PUBLIC ACCOUNTS COMMITTEE
(2000-2001)

TWENTY - FIRST REPORT

(THIRTEENTH LOK SABHA)

DESIGN AND DEVELOPMENT OF PILOTLESS TARGET AIRCRAFT

MINISTRY OF DEFENCE
(DEPARTMENT OF DEFENCE RESEARCH & DEVELOPMENT)

Presented to Lok Sabha on 19.03. 2001
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L O K S A B H A S E C R E T A R I A T
N E W D E L H I
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*** Elected w.e.f. 2 August, 2000 vice Shri Rajesh Pilot expired.**

*** * Elected w.e.f. 25 August, 2000 vice Shri Vayalar Ravi - ceased to be a Member of Committee consequent upon his retirement from Rajya Sabha on 1 July, 2000**

INTRODUCTION

I, the Chairman, Public Accounts Committee having been authorised by the Committee to present the Report on their behalf, do present this 21st Report on Paragraph 30 of the Report of C&AG of India for the year ended 31 March 1996, (No.8 of 1997), Union Government (Defence Services – Air Force & Navy) relating to "Design and Development of Pilotless Target Aircraft"

2. The Report of the C&AG for the year ended 31 March, 1996 (No. 8 of 1997), Union Government (Air Force & Navy) was laid on the Table of the House on 20 March, 1997.

3. The Committee took the evidence of the representatives of the Ministry of Defence (Departments of Defence Production & Supplies, Defence Research & Development and Hindustan Aeronautics Ltd.) on the subject at their sitting held on 29 October, 1998. The Committee considered and finalised this Report at their sitting held on 20 March, 2001. Minutes of the sitting form Part II* of the Report.

4. For facility of reference and convenience, the observations and recommendations of the Committee have been printed in thick type in the body of the Report and have also been reproduced in a consolidated form in Appendix* to the Report.

5. The Committee would like to express their thanks to the Public Accounts Committee (1998-99) for taking evidence on Paragraph 30 and obtaining information thereon.

6. The Committee would like to express their thanks to the officers of the Ministry of Defence (Departments of Defence Production & Supplies, Defence Research & Development and Hindustan Aeronautics Ltd.) for the cooperation extended by them in furnishing information and tendering evidence before the Committee.

7. The Committee place on record their appreciation of the assistance rendered to them in the matter by the Office of the Comptroller and Auditor General of India.

NEW DELHI;
20 March, 2001
29 Phalguna, 1922(Saka)

NARAYAN DATT TIWARI,
Chairman,
Public Accounts Committee

R E P O R T

Introductory

Training of pilots in air-to-air weaponry and target practice of surface-to-air missile batteries and guns is a regular peace time drill of all the three Services. In such training, certain amount of live firing practice is essential against realistic airborne targets for proper perception of actual threat parameters likely to be encountered. For this purpose, use of recoverable Pilotless Target Aircraft (PTA) with towed sub-targets had long been considered the most cost effective option. The PTA was also required for evaluation/development trials of new surface-to-air and air-to-air weapon systems.

Audit Paragraph

2. This Report is based on paragraph 30 of the Report of the Comptroller and Auditor General of India for the year ended 31 March 1996, No. 8 of 1997, Union Government – Defence Services (Air Force & Navy) relating to Design and development of pilotless target aircraft, which is reproduced at Appendix-I.* The delay in development of the PTA, consequential cost over-run and its impact on training efforts of the services was commented upon in paragraph 46 of the Report No. 3 of 1989 of the C&AG of India, Union Government – Defence Services (Air Force & Navy) for the year ended 31 March 1988. In their action taken note, the Ministry of Defence had intimated Audit in June 1990 that suitable measures had been instituted to monitor/review the project for its timely completion.

Genesis of the project on PTA

3. The need to develop PTA indigenously was identified in 1976. An Inter Services Qualitative Requirement (ISQR), common to the three Services, was formulated by a Working Group constituted by the Ministry of Defence in January 1977 and 35 ISQR points were identified. Subsequently, based on a feasibility study carried out by Aeronautical Development Establishment (ADE) , the project for the design and development of Inter-Services PTA by ADE, satisfying the ISQR was sanctioned by Government in September 1980 at a cost of Rs. 17 crore including a foreign exchange (FE) element of Rs. 8 crore. The development activity was planned for completion within five years. In parallel, a development project for indigenous development of PTA Engine (PTAE-7) was also sanctioned at an estimated cost of Rs.4.5 crore (FE Rs. One crore) to Hindustan Aeronautics Limited (HAL) in September 1980, based on a feasibility study and project proposal submitted by HAL. The engine was to be developed by HAL by September 1985, concurrently with the PTA.

4. On being asked why it look about four years for the Ministry to sanction the Project for development of PTA and PTAE, the Ministry of Defence (Department of Defence Research & Development) in a note stated that various studies were undertaken during the period 1976-80, before a formal sanction of PTA Development Project was accorded in September 1980. The studies included, evolving a common QR by the Working Group, feasibility study by ADE, preparation of statement of case by ADE for sanction of development of PTA, preparation of statement of case by HAL for development of PTA engine etc. On being pointed out by the

Committee that the whole exercise leading to sanction of the Project could have been expedited, the Ministry in a post-evidence note stated:

"Without doubt and especially in hindsight, we agree that a faster decision with regard to project sanction would have been helpful".

Delay in Development of PTA

5. According to Audit, the project was based on the assumption that the annual requirement of PTA would be around 85 (60 for the Army, 16 for the Air Force and 9 for the Navy) and unit cost of PTA was assessed in 1980 at Rs. 12 lakh. An annual saving of Rs. 11 to 12 crore in FE was envisaged after productionisation of the PTA. According to the Audit Paragraph, ADE was to manufacture 20 PTA prototypes by September 1985 to carry out flight tests for proving the design and User evaluation trials to facilitate an early decision by the Services on the quantum of production. Between December 1985 and July 1986, four prototypes powered by imported engines were launched for trials. Out of these, two launches were successful, but the recovery system failed to operate, necessitating design changes. Then the time frame for the completion of development of PTA was extended twice, once upto September 1988 and then upto March 1991. The Project cost was also revised from Rs. 17 crore to Rs. 21.84 crore (FE Rs. 9.25 crore). The Project could, however, not be completed even by the date extended for the second time. Against the planned 20 prototypes, ADE fabricated 18 by September 1993 and conducted 43 trials of which 24 were conducted between December 1985 and February 1992.

6. Explaining the shortfall in fabrication of two prototypes by ADE, the Ministry stated that initially need for 20 prototypes was estimated for development flight testing, User evaluation of PTA and to cater for uncertainties in the course of development phase. However, it was possible to complete the project successfully with 18 prototypes due to improved performance reliability achieved in developmental flights.

7. The Committee desired to know the reasons for such abnormal delays that took place in the development of PTA by ADE. The Ministry in a note inter-alia submitted that the optimistic schedule for commencement of flight test phase after due development ground testing and check out of systems performance was September 1983. As against this, first flight trial sortie with PTA prototype took place in December 1985, by which time two prototypes were made for the flight testing. The factors attributed to the delay of about two years in the commencement of flight trials were, delays in arranging Wind tunnel testing facilities, development of Booster and the fabrication of flight worthy hardware, launch dynamic studies, development problems in FCE Box, delay of one year in the receipt of imported VEGA Ground Control Station, etc.

The Committee were further informed that during1985-90 (June 1985 to May 1990), a total of 12 prototypes were fabricated. Two targets out of 12 were used for tests and 18 development flight sorties were carried out with 10 prototypes to demonstrate various performance features between December 1985 and May 1990. During this period, prototype targets were stated to have been lost due to malfunction of Para recovery system, though launch and mission objectives were mostly met. Inspite of simulated trials on launch and recovery systems, difficulties were experienced during development flight trials, which were overcome subsequently. In addition, flight test programmes were to be dovetailed to suit the time slots available at SHAR, as DRDO did not have a range of their own till 1989-90.

The Ministry added that as per the original schedule, the User evaluation phase was planned to

commence by 1987. However, the User evaluation phase-I was conducted in May 1992, followed by completion of User evaluation phase-II in April 1994 and the Project was technically closed with effect from June 1994. The late commencement of User trials in May 1992 was attributed to the factors like, launch dynamics problems, experimental investigations on Para recovery system failure with Para modules, configuration changes for improved aerodynamic performance, loss of targets and fabrication of prototypes for flight trials etc. According to the Ministry, intensive efforts on improving the reliability of Para recovery system resulted in acceptable performance levels being achieved by 1992. Further technical problems pertaining to safe recovery over land, as was requested by Army and scoring systems etc. needed more time for finding solutions.

8. Since the implementing units were aware of the complexity of the Project, the Committee enquired as to how did the Ministry justify envisaging a target which was apparently not feasible. The Ministry in a post-evidence note inter-alia stated:

"The Ministry cannot and does not intend to justify envisaging a target which was not feasible; on the other hand, the Ministry emphasises once again that the target date for completion set at each stage was considered feasible based on the estimates and information available at that time. The Ministry also feels that deviations from planned time schedules are not unusual during the implementation stage in R&D activities anywhere in the world, as such deviations are reflective of the imponderables in the R&D process. While every effort must be (and are being) made to learn from the shortfalls of the past to effect improvements in the future, the Ministry feels that allowances for the unexpected imponderables will always have to be made while dealing with R&D."

9. Even though the time frame of the Project was extended twice, first upto September 1988 and then upto March 1991, still the Project was not completed. In this context, the Committee enquired whether the Ministry agreed that even after seeking extensions twice, ADE failed to appreciate the technical complicacies of the Project. In response, the Ministry stated:

"It is accepted that the complexities of the technical solutions to be implemented to solve problems encountered during development could not be fully appreciated by the development agencies at the beginning in some cases, this resulted in time over runs."

10. According to the Audit Paragraph, the time frame for the completion of the PTA project was extended upto September 1988 by the Ministry and the cost of the Project was also revised from Rs. 17 crore to Rs. 19.55 crore in December 1987. Since the PTA could not be developed for User trials within the extended time, the Ministry approached Cabinet Committee on Political Affairs (CCPA) in April 1990 for revision of the total cost of PTA project to Rs 21.84 crore (FE Rs 69.25 crore) and extension of time to March 1991. While processing the proposal for consideration by CCPA, the Secretary (Expenditure) expressed serious concern about the enormous time over-run on account of "either excessive optimism at the initial project formulation stage and sweeping under the carpet the likely teething troubles in R&D project of this type or inefficiencies at the implementation stage". Subsequently, the proposal was approved by the Prime Minister in March 1990, subject to fixation of responsibility for the enormous delay.

11. The Committee enquired about the follow-up action taken in pursuance of the directives by the Prime Minister to fix responsibility for the delays in the completion of the Project. The Ministry in a note inter-alia submitted that in the context of a technological development programme such as PTA, the directive regarding "responsibility for delay" was to be reckoned as "responsible causes" rather than responsible persons, as it was not possible to identify and single out responsible persons with any degree of fairness. Accordingly, the

Ministry reportedly initiated necessary action to analyse and identify the causes of such technical failures and delays through a series of Peer Reviews. It was also submitted that such reviews were greatly helpful in obtaining an objective view of the status and problems of the Project (somewhat independently of the personnel deeply engrossed in the activity) and identify feasible solutions. A copy of the noting made by the Joint Secretary (Prime Minister's Office) on the file indicating PM's directives to fix responsibility for delay in completion was furnished to the Committee.

12. To a related query on the issue, Secretary DRDO, during evidence inter-alia stated:

"We reviewed the programme. Then there were two major changes we have effected. A new Project Director was appointed and also some of the Divisions within the Laboratory were re-organised. In technical and scientific work, it is not that we personally supervise the work. There is a Board of Management. Because of one failure, I cannot just throw a person out. Then science will not exist"

13. The Committee specifically desired to know whether any compliance report, in any case, on the inordinate delay in the implementation of the PTA project was ever submitted to the then Prime Minister after March 1990 and if not what were the reasons therefor. The Ministry could not furnish any documentary evidence to show that any compliance report was submitted to the then Prime Minister in pursuance of his observations in March 1990.

14. It is seen from Audit Paragraph that the PTA Project continued beyond 1991 and was formally closed in June 1994. In this context, the Committee enquired whether approval of CCPA was obtained for extending the date of completion from April 1991 to June1994. The Ministry stated that Raksha Mantri (RM) accorded approval for extension of planned date of completion (PDC) of the Project upto December 1992 based on the recommendation of Peer Review and Programme Review Committee on PTA and PTAE. On the issue of obtaining approval of CCPA beyond December 1992, it was stated that as the CCPA limit for projects/schemes was enhanced to Rs.50 crore on 24 August 1992 by Ministry of Finance, approval from CCPA for further PDC extension beyond December 1992 was not necessary. On vetting the replies of the Ministry, Audit pointed out that since the amended limit applied to the schemes/Projects that had been sanctioned after the issue of orders enchancing the limit and in the subject case, the Project was sanctioned with the approval of CCPA, it was mandatory to get the approval from the authority which had originally sanctioned the project for extending the PDC of the Project. Giving clarification to the Audit observation, the Ministry in a post-evidence note maintained that approval from CCPA was not required in view of the revised instructions issued in August 1992. According to them, extension beyond 1992 was approved by SA to RM based on the recommendations of the 13th PTA Steering Committee on 3 February 1993.

Inter-Services Qualitative Requirement (ISQR)

15. The Audit paragraph highlighted that when the PTA development Project was closed in June 1994, the prototypes did not meet all the 35 ISQR points identified at the time of sanction of the Project. The Committee desired to know the considerations which led to the closure of the development project without ensuring complete ISQR parameters. The Ministry furnished the extracts of the Minutes of the 14th High Level Steering Committee (HLSC) of PTA wherein a decision was taken for formal closure of PTA development Project after considering the Report of Trial and Evaluation Sub-Committee (TESC) headed by Director of Aeronautics. It

was stated that out of 35 ISQR points, 26 had been demonstrated to be fully complied with, 5 had been partially demonstrated and 4 yet to be demonstrated (out of which two were not practicable to plan). The PTA Steering Committee took stock of the total situation in 1994, based on the detailed evaluation of the developed PTA by an expert group and concluded that the main objectives set for PTA as an inter-service aerial target system had been achieved and cleared the PTA (PTA-16) for limited series production. Only three technical issues were identified by the Steering Committee for further action. These were:

Land recovery to be demonstrated again in the next launch compaign;

IR tow body performance to be demonstrated at the earliest;

Doppler MDI to be demonstrated at the earliest opportunity.

According to the Ministry, all the above three demonstrations had been completed subsequent to closure of the Project. Safe Land Recovery was demonstrated again in May 1995. IR towbody performance was demonstrated in July 1996 and DMDI performance was demonstrated in static gun fire in November 1996.

16. Giving the latest status of the five ISQR points which were partially demonstrated at the time of closure of the project, the Ministry in a post evidence note stated that PTA-16 had been launched 10 times. Refurbish and re-launch within 24 hours was accepted by the User. Manoeuverability of 3.5 g was also accepted by the User. No. of Hot legs/presentations were met by PTA. According to the Ministry, as hot legs requirement were met, endurance reckoning was superfluous and this was accepted by the User.

17. As regards the status of two ISQR points which were stated to have been not practicable to plan at the time of closure of the Project, the Ministry in a note stated:
"Users have accepted it as not practicable to be demonstrated in the Steering Committee itself. This means that these points need not be demonstrated explicitly in a flight experiment and are deemed to be acceptable from other data such as ground tests etc. already conducted."

Cost of PTA development Project

18. It is seen from Audit Paragraph that the PTA project was formally closed in June 1994 and a final closure report was issued in April 1995 after incurring a total expenditure of Rs 21.82 crore (including liability of Rs. 0.13 crore) against a sanctioned amount of Rs. 21.84 crore. Audit pointed out that the cost of the project was not drawn correctly as the salary and allowances of scientists and staff engaged in development of PTA was not found to have been charged to the project after March 1988. Calculations showed that on this account, an additional amount of Rs 2.87 crore should have been booked to the PTA project. Further, a liability of Rs 1.52 crore towards the procurement of tow bodies and pylons from HAL had also not been taken into consideration in calculating the total project cost before closing it. According to Audit, had the project cost been reflected accordingly, it would have been Rs 26.21 crore and exceeded the sanctioned amount by Rs 4.37 crore for which fresh Government sanction would have been necessary. . The Committee desired to know as to why the amount of Rs. 4.39 crore was not included in the Project cost. Explaining the position, the [10]Ministry submitted that since the manpower sanctioned for PTA was merged with Peace Establishment of ADE, the concept of debiting the project cost beyond 31 March 1988 was entirely notional. While vetting the reply of the Ministry, Audit had pointed out that the stance taken by the Ministry for not booking the expenditure on PTA

project was not proper as the Government sanction of 27 September 1989 under which revised core Peace establishment was authorised, clearly stipulated that the expenditure on manpower of project for development of an inter-services PTA would continue to be debited to Project cost till the closure of the project. Clarifying the position further the Ministry in a post - evidence note stated that the additional manpower sanctioned for the project was merged with the core peace establishment of ADE. Although the Government sanction dated 27th September 1989 regarding the merger mentioned that the expenditure on manpower would continue to be debited to the project cost till the closure of the Project, this was not considered practical. .The Government sanction dated 27 September 1989 was stated to have been amended to correct the anomaly vide Ministry of Defence letter dated 20 January 2000. As regards non-booking of expenditure of Rs. 1.52 crore to the project cost, the Ministry stated that the decision to delink the payment due to HAL for tow bodies etc. was taken by the Steering Committee so that development project closure could be effected on completion of all necessary technical activities associated with development.

Delay in development of Pilotless Target Aircraft Engine (PTAE-7)

19. According to the Audit Paragraph, development of PTAE-7 at a cost of Rs.4.50 crore was to be completed by HAL by September 1985 as its successful development would have obviated the need for import of engines. The annual requirement was estimated at approximately 100 engines. HAL was to produce by September 1985 six prototype engines besides spares equivalent to two additional prototype engines. There had, however been abnormal delays on account of excessive rotor vibration and failure of rotor blades necessitating design change. At the instance of HAL, the Ministry enhanced the project cost twice between September 1986 and March 1990. After the last revision of the project cost to Rs.7.40 crore, the Ministry again sought to enhance the same in April 1990 to Rs.9.22 crore. The time of completion of project was simultaneously sought to be extended to December 1990 with the approval of CCPA. According to Audit, the reasons advanced for the cost enhancement and extension of time were that five more prototypes of PTAE were to be constructed with a modified design in addition to the four prototypes produced upto April 1990. Accordingly, sanction of the Government was issued in June 1990. HAL however, failed to complete the project even by the extended date.

20. The Committee enquired the reasons for delay in completion of PTAE-7 Project. The Ministry in a note stated that due to redesigning and dependence on the offshore vendor to supply the required castings, the development time got extended beyond the original estimated date. It was explained that during the initial phase of the programme, HAL had an arrangement with an offshore vendor for development and supply of fuel control system. During the course of the development, the vendor backed out without completing the development and the supply of fuel control system. This adversely affected and the programme came to a halt and HAL had to take upon itself further development of the fuel control system by ab-initio generation of know-how. This resulted in additional time. With regard to centrally designed components for compressor, HAL placed an order with an offshore vendor, for investment castings (integrally bladed rotors stators). The vendor withdrew support for the programme after initial supplies towards development as it was failure in his case. This necessitated HAL to look for alternate sources of supply. Since the task involved is a precision investment castings in aluminium alloy, HAL could not get any alternate supplier for the castings either Indian or offshore. Therefore HAL had to redesign and develop its own manufacturing process by the forging and matching route and succeeded in establishing know-how for first time in India although this caused an extension of time. It took time and effort to change the basic design. The Ministry added that the engine, the first ever designed in India has been a successful culmination of the ab-initio generation of know-how of a number of critical technologies which have

actually raised the competence of HAL Engine design capability. According to them, the time extensions were to be looked at on this perspective.

21. The Committee were informed that the first flight of indigenous engine was proposed to be test flown in June 1984. It is seen from Audit Paragraph that in June 1994, only one engine developed by HAL was delivered to ADE for flight trials. But during trials conducted in May 1995, the engine failed. HAL intimated Audit in June 1996 that two more engines with uprated performance were planned to be test flown in August –September 1996 and type certification of the engine was planned to be completed by March, 1997. According to Audit, the entire amount sanctioned for development of PTAE viz, Rs. 9.22 crore had been paid by the Ministry in advance to HAL between August 1981 and January 1991.

22. On being asked to explain the failure of HAL to develop PTAE with reference to the fact that only engine produced after 14 years also failed in flight trials, the Ministry stated that HAL, in fact delivered two flight worthy engines. Out of the two engines delivered by HAL, ADE conducted a test flight with one engine. They added that PTA flew with PTAE-7 engine in May 1995 for 30 minutes without any technical problem. The test flight was stated to be quite successful in establishing the engine performance in flight. During the flight, an engine lubrication problem was encountered due to which the flight was terminated and the PTA was recovered. According to the Ministry, since then design improvements were incorporated to overcome the said problem.

23. The Committee desired to know about the outcome of flight trials conducted with indigenous engine after May 1995. The Ministry in a post- evidence note stated that flight trials with indigenous engine were conducted twice, after May, 1995, the first one was carried out on 14 April 1999 and the second one on 30 September 1999. According to them, in the flight trial of April 1999, engine performance during launch was satisfactory. Performance in flight could not be ascertained due to premature termination of flight for reasons other than engine. This engine was stated to be lost. During trial of September 1999, after successfully completing the mission, for which it was intended, the bearing temperature of the engine increased resulting in Auto recovery of the aircraft one minute prior to planned recovery.

24. Asked to justify the delay of nearly 11 years in development of PTAE, particularly when the flight trials of PTA with the indigenous engine had met with partial success so far, the Ministry in a note inter-alia stated:

"Since the engine of this complex technology was being developed for the first time in the country, development problems such as excessive rotor vibration and failure of turbine blades are likely to occur and these have been resolved satisfactorily. The first prototype of the engine was run within four years from the commencement of the programme and the rated performance of the engine was achieved. This achievement itself is one of the milestones that has been obtained without any development problem. While the performance of the engine was achieved, serious technical problems unfolded during the endurance test of the engine. The problems identified were mainly related to rotor vibration and turbine blade failure. The problem of rotor vibration was solved by designing different shaft configuration and bearing arrangement. The failure of turbine blade was attributed to resonance and this was solved by re-design of turbine with changed number of blades. It is to be noted that this turbine is cast as an integrally bladed disc by investment casting from super alloy. Since the technology to cast this turbine was not available within the country, HAL had to resort to import of these castings and even in them, had to resort to weld corrections. Due to re-designing and dependence on the off shore vendor to supply the required castings, the development time got extended beyond the originally estimated time. With the efforts put in by HAL, the indigenisation of most of the components relating to compressor and fuel control system is

complete and the dependence on foreign supplier is minimised. HAL is also making all out efforts to indigenise the turbine components with the help of DMRL, Hyderabad, who in the meanwhile generated the know-how for this fabrication. In spite of all these problems, the project ultimately achieved an important milestone of maiden flight of PTA with PTAE-7 engine during May 1995. The test flight was quite successful in establishing the engine performance in flight. The flight encountered on engine lubrication problem in the last phase during recovery after completing the mission."

25. In the evidence held on the subject on 29 October 1998, the Committee specifically desired to know the revised schedule for completion of PTAE-7 by HAL. The Committee were informed that the estimated completion of the development in the engine side in the HAL was June 1999 and for certification it was December 1999. Considering the inordinate delay that already took place in the engine development , the Committee specifically desired to know whether HAL would be able to complete the development by December 1999. The Secretary DRDO deposed that the decision to achieve the target was arrived at after many discussions with the experts. He assured the Committee that the engine would be available at the beginning of the year 2000 for production work.

26. As regards the present status of development of PTAE, the Ministry in a post-evidence note stated that following flight test planned during September-November 2000, type test completion and sealing of production to drawings was anticipated in March 2001. Expenditure incurred on the development of PTAE so far amounted to Rs. 1088 lakhs, out of which Rs. 922 lakhs was sanctioned by DRDO and the rest of the amount was incurred by HAL.

27. To a query from the Committee about placement of production order on HAL for PTAE, it was stated by the Ministry that no order was placed on HAL for producing PTAE so far.

28. The Committee enquired about the anticipated cost of PTAE-7 being produced by HAL as well as the reasons for increase in unit cost of the engine compared to the originally estimated cost. The Ministry stated that the estimated unit cost of the indigenous engine was Rs. 52.19 lakhs for a production run of 125 engines over a period of 6 years at 1999 price level. The earlier project study had estimated a unit cost of Rs.3.88 lakhs at 1979 price level, assuming a production run of 1000 engines during a period of 10 years. The increase in unit cost of PTAE-7 was attributed to increase in rate of foreign exchange over the time period, increase in labour hours due to design change, reduction in the number of engines from 1000 to 125 and profit consequential.

29. The Audit pointed out that as a result of delay in development of PTAE-7, engines had to be imported by the Government. The Committee enquired about the number of engines imported from 1985 onwards and the total cost incurred on that count. The Committee were informed that 14 engines had been imported by ADE from a foreign firm at a cost of Rs. 6.57 crore as part of deliverables to Air Force and Navy under Limited Series Production in 1995 and 1996.

Production of PTA
Limited Series Production (LSP) at ADE

30. According to Audit, at the time of conceptualising the PTA project, it was envisaged that development of PTA would be undertaken by ADE while the series production after successful development would be entrusted to HAL. As the Air Force and the Navy required PTA urgently, the Ministry decided in May 1994 and March

1995 that 10 PTA would be produced (five each for the Air Force and Navy) by ADE at a total cost of Rs.28.86 crore eventhough the annual requirement of the Air Force was 16 and that of Navy was nine. The Ministry intimated Audit in December 1996 that the rationale to launch the limited series production was two fold; (a) to meet the urgent limited requirement of the Air Force and the Navy and (b) to facilitate smooth transfer of technology to the production agency with the least infrastructural investment. Accordingly, production schedule and payment terms were finalised amongst ADE, the Air Force and the Navy in June 1995 and December 1995 respectively for the LSP. One PTA was to be delivered to the Air Force in June 1996 and the balance at the rate of two each in August and December 1996. In case of the Navy, all the PTA were to be delivered between August and December 1997. According to Audit, although the PTA due to be delivered to the Air Force in June 1996 had not been delivered but a total advance of Rs. 11.54 crore had been paid to ADE by the Air Force between October 1994 and June 1995. An advance of Rs. 7.22 crore was also paid by the Navy in November 1995 for production of PTA in limited numbers. Thus, against the total sanctioned amount of Rs. 28.86 crore for 10 PTA, an amount of Rs.18.76 crore was paid to ADE between October 1994 and November 1995.

31. The Committee enquired the reasons for slippage in time schedule for production of PTA by ADE particularly when the rationale behind launching LSP at ADE was to meet the urgent limited requirements of the Air Force and the Navy. The Ministry in a post evidence note stated that several factors contributed to the delays in the execution of LSP programme which fell broadly under two categories viz. (i) vendor related delays, (ii) delays due to documentation standard. In respect of the former category it was stated that that significant delays occurred in supply of materials and components by vendors. Major instances of such delays were flight control actuators and brake pads from foreign firms, tracking antenna, ruggedised computer and other components from Indian suppliers. These suppliers attributed the delays to unavoidable changes in their business plans and statutory limitations in some cases and to technical problems and non availability of materials. In case of the later category the Ministry stated that it was originally assumed that LSP phase will adopt prototype procedures and processes and the documentation standard would mature through the programme. This approach, however, did not prove to be fully practicable considering the involvement of certification and QA steps in the programme. Thus, the documentation standards and route to delivery followed an approach similar to bulk production. This change, though beneficial in the interest of establishment of future production process, required significantly more time allocation during LSP.

32. The Committee desired to know whether PTA as indented were delivered to Indian Air Force and Navy. According to the Ministry, Indian Air Force had received the phase I and II deliveries (3 aircraft, ground systems and expendables) in September 1999 and April, 2000. Indian Navy was scheduled to receive its first phase deliveries in November 2000..

33. According to Audit, Army had not placed any order on ADE till September 1996 as land recovery and re-launch life was not demonstrated in full and usefulness of the PTA was not assessed by them till that period. In this context, the Committee desired to know whether Army, the major User of the PTA, placed any order on the ADE. The Ministry in a note stated that Army had placed an order on ADE on 13th June 1997. Giving the details, it was stated that the contracted value was Rs. 18.87 crore for 5 PTA, GCS, GSE, flight expendables for 50 flights and these were to be delivered in 24 months. An amount of Rs. 15.09 crore was received from Army. As regards the delivery schedule, the Committee were informed that Phase-I delivery was planned in June 2001, followed by final delivery by December 2001.

34. The Committee enquired whether the PTA produced by ADE had undergone the requisite evaluation by the Users and if so what was the outcome of the evaluation. The Ministry stated that the PTA produced under LSP had undergone the requisite evaluation by the Users. According to them, the evaluation consisted of inspection and clearance of the manufactured sub-systems and systems by Directorate General of Aeronautical Quality Assurance (DGAQA) prior to delivery to Users. This is followed by flights of these aircraft at the test range. The Ministry added that 5 such flights had already taken place.

Bulk production at HAL

35. According to the Audit Paragraph, though the series production of PTA after its successful development was planned to be entrusted to HAL, DRDO did not transfer technology till 1997. On being asked by the Committee about the planning for production of PTA, the Ministry stated that the regular production at HAL was expected to commence from 1998-99. The Committee further enquired about the status of setting up of infrastructural facilities at HAL for production of PTA and the likely expenditure to be incurred for its creation. The Ministry in a post -evidence note stated:

"No infrastructural facilities have been established so far. HAL has prepared a project report and sent to ADE for review and vetting. The rough estimate for the infrastructural facilities assessed by HAL for a production run of 100 PTA over a period of five years indicates that the expenditure will be of the order of Rs. 60 lakhs for Capital, and Rs. 1331 lakhs for DRE at 1999 level. These facilities can however be created only after receipt of a firm commitment from the Services regarding their requirement of PTA and after obtaining necessary approval. A Sub-Committee nominated by the PTA Joint Management Board is in the process of reviewing the estimate made by HAL."

36. On being asked when was regular production of PTA at HAL expected to commence, the Ministry stated that regular production of PTA would begin when the series production order is placed by the Users on HAL. Delivery of the first PTA was expected to commence 24 months after receipt of order, with a peak production rate of 25 PTA per year.

37. On being asked whether firm requirement had been intimated by the Services for facilitating and formulating the production plan at HAL, the Ministry stated that based on the information given by the Users to the PTA Joint Management Board, HAL was asked to estimate the series production cost of PTA under the assumption that the annual requirement was 25 PTA per year. No firm requirement had been intimated by the services.

Cost of PTA

38. According to the Audit Paragraph, in 1980 the average cost of each PTA was expected at Rs. 12 lakhs. In 1995, the Ministry approved Limited Series Production (LSP) of 10 PTAs for Air Force and Navy at a total cost of Rs. 28.86 crore. Giving the analysis of the increase in the cost of PTA, the Ministry stated that the 1978/1980 estimated cost of Rs. 12-15 lakhs per PTA referred to the airborne system only. The LSP figures of Rs. 28.86 crore referred to cost of 5 Airframe systems, Flight expendables to support 20 flights, 1 Ground Support Equipment and Spares, to each of the 2 Services, viz., Air Force and Navy. The Ministry added that considering the airborne system of PTA alone, the unit cost in LSP was estimated at Rs. 109.8 lakhs. They submitted that this figure might be compared with Rs. 12 lakhs estimated at 1978 price level and Rupee/Dollar

conversion rates prevailing at that time. It was further stated that the price quoted for PTA system (Air vehicle + Ground Support Equipment + Spares + Product Support etc was considered competitive with the prices of imported PTAs used by the Services.

39. In the aforesaid background, the Committee enquired whether the increase in the cost of PTA airframe to Rs. 97 lakhs was squarely attributable to time over-run or the result of pure underestimation of the cost at the stage of project conceptualisation. The Ministry in a note stated that the increase in the cost of PTA by 97 lakhs was attributable to cost escalation in foreign exchange rate variation which occurred between 1978-97. They denied that it was under estimation at the stage of project conceptualisation.

40. On being asked, what would be the likely cost of PTA under full scale production taking into account all elements that forms the basis of the cost, it was stated by the Ministry that a committee constituted by PTA Joint Management Board was in the process of estimating the series production cost of PTA. The likely figure was estimated to be Rs. 1.8 crore at 2000 price level. On being asked what was the present cost of PTA available through import, the Committee were informed that exact cost data was not available. However, extrapolation of figures from imports of comparable PTA systems in US showed that current price was likely to be Rs.2.20 crore approximately at 2000 price level.

Project Management

41. The Committee desired to know the project management and monitoring mechanism that existed for effective monitoring/review of the progress done in development of PTA and PTAE. The Ministry stated that the project management monitoring mechanism for PTA was guided, monitored and managed at various levels. This constituted DRDO at the apex level in which PTA Steering Committee with SA to RM as Chairman and other Review Committees as constituted by SA to RM, technical progress reviews at periodic intervals and other discussions/reviews initiated by Director-ADE and also at the level of Project Directors. In addition PTA Steering Committee in coordination with Director ADE initiated various special reviews at the peak of development for PTA and PTAE-7. This included, Scientific Review Group (SRG) for PTA in 1985 and Dr. R. Krishnan's Review Committee in 1988, Peer Review Committee of PTAE-7 engine in 1988, Peer Review Committee of PTA in 1990. Expert Team Review on the performance of para Recovery System of PTA and PTAE-7 (1990-91) and Programme Review committee in 1991. Flight Readiness Review (FRR) was constituted by Director, ADE and convened by Project Director-PTA as required prior to each flight trials campaign of PTA to critically study and assess the flight worthy aspects and the mission objectives set out for the trials.

User Evaluation Trials were conducted during 1992-94. Trial Evaluation Sub-Committee and joint trial planning and Evaluation Group were constituted under the aegis of PTA Steering Committee for planning, guiding, conducting and assessing the User trials as the common trial agency for all the three Services. According to the Ministry, all the recommendations/solutions suggested at the progress and reviews/meetings were considered and implemented. This enabled the Project Director-PTA and Director ADE to take appropriate technical and management decisions and also assisted steering committee to take total view of the Project.

The Project on PTAE was managed by Design Project Manager at Technical Planning and Execution level. The technical/commercial/financial problems of the programme were reviewed by Peer Review

Committee. At the Apex level a Steering Committee headed by SA to RM was monitoring the project.

42. Considering the enormous delay both in PTA and PTAE projects and the fact that PTA and PTAE are yet to be fully productionised, the Committee enquired about the structural changes, if any, are being contemplated to arrest further slippage in the envisaged targets. The Ministry in a post evidence note submitted that the need for structural changes etc. should be seen in the light of the total performance and not in isolation of one aspect. It was pointed out that, not withstanding the delays, the PTA development has already succeeded and entered LSP which is considered a creditable achievement in technology creation and management. Series Production is also on the way with Air Force leading the way with further orders. HAL and ADE are optimistic that the development of PTAE will also succeed shortly. It is therefore necessary to adopt past structures and management practices to future needs – preserving the merits which have enabled us to build advanced technologies in very adverse circumstances and environment, while improving/changing the practices which have caused time schedule slippages. With these objectives in view, some changes have been introduced which included introduction of modern project activity planning and monitoring tools, closer monitoring of critical activities. A major DRDO wide programme is also being undertaken to refine our techniques for assessing critical technology requirements and their availability prior to undertaking development of major systems. The Ministry added that HAL had already initiated several measures to strengthen in-house R&D capabilities in all technologies that would be important to the future growth of its business.

User requirement

43. The Audit pointed out that as per the projected requirement, during 1986-96, the Services should have required 935 (11x85) PTA for providing ideal air-to-air and surface-to-air weaponry target practices. Against this, a mere 25 PTA were imported between December 1985 and March 1995 at a total cost of Rs. 23.42 crore. The Ministry intimated Audit that the training needs of the Services were met by imported PTA and towed targets deployed from manned aircraft. The Committee were informed that the present annual requirement of PTA for Army, Air Force and Navy were approximately 30 PTA. Since the order for only 15 PTA was placed on ADE the Committee enquired as to how the requirement of balance PTAs was proposed to be met. It was stated that series production orders would have to be placed for PTA to meet the annual requirement of PTA by the three services. The Committee were further informed that Army was reassessing the requirements for an affordable mix of lower performance (lower cost) aerial target and PTA. If the major requirement of Army (projected to be the major user of PTA) was for the lower performance/lower cost aerial target, the Committee drew the attention of the Ministry that presumably there would be very limited requirement of PTA of `performance class'. In this context, the Committee desired to know about the firm requirement of Army. It was stated that as per the requirement assessed by Army, a total of 15 PTA would be required upto 2007 AD.

44. On being asked whether it would be cost effective to use the PTA for the requirement of Army, the Ministry submitted that PTA was expected to be cost effective for advanced training of Air Defence crew while a User performance system could cater to the needs of ab-initio training.

Technology

45. According to the Audit Paragraph, the development of PTA was sanctioned on the assumption that PTA would remain in service for at least 10 years. Since the PTA had not been delivered even after 15 years of its

scheduled period of completion, the Committee urged the Ministry to assess the sustainability of the technology used in the indigenously developed PTA in the changed scenario and its adaptability to the requirements of a modern aircraft. The Committee were informed that PTA can meet the requirement of the three Services for the next 10 years. It was stated that PTA has adequate growth potential to simulate more sophisticated air defence threats of future such as low level variants, limited EW profiled etc.

Development Projects in the DRDO

46. It is learnt that there had been reports of excessive delays and abnormal cost over-runs in many projects undertaken by DRDO. Some of the major projects undertaken many years ago were not completed and there was always a risk of technology obsolescence because of delays. Technology upgrading in delayed developments and production further added to delays. At the instance of the Committee the Ministry furnished status of some of the important projects undertaken by DRDO in the past. As per the information made available to the Committee, the ALH project which was initially scheduled for completion in 1991 at a total cost of s. 97.31 crore was not completed despite extension till 1998 with revised cost of Rs. 426.84 crore. The LCA project with PDC in 1993 at a cost of Rs. 560 crore was not completed and the time schedule was revised upto 2003 with cost escalation to Rs. 2188 crore. Now the PTA and PTAE projects which were launched in 1980 with PDC of 1985, failed to achieve the enshrined objectives despite a lapse of 15 years and incurrence of expenditure of Rs. 35.43 crore. The Committee asked whether the Ministry agreed that the projects of such vital nature were launched with a tone of excessive over-optimism brushing aside many foreseeable critical points at the time of conceptualisation itself which not only presented a distorted picture initially but ultimately upset the whole schedule of the projects. The Ministry in a post-evidence note stated:
"While planning a high technology project, and the resulting project being exploited for 15 to 20 years, an assessment of the technologies that would be available near the induction period has to be kept in mind. This ensures that the products would be contemporary with those available from other sources as well. While executing such a project with the above aim in mind, there are impediments such as knowledge base, availability of trained manpower, adequate infrastructure and technology denials. Inspite of the above, the project has been completed, initial deliveries made to the services and technology transfer process to the industry initiated."

47. On being enquired by the Committee whether the Ministry undertook any detailed review on the aspects of planning and execution of major developmental projects particularly where overall execution had been very dismal with both time and cost over-runs, the Ministry in a note added:

"All the developmental projects, both major and minor, irrespective of the cost are constantly reviewed, monitored and guided right from the inception stage till completion stage through various means, like Peer Reviews, Steering Committee meetings, Management Boards, Apex Boards and DRCs. These reviews which have been evolved over a period of time based on the experience gained in the past in the planning and execution of development projects is a unique feature of DRDO. DRDO is presently in the process of systematic analysis of development projects by Decision Aid for Technology evaluation (DATE) in order to assess the importance of the project, confidence in exploiting the national technological resource and determine quantitatively the potential for successful completion of the project, thus making sure the project cost and time are not over-run."

Observations/Recommendations

48. Recognising the need to provide realistic airborne targets for training air and ground crews in air-to-air and surface to air weaponry, Government sanctioned in September 1980 design and development of Inter-Services pilotless target aircraft (PTA) by Aeronautical Development Establishment (ADE) at a cost of Rs. 17 crore (FE Rs.8 crore). The development of PTA was planned for completion by 1985. Simultaneously, a development project for indigenous development of PTA engine (PTAE-7) was also sanctioned by Government at an estimated cost of Rs. 4.5 crore (FE-Rs. One crore) to Hindustan Aeronautics Ltd.(HAL) in September 1980. The engine was to be developed by September 1985, concurrently with the PTA. The Committee note that even though the need to develop PTA indigenously was identified in 1976, it took about four years for the Ministry to sanction the Project. The Committee feel that the studies including formulation of Inter-Services Qualitative Requirement (ISQR), feasibility study by ADE and HAL, which were undertaken during the interregnum could have been expedited facilitating early sanction of the project. The Ministry conceded that a faster decision with regard to project sanction would have been helpful. The facts brought out in the Audit Paragraph and further examination by the Committee revealed that execution of both the projects for development of PTA and PTAE was beset with delay, which not only resulted in cost over-run but also defeated the envisaged objectives of the project.

49. The Committee note that ADE was to manufacture 20 PTA prototypes by September 1985 to carry out flight tests for proving the design and User evaluation trials to facilitate an early decision by the Services on the quantum of production. However, the Committee find that against the 20 prototypes planned, ADE fabricated 18 prototypes by September 1993 i.e. after a lapse of eight years. As per the original schedule, development flight task of PTA was planned to commence by September 1983. As against this, first flight trial sortie with PTA prototype took place in December 1985 i.e. after a lapse of two years. While the User evaluation of PTA was planned to commence by 1987, evaluation phase –I was conducted in May 1992, followed by completion of evaluation phase-II in April 1994. The project was closed in June 1994 and PTA (PTA-16) was cleared for Limited Series Production (LSP). The Committee take note of the various reasons advanced by the Ministry for the intermittent delays in developing PTA prototypes and carrying out User evaluation trials. The Committee do share the feeling of the Ministry that deviations from planned time schedules are reflective of imponderables in the implementation of R&D projects. The Committee disapprove the culture of providing over-optimistic targets by DRDO at the project formulation stage. An impression is created that the DRDO does not seriously take into account the likely imponderables in the execution of projects, which ultimately lead to delay with all the attendant complications. Given the complexity of the PTA project, five years time-frame was obviously unrealistic and the Committee do not agree with the contention of the Ministry that target date for completion set at each stage was considered feasible.. The delay of eight years in the completion of PTA development project as against the envisaged target amply substantiates the point emphasised by the Committee. Another disturbing aspect of the PTA development project relates to seeking piecemeal extensions without correct assessment of the time schedule for the completion of the project. The Committee are dismayed that even after seeking extensions twice, first upto September 1988 and then upto March 1991, the project could not be completed. That the completion schedule should have gone awry repeatedly, speaks volumes of the unscientific assumptions on which the planned date of completion (PDC) of the project was based. As a result of the delay in the development of PTA, Government had to spend a total amount of Rs. 23.42 crore in foreign exchange on importation of 25 PTA between December 1985 and March 1995. Successful development of PTA would have avoided this outgo of foreign exchange.

50. The Committee observe that while approving the proposal for seeking extension of PDC of PTA development project upto March 1991, the then Prime Minister desired that responsibility should be fixed for the enormous delay in the implementation of the project. On the question of fixing responsibility, the Ministry submitted that in the context of a technological development programme such as PTA, the directive regarding "responsibility for delay" was to be reckoned as "responsible causes" rather than responsible persons, as it was not possible to identify and single out responsible persons with any degree of fairness. The Ministry reportedly initiated necessary action to analyse and identify the causes of such technical failures and delays through a series of Peer Reviews. Based on the review of the Programme, two major changes were effected in the form of appointing a new Project Director and reorganising some of the Divisions within the laboratory. The Secretary DRDO, during evidence, informed the Committee that in technical and scientific work, there is a Board of Management which supervise the work. Because of one failure, a person cannot be just thrown out and if that happens, then science would not exist. The Committee appreciate the view of the Secretary in the matter. However, what is disquieting to note is the fact that no compliance report on the inordinate delay in completion of the project was submitted to the then Prime Minister after March 1990, which violates the cardinal principle of accountability.

51. The Committee note that PTA development project continued beyond 1991 and was formally closed in June 1994. According to the Ministry, based on the recommendation of the Peer Review and Programme Review Committee on PTA and PTAE, Raksha Mantri approved extension of PDC of the Project upto December 1992. On the question of obtaining approval of CCPA beyond December 1992, it was stated that as the CCPA limit for projects/schemes was enhanced to Rs. 50 crore on 24 August 1992 by the Ministry of Finance, approval from CCPA was not necessary. The Audit however, pointed out that since the amended limit applied to the schemes/projects that had been sanctioned after the issue of orders enhancing the limit and in the subject case, the project was sanctioned with the approval of CCPA, it was mandatory to get the approval from the authority which had originally sanctioned the project for extending PDC of the project. The Committee find logic in the argument adduced by Audit. The Committee, however recommend that the matter be referred to the Ministry of Finance for ascertaining the exact implication of the instructions issued by them in August 1992 and the Committee apprised of the position in this regard. Further, the Ministry may also intimate the Committee whether approval accorded by Scientific Adviser to RM for extension of the project beyond 1992 was in order.

52. The PTA development project was formally closed in June 1994 after incurring a total expenditure of Rs.21.82 crore against a sanctioned amount of RS. 21.84 crore. The Committee's examination revealed that an amount of Rs.4.39 crore was not booked to PTA project, which included Rs. 2.87 crore on account of salary and allowances of scientists and staff engaged in the project after March 1988 and a liability of Rs.1.52 crore towards procurement of tow bodies and pylons from HAL. The Ministry contended that since the manpower sanctioned for PTA was merged with the Revised Core Peace Establishment of ADE, the concept of debiting the project cost beyond 31 March 1988 was entirely notional. The Committee are constrained to point out that the stance taken by the Ministry is improper as the Government sanction of 27 September 1989 under which revised core Peace Establishment was authorised, clearly stipulated that the expenditure on manpower of project for development of an Inter-Services PTA would continue to be debited to project cost till the closure of the project. The Committee were subsequently informed that the sanction of Government issued in 1989 was amended vide Ministry's letter dated 20 January, 2000 wherein the requirement of debiting the expenditure incurred on manpower in the Peace Establishment of ADE to project cost was

deleted. The Committee find no justification in favour of the amendment effected in the earlier sanction of Government after a lapse of near about 11 years. Evidently, the action of the Ministry, in the instant case, was oriented towards covering the procedural infirmity in computation of project cost, which was deplorable. As regards non-booking of expenditure of Rs. 1.52 crore to the project cost, it was stated that the decision to delink the payment due to HAL was taken by the PTA Steering Committee to effect closure of the Project. In this background of the matter, the Committee are inclined to conclude that non-booking of Rs. 4.39 crore in the project cost was a deliberate act on the part of the Ministry, because had the project cost been reflected accordingly, it would have exceeded the sanctioned amount by Rs. 4.37 crore, for which fresh Government sanction would have been necessary.

53. The Committee observe that the project for development of PTAE-7 by HAL was also plagued with abnormal delays and its implementation was far from satisfactory. Since the project could not be completed by 1985, PDC and cost of the project was revised several times. In the latest revision, the PDC of the project was extended to December 1990 and the cost was revised to Rs. 9.22 crore. The project was also not completed by the extended date. The Ministry stated that since the engine of this complex technology was being developed for the first time in the country, development problems such as excessive rotor vibration and failure of turbine blades occurred necessitating design change. It was added that due to redesigning and dependence on the offshore vendor to supply the required castings, the development time of the project got extended beyond the original estimated date. The Ministry also advanced several reasons of technical character including new technological challenges faced by HAL, the solution of which admittedly took longer time. The Committee need hardly emphasise that estimation of PDC of such a complex engine being manufactured for the first time in the country was over-optimistic and viewed in the light of available infrastructure in the country was apparently not feasible. Thus, over-estimation of the capability of HAL and underestimation of the likely teething problems in the project implementation right from the stage of the conceptulisation of the project was suggestive of poor project planning.

54. The Committee note that the first flight with indigenous engine was proposed to be test flown in June 1984. As against this, test flight with PTAE-7 which was conducted in May 1995 met with partial success only. During flight, an engine lubrication problem was encountered due to which the flight was terminated and the PTA was recovered. The Committee were informed that flight trials were conducted with indigenous engine twice after May 1995, the first one on 14 April 1999 and the second one on 30 September 1999. In the flight trial of April 1999, engine performance during launch was stated to be satisfactory, but the performance in flight could not be ascertained due to premature termination of flight. This engine was stated to be lost. During trial of September 1999, after successfully completing the mission, the bearing temperature of the engine increased resulting in auto recovery of the aircraft. As regards the present status of development of PTAE-7, the Committee were informed that completion of type test and sealing of production drawings of the engine was anticipated in March 2001. Distressingly, HAL could not successfully develop the engine even after a lapse 15 years. As a result of the delay in the development of PTAE-7, 14 engines had to be imported by ADE from a foreign firm at a cost of Rs.6.57 crore for PTA being produced for Air Force and Navy under limited series production. Underscoring the urgency to complete the development of engine by HAL, the Committee recommend that all out efforts be made in this direction so that PTAE-7 enters production phase at the earliest, facilitating fulfillment of requirements of the services and checking further drainage of foreign exchange.

55. The Committee observe that based on the urgent requirement of PTA by Air Force and Navy,

the Ministry decided in May 1994 and March 1995 that 10 PTA would be produced (five each for the Air Force and Navy) by ADE at a total cost of Rs. 28.86 crore, even though the annual requirement of Air Force was 16 and that of Navy was nine. According to the Ministry, the rationale to launch limited series production at ADE was two fold viz: to meet the urgent limited requirement of Air Force and Navy and (b) to facilitate smooth transfer of technology to the production agency with the least infrastructural development. As per the original schedule, one PTA was to be delivered to the Air Force in June 1996 and the balance at the rate of two each in August and December 1996. In case of Navy, all the PTA were to be delivered between August and December 1997. However, ADE failed to deliver any PTA by the scheduled time even though an amount of Rs. 18.76 crore was paid to them between October 1994 and November 1995. The reasons for slippage in time schedule of LSP were mainly attributed to Vendor related delay and delays due to documentation standard. The Committee fail to appreciate the reasons for delay adduced by the Ministry at this crucial stage when production orders were placed with ADE under special circumstances for meeting the urgent requirements of the Air Force and Navy. Evidently, once again casual and wayward estimation on the part of ADE, without considering the possible impediments in the production stage, culminated in non-fulfillment of the ideal associated with launching LSP. The Committee note with dismay that only 3 aircraft, ground system and expendables were delivered to Air Force in September 1999 and April 2000 and no aircraft was delivered to Navy till November 2000. According to the Ministry, the Army had also placed an order on ADE on 13 June 1997 for 5 PTA, Ground Control Station, Ground Support Equipment, flight expendables for 50 flights at a total cost of Rs. 18.87 crore. These aircraft were to be delivered in 24 months. In this case also ADE failed to fulfill the delivery schedule even though Rs. 15.09 crore was paid by Army. The Committee were informed that Phase-I delivery was planned in June 2001, followed by final delivery by December 2001. While deprecating the delays at the stage of LSP of PTA, the Committee urge upon the Ministry to strictly watch the progress in production to guard against further slippage in the schedule of production. The Committee would like to be apprised of the status of deliveries of aircraft to Air Force, Navy and Army.

56. The bulk production of PTA after its successful development was planned to be entrusted to HAL. The Committee were informed that the regular production at HAL was expected to commence from 1998-99. Lamentably, even the infrastructural facilities for bulk production at HAL is yet to be created. Intimating the status in this regard, it was stated that HAL had prepared a project report and sent to ADE for review and vetting. The rough estimate for the infrastructural facilities assessed by HAL for a production run of 100 PTA over a period of five years indicated that expenditure would be of the order of Rs.60 lakhs for Capital and Rs. 1331 lakhs for Deferred Revenue Expenditure at 1999 price level. A Sub-Committee nominated by the PTA Joint Management Board was in the process of reviewing the estimate made by HAL. The Committee were informed that these infrastructure facilities would be created only after receipt of a firm commitment from the Services regarding their requirement which is yet to be intimated by the Services. As regards bulk production, it was stated that regular production of PTA would commence when series production order is placed by the Users on HAL. From the foregoing, it is amply clear that the date of commencement of bulk production at HAL cannot be anticipated with any degree of certainty. Now in the present setup, when production facility at HAL is yet to be created and LSP at ADE is lagging behind, the Committee wonder as to how the projected annual requirement of PTA will be met. The Committee would like to know the strategy chalked out by the Ministry in this regard. They may be apprised of the reasons for the abysmal delay in setting up of production facilities at HAL and the time frame for the commencement of bulk production.

57. The Committee note with concern that the estimated cost of Rs. 12-15 lakhs per PTA (airborne system only) in 1978/1980 price level had gone upto Rs. 109.8 lakhs under limited series production. The increase in cost of PTA airframe by Rs. 97 lakhs was mainly attributed to escalation in exchange rate variation which occurred between 1978-97. The Committee are, however, inclined to conclude that time over-run in the completion of the project was crucial for consequential cost over-run of PTA airframe. The Committee were informed that the likely cost of PTA under full scale production was under the process of estimation by a Committee constituted by PTA Joint Management Board. The likely figure was estimated to be Rs. 1.8 crore at 2000 price level. The Committee may be informed of the actual cost of PTA under series production.

58. The unit cost of PTAE-7 estimated at Rs. 3.88 lakhs in 1979 had increased to Rs. 52.19 lakhs in 1999. The increase in the unit cost of PTAE-7 was attributed to increase in rate of foreign exchange over the time period, increase in labour hours due to design change, reduction in the number of engine from 1000 to 125 and profit consequential. While it should be the endeavor of HAL to contain further increase in the cost of the engine, the Committee would like to be apprised of the actual cost of the engine under full scale production.

59. The Committee are constrained to point out that despite elaborate mechanism instituted for monitoring/review of the progress of the Projects on PTA and PTAE, the implementation of the projects was far from satisfactory, when compared with the achievements vis-à-vis laid down targets. It is appalling to observe that at no stage, the time schedule of the envisaged targets were adhered to. Hence, the Committee cannot help concluding that the project management leaves a lot to be desired.

60. To sum up, after 14 years of its sanction, the PTA was cleared for limited series production and orders of 15 PTA only have been placed on ADE against the present estimated requirement of approximately 30 PTA. As a result of delay, Government had to spend a total amount of Rs. 23.42 crore in foreign exchange on importation of 25 PTA between 1985 and March 1995 in addition to resorting to conventional methods of training. The PTAE has not yet been cleared for production despite a lapse of 20 years of its sanction and 15 years after the original date of completion was fixed. 14 engines had to be imported by ADE at a cost of Rs. 6.57 crore as part of deliverables to Air Force and Navy under limited series production in 1995 and 1996. The total cost incurred on PTA was Rs. 26.21 crore and on PTAE Rs. 10.88 crore. Though saddened to note that even after a lapse of 20 years and expenditure of Rs. 37.09 crore, the twin objectives of reducing drain on foreign exchange and providing the Users with unmanned targets remains largely unfulfilled, the Committee still hope dedicated efforts of the concerned engineers and scientists would fructify in near future.

NEW DELHI; **NARAYAN DATT**
TIWARI,
20 March, 2001
Chairman,
29 Phalguna, 1922(Saka) **Public Accounts**
Committee

ACRONYM

1.	ADE	-	Aeronautical Development Establishment
2.	CCPA	-	Cabinet Committee on Political Affairs
3.	DATE	-	Decision Aid for Technology Evaluation
4.	DGAQA	-	Directorate General of Aeronautical Quality Assurance
5.	DRE	-	Deferred Revenue Expenditure
6.	FE	-	Foreign Exchange
7.	FFR	-	Flight Readiness Review
8.	HAL	-	Hindustan Aeronautics Ltd.
9.	HLSC	-	High Level Steering Committee
10.	ISQR	-	Inter Services Qualitative Requirement
11.	LSP	-	Limited Series Production
12.	PDC	-	Planned Date of Completion
13.	PRC	-	Peer Review Committee
14.	PTA	-	Pilotless Target Aircraft
15.	PTAE	-	Pilotless Target Aircraft Engine
16.	SRG	-	Scientific Review Group
17.	TESC	-	Trial and Evaluation Sub-Committee