national resources and a consolidated approach in the matter rather than viewing industry as a public or private or a defence oriented industry. They also stressed upon the need to achieve synergy between recognised strength of DRDO in scientific research and development and the acknowledged strengths of private sector in successful bulk production keeping in view cost, time and quality in line with global practices.

4. Members of the Committee then sought clarifications on some of the points from the representatives of CII and Ministry of Defence such as steps to be taken to provide level playing field to private production houses, assimilation and development of technologies, involvement of private sector at the stage of conceptualisation of the equipment by the armed forces and the Ministry of Defence, etc. The representatives of the Ministry answered the queries one by one including the ten points raised by the representatives of CII in their presentation.

5. The Committee then sought to know from the Ministry officials what was their opinion on allowing the Private Sector to participate in taking advantage of the offset clause for manufacturing defence product and it should not be used for trade account. The Ministry officials expressed their willingness in providing the Private Sector all necessary cooperation in this regard.

6. The Committee desired that the Ministry should take advantage of CII in development and production of low level radar systems.

7. A verbatim record of proceedings was kept.

*The Committee then adjourned.*



MINUTES OF THE TWELFTH SITTING OF THE STANDING  
COMMITTEE ON DEFENCE (2005-06)

The Committee sat on Thursday, the 1 December 2005 from 1800 hrs. to 1940 hrs. in Committee Room No. 'D', Parliament House Annexe, New Delhi.

PRESENT

Shri Balasaheb Vikhe Patil — *Chairman*

MEMBERS

*Lok Sabha*

2. Shri A.V. Bellarmin
3. Shri Thupstan Chhewang
4. Dr. C. Krishnan
5. Shri S.D. Mandlik
6. Shri Manvendra Singh

*Rajya Sabha*

7. Smt. N.P. Durga
8. Shri Janardan Dwivedi
9. Shri Anand Sharma
10. Shri Lalit Suri

SECRETARIAT

- |                      |   |                             |
|----------------------|---|-----------------------------|
| 1. Shri S.K. Sharma  | — | <i>Additional Secretary</i> |
| 2. Shri R.C. Ahuja   | — | <i>Joint Secretary</i>      |
| 2. Smt. Anita Jain   | — | <i>Deputy Secretary</i>     |
| 4. Shri D.R. Shekhar | — | <i>Under Secretary</i>      |

**List of Witnesses of Ministry of Defence**

1. Shri Shekhar Dutt, Defence Secretary
2. Shri M. Natrajan, SA to RM
3. Shri K.P. Singh, Secretary (DP)

4. Shri V.K. Misra, FA (DS)
5. Shri S. Banerjee, DG (Acquisition)
6. Dr. V.K. Saraswat, CCR&D (M&SS) & DS
7. Dr. D. Banerjee, CCR&D (AMS) & DS
8. Shri Prahlada, CCR&D (SI) & DS
9. Shri K.U. Limaye, CCR&D (ECS) & DS
10. Dr. W. Selvamurthy, CCR&D (LS&HR)
11. Shri S.C. Narang, CCR&D (R)
12. Shri P.K. Jena, Addl. FA (J) & JS
13. Shri B. Rajendran, OSD to SA to RM
14. Shri Gopal Bhushan, SO to SA to RM
15. Shri Pushkar Raj, Addl. Dir. P&C
16. Ms. Nabnita R. Krishnan, Sc 'F'
17. Dr. J.P. Singh, Jt. Dir. P&C

2. At the outset, the Chairman welcomed the representatives of Ministry of Defence to the sitting of the Committee and invited them to brief the Committee on the subject 'Defence Research and Development Organisation' (DRDO).

3. The representatives of the Ministry of Defence briefed the Committee on various aspects of 'DRDO' through slide presentation on matters like Budget allocation and pattern of expenditure, development of Light Combat Aircraft, Missile programme, Electronic warfare programme, Armoured System, indigenous development of cutting edge technology, Joint Venture with foreign partner for major weapon system, etc.

4. A verbatim record of the proceedings was kept.

*The Committee then adjourned.*

MINUTES OF THE SIXTEENTH SITTING OF THE STANDING  
COMMITTEE ON DEFENCE (2005-06)

The Committee sat on Friday, the 2 January, 2006 from 1100 hrs. to 1600 hrs. in 'Main' Committee Room, Parliament House Annexe, New Delhi.

PRESENT

Shri Balasaheb Vikhe Patil — *Chairman*

MEMBERS

*Lok Sabha*

2. Shri A.V. Bellarmin
3. Dr. K.S. Manoj
4. Shri Raghuraj Singh Shakya
5. Shri Mahadeorao Shiwankar
6. Shri Ganesh Prasad Singh

*Rajya Sabha*

7. Smt. N.P. Durga
8. Shri Janardan Dwivedi
9. Shri Pramod Mahajan

SECRETARIAT

1. Shri S.K. Sharma — *Additional Secretary*
2. Smt. Anita Jain — *Deputy Secretary*
3. Shri D.R. Shekhar — *Under Secretary*

**Non Official Witnesses**

1. Lt. Gen. S.S. Mehta, PVSM, AVSM, VSM (Retd.)
2. Air Chief Marshal S. Krishnaswamy, PVSM, AVSM, VM & Bar (Retd.)

**List of Representatives from Confederation of  
Indian Industry (CII)**

1. Shri Rahul Chaudhry
2. Shri S. Sen
3. Brig K.A. Hai (Retd.)
4. Shri V.S. Noronha
5. Shri Rajesh Kakkar
6. Shri Vikram Badshah
7. Shri Rakesh Kumar Verma
8. Shri N.B. Mathur
9. Shri Sujith Haridas
10. Shri Prashant A.N.

2. The Chairman welcomed Lt. Gen. S.S. Mehta (Retd.) and requested him to present his views on DRDO and Threat Perception and Associated Procurements. As regards DRDO, Gen. Mehta stressed that investment in R&D must begin to be seen with a spin off benefits to the country. There are dual used technologies for both military and civil sector in which private sector would also be interested. He expressed the need for institutionalised academia industry interface. Gen. Mehta expressed core problem was human resource development of India which was not keeping pace with the demand for employment and employability. As regards the DRDOs budget he stated that there must be a portion earmarked for three services. For all new and basic research work DRDO should be given sufficient fund so that country might not depend on other countries. He also expressed his views on concept of R&D offset direct and indirect clause, public and private participation in R&D, threat perception, etc.

3. The Chairman then welcomed Air Chief Marshal S. Krishnaswamy (Retd.) and requested him to present his views on DRDO and Threat Perception and Associated Procurements. Air Marshal Krishnaswamy gave his views on the threat perception. He emphasised that the reasons for increase in the external threats are unsettled borders, poverty in certain countries and their prevailing underdeveloped socio-economic conditions. On the issue of DRDO, he stressed that there is weak capability of the country to design and develop a jet engine, for improvement in DRDO working it was essential to make fundamental changes in organisation and structure of the DRDO with accountability to user and to do work in time. He also suggested more participation by the users through a project team of the user services in development of projects.

4. Hon'ble Chairman, then invited representatives of CII to present their views on capability of private sector to undertake and develop complex Defence projects and to undertake R&D works on sharing basis with the DPSUs & OFB. The representatives of CII then placed before the Committee three main suggestions (i) clear mechanism of funding the projects whereby the DRDO puts in about 75 percent, the industry puts in 15 percent and the user puts in 10 percent and the user should be directly invited in the decision making at the project stage. (ii) The involvement of the industry both private and public sector, should be ensured at the conceptualisation stage itself and not at final stage. At the time of development of the products, there should be clear commitment on procurement. (iii) There should be some process whereby private industry can directly participate using their capabilities, technology and some of the resources. They also informed the Committee about the project of Cockpit display for Su-30 in which the private sector was producing both software and hardware under the PSU/DRDO programme.

5. The representatives of CII also answered the queries of members on how private sector looks at the Threat Perception before the country. The representatives of CII were asked to send a note on their capability and views on DRDO, structure and Threat Perception.

6. Hon'ble Chairman then welcomed the representatives of Ministry of Defence. The representatives of Ministry of Defence briefed the Committee on the various aspects of products being developed by DRDO. On the question of delay in completion of projects *i.e.* Akash, MBT, LCA by DRDO, the representatives of DRDO informed the Committee that there were delays because of certain complexities involved. There were delays at developmental stage because testing of missiles was not easy.

7. Members of the Committee also raised certain questions on some other issues relating to DRDO to which the representatives replied, they also assured the Committee that within four years the country would have the first Kavery qualified.

8. A verbatim record of the proceedings was kept.

*The Committee then adjourned.*

MINUTES OF THE TWENTY FIRST SITTING OF THE STANDING  
COMMITTEE ON DEFENCE (2005-06)

The Committee sat on Tuesday, the 31 January, 2006 from 1500 hrs. to 1630 hrs. in Committee Room No. 'D', Parliament House Annexe, New Delhi.

PRESENT

Shri Balasaheb Vikhe Patil — *Chairman*

MEMBERS

*Lok Sabha*

2. Shri Iliyas Azmi
3. Shri A.V. Bellarmin
4. Shri Thupstan Chhewang
5. Smt. Sangeeta Kumari Singh Deo
6. Shri Suresh Kalmadi
7. Dr. C. Krishnan
8. Dr. K.S. Manoj
9. Ms. Ingrid Mcleod

*Rajya Sabha*

10. Shri Pramod Mahajan

SECRETARIAT

1. Shri S.K. Sharma — *Additional Secretary*
2. Shri R.C. Ahuja — *Joint Secretary*
3. Smt. Anita Jain — *Deputy Secretary*
4. Shri D.R. Shekhar — *Under Secretary*

**List of Representatives from Ministry of Defence**

1. Shri Shekhar Dutt, Defence Secretary
2. Dr. M. Natarajan, SA to RM
3. Shri K.P. Singh, Secretary (DP)

4. Shri V.K. Misra, FA(DS)
5. Shri S. Banerjee, DG (Acq.)
6. Shri AS Pillai, CCR&D (ACE&NS) & DS
7. Dr. V.K. Saraswat, CCR&D (M&SS) & DS
8. Dr. D. Banerjee, CCR&D(SI) & DS
9. Shri Prahlada, CCR&D (LS&HR)
10. Shri K.U. Limaye, CCR&D (ECS) & DS
11. Dr. W. Selvamurth, CCR&D (LS&HR)
12. Shri S.C. Narang, CCR&D (R)
13. Shri P.K. Jena, Addl. FA (J) & JS

2. At the outset, the Chairman welcomed the representatives of the Ministry of Defence to the sitting of the Committee to render oral evidence on the subject 'Defence Research and Development Organization (DRDO)' and invited their attention to Directions 55 and 58 by the Hon'ble Speaker, Lok Sabha regarding maintaining confidentiality of the deliberations of the sitting. The Committee then raised the matter regarding developments in radar systems, problems in INSAS rifle and roadmap for achieving self-reliance in Defence Production and asked the Ministry to clarify the issues.

3. The representatives of the Ministry of Defence briefed the Committee on development of radars. They informed the Committee that Radar Development Establishment works in close cooperation with BEL, TATA Power and L&T. They have developed Indira PC Radar of 90 km. range. DRDO was also working with HAL on multimode radar for LCA, which was undergoing test in Hawk aircraft.

4. The representatives of the Ministry stressed upon the need to upgrade and reinforce the design talent in the country both in public and private sectors, who can handle design & development tasks of a wide variety.

5. The representatives of the Ministry also briefed the members on the progress made by DRDO in the development of Multi Mode Radar (MMR), PV-5, a two seater trainer aircraft and Naval variant of LCA.

6. The members of the Committee put forth questions ranging from users participation, production of surveillance system in the country and problems faced by the users of INSAS rifle to which the representatives of the Ministry replied and also promised to send a written note thereon.

7. The Committee expressed concern over the reduction of R&D budget, IAF's refusal to fly new Jaguars, MiG crash near Jamnagar, C&AG's complaints about the T-72 tanks, non-availability of platforms for testing and the 20 year roadmap. The representatives of the Ministry replied to the queries of the Members of the Committee.

8. A verbatim record of the proceedings was kept.

*The Committee then adjourned.*



MINUTES OF THE THIRTY FIRST SITTING OF THE STANDING  
COMMITTEE ON DEFENCE (2005-06)

The Committee sat on Thursday, the 23rd March, 2006 from 1500 hrs. to 1630 hrs. in Committee Room No. '074', Parliament Library Building, New Delhi.

PRESENT

Shri Balasaheb Vikhe Patil — *Chairman*

MEMBERS

*Lok Sabha*

2. Shri Churchill Alemao
3. Shri Iliyas Azmi
4. Shri Thupstan Chhewang
5. Shri Ramesh Jigajinagi
6. Shri Raghuraj Singh Shakya
7. Shri Mahadeorao Shiwankar
8. Shri Ganesh Prasad Singh
9. Shri Manvendra Singh
10. Ms. Ingrid Mcleod

*Rajya Sabha*

11. Smt. N.P. Durga
12. Shri Jai Prakash Aggarwal

SECRETARIAT

1. Shri S.K. Sharma — *Additional Secretary*
2. Smt. Anita Jain — *Deputy Secretary*
3. Shri D.R. Shekhar — *Under Secretary*

**List of Non-Official Witnesses**

1. Shri Ajay Vikram Singh — Former Defence Secretary
2. Major General Bikram Singh Kanwar (Retd.) — Ex-MP

3. Col. Sudhir Sawant (Retd.) — Ex-MP

4. Vice-Admiral Retired K.K. Nair (Retd.)

2. At the outset, Hon'ble Chairman welcomed Shri Ajay Vikram Singh, Defence Secretary (Retd.) and requested him to putforth his view points on (i) \* (ii) \* (iii) \* (iv) Role of DRDO in Self-Reliance and (v)\*.

As regards DRDO, he stated that keeping in view the large size of procurement from outside, our main concern should be to make the R&D efforts of the country more effective by involving and working together closely with private sector, ordnance factories and Defence PSUs.

*The witness then withdrew.*

Then Hon'ble Chairman welcomed Maj. Gen. Vikram Singh Kanwar, (Retd.) Ex-MP to express his opinion on (i) \* (ii) \* (iii) \* (iv) Role of DRDO in Self-Reliance and (v) \*.

*The witness then withdrew.*

Then Hon'ble Chairman welcomed Col. Sudhir Sawant (Retd.), Ex-MP and requested him to putforth his suggestions on (i) \* (ii) \* (iii) \* (iv) Role of DRDO in Self-Reliance and (v)\*.

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Hon'ble Chairman then welcomed Vice-Admiral (Retired) K.K. Nair and requested him to put forth his view point on the subject. He was of the view that problems in the armed forces could be resolved if there was a board consisting of three service Chiefs and the Minister.

*The witnesses then withdrew.*

A verbatim record of the proceedings was kept.

*The Committee then adjourned.*

MINUTES OF THE THIRTY SECOND SITTING OF THE  
STANDING COMMITTEE ON DEFENCE (2005-06)

The Committee sat on Friday, the 24th March, 2006 from 1100 hrs. to 1430 hrs. in Committee Room No. 'G-074', Parliament Library Building, New Delhi.

PRESENT

Shri Balasaheb Vikhe Patil — *Chairman*

MEMBERS

*Lok Sabha*

2. Shri Iliyas Azmi
3. Shri Thupstan Chhewang
4. Shri Ramesh Jigajinagi
5. Shri Mahadeorao Shiwankar
6. Shri Ganesh Prasad Singh
7. Shri Balashowry Vallabhaneni

*Rajya Sabha*

8. Shri Jai Prakash Aggarwal

SECRETARIAT

1. Shri S.K. Sharma — *Additional Secretary*
2. Shri R.C. Ahuja — *Joint Secretary*
3. Smt. Anita Jain — *Deputy Secretary*
4. Shri D.R. Shekhar — *Under Secretary*

**Non-Official Witnesses**

Gen. V.P. Malik (Retd.)

2. At the outset, the Hon'ble Chairman welcomed Gen. V.P. Malik (Retd.) to share his viewpoints on (i) \*\*\*\*\*; (ii) \*\*\*\*\*; (iii) \*\*\*\*\*; (iv) Role of DRDO in self-reliance and (v) \*\*\*\*\*.

3. \*\*\*

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4. \*\*\* \*\*\* \*\*\*

5. On DRDO he suggested the following points:

- Every year the budget allocation is increasing, without accountability. Our country is spending 2.5% of GDP on defence and out of that 18 billion dollars worth equipment are being imported.
- There is a need to upgrade our DRDO. There is a need for capital investment and import of technology and involvement of private sector engaged in defence production.
- The DRDO should do some in-house introspection as to what happened in those 10 years, where they have gone wrong, why they have not been able to stick to that plan. They themselves ought to do this introspection.
- They should work now as a consortium with the private sector within the country.
- Users should be closely associated with DRDO and manufacturers.
- All the Ordinance Factories and all defence PSUs must be given total freedom to upgrade their R&D.
- GSQR should always be done by the Armed Forces and DRDO together and it should be under the General staff.
- DGQA has been wrongly placed and has failed in the services on very important equipment. Instead of expanding the capability, the Ministry is expanding the manpower. That is a wrong step. People who are manufacturing are cleaning their equipment.

There should be a Non-lapsable Fund.

6.\*\*\* \*\*\* \*\*\*

*The witness then withdrew.*

7. A verbatim record of the proceedings was kept.

*The Committee then adjourned.*

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\*\*\*not related to the subject.

MINUTES OF THE FORTY FOURTH SITTING OF THE  
STANDING COMMITTEE ON DEFENCE (2005-06)

The Committee sat on Wednesday, the 7th June, 2006 from 1100 hrs. to 1330 hrs. in Committee Room No. 'C', Parliament House Annexe, New Delhi.

PRESENT

Shri Balasaheb Vikhe Patil — *Chairman*

MEMBERS

*Lok Sabha*

2. Shri Iliyas Azmi
3. Shri Thupstan Chhewang
4. Smt. Sangeeta Kumari Singh Deo
5. Dr. K.S. Manoj
6. Shri Raghuraj Singh Shakya
7. Shri Mahadeorao Shiwankar
8. Shri Ganesh Prasad Singh
9. Shri Balashowry Vallabhaneni

*Rajya Sabha*

10. Smt. N.P. Durga

SECRETARIAT

1. Shri R.C. Ahuja — *Joint Secretary*
2. Shri D.R. Shekhar — *Under Secretary*

**List of Representatives from Ministry of Defence**

1. Shri K.P. Singh — Secretary (DP)
2. Dr. M. Natrajan — SA to RM
3. Smt. Rekha Bhargava — AS(B)
4. Dr. A.S. Pillai — CCR&D (ACE&NS), DS
5. Shri D. Banerjee — CCR&D (AMS)

6. Shri Prahlada	— CCR&D (SI), DS
7. Shri K.U. Limaye	— CCR&D (ECS), DS
8. Shri W. Selvamurthy	— CCR&D (LS&HR)
9. Shri S.C. Narang	— CCR&D (R)
10. Dr. Thomas Mathew	— JS&AM (MS)
11. Shri P.K. Jena	— Addl. FA (J)
12. Lt. Gen. G.D. Singh	— DCOAS (P&S)
13. Air Marshal B.U. Chengappa	— AOM
14. Rear Admiral R.K. Dhowan	— ACNS (P&P)
15. Air Vice-Marshal N.V. Tyagi	— ACAS (Plans)
16. Shri Rajwant B. Singh	— Director (P&C)
17. Brigadier H.C. Sethi	— Officiating ADG (WE)
18. Shri B. Lalmohan	— SA to CNS

2. At the outset, Hon'ble Chairman welcomed the representatives of Ministry of Defence to the sitting of the Committee to render oral evidence on the subject 'Defence Research and Development Organisation' and drew their attention to the Direction 58 of the Directions by the Speaker, Lok Sabha regarding maintaining confidentiality of the deliberations of the sitting.

3. The Committee then took oral evidence of the representatives of the Ministry of Defence on the above subject. Members of the Committee sought clarifications on certain important issues *viz.* creating a separate research organisation on Medical and Allied Sciences outside DRDO so that DRDO can concentrate more on development of crucial technology *i.e.* to make the country self-reliant in the field of weapon system and force multipliers.

4. On the question of future self-reliance, the representatives apprised the Committee that in the last 10-15 years they have focused on platforms within their capability. They are focusing on indigenization of systems required in tanks etc. with local industry. In the area of sensors they are trying to tie up with certain countries depending on to what extent these countries can share the technology.

5. On the question of technical difficulties in MBT Arjun, the representatives informed the Committee that there was problem in Arjun Tank because of defect in setting switches.

6. Indigenization percentage they informed the Committee that in Xth Plan they were supposed to reach 70% indigenization by 2005 but it did not happen. Today they have reached 30-35% because of the orders from three services. They expect that by the end of XIth Plan they would reach about 65%.

7. The Committee desired that Brahmos model should be followed in other projects also. The Committee also desired that private sector should be given more opportunities in Defence production and user participation should be encouraged from R&D stage.

8. Verbatim record of the proceedings was kept.

*The Committee then adjourned.*

MINUTES OF THE FORTY EIGHTH SITTING OF THE STANDING  
COMMITTEE ON DEFENCE (2005-06)

The Committee sat on Monday, the 17 July, 2006 from 1030 hrs to 1530 hrs in Main Committee Room, Parliament House Annexe, New Delhi.

PRESENT

Shri Balasaheb Vikhe Patil — *Chairman*

MEMBERS

*Lok Sabha*

2. Shri Thupstan Chhewang
3. Shrimati Sangeeta Kumari Singh Deo
4. Shri Ramesh Jigajinagi
5. Dr. C. Krishnan
6. Shri Raghuraj Singh Shakya
7. Shri Ganesh Prasad Singh
8. Shri Manvendra Singh
9. Shri Balashowry Vallabhaneni

*Rajya Sabha*

10. Shrimati N.P. Durga
11. Shri R.K. Dhawan
12. Shri K.B. Shanappa
13. Shri Jai Prakash Aggarwal
14. Shri Lalit Suri

SECRETARIAT

1. Shri R.C. Ahuja — *Joint Secretary*
2. Shrimati Anita Jain — *Deputy Secretary*
3. Shri D.R. Shekhar — *Under Secretary*



## SPECIAL INVITEE

Shri Pranab Mukherjee — Hon'ble Minister of Defence

## LIST OF REPRESENTATIVES FROM MINISTRY OF DEFENCE

1. Shri K.P. Singh — Secretary (DP)
2. Shri S. Banerjee — DG (ACQ)
3. Dr. M. Natrajan — SA to RM
4. Shri V.K. Misra — Secretary (Def. Fin.)
5. Shrimati Rekha Bhargava — AS (B)
6. Shri A.K Jain — AS (J)
7. Shri P.K. Rastogi — Addl. Secy. (DP)
8. Shri K.P. Lakshamana Rao — FA (ACQ)
9. Shri Prahlada — CCR & D (SI) & DS
10. Shri S.C. Narang — CCR & D (R)

## LIST OF REPRESENTATIVES FROM CONFEDERATION OF INDIAN INDUSTRY (CII)

1. Shri R. Seshasayee — President, CII and MD, Ashok Leyland Limited
2. Lt. Gen. S.S. Mehta (Retd.), PVSM, AVSM — Director General, CII
3. Shri Atul Kirloskar — Chairman, CII National Committee on Defence and CMD, Kirloskar Oil Engines Limited
4. Shri Abhay Firodia — Member, CII National Committee on Defence and Chairman and Managing Director, Force Motors Ltd.
5. Brig K.A. Hai (Retd.) — Member, CII National Committee on Defence and Chief Executive, Mahindra Defence Systems
6. Shri N. Nigam — Vice President, Larsen and Toubro Limited
7. Shri Ashok Kanodia — Member, CII National Committee on Defence and Managing Director, Precision Electronics Ltd.

8. Shri S. Niyogi — Deputy Director General, CII  
 9. Shri S. Sen — Coordinator (Projects)

LIST OF REPRESENTATIVE FROM FEDERATION OF INDIAN  
 CHAMBERS OF COMMERCE AND INDUSTRY (FICCI)

1. Shri Vivek Pandit — Joint Director, FICCI

LIST OF REPRESENTATIVE FROM INDUSTRY

1. Shri Rahul Chaudhary — CEO, Strategic Electronics  
 Division, Tata Power

LIST OF REPRESENTATIVE FROM INSTITUTE OF  
 DEFENCE STUDIES AND ANALYSES (IDSA)

1. Dr. Narendra Sisodia — Director, IDSA

1. At the outset, Hon'ble Chairman welcomed the representatives of Ministry of Defence, Confederation of Indian Industry (CII), Federation of Indian Chambers of Commerce and Industry (FICCI), IDSA and Industry to the sitting of the Committee on Public-Private partnership of Defence R&D and Production and apprised them of the Direction 58 of the Directions by the Speaker, Lok Sabha regarding maintaining confidentiality of the deliberations of the sitting.

3. The Committee then asked the view point of the representatives of the Ministry of Defence on Public-Private partnership on Defence R&D and Production and desired to know the reason for low investment by the Public Sector and Private Industry in the R&D activity. The representative of the Ministry apprised the Committee about the action being taken by them on the issue of expenditure on Defence (R&D). They stated that for the past two years they have been extensively modernising their procurement policies and the issue is being addressed by a group comprising of three Voice Chiefs, Members from DRDO, Defence Production, Finance, etc. This group categorised the requirement into Make, Buy and Make and Buy. The main idea behind that is to procure more and more Defence material from sources within India.

4. On off set policy, the representatives of the Ministry informed the Committee that the acquisitions which are of a size of more than Rs. 300 crore would be accompanied with an off set.

5. The representatives of CII apprised the Committee that private industry and private technology development all over the world has

been fountainhead of some breakthrough concepts coming which have revolutionised market forces. Apart from meeting the needs of Defence, the private industry will have to play a role to be supported by the Government policy to attain breakthrough technology which will have tremendous spin-off effect in revolutionising the industrial landscape in this country. They further informed that modern Army not only requires modern equipment, but it also needs to be backed up by modern processes.

Then the Committee had slide presentation from the representatives of CII on the subject.

6. The representatives of CII apprised the Committee that during the discussion in Kelkar Committee they had discussed the sharing of development cost in the ratio of 75% by Government, 15% by Industry and 10% by the user in terms of developing the technology. They needed an assurance on returns. They assured the Committee that the industry would take the initiative to invest in R&D and they are ready to get technology from abroad whenever it is needed, which could also attract FDI.

7. The representative of the Industry apprised the Committee that the country is among the largest importers of defence equipments and it does not befit the stature of country's economy and engineering capabilities for which this country is recognised world over. He suggested that capability in the Defence Industry should be funded by the Government.

8. On the question of basic requirement of Armed Forces, the representative of the Air Force apprised the Committee that to get high quality equipment on time over the years, they earlier had a problem because the import contents have been high and acquisition procedures were slow. On involvement of private sector he further apprised the Committee that like in all other countries private industry in the arms manufacturing is the most lucrative and high-tech industry which has a lot of spin off. He assured the Committee that if private sector join hands with DRDO and DPSU, the country can get high-tech equipment.

9. The representative of Navy apprised the Committee that DPSUs are manufacturing state of the art equipment in the field of water electronics and radars developed by DRDO. If the procedures could be simplified private industry would be a great help.

10. The representative of IDSA apprised the Committee of over all situation between Department of Defence Production, DPSU and private sector. He suggested that Department of Defence Production should be renamed as the Department of Defence Industrial Development whose mandate should be to develop Defence Industry in the country. This Department should focus not only on public sector units but also facilitate the process of Defence Industrial Development in the country. He was of the view that because there is no perspective plan of the Ministry, therefore, it is not possible to give assured orders to public or private industry. Therefore, this is one of the reasons that industry is not spending enough money on R&D because R&D costs are very high.

Hon'ble Minister of Defence also briefed the Committee on the subject. He stated that introduction of the policy initiative in 2001 would facilitate the participation of the private sector in Defence Industries. He also apprised the Committee that roughly about 40 recommendations in Part I of the Report of the Kelkar Committee have been accepted either *in toto* or partly modified form and quite a large number of them are being actually implemented. In respect of Part II, recommendations are still under the consideration of the Government and the final view is to be taken thereon. He also assured the Committee that the Ministry will look into the recommendations of the Committee and implement them.

He further apprised the Committee that it would be easier to have latest updated technology through the private sector participation because the technologies which are being developed abroad could be comfortably transferred to their counterparts in India. He also informed the Committee that Eleventh Plan for the Ministry of Defence is being prepared and the Ministry is in the process of going through various sectors and service requirements to make it a realistic plan. On the allocation of budget for the Ministry of Defence, he further informed the Committee that it should remain well below three percent of the GDP and it would be extremely difficult to go beyond that limit. The average expenditure normally is 16 to 17 percent of the total expenditure budget which goes to the finance.

On non-lapsable fund, he informed the Committee that the characteristics of having a separate fund which is non-lapsable would not help. He felt that there is a need for a separate Budget Head. On the acquisition process, he informed the Committee that the Ministry normally makes acquisition through two or three routes. One is the direct purchase, another one is buy and make—partially buy and

partially make and the third one is the made procedures and the Ministry has systematized both for revenue and capital acquisition in the Defence procurement procedure.

12. The representative of Ministry of Defence from DRDO informed the Committee that BrahMos Aerospace is a private company so it follows the private company rules as per the Act. But at the same time when it gives the development work to the DRDO, the Government procedures are followed.

13. On the issue of duties and taxes, representative of CII apprised the Committee that Indian vendors are loaded with excise, sales tax, octroi as applicable whereas the foreign vendors are generally exempted from all duties, therefore, they desired there should be a level playing field so either the Indian vendors price should be taken without the duties or foreign vendor should be loaded with the taxes.

14. He further desired that officers from CII/Private Industries should be trained at National Defence College or similar institutions to have experience on the issue. He also desired that if a Company has a licence for a particular equipment it should be allowed to import items/sub-assemblies for R&D.

15. He was also of the view that if the representatives of the private sector cannot be on the Categorization Committee where decisions on buy, buy and make and make or made are taken, at least they should have an option of hearing after a decision is taken so that there is still a possibility of private sector saying that they have the capability to do that.

16. Representative of BEML apprised the Committee that there is a huge possibility of private sector participation in manufacturing of wheel sets for both metro and rail wagons, electrical systems for trucks etc.

17. Representative of HAL also apprised the Committee that they have involved private sector in a big way in supplying various items in manufacturing of aircraft.

18. A verbatim record of the proceedings was kept.

*The Committee then adjourned.*

MINUTES OF THE THIRD SITTING OF THE STANDING  
COMMITTEE ON DEFENCE (2006-07)

The Committee sat on Friday, the 22 September, 2006 from 1100 hrs to 1300 hrs in Committee Room No. 'D', Parliament House Annexe, New Delhi.

PRESENT

Shri Balasaheb Vikhe Patil — *Chairman*

MEMBERS

*Lok Sabha*

2. Shri Santosh Kumar Gangwar
3. Shri Suresh Kalmadi
4. Dr. K.S. Manoj
5. Shri Shrinivas Patil
6. Shri Raju Rana
7. Dr. H.T. Sangliana
8. Shri Balashowry Vallabhaneni
9. Shri Rajesh Verma

*Rajya Sabha*

10. Dr. Farooq Abdullah
11. Shri Abu Asim Azmi
12. Shri R.K. Dhawan
13. Shrimati N.P. Durga
14. Shri K.B. Shanappa
15. Shri Arun Shourie
16. Shri Lalit Suri
17. Shrimati Viplove Thakur

SECRETARIAT

1. Shri S.K. Sharma — *Additional Secretary*
2. Shri S. Bal Shekar — *Joint Secretary*
3. Shrimati Anita Jain — *Deputy Secretary*
4. Shri D.R. Shekhar — *Under Secretary*

## LIST OF REPRESENTATIVES FROM MINISTRY OF DEFENCE

1. DR. M. Natarajan	— SA to RM
2. Shri K.P. Singh	— Secretary (DP)
3. Shri S. Banerjee	— DG (ACQ)
4. Shri A.K. Jain	— AS (J)
5. Shri K.P. Lakshamana Rao	— FA (ACQ)
6. Dr. V.K. Saraswat	— CCR&D (M&SS) & DS
7. Dr. Prahlada	— CCR & D (SI) & DS
8. Dr. W. Selvamurthy	— CCR & D (LS & HR)
9. Shri N. Sitaram	— CCR & D (ECS)
10. Shri S.C. Narang	— CCR & D (R&M)
11. Shri P.K. Jena	— Addl. FA (J) & JS
12. Lt. Gen. H.S. Lidder	— CISC
13. Lt. Gen. S. Pattabiraman	— VCOAS
14. Air Mshl. A.K. Nagalia	— DCAS
15. Shri Ranjan Chatterjee	— JS (HAL)
16. Shri V. Somasundaran	— JS (OF)

2. At the outset, Hon'ble Chairman welcomed the Members and representatives of Ministry of Defence to the sitting of the Committee. The Chairperson then requested the Representatives of the Ministry to brief the Committee on the subject 'Defence Research and Development Organisation' and drew their attention to the Direction 58 of the Directions by the Speaker, Lok Sabha regarding maintaining confidentiality of the deliberations of the sitting.

3. The representatives of the Ministry of Defence briefed the Committee on the functioning of DRDO through slide presentation.

4. On the question of production of Arjun Tank, the representatives of the Ministry apprised the Committee that the MBT Arjun had received the users acceptance and it was under production. They further stated that trial of 5 tanks were done and they have asked for 15 tanks more to do a further trial before they give clearance for final production of them. The representative from Army informed the Committee that in the recent trials with the five Arjun tanks, they were satisfied with the performance. He also stated that in mobility, driving and in quality, the tank was very good. The representatives of the Ministry informed the Committee that night fighting capability in

an integrated mode was the best with Arjun and in terms of ability it might be compared very well with the best state-of-art western tank-Leopard II or Challenger-II.

5. With regard to a query on the abandonment of projects, the Committee have been informed that the Industry was heavily dependent on the kind of technology base that was available in the country, the science base available in the country and the projects thereof by the other entities who would be cooperating with the industry during the phase of development. It was further informed that industry was constrained to manufacture because they were highly specialised items for which the technology did not exist with the industry so they were developing that technology as such they were constrained to do that work.

6. On the issue of technical difficulties and delay in production of LCA, the representatives informed the Committee that though it was DRDO's first design, yet it featured the most advanced technology relating to 40% composite structure and digital fly by wire.

7. On the issue of funding pattern of future projects, the representatives informed that DRDO should fund 70 per cent, the Services 10 per cent and the industry 20 per cent.

8. Members of the Committee also sought clarifications on other important issues *viz.* Eleventh Plan, interaction with the Universities etc. The representatives of the Ministry responded to the queries of the Members one by one.

9. Verbatim record of the proceedings was kept.

*The Committee then adjourned.*



MINUTES OF THE FOURTEENTH SITTING OF THE STANDING  
COMMITTEE ON DEFENCE (2006-07)

The Committee sat on Tuesday the 26th December, 2006 from 1630 hrs. to 1700 hrs. in Committee Room 'D', Parliament House Annexe, New Delhi.

PRESENT

Shri Balasaheb Vikhe Patil — *Chairman*

MEMBERS

*Lok Sabha*

2. Shri Santosh Gangwar
3. Shri C. Kuppusami
4. Shri Shriniwas Patil
5. Shri H.T. Sangliana
6. Shri Mahadeorao Shiwankar
7. Shri Manvendra Singh
8. Shri Rajesh Verma

*Rajya Sabha*

9. Shri R.K. Dhawan
10. Shri N.P. Durga
11. Shri K.B. Shanappa

SECRETARIAT

1. Shri R.C. Kakkar — *Deputy Secretary*
2. Shri D.R. Shekhar — *Under Secretary*

LIST OF REPRESENTATIVES FROM MINISTRY OF DEFENCE

1. Shri K.P. Singh — *Secretary (DP)*
2. Dr. M. Natarajan — *SA to RM*
3. Shri V.K. Misra — *Secretary (Def. Fin.)*
4. Shri Prahlada — *CCR & D (SI) & DS*

2. At the outset, Hon'ble Chairman welcome the Members to the sitting of the Committee to consider the Draft Report on the subject Defence Research and Development Organisation (DRDO). The Committee then took up the Draft Report for consideration and adoption. After deliberation, on the Draft Report the Committee decided to have some further clarifications on the information supplied by the Ministry of Defence on DRDO. Then the Committee decided to postpone the consideration of the Draft Report for the next sitting of the Committee.

3. Hon'ble Chairman then welcomed the representatives of the Ministry of Defence to this sitting of the Committee to give clarifications on some important points relating to DRDO. Thereafter, Hon'ble Chairman drew their attention to the Direction 58 of the Directions by the Speaker, Lok Sabha regarding maintaining confidentiality of the deliberations of the sitting. The members putforth the following queries:—

- (i) Review of DRDO by an independent authority.
- (ii) Number of projects which were initiated by DRDO and approved and abandoned by the Ministry and DRDO and expenditure incurred for the last 20 years.
- (iii) The time taken by DRDO/Ministry and other relevant organization in approving, disapproving or abandoning the projects and the expenditure incurred at each stage.
- (iv) The method of appointment of the Head of the Defence Research and Development in USA, UK and Israel.

4. The representative of Ministry of Defence answered the queries of the Members one-by-one.

*The witnesses then withdrew.*

*The Committee then adjourned.*

MINUTES OF THE FIFTEENTH SITTING OF THE STANDING  
COMMITTEE ON DEFENCE (2006-07)

The Committee sat on Tuesday the 09th January, 2007 from 1100 hrs. to 1315 hrs. in Committee Room 'D', Parliament House Annexe, New Delhi.

PRESENT

Shri Balasaheb Vikhe Patil — *Chairman*

MEMBERS

*Lok Sabha*

2. Shri Milind Deora
3. Shri Santosh Gangwar
4. Dr. K.S. Manoj
5. Shri Adhalrao Shivaji Patil
6. Shri Raju Rana
7. Shri H.T. Sangliana
8. Shri Mahadeorao Shiwankar
9. Shri Balashowry Vallabhaneni
10. Shri Rajesh Verma

*Rajya Sabha*

11. Dr. Farooq Abdullah
12. Shrimati N.P. Durga
13. Shri K.B. Shanappa
14. Shrimati Viplove Thakur

SECRETARIAT

1. Shri P.K. Bhandari — *Joint Secretary*
2. Shri D.R. Shekhar — *Under Secretary*

2. At the outset, Hon'ble Chairman welcomed the Members to the sitting of the Committee to consider the Draft Report on the subject 'Defence Research and Development Organisation (DRDO)'. The Committee then took up the Draft Report for consideration and adoption. Hon'ble Chairman moved some amendments on the report which were adopted by the Committee. The Committee then considered the whole report and adopted the same.

3. The Committee then authorised the Chairman to finalise the Report in light of consecutive changes and present it to both the Houses of Parliament.

*The Committee then adjourned.*