

DESIGN AND DEVELOPMENT OF ADVANCED LIGHT HELICOPTER

MINISTRY OF DEFENCE

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**PUBLIC ACCOUNTS
COMMITTEE
1993-1994**

TENTH LOK SABHA



सत्यमेव जयते

LOK SABHA SECRETARIAT
NEW DELHI

FIFTY-EIGHTH REPORT
PUBLIC ACCOUNTS COMMITTEE
(1993-94)

(TENTH LOK SABHA)

**DESIGN AND DEVELOPMENT OF
ADVANCED LIGHT HELICOPTER**

MINISTRY OF DEFENCE



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Presented to Lok Sabha on.....
Laid in Rajya Sabha on.....

LOK SABHA SECRETARIAT
NEW DELHI

February, 1994/Magha, 1915 (Saka)

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Corrigenda to the 58th Report (10th Lok Sabha) of the Public Accounts Committee presented to the House on 9.3.1994.

<u>Page</u>	<u>Para</u>	<u>Line</u>	<u>For</u>	<u>Read</u>
1	2	13	1980	1980s
3	6	15	form	for
4	9	2	know	known
4	9	17	add <u>from</u>	after <u>needed</u>
4	9	18	add <u>was not</u>	after <u>Agusta</u>
4	9	19	tech	technical
5	11	5	Rs.10.67	Rs.10.67 lakhs
5	11	10	add <u>not</u>	after <u>was</u>
7	20	5	add <u>in</u>	after <u>committee</u>
7	22	7	HASL	HAL
20	66	13	Depreciating	Deprecating
22	70	16	LAH	ALH
22	71	8	five times	13 times
23	72	8	is	in
23	72	18	activites	activities
24	74	1	at a	that a
37	Sl.No.4	10	infructious	infructuous
39	Sl No.6	5	so f r	so far
39	70	9	LAH	ALH
39	71	13	five times	13 times
41	Sl.No.9	2	firm 'BS'	firm 'B'
44	Sl.No.12	5	development	deployment

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PART II*

Minutes of the sittings of Public Accounts
Committee held on 16.2.1993 and 24.1.1994.

*Not printed (one cyclostyled copy laid on the Table of the House and five copies placed in Parliament Library).

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(1993-94)

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INTRODUCTION

1. The Chairman of the Public Accounts Committee do present on their behalf this Fifty-Eighth Report on Paragraph 5 of the Report of the Comptroller and Auditor General of India for the year ended 31 March, 1991, No. 9 of 1992, Union Government—Defence Services (Air Force & Navy) relating to Design and development of Advanced Light Helicopter.

2. The Report of the Comptroller and Auditor General of India for the year ended 31 March, 1991, No. 9 of 1992, Union Government—Defence Services (Air Force & Navy) was laid on the Table of the House on 12 May, 1992.

3. In this Report, the Committee have found that the development and manufacture of an advanced technology multi-role light helicopter which was mooted as early as in 1970 to succeed Cheetah and Chetak helicopters and whose induction was to commence from 1981-82 is still to take off even after a lapse of over 23 years. The cost of design and development of Advanced Light Helicopter (ALH) which was envisaged as Rs. 27.36 crores in 1976 and revised to Rs. 67.87 crores in 1984 went up to Rs. 251.90 crores in 1990. The present estimate of design and development cost of Advanced Light Helicopter based on April, 1992 level is Rs. 390.68 crores. Similarly, the cost of Advanced Light Helicopter which was originally estimated at Rs. 35 lakhs in 1971 and revised to Rs. 70 lakhs in 1979 would now cost Rs. 9 crores. As per the schedule, all the 13 milestones including proto-type delivery of the helicopters to IAF should have been completed by 1991. However, only 8 out of the 13 milestones have been achieved so far. Expressing their deep distress over the inordinate delay in the development and production of ALH resulting in huge cost and time overruns, the Committee have recommended that with a view to obviating chances of any further cost and time overruns, concerted efforts should be made by all concerned to ensure that the remaining part of the developmental activities on this project is completed expeditiously and that the production of the helicopter commences as per the time schedule now worked out.

4. The Committee have also noted that the Advanced Light Helicopter developed by Hindustan Aeronautics Limited (HAL) was found unsuitable by the users for the intended multi-role requirements and had led to the decision to develop only a general purpose version of the ALH. This change in project perception clearly defeated the original purpose of developing a multi-role ALH. It also necessitated formulation of a fresh ASR to develop an attack version of the ALH, work for which is yet to commence. The overall delay in the availability of ALH particularly with

attack role capability, apart from denying a vital weapon system to IAF, led to the continued deployment of available helicopters for roles for which they were not fully equipped. There had also been inordinate delay in concluding the second collaboration agreement for development of ALH and the expenditure of sizeable magnitude incurred under the first agreement being rendered largely infructuous. While taking a serious view of the manner in which the project has been developed so far the Committee have recommended that the reasons for the inordinate delay in the execution of this project should be thoroughly analysed at the highest level and remedial steps should be taken to ensure that the deficiencies experienced in the execution of this project are obviated in the future defence projects.

5. The Committee (1992-93) examined audit Paragraph 5 at their sitting held on 16 February, 1993. The Committee considered and finalised the Report at their sitting held on 24 January, 1994. Minutes of the sittings form Part II* of the Report.

6. 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 been reproduced in a consolidated form in Appendix II to the Report.

7. The Committee would like to express their thanks to the Public Accounts Committee (1992-93) for taking evidence on Paragraph 5 and obtaining information thereon.

8. The Committee would also like to express their thanks to the officers of the Ministry of Defence for the cooperation extended to them in giving information to the Committee.

9. 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;
February 1, 1994

BHAGWAN SHANKAR RAWAT,
Chairman,
Public Accounts Committee.

Magha 12, 1915 (Saka)

REPORT

Audit Paragraph

This Report is based on Paragraph 5 of the Report of Comptroller and Auditor General of India for the year ended 31st March, 1991 (No. 9 of 1992). Union Government (Defence Services—Air Force & Navy) relating to 'Design and Development of Advanced Light Helicopter', which is appended as Appendix-I.

Genesis of the Project

2. The Aeronautics Committee, constituted by the Government in 1967, under the Chairmanship of Shri C. Subramaniam had envisaged an increasingly important role for helicopters and in keeping with the national policy of acquiring indigenous capabilities and self-reliance, had recommended in 1969 that steps should be initiated to develop a design organisation in the country in this field. Based on this recommendation and the decision taken by the Defence Committee of the Cabinet in this regard in their meeting held on 4 February, 1970, the Government of India entered into a 10 year collaboration agreement in September, 1970 with a foreign firm SNIAS of France (Society National Industriale Aerospatiale presently known as Aerospatiale, hereinafter referred to as firm 'A') for the design and development of an Armed Light Helicopter (Ar. L.H) to meet the requirements of 1980. The helicopter was expected to meet the multi-role requirements of the three Services including attack, Air observation—post and training. This project was assigned to Hindustan Aeronautics Ltd. (H.A.L.) for implementation on behalf of the Government of India. The objective of establishing a competent indigenous design capability including training of the design and technical personnel in India, transfer of relevant designs and technical data and production of helicopters as developed, was sought to be achieved through the participation of firm 'A'.

3. Giving the background of this project, the Ministry of Defence in a note stated as follows:—

“Based on the draft Air Staff Requirement (ASR) (2/71) dated 15th May, 1971, feasibility reports and project estimates were submitted to Government by HAL in October, 1971. The Armed Light Helicopter (Ar. L.H.) was to be sophisticated in design, capable of operating in high mountain regions, extremely manoeuvrable and robust in construction, and in all-up weight category of 2000 kg. The helicopter was to comfortably accommodate 6 persons including 1 or 2 pilots or carry a load of not less than 700 kg. internally.

When the project was submitted (in 1971), it was envisaged that it would be launched in 1971-72, and the helicopter could be developed and productionised by 1981-82. However, due to financial constraints, the project was approved in February, 1976. Therefore, the schedule

had to be revised and the first flight of the first prototype was expected to take place by 1981-82 and series production was to commence in 1984-85."

Initial changes in the concept of the project

4. After the sanction of the project was issued in February, 1976, the design work on the Ar. L.H. with single engine configuration was taken up and the fabrication of the wind-tunnel model and the mock-up were carried out. The first mock-up conference was held at Bangalore in April, 1977. Subsequently, in August, 1977, based on the experience gained from the Vietnam war and Arab-Israeli conflict, Air Hqrs. put up a proposal to the Ar. L.H. Steering Committee for changing the Ar. L.H. to the twin-engine configuration. The Steering Committee at its third meeting, held on 3rd September, 1977, directed Air Hqrs. to put up a paper for changeover to the twin-engine configuration taking into account the cost, state of technology, and time implication and bringing out the need for extension and enlargement of the scope of consultancy so that the Ministry could obtain clearance from the CCPA. The proposal was put up on 17 October, 1978 approved by CCPA on 22 December, 1978 and sanction issued by Government in January, 1979. The Helicopter was renamed as Advanced Light Helicopter (ALH) and planned to be inducted into service by 1986-87.

Earlier Reports of PAC

5. The development of the helicopter under reference had engaged the attention of the Public Accounts Committee earlier also. The delay in sanction and execution of this project as also the extent of redundancies as a result of changeover from single to twin-engine configuration were commented upon by the Public Accounts Committee (1981-82) in their 76th Report (Seventh Lok Sabha) presented in the Lok Sabha on 26th March, 1982. In that report, the Committee had observed that due to the delay of 5½ years in sanctioning the project, the cost of setting up the design facilities and for development had escalated from Rs. 31.84 crores in 1972 to Rs. 41.05 crores in 1976. The development cost had gone up from Rs. 23.04 crores in 1972 to Rs. 37.50 crores in 1979. Referring to further delay caused by the decision to change over from single engine to twin-engine configuration, the Committee in para 1.82 of the Report had observed:—

"Since twin-engine helicopters were designed and developed in 1960s, the Committee fail to appreciate on what considerations the Ministry/Air Headquarters opted for single engine helicopters in September, 1970—a decision which they were obliged to reverse later. The Committee are therefore led to believe that the Ministry and the Air Headquarters have not been keeping themselves abreast concurrently of the latest developments in the field of helicopter technology in the other countries. The Committee consider it unfortunate that a technological gap was allowed to develop and the Ministry of Defence failed to incorporate the advanced technology already available. The Committee deprecate this lacuna,

in Defence Planning with reference to vital projects of this nature: The Committee would suggest that active steps should now be taken to overcome this deficiency:"

6. While reviewing the action taken on the recommendations contained in 76th Report, the Committee in their 130th Report (1982-83, Seventh Lok Sabha) presented in the Lok Sabha on 25th March, 1983 had expressed their concern over the delay in finalising the proposals for design collaboration agreement and emphasised the need for expeditious manufacture of the helicopter. In this connection, the Committee in paragraph 1.8 of the 130th Report had recommended:—

"The Committee had in their 76th Report (March 1982) taken a serious view of the fact that the project for the manufacture of Armed Light Helicopter which was mooted as early as in September 1970 to meet the requirements of the 1980s was still at the drawing board stage. The delay was in the first instance due to change-over from single engine to twin-engine configuration in 1978 and thereafter because of the continuing search for a suitable engine and a collaborator, for manufacturing the air-frame. The Committee are concerned to note that even after a lapse of about an year since the presentation of their 76th Report, it has not been possible for Government to finalise the proposals for design collaboration agreement. Considering the lackadaisical manner in which the project has been pursued so far, the Committee have an apprehension that until and unless the agreement is finalised with the requisite speed, the introduction of modern combat helicopter might not fructify even by 1990. This would inevitably push up the cost of development and manufacture of the helicopter besides depriving the armed forces of the use of a much needed facility. The Committee need hardly stress that concerted efforts should be made at all levels in order to ensure that all the arrangements necessary for taking up the manufacture of the helicopter are finalised expeditiously and its manufacture taken up at the earliest."

Delay in entering into second collaboration agreement

7. It is seen from Audit paragraph that the change in the concept from single to twin-engine helicopter necessitated the formulation of a revised Air Staff Requirement (ASR) in May, 1979, after eight years of the first ASR. The revised ASR envisaged a twin-engine multirole helicopter with armament, weapon carrying and firing capability. This single design helicopter with different standard of equipment fit for attack, utility, casualty evacuation, air observation post (AOP) and other roles including training and with capacity for carrying two plus six passengers was

to be designed, developed and manufactured by HAL. In addition a naval version was also required for use by the Indian Navy. The unit price of the renamed Advance Light Helicopter was at that point of time estimated at around Rs. 70 lakhs for attack version and Rs. 65 lakhs for utility version.

8. The Government also decided to enter into a fresh consultancy agreement to cater for the needs of the twin-engine configuration. Proposals were received from three firms. Draft proposal was put up to CCPA in February, 1984 and approved in May, 1984. Thereafter, an agreement at a total cost of Rs. 36.04 crores was signed with a firm then known as M/s. MBB and now Eurocopter of West Germany, hereinafter referred to as firm 'B' in July, 1984.

9. It will be seen from the above that even though the relative merits of twin-engine helicopter were known as far back as in 1977 itself, it took seven years for entering into an agreement for their development. Even the sanction for switch over from single to twin-engine helicopter was issued in January 1979, after a delay of 20 months. The Committee desired to know as to the reasons for the delay of seven years in finalising the second collaboration agreement. The Ministry of Defence, in their note, stated:—

“The activities on the single engine Ar. L.H. were discontinued by end 1977 when it was decided that the twin-engine configuration was to be progressed. A joint study for ascertaining the feasibility of accommodating two engines on the Ar. L.H. design was carried out by HAL and M/s. SNIAS. However, this was not found feasible. ASR 2/79 for the twin-engine Ar. L. H. was issued in May, 1979 and three firms viz. M/s. MBB, Aerospatiale and M/s. Agusta forwarded their proposals. After scrutiny of the bids, several clarifications were needed M/s. MBB and M/s. Aerospatiale, whereas the offer of M/s. Agusta considered, as it was for an existing helicopter. The offers received and their tech aspects were thoroughly discussed and analysed the Working Group and the Government before the configuration and the area of collaboration were finally decided upon. The request for proposals (RFP) were issued in 1980 and the proposals received from the three firms in 1982 were examined. Detailed discussions with the prospective vendors were held in order to evaluate the comparative advantage of the different systems. The agreement for collaboration was concluded in July, 1984, after due consideration of all relevant factors.”

10. In another note, the Ministry explained the reasons for the delay in submission and scrutiny of request for proposals (RFP) as follows:—

“The draft proposals submitted by the firms were thoroughly scrutinised. A lot of interaction was required. Supplementary questions were raised and sent to the firms for clarifications. As the

issue involved were complex and related to the development of a new technologically complex item, these required extension study by the Working Groups in which both technical and commercial aspects were considered. All that took time."

11. According to the audit paragraph the agreement for single engine configuration with firm 'A' was allowed to be operative until it expired in September 1980. It was not foreclosed even after change in the configuration by invoking provisions to this effect in the agreement resulting in an avoidable payment of Rs. 10.67 (according to the Ministry the amount involved was Rs. 10.20 lakhs) to the firm from 1977 onwards. Asked to explain the reasons for not foreclosing the first collaboration agreement with Firm 'A' in 1977 when the change in configuration from single to twin-engine was initiated, the Ministry of Defence stated:—

"The first collaboration agreement with SNIAS was foreclosed as the issue of changeover from single engine to twin-engine version continued to be negotiated with the firm."

12. Since firm 'A' was a contender for the fresh proposal involving change in configuration from single to twin-engine, the Committee desired to know the reasons for having not contemplated extension of the earlier agreement with them. In reply, the Ministry in a note stated that the initial collaboration agreement with firm 'A' was valid for a period of ten years with an option to extend the agreement for a further period of two years on payment of US \$20,000 per year. According to the Ministry, it was of no avail because the helicopter to be newly designed was fundamentally different from the one being developed under the previous agreement.

13. It has been pointed out by Audit that as a result of the change over to twin-engine configuration and entering into an agreement for its development, a revenue expenditure of Rs. 7.56 crores on account of pay and allowances of technicians and acquiring of tools, incurred in respect of the earlier ten-year collaboration agreement for the design, development and production of a single-engine helicopter and inclusive of the payment of Rs. 61.95 lakhs made to firm 'A' as technical assistance fees, was rendered largely redundant. When asked to comment on the same, the Ministry of Defence in their note stated:—

"Revenue expenditure of Rs. 7.56 crores was mainly incurred on account of pay and allowances and procurement of tools for the Ar. L.H. Project. The expenditure incurred was not entirely infructuous as it resulted in acquiring valuable experience in the basic concepts of helicopter design. An expenditure of Rs. 20.74 lakhs was incurred for the procurement of tools, which were specific to single engine helicopter and could not be utilised for twin-engine configuration."

14. Asked whether any steps have been taken to utilise the redundant material, the Ministry of Defence stated:—

"The tools valued at Rs. 20.74 lakhs were specific to single engine helicopter and could not be made use of for any other purpose or disposed of and were hence scrapped."

Deviations in ALH perception and its impact

15. The Audit paragraph has revealed that the ALH which was being developed from 1970 onwards for meeting the multirole requirements of the three services including attack, AOP and training would now be used only for utility roles. In this context, the Committee attempted to look into the deviations under-gone in the project and its effect on the requirements of the services.

16. The revised ASR issued in May 1979 had envisaged a twin-engine multi-role helicopter with different standard of equipment fit for attack, utility, casualty evacuation, air observation post and other roles including training and with capacity for carrying two plus six passengers to be designed, developed and manufactured by HAL. In addition, a naval version was also required for use by the Indian Navy. However, even before the issue for revised ASR, Army was reported to have expressed some reservations regarding the too many roles being allotted to the multi-purpose helicopter.

17. On being enquired whether the Army was specifically consulted and their needs taken care of before issue of the revised ASR, the Ministry of Defence stated:—

“ASR 2/79 retained most of the operational parameters of ASR 1/71. However, the major conceptual change was the introduction of the twin-engine configuration for enhanced survivability. The concept was revalidated by the three Services in the form of Inter Service Equipment Policy Committee (ISEPC) recommendations in April, 1974. However, while finalising the ASR 2/79, Army Hqrs. expressed the view that three different types of helicopters would be required to cover the desired operational spectrum. Subsequently, the Army Hqrs. reduced the requirement to two types of helicopters as it was felt that Cheetah helicopter was suitable for reconnaissance and observation roles. The question was discussed in the fifth meeting of the Steering Committee held on 3rd November, 1979 in which it was decided that the matter would be further discussed between HAL and Army Hqrs. As a result of these discussions in 1979-80, HAL indicated that the requirements of the Army would be satisfied while also meeting the ASR. The resultant trade-offs due to multirole concept as brought out by HAL were also noted by Army Hqrs.”

18. The two types of helicopters required by the Army (referred to above) was one for attack role and the other for air assault and logistic support role. In the attack version the requirement was for two pilots plus weapons pay load and for the air assault/logistic support version two pilots plus ten combat troops. It is, however, seen from the audit paragraph that the Air HQ *inter-alia* pointed out that if the capacity of the ALH was to be enhanced as required by the Army, it would become too heavy causing unacceptable loss in performance and it would not be a viable proposition to assign to it the training role envisaged in the ASR. Notwithstanding the disagreement of Air Force on the conceptual change in the design of the ALH prior to the conclusion of the agreement with the firm in July, 1984,

the configuration was changed to two plus ten troops from two plus six troops stipulated in the ASR on the instance of the Army. Further, on the assertion of the Army that Chectah helicopter adequately fulfilled the requirement of AOP role, the development of ALH for this role was dispensed with.

19. The Committee desired to know as to why configuration was changed to two plus ten troops from two plus six stipulated in the revised ASR which led to increase in the size and weight of the ALH. The Ministry of Defence stated:-

"The ASR 2/79 was discussed in detail by the three services and HAL and was accepted as a common base reference for development of ALH. Certain trade-offs were worked out to meet the multirole requirement of the helicopter and the same were discussed with Army Headquarters and conveyed to the Air Headquarters. This obviously led to certain compromises in the performance."

20. Asked why the configuration was changed particularly when it was the considered opinion of the IAF that it would not meet the ASR, the Ministry of Defence stated:-

"The question of changing the configuration was discussed in the fifth meeting of the Steering Committee which it was decided that the matter would be further discussed between HAL and Army Hqrs. As a result these discussions, HAL indicated at the sixth meeting of the Steering Committee held on 6th May, 1980 that the requirements of the Army would be satisfied. Trade-offs occurring as a result were communicated to Air Hqrs. by HAL in May, 1980. By the time the agreement was concluded with firm 'B' (MBB) 10 troops requirement was already taken as the basis for the configuration design."

21. When asked as to why the ASR was not amended to accommodate this particular change in configuration, the Ministry of Defence stated:—

"Change in the configuration with reference to ASR were discussed at the 5th/6th Steering Committee meeting to accommodate additional troops requirements of Army. Since the changes had been discussed in the Steering Committee meetings, these were binding on all the parties and to this extent considered as amendments to the ASR."

22. The Committee further enquired whether the changes in the configuration discussed at the Steering Committee meetings were specifically brought to the notice of the Army, Air Force and Navy. The Ministry of Defence stated:-

"The reps. of the IAF, Army and Navy were present during the 5th and 6th Steering Committee meetings. It had been agreed that HASL was to continue with the design and development of the ALH on the basis of ASR 2/79 issued by Air Hq. Air Hqr's view was that if the specifications of ASR 2/79 were met, all role requirements would be fulfilled. HAL indicated that the requirements of the Army would be satisfied while also meeting the ASR."

It was also stated during the 6th SCM that Army Hqrs had no objections as to how the ALH was designed provided the requirements of the Army were met."

23. It has been stated in the audit Paragraph that in September 1986, the Army had pointed out that ALH under development would be sub-optimal in the attack role because of its increase weight and volume. The Indian Air Force viewed that the ALH would be unsuitable in the attack role owing to its size, weight and limited manoeuvrability. On these being pointed out, HAL stated that it would be possible to develop the attack variant of the ALH as a follow on programme within two years after the completion of design of ALH. It was, therefore, decided to develop the utility version of helicopter first with Weapon Systems Integration (WSI) as a separate follow on programme.

24. Further, according to the Audit Paragraph in March 1988 IAF pointed out that apart from the fact that the attack capability of the ALH was only sub-optimal due to its vulnerability on account of its size it had also limitations in its capacity to carry adequate number of missiles. Keeping in view the delay in initiating work on WSI and that spending of scarce resources towards WSI on the ALH whose size was sub-optimal for the attack role would be a waste of resources and infructuous, IAF suggested that if a successor to the ALH could be designed as an agile light attack helicopter (LAH) it would be acceptable to them. Thus it will be seen that the peculiar situation arising out of the inability of the ALH in meeting in the attack role requirements had led to the formulation by IAF for a light attack helicopter.

25. In reply to question as to how far and to what stage is it proposed to incorporate the attack and AOP roles in the ALH, the Ministry of Defence stated:—

"It is now envisaged that the role will be performed by the weapon systems integrated version names ALH (WSI) till either the Light Attack Helicopter (LAH) in the 4 ton class as visualised by ASR 2/87, or a suitable dedicated attack helicopter can be provided. Air OP roles would continue to be performed by Chetak/Chetak helicopters."

26. To a question of the Committee the Ministry of Defence in a note replied that work on Weapon Systems Integration with the ALH has not been sanctioned or taken up so far. Asked further as to how the requirements of the service in attack role were proposed to be met in the absence of sanction to WSI the Ministry replied that the current requirements of the services for armed helicopters has been met by acquiring MI-35 helicopters and reequipping existing units of Chetak helicopters. On further enquiry about additional expenditure incurred by IAF in acquiring MI-35 attack helicopters, the Ministry stated that the value of contract for acquiring MI-35 in 1989-90 was 88.26 million roubles.

27. When asked to indicate the present status of LAH the Ministry of Defence in a note stated that Air Headquarters have issued ASR 287 for LAH in December 1987 which has been concurred in by Army Headquarters. HAL has carried out the feasibility study and submitted a report.

According to the Ministry, only after the performance of ALH proto-type was fully assessed and design freeze for production taken place the proposal would be further considered.

28. On being pointedly asked whether the helicopter under development satisfied the requirements projected by the services, the Secretary (DP&S) stated during evidence:—

“It satisfies all the expectations which are put down by Navy in the NSR of 1985. It satisfies all the expectations given in the ASR 297 which was for Air Force and Army. The question has been raised generally whether it still fulfils the attack role. We understand from the Army that they are prepared to accept it for the attack role. There will have to be a weapon system integration which is in hand and we are quite confident that we will be able to deliver a helicopter which would satisfy the army’s attack role.”

29. In reply to another question whether the Ministry of Defence have persuaded the three services to accept the helicopter being developed by HAL, the Secretary (DP&S) stated:—

“We are doing a little bit of adjustment. We are trying to adjust all the roles into a single helicopter.”

Elaborating further, the Chairman, HAL Stated:—

“If you look at the total project, we are going in for four prototypes, two would be basic version with which we would go ahead and establish the flying characteristics to the helicopter.

The Third prototype is the one which is being made for the Army and Air Force.

The fourth one is for the naval role.

They will be dedicated but the basic structure, the entire dynamic system and dynamic parts would remain the same.”

30. The Committee specifically desired to know whether the problem of excess weight of helicopter as pointed out by Air Force has been taken care of. The Chairman, HAL deposed :—

“The Air Force would have been glad if we could have the helicopter into 2.5 and 3 tonne class. Today the helicopter which we are going to deliver is 4 tonne class. There is an overweight problem. But one of the fundamental requirement of ASR is that there should be a single design to meet all the requirements, the requirement of having 10+2 passengers which was becoming very evidence as far as the Army requirement is concerned, the requirement of having stretchers in its evacuation role and the ambulance role and the amount of load which it is required to take to very high altitude. When all these considerations were taken into account, the weight of the helicopter came to 4 tonne and there was an agreement between the three services and the development agency, HAL. The weight consideration has already been agreed to and, it was based upon this, that we have done it.

I also mentioned that helicopter of similar class like LYNX is today being operated by 15 different Armies and the Air Force all over the

world in the attack role. It is not that the 4 tonne is not suitable. It is a question of having higher power. We are giving them that much of extra power which would be available."

31. In reply to a question whether the helicopter being developed would meet the assigned objectives in attack role, the representative of Air Force stated:—

"After the full weapon system integration as done on the present helicopter, the ALH would become a fully equipped helicopter. Of course, there is some trade-off as far as the manoeuvrability is concerned. Regarding the attack role helicopter, with certain compromises, it could perform and it would be acceptable. There would be a slight compromise."

He also added:

"I would say that the present helicopter with certain compromises will be able to meet practically all the roles that we defined. As I said, for example certain amount of manoeuvrability trade off would be there because the aircraft with all the Armament load would be a heavy machine. If the funds for the ALH are not likely to be available in the near future, then under the circumstances the compromise has to be struck."

32. In this context, the representative of the Army stated:—

"Coming to the attack helicopter we felt that we will need a separate attack variant. Our reasons for the attack variant encompassed flying aspects and I can hardly add to what Air Marshal has already covered with regard to this. I have to however bring in the element of survivability. In a classic attack helicopter the seating is for one pilot behind the other leading to a narrower profile and therefore somewhat better battle field survivability because of its smaller profile. This obviously is catered for or would be catered for in the LAH. The Air HQs. has brought out the time involved in getting an LAH and the cost which is estimated, at a pretty astronomical figure. We therefore, looking at our financial commitment and alternatives of carrying on which the existing machine until we would develop separate LAH or modifying the ALH and integrating weapon systems with it.

To find out how much of our original estimate was met an exercise was carried out with the HAL and the conclusion we reached was that about 90% of the requirements that we would have met with the LAH would be met with the ALH with weapon system integration."

33. On the question of suitability, the representative of Navy stated during evidence that the helicopter had two roles insofar as Navy was concerned—in the search attack role against submarines as well as in carrying antiship missile and also in the submarine warfare. He stated:—

"The naval proto-type is under development...We had a few observations on the blade fold system and hope that these would be set right... the Navy does not see any other alternative or option before the country or before itself. The fact is that a helicopter in the

world market is so very expensive that it is not an option at all....the approach of the Navy is that when we have got this helicopter which meets our requirements, we should go in for it."

34. The Committee pointed out that from the very inception of the project, the development of the ALH was aimed at developing a single design multi-role helicopter with different standard of equipment fit for attack, utility AOP and other roles including training. Both the ASRs initial as well as the revised catered for this need. However, the AOP role was dispensed with due to increased weight of ALH and IAF did not find the ALH suitable for training role. For attack role it was not considered suitable by the services and a separate follow on programme was to be taken up subsequently. Since this defeated the very purpose of going for single design multi-role ALH the Committee asked as to why the project might not be considered as a failure. The Ministry of Defence in a note stated as follows:—

"Even though there have been slippages of 45 months to achieve the 8th milestone the project should not be considered a failure since it is for the first time that an attempt has been made to develop a helicopter in the country."

35. The Ministry of Defence in their note also maintained that despite the removal of the attack and AOP roles it was envisaged that the ALH would still be used for a number of roles like, casualty evacuation, communication, carriage of under slung loads, logistic support and assault, off-shore operations, counter-insurgency operations and anti-ship/sub-operations, by Navy. The Ministry also added that after the first version was finalised, variant of the ALH to suit specific roles/requirements can always be developed.

Over payments to the collaborator

36. It is seen from Audit paragraph that payments were to be made to the firm 'B' in terms of the collaboration agreement with them on achievement of each of the 13 milestones prescribed in the agreement. The achievement of milestones was to be indicated in documents to be executed by the firm and HAL and if any extension of time schedule was involved, payment for the milestone was to be made at the end of such extension which in any case was not to exceed 120 days. The cost of the agreement and payment terms were subsequently amended in December, 1985 by the Government which stipulated that the milestone payments were to be made only upon achievement of each of the milestones. The Government also stipulated from time to time that release of payment against each milestone would be made only after documents certifying the achievement of the respective milestone were executed jointly by the firm and the HAL. Despite these provisions, payments upto the tenth milestone were made to firm 'B' even though works upto the seventh milestone only were completed till May 1990. The overpayment on this account amounted to Rs. 29.18 Crores.

37. At the instance of the Committee, the Ministry of Defence have furnished the following information regarding release of payment of the firm:—

(Rs. in lakhs)					
Milestone No.	Scheduled milestone date as per agreement with MBB	Actual completion date	Amount due	Payment date	Amount paid
ADVANCE PAYMENT			277.57	4.9.84	243.90
				27.12.84	33.67
1.	May, 1985	18.05.85	276.08	21.08.85	276.08
2.	Nov. 1985	18.11.85	397.44	18.01.86	386.38
				1.10.86	6.48
				29.7.88	4.58
3.	May, 1986	18.08.86	613.63	22.08.86	613.63
4.	Nov. 1986	19.11.86	576.25	24.12.86	576.25
5.	May, 1987	23.07.87	641.53	29.07.87	641.53
6.	Nov. 1987	29.06.88	694.75	30.03.88	694.75
7.	May, 1988	19.03.91	798.47	30.12.88	798.47
8.	Nov. 1988	30.08.92	942.86	16.05.89	942.86
9.	May, 1989		740.40	23.11.89	740.19
10.	Nov. 1989		679.19	11.05.90	679.19
			424.50	30.12.91	424.50
			813.00	21.08.92	813.00

There are net amounts paid to firm 'B' after deducting the applicable Indian with-holding tax.

— Payment made as per record of agreement dated 10.10.1991.

38. Asked about the reasons for over payments made to the collaborator in contravention of the terms of the agreement, Secretary (D.P.&S.) stated during evidence:—

"On the question of overpayment, what the audit has pointed out is technically correct. But what happened was that a certain clause in the agreement was revised with a limited objective of converting certain payments in kind, into cash because administering those payments in kind was posing an administrative problem. But inadvertently at that stage this provision relating to payment not being connected with milestone was missed. This was inadvertent. We have seen it. So, everyone lost sight of the deletion and the payments continued to be made."

39. When enquired about the role of internal audit in regard to release of milestone payments, the Secretary (DP&S) stated:—

"It was pointed out by internal audit. When it was discovered the payments were stopped. That company protested that deletion of the clause was unintended but still we persisted and we did not pay. Now we have got the contract revised and it is at least partially related to the achievement of milestones before the payments are released, and on hindsight, we realise that the discovery by the Audit resulted in our negotiating a contract which was more favourable."

40. On being pointed out that such payments revealed total lack of supervision of finances, the representatives of the Ministry of Defence stated:—

"Firstly about the observation that supervision in financial matters should be there, I may mention that it was actually detected by the auditors during the course of post audit in June 1990. Statutory audit and the commercial audit. There was statutory audit, so far as the commercial audit was concerned."

41. Enquired as to when this omission was pointed out by the auditors and about the action taken thereafter, the Ministry of Defence, in their subsequent note, stated:—

“The omission was noticed when DCDA raised objection for the release of the 10th milestone payment when the invoice was raised by HAL in June, 1990. Subsequent to this, milestones, related payments to the firm were withheld. Further, suitable amendments for linkage of payments to milestone achievements were brought in the extended contract concluded in February 1993. Also, instructions have been given to the internal auditors of the company to include in the programme of audit, verification of payment against all such contracts.”

42. In reply to another question, the Ministry in their note also stated that the question of fixing of responsibility for the lapse on any particular person was not felt.

Time and cost Overrun

43. As mentioned earlier, the production and induction of ALH was initially expected to commence from 1981-82 and later revised to 1986-87. The agreement entered into with firm 'B' in July 1984 provided for the design. Development and establishment of production facilities within seven years by HAL. There were 13 milestones to be achieved within this span of 7 years with the provision for production of the four prototype and one ground test vehicle. The prototype was scheduled to fly in November 1988 and production helicopter expected to enter into service by 1991.

44. At the instance of the Committee, the Ministry of Defence have furnished a note indicating the actual date of completion of each milestone *vis-a-vis* the targeted date and the same is reproduced below:—

Details of Milestones

Status

*[As per the agreement
between GDI and MBB(ECD)
entered into in July 1984]*

Milestone No.1 : Specification of development target values

Lay down of the necessary target values for design and development of the different systems Preliminary definition of role equipment	Achieved as per agreement on	18.05.85
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Milestone No. 2 : Freeze of ALH basic configuration

Acceptance of the PDP results related to the Helicopter	Achieved as per agreement on	18.11.85
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Milestone No. 3: Definition of Critical Components

Overall design of these components before starting detailed design	Achieved as per agreement on	18.05.86
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Milestone No. 4: Release of long lead items (LLIT's) for prototypes

Beginning of LLIT procurement	Achieved as per agreement on 19.11.86
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Milestone No. 5: Lay down of test programmes and test procedures

Essential test programmed and acceptance tests are written	Achieved on 23.07.87 as against the target date of 18.05.87
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Milestone No. 6: Design freeze of PTI

Only design changes are permitted, which *do not delay the PTI roll out or *are necessary for flight safety	Achieved on 29.06.88 as against the target date of 18.11.87
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Milestone No. 7: GTV operational

GTV ready to berun. The test facilities shall be available. Finalization of role equipment not resulting in basic design changes.	Achieved on 19.03.91 as against the target date of 18.05.88
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Milestone No. 8: PTI roll out

Self-explaining

Milestone No. 9: PT2/PT3 first flight

Milestone is PT2 first flight

Milestone No. 10: Design freeze of production version

After milestone (10), only those design changes are permitted, which

- *do not delay the production work or
- *are necessary for reason of certification or acceptance of performance data

Milestone No. 11: PT4 first flight

Self-explaining

Milestone No. 12: Acceptance of performance data

The Helicopter fulfills the guaranteed values or has achieved its type certification, whatever happens earlier.

Milestone No. 13: PT delivery to Indian Armed forces test centre

Delivery of a Helicopter prototype.

45. It will be seen from the above that only seven milestones were actually achieved out of the thirteen till November, 1991 when the original agreement entered into between Government of India and firm 'B' expired. The present status of ALH project and the collaboration agreement is discussed subsequently.

46. When enquired about the reasons for the delay in the development of ALH, the Ministry in a note attributed it to the delay in engine selection, change in the configuration, delay in procurement of certain bought out items due to foreign exchange crunch, developmental problems and delays in the supply of vendor developed items.

47. Elaborating the reasons for delay in achieving the milestones in ALH programme, the Secretary (DP & S) stated during evidence:

"..... there have been delays with reference to the time schedule which has been set for it. Upto the fifth milestone the work was mostly on paper and table, it was mostly intellectual input which was being organised. Upto that time, it was more or less in control. But the delays took place when the project first started being physicalised, that is in the sixth and seventh milestones. You are right that cumulatively with reference to the schedule which was set for it, we have fallen behind by about three years. That is correct. Now, the present contract runs upto November, 1994 and what we are trying to do is that we are trying our best to see that we do not slip any further and we are able to complete the project by the end of 1994.

The other thing which we are trying to do is that we are trying to parallelise the ongoing test and certification activities with the initial steps and productionisation. That is possible to do. We hope that as far as the delivery of the aircraft to the services is concerned, we should be able to do it by 1997."

He also stated:

"The delays have taken place. We agree with that. But those delays, as I said, are inherent in a project of this nature. We would very much like to avoid them but unfortunately, they are there.

Secondly, there was also a certain amount of over-ambitiousness in setting the milestones at the initial stage."

48. Asked whether any re-appraisal was undertaken at any stage in view of the delays to assess the technical ability of HAL to develop ALH in accordance with the projected requirements, the Ministry in a note stated that the capability of HAL for the purpose had never been in doubt.

49. According to the Audit Paragraph the cost of design and development of ALH which was originally sanctioned in February 1976 at Rs. 27.36 crores and revised to Rs. 67.87 crores (FE Rs. 46.92 crores) in September, 1984 for the twin engine configuration went upto Rs. 251.90 crores (FE Rs. 153.46 crores) in January, 1990. The cost of the ALH originally envisaged at Rs. 35 lakhs in 1971 and revised to Rs. 70 lakhs in May 1979 would now be Rs. 9 crores. On being enquired about the present estimated cost of design and development of ALH, the Ministry of Defence stated that based on April, 1992, level, it was Rs. 390.68 crores.

50. The following Table indicates the break-up of estimated expenditure on ALH at different points of time :

(Rupees in crores)

	Estimate based on 1982 price level	Estimate based on November 1989 price level	Expenditure which is expected to be finally incurred (April 1992 price level)
(1)	(2)	(3)	(4)
Labour cost	9.53	60.32	91.50
Material cost	15.94	84.77	131.24
Payment to collaborators	39.19	95.56	153.63
Other costs	3.21	11.25	14.31
Total:			
	67.87	251.90	390.68

51. Asked whether the Ministry subscribed to the view that the initial project cost and time frame for completion of project were deliberately kept low so as to get the project sanctioned by Government, the Ministry in a note stated:

“There was no deliberate attempt to keep the projections regarding cost and time required for development of the ALH low. However, in retrospect, it is seen that delay in supplies from vendors, difficulties in development of certain items and exchange rate variation etc. resulted in project delay as well as considerable cost overrun.”

52. On being enquired whether the cost overrun was not due to delay in decision makings, the Secretary, Defence, stated during evidence:

“I am not very clear to what extent the cost overruns are entirely and directly related to decision making. There are a number of factors. In all cases, the effect of time and cost overruns is one of the factors which is reckoned. Delays and consequent cost overruns takes place in the process of development as well as of production. There are also delays at the level of Government in decision making I cannot say that there are none.”

Present Status of the Project

53. According to the schedule prescribed in the collaboration agreement with firm ‘B’ all the 13 milestones including prototype delivery to IAF should have been completed by May, 1991. However, only 7 out of the 13

milestones were achieved till November, 1991 when the original agreement entered into between Government of India and firm 'B' had expired. The Ministry of Defence in a note furnished to the Committee stated that further collaboration with firm B has been concluded and the extended contract will expire in December, 1994 with a provision for extension of the same for a further period of one year if the need arises. When asked about the total financial implications on account of extending agreement, the Ministry stated that the firm B would be paid an additional amount of Rs. 42.95 crores (at the 1992 exchange rate) on account of the extension of the agreement.

54. The Committee enquired about the present status of the ALH project. In reply the Ministry in a note stated that HAL had completed 8 milestones out of a total number of 13 milestones. The proto-type one rolled out on 29th June, 1992 and the first flight took place on 30th August, 1992. According to the Ministry the following milestones were yet to be achieved:-

Milestone No.	Description of the milestone	Date of achievement
9.	PT-2 (First flight)	April, 1993
10.	PT-3 (PT-A) first flight	June, 1993
11.	Design freeze for production	December, 1993
12.	PT-4 (PT-N) first flight	June, 1994
13.	Acceptance of performance data	December, 1994

55. Asked whether the test flight which took place on 30.8.1992 of the proto-type confirmed to the standard and quality of requirements expected of ALH, the Ministry stated that to the extent ALH had flown, standard and quality requirements had been fully met. According to the Ministry with the trend of results so far HAL hoped to meet the standard and quality of the requirements of ALH.

56. On being asked about the level of satisfaction with this proto-type flights amongst the three services the Ministry in a note stated that the development flights had been carried out by HAL test pilots only. According to the Ministry it will be offered to Air Force and Navy for testing after HAL had completed that test.

57. The Committee desired to know the present status of development of ALH and the time by which it was likely to be productionised and made available to users. The Ministry of Defence in a note stated as follows:-

“All the development activities are expected to be completed by Dec., 1994 On present reckoning this entire exercise of commencing series production of the ALH is likely to take 4 to 5 years after the design freeze of the production version (which was scheduled to take place in Dec., 1993 but is understood to have not been undertaken so far)..... A project report for series production of the ALH is under preparation. Setting up of the production facilities will depend upon the availability of the finances”.

58. In this connection the Chairman, HAL deposed before the Committee as follows:

“The manufacturing programme, as mentioned earlier is going to be started by 1995-96. I must say the time to be taken for production will depend on the availability of funds. I must confess and I would not like to keep the hon. Members in dark. The matter is before the Ministry. They are looking at it how to get the resources we want to hasten things. The production rate scheduled is 2-3 helicopters per month. We also need other equipment for this purpose. It is a time-consuming factor. We are aware of the constraints. Funding has been discussed with Ministry. If the funds are made available, I can assure the Committee that I can launch production of these helicopters positively from 1996-97. We gave our requirement of funds.”

59. It is understood that the project is still lagging behind even in terms of achievement of the revised schedule of milestones.

Monitoring by the Ministry

60. The Committee desired to know the special measures taken by the Ministry for timely completion of the ALH project. In reply, the Ministry in a note stated that a Steering Committee was constituted by Government on 28 June, 1976 to review the quarterly progress of the project development and manufacture of ALH. This was later amended *vide* Government letter of 4 December, 1984 to the effect that the Steering Committee will review the progress atleast once in six months. This Committee was *inter alia* required to review the fulfilment of the contractual obligations at pre-determined review/cut off points, assess progress towards successful and timely completion of the project *vis-a-vis* the expenditure and time frame and recommend any further course of action.

61. From the information furnished to the Committee it is seen that the Steering Committee met only 11 times between its reconstitution in 1984 and June 1992. When asked about the reasons for the deviations in the

periodicity of the meetings held by the Steering Committee with reference to the prescribed norms, the Ministry of Defence in a note *inter alia* stated that eventhough the meetings were not formally convened, the ALH project was kept under constant review through close interactions between the Ministry and HAL.

62. On being specifically asked about the progress of the project during the period October, 1980 to June 1984 when there was no collaborations agreement, the Ministry in a note stated:

“The Steering Committee on the Ar. L.H. project met only once between October, 1980 to June, 1984, as there was no collaboration agreement during this period and the issue of a new collaboration agreement was still under discussion with the prospective partners.”

63. The Public Accounts Committee (1981-82) in the context of the delay in a project for replacement of a basic trainer aircraft had in para 1.105 of their 87th report (Seventh Lok Sabha) presented in the Lok Sabha on 16th April, 1982, recommended *inter alia* as follows:-

“..... The Committee desire that the Ministry of Defence should undertake a comprehensive review of major developmental projects initiated during the last 15 years with a view to ascertaining the reasons for delay in their execution (including the delays caused by frequent changes in ORs/ASRs). This review should attempt to correlate the effect of the delays on the morale and combat-worthiness of Defence personnel and the steps that may be necessary to obviate them. This study may also identify the projects which were abandoned half way and the reasons therefor. The Committee would like this study to be entrusted to a high level team consisting of eminent scientists in the field of Defence research as well as high ranking representatives of the three Services and HAL. The Team may be asked to furnish its findings within a year and the same should be reported to the Committee as soon as available.”

64. In pursuance of the recommendations, Government constituted a study Team. Amongst other recommendations, the study team had suggested that a Steering Committee with specific powers should be constituted for each major project like Ajcet Trainer. According to the Ministry of Defence, Steering Committee has been constituted by the Department of Defence Production and Supplies for all major projects under execution.

65. The Aeronautics Committee constituted by the Government of India in 1967 had envisaged an increasingly important role for helicopters and in keeping with the national policy of acquiring indigenous capabilities and self-reliance had recommended in 1969 that steps should be initiated to develop a design organisation in the country in this field. Based on this recommendation and the decision taken by the Defence Committee of the

Cabinet in this regard at their meeting held in February 1970, the Government of India entered into a 10 years collaboration agreement in September 1970 with a foreign firm, SNIAS of France (firm A) for the design, development and production of an Armed Light Helicopter (Ar. L.H.) to meet the requirements of the 1980s as a successor to Cheetah and Chetak helicopters. This project was assigned to Hindustan Aeronautics Ltd. (HAL) for implementation on behalf of the Government of India. The project was finally approved by Government in January 1976 and sanction issued in February 1976. The design work on the Armed Light Helicopter with single engine configuration was initiated soon after the approval of the project in February 1976. The first mock-up conference was held at Bangalore in April 1977. Subsequently, in August, 1977, based on the experience gained from the Vietnam war and Arab-Israeli conflict, AIR Headquarters submitted a proposal to the Armed Light Helicopter Steering Committee for changing the helicopter to twin engine configuration.

66. The development of the Armed Light Helicopter had engaged the attention of the Public Accounts Committee on an earlier occasion also. In their 76th Report (1981-82 Seventh Lok Sabha) presented in the Lok Sabha on 26th March, 1982 the Committee had observed that due to the delay of 5½ years in sanctioning the project, the cost of setting up of the design facilities and for development had escalated from Rs. 31.84 crores in 1972 to Rs. 41.05 crores in 1976. The development cost had gone up from Rs. 23.04 crores in 1972 to Rs. 37.50 crores in 1979. Referring to the further delay caused by the decision to change-over from single engine to twin engine configuration, the Committee had observed that it was unfortunate that a technological gap was allowed to develop and the Ministry of Defence failed to incorporate the advance technology already available since 1960s. Depreciating this lacuna in defence planning with reference to vital projects of this nature, the Committee had suggested that active steps should be taken to overcome this deficiency. In their 130th Report (1982-83, Seventh Lok Sabha) presented in the Lok Sabha on 25th March, 1983 while reviewing the action taken on 76th Report, the Committee had expressed their concern over the delay in finalising the proposals for design collaboration agreement and had emphasised the need for expeditious manufacture of the helicopter. The Committee's examination of the present Audit Paragraph has revealed several disquieting aspects arising out of the progress of the project, performance of collaboration agreements, the impact of delays and the current status which are dealt with in the succeeding paragraphs.

67. The Committee are concerned to note that despite the fact that the relative merits of twin engine helicopters were known in early 1977, sanction to switch over from single to twin engine helicopter was issued only in January 1979 i.e. after a delay of 20 months. The Ministry of Defence failed to convince the Committee of the reasons for this inordinate delay. What has further caused concern to the Committee is that the agreement

with firm 'A' was not foreclosed even after change in the configuration by invoking provisions to this effect in the agreement. It was simply allowed to expire in September 1980 resulting in an avoidable payment of over Rs. 10 lakhs to the firm. While explaining the position, the Ministry of Defence stated that the collaboration agreement with firm 'A' was not foreclosed as the issue of change-over from single to twin engine version continued to be negotiated with that firm. In the opinion of the Committee, the argument is somewhat specious as the matter could have been discussed with firm 'A' even after foreclosing the existing agreement. The Committee deprecate this omission on the part of the authorities concerned.

68. The Committee note that the change in the concept from single to twin engine helicopter necessitated the formulation of a revised Air Staff Requirement (ASR) which was issued in May, 1979. The helicopter was re-named as Advanced Light Helicopter (ALH) and was planned to be inducted into service by 1986-87. The Government also decided to enter into a fresh collaboration agreement to cater to the needs of the twin engine configuration. The 10 years collaboration agreement with firm 'A' expired in September 1980. Unfortunately, by that time even the design parameters of the twin engine helicopters had not been decided. Eventually the second collaboration agreement was concluded with another firm M/s. MBB of West Germany (firm 'B') on 21 July, 1984, after a lapse of four years. Thus, the Committee find to their dismay that the revenue expenditure of Rs. 7.56 crores incurred on pay and allowances of technicians, collaboration fee and acquiring of tools valuing more than Rs. 20 lakhs under the 10 years agreement with firm 'A' was rendered largely infructuous.

69. The Committee note that from the very inception of the project, the development of the Advanced Light Helicopter was aimed at developing a multi role helicopter with different standard of equipment fit for attack, utility, Air Observation Post (AOP) and other roles including training. However, in pursuance of the assertion and insistence of particularly the Army, who had their own reservations about the multi-utility of the ALH, certain vital structural changes were effected in the design during the course of development which had an important bearing on its multi-purpose utility. These conceptual changes, in turn, brought out substantial variations in the size, weight and manoeuvrability of the multirole helicopter. Different services had reacted to these deviations as per their own perceptions. The ASR, however, was not amended. Consequently, the AOP role of the ALH had to be dispensed with due to its increased weight and IAF did not find it suitable for training purposes. Even for attack role, it was not considered suitable by the services. While conceding these shortcomings, the Ministry of Defence maintained that ALH would still be used for a number of roles like casualty evacuation, communication, logistic support and assault, offshore operations, counter insurgency operations, etc. The representatives of the Army and Air Force also admitted during evidence that the helicopter

as presently developed would meet their requirements "with certain compromises". The Committee wonder whether such compromises are proper in designing advanced equipments for purposes of defence. They regret to note that despite the enormous amount of money and time spent on ALH, the helicopter now being sought to be developed will not meet the projected requirements of the services and will only be a diluted version of the one which was originally envisaged. The Committee strongly deprecate the manner in which the project was allowed to undergo several deviations from its original perception at various stages. The Committee expect the authorities concerned responsible for the planning process in such projects which are strategically vital from the point of view of defence preparedness of the country, to be more careful while conceiving projects of such magnitude and importance.

70. One of the sorry fall outs of the failure of ALH to perform its intended multi role purposes is that the AOP roles would now continue to be performed by Cheetak/Chetak helicopters. The attack requirement of the services in the form of the armed helicopters is being met by MI-35 helicopters and by re-equipping the existing units of Chetak helicopters. Significantly, IAF incurred an additional expenditure of 88.26 million roubles in acquiring MI-35 helicopters in 1989-90. The Committee have been informed that the attack role will gradually be performed by the integration of the weapon system to the ALH named ALH (WSI) by developing an attack variant of the ALH as a follow on programme within two years after the completion of the design of ALH. An alternate proposal is to develop a Light Attack Helicopter (LAIH). While sanction has not been accorded to weapon system integration to ALH so far the AIR Headquarters have issued ASR for LAIH in December, 1987 which has been concurred in by Army headquarters. However, according to the Ministry only after the performance of LAIH proto-type was fully assessed and design freeze for production taken place, the proposals would be further considered. The Committee would like to be informed of the further developments in the matter.

71. The Committee find that the cost of design and development of ALH which was envisaged as Rs. 27.36 crores in 1976 and revised to Rs. 67.87 crores in 1984 went up to Rs. 251.90 crores in 1990. The Committee have been informed that the present estimate of design and development cost of ALH based on April, 1992 level is Rs. 390.68 crores. Similarly, the cost of ALH which was originally estimated at Rs. 35 lakhs in 1971 and revised to Rs. 70 lakhs in 1979 would now cost Rs. 9 crores. In other words the design and developemnt cost had gone up to about five times of the original estimates and the cost of the helicopter to about 30 times of the original estimates. The Committee are deeply distressed to note that the inordinate delay in the development and production of ALH has resulted in huge cost overruns. The overall delay in the availability of ALH particularly with attack role capability, apart from denying a vital weapon system to IAF, led

to the continued deployment of available helicopters for roles for which they were not fully equipped. They are of the considered view that the lack of adequate planning at different levels has resulted in this cost and time overruns of immense magnitude which is deplorable. The Committee suspect that there is a tendency to underestimate the cost to enable the organisation to get sanctions from the Ministry. This should be looked into in all future estimates.

72. The Committee note that as per the schedule prescribed in collaboration agreement executed with firm 'B' all the 13 milestones including proto-type delivery to IAF should have been completed by 1991. However, only 7 out of the 13 milestones were achieved till November, 1991 when the original agreement with the firm 'B' had expired. Explaining the reasons for delay in achieving the milestones the Secretary (DP&S) during evidence *inter alia* stated that there was a certain amount of overambitiousness in setting the milestones at the initial stage. In the opinion of the Committee it is good to be ambitious but it should not be to such an extent as to mislead the authorities. The Committee have been informed that a further collaboration with firm 'B' has now been concluded and the extended contract will expire in December, 1994 with a provision for extension of the same for a further period of one year if the need arises involving an additional amount of Rs. 42.95 crores (at the 1992 exchange rate) payable to the firm. While apprising the Committee of the present status of the project the Ministry have stated that HAL has completed 8 milestones out of a total number of 13. The Committee were informed during evidence that on present reckoning the development activities are expected to be completed by December, 1994 and the exercise of commencing series production of the ALH is likely to take place from 1996-97. The Committee, however, found to their dismay, that even in terms of the revised schedule of achievement of milestones as per the extended collaboration contract, the project is still lagging behind. The Committee, therefore, recommend that with a view to obviating chances of any further cost and time overruns, concerted efforts should be made by all concerned to ensure that the remaining part of the developmental activities on this project is completed expeditiously and that the production of the helicopters commences as per the time schedule now worked out. The Committee would like to be informed of the latest position of the project.

73. The Committee find that as per the original agreement with the firm 'B' payments were required to be made to them on achievement of each of the 13 milestones prescribed in the agreement. It was also stipulated from time to time that release of payment against each milestone would be made only after documents certifying the achievement of the respective milestone were executed jointly by the firm and HAL. The Committee are concerned to find that inspite of these provisions, payments upto the 10th milestone were made to the firm even though works upto the 7th milestone only were completed which resulted in over payment on this account to firm A to the

tune of Rs. 29.18 crores. While admitting this lapse during evidence the Secretary, Defence Production & Supplies explained that a clause in the agreement was revised in December, 1985 with a limited objective of converting certain payments in kind into cash and inadvertently at that stage this provision relating to payment being connected with the achievement of milestone was overlooked. The Committee are not satisfied with this explanation. They desire that the matter should be thoroughly inquired into with a view to fixing responsibility.

74. The Committee note that a Steering Committee was constituted by Government on 28 June, 1976 to review the quarterly progress of the project development and manufacture of ALH. This was later amended vide Government order of 4 December, 1984 to the effect that the Steering Committee will review the progress at least once in six months. The said Committee was *inter alia* required to review the fulfilment of the contractual obligations, assess progress towards successful and timely completion of the project vis-a-vis the expenditure and time frame and recommend further course of action. From the information made available to the Committee it was seen that the Steering Committee had met only 11 times between its reconstitution in 1984 and June, 1992. Astonishingly, before its reconstitution, the Steering Committee had met only once during the period October, 1980 to June, 1984. While explaining the reasons for the deviations in the periodicity of the meetings held by the Steering Committee with reference to the prescribed norms, the Ministry of Defence maintained that even though the meetings were not formally convened, the ALH project was kept under constant review through close interaction between the Ministry and HAL. The Committee are not satisfied with this and are of the view that the quality of monitoring effected by the Steering Committee leaves a lot to be desired. They recommend that the Ministry of Defence should look into the matter and take necessary steps so as to ensure that the progress of ALH is effectively monitored.

75. In this context, the Committee recall their recommendation made in Para 1.105 of their 87th Report (Seventh Lok Sabha) presented in the Lok Sabha on 16 April, 1982 wherein they had recommended a review of important defence development projects sanctioned during the last 15 years. In pursuance of the recommendation Government constituted a study team. Amongst other recommendations, the study team had suggested that a Steering Committee with specific powers should be constituted for each major project. According to the Ministry of Defence, Steering Committees have since been constituted by the Department of Defence Production & Supplies for all major projects under execution. In the light of the dismal progress in the development of the Advanced Light Helicopter as discussed in this Report, the Committee desire that the Ministry of Defence should have a fresh look at the functioning of the mechanism for monitoring the progress in the execution of important

development projects to make it more effective. The Committee would like to be informed of the precise action taken in the matter.

76. The facts stated in the foregoing paragraphs clearly bring out that the development and manufacture of an advanced technology multi-role light helicopter which was mooted as early as in 1970 to succeed Cheetah and Chetak helicopters and whose induction was to commence from 1981-82 is still to take off even after a lapse of over 23 years. The ALH developed by HAL was found unsuitable by the users for the intended multi-role requirements and had led to the decision to develop only a general purpose version of the ALH. This change in project perception clearly defeated the original purpose of developing a multi role ALH. It also necessitated formulation of a fresh ASR to develop an attack version of the ALH, work for which is yet to commence. The overall delay in the availability of ALH particularly with attack role capability, apart from denying a vital weapon system to IAF, led to the continued deployment of available helicopters for roles for which they were not fully equipped. There had also been inordinate delay in concluding the second collaboration agreement for development of ALH and the expenditure of sizeable magnitude incurred under the first agreement being rendered largely infructuous. The Committee take a serious view of the manner in which the project has been developed so far and recommend that the reasons for the inordinate delay in the execution of this project should be thoroughly analysed at the highest level and remedial steps should be taken to ensure that the deficiencies experienced in the execution of this project are obviated in the future defence projects.

NEW DELHI;
February 1, 1994

Magha 12, 1915(S)

BHAGWAN SHANKAR RAWAT,
Chairman,
Public Accounts Committee.

APPENDIX I

(Vide Para-1)

Audit Paragraph 5 of the Report of the C & AG of India for the year ended 31 March, 1991 (No. 9 of 1992) Union Government (Defence Services—Air Force & Navy) relating to Design and Development of advanced light helicopter

Introduction

Government signed in September 1970, a ten year collaboration agreement with foreign firm 'A' for the design and development of an Armed Light Helicopter (ArLH) as a successor to the Cheetah and Chetak helicopters in the 1980s. The project was assigned to a public sector undertaking (PSU) for implementation. The Air Force (IAF) desired the ArLH to be inducted into service in 1981-82.

The delay in sanction and execution of the project as also redundancies as a result of change over from single to twin-engine configuration were commented upon in Paragraph 8 of the Report of the Comptroller and Auditor General of India, Union Government (Defence Services) for the year 1974-75 and paragraph 6 of the report for the year 1979-80. The approach of Government towards project implementation was also commented upon by the Public Accounts Committee (1981-82) in their seventy sixth report of Seventh Lok Sabha. Referring to further delay caused by the decision to change over from single engine to twin-engine configuration, the Committee stated that it was unfortunate that a technological gap was allowed to develop and the Ministry failed to incorporate the advanced technology already available. Deprecating this lacuna in defence planning with reference to vital projects of this nature, the Committee suggested that active steps should be taken to overcome this deficiency.

Scope of Audit

Further progress of the project with reference to the requirements projected by the Services as also the performance of collaboration agreements; the current status of the project and impact of delays was reviewed in audit during 1990-91.

Highlights

- Despite the fact that relative merits of twin-engine helicopters were known in early 1977, sanction to switch over from single to twin-engine helicopter was issued in January 1979 after a delay of 20 months. The agreement for single-engine configuration with firm 'A' was allowed to be operative until it expired in September 1980. It was not foreclosed even after change in the configuration by invoking

provisions to this effect in the agreement resulting in an avoidable payment of Rs. 10.67 lakhs to the firm from 1977 onwards.

- Ten-year collaboration agreement with firm 'A' expired in September 1980 by which time even the design parameters of the twin-engine helicopter had not been decided. The second collaboration agreement was concluded only in July 1984 after a lapse of nearly four years of the expiry of the first agreement. This resulted in revenue expenditure of Rs. 7.56 crores incurred on pay and allowances of technicians and acquiring of tools under the ten-year agreement including collaboration fee amounting to Rs. 61.95 lakhs paid to firm 'A' being rendered largely redundant.
- The development and manufacture of an advanced technology multirole ALH which was mooted as early as in 1970 to succeed Chectah and Chetak helicopters is yet to take off even after a lapse of over 20 years. The ALH presently under development at the PSU was found unsuitable for the intended multirole requirements due to its size and weight factors and led to the decision of developing only the utility version of the ALH. This deviation in project perception completely defeated the very purpose of going in for a single design multirole ALH. The overall delay in the availability of the ALH, particularly with attack role capability, apart from denying a suitable weapon system to IAF, led to the continued deployment of the available helicopters for roles for which they were not designed.
- Owing to the unsuitability of the ALH being developed by the PSU in attack role, IAF had to formulate a fresh ASR to develop an attack version of the ALH. However, no work has yet been started.
- Tardy progress of the project has resulted in abnormal cost and time overrun. The cost of design and development of ALH which was envisaged as Rs. 27.36 crores in 1976 and revised to Rs. 67.87 crores in 1984 went upto Rs. 251.90 crores in 1990. The cost of ALH originally estimated at Rs. 35 lakhs in 1971 and revised to Rs. 70 lakhs in 1979 would now cost Rs. 9 crores. Also, the induction of ALH which was to commence from 1981-82 and revised to 1986-87 is now expected to commence only after 1994-95 and that too with diluted utility role.
- Despite clear provisions made in the agreement that payment to firm 'B' would be released only on completion of respective milestones, payments in respect of three additional milestones (upto tenth) were made without their physical completion resulting in overpayment of Rs. 29.18 crores.

- Delay in development and making available of the ALH led the Navy to stretch the existing resources with them thereby accepting certain degree of reduction in the performance level. As a result of the non-availability of ALH as per the expected schedule, Army was unable to deploy the helicopters in all the needy formations.

Formulation of revised ASR

The change in concept from single to twin-engine helicopter necessitated the formulation of a revised Air Staff Requirement (ASR) in May 1979, after eight years of the first ASR. The revised ASR envisaged a twin-engine multirole helicopter with armament, weapon carrying and firing capability. This single design helicopter with different standard of equipment fit for attack, utility, casualty evacuation, air observation post (AOP) and other roles including training and with capacity for carrying two plus six passengers was to be designed, developed and manufactured by the PSU. In addition, a naval version was also required for use by the Indian Navy (Navy). The helicopter was renamed Advance Light Helicopter (ALH) and was planned to be inducted in service by 1986-87. The unit price of the ALH was estimated at around Rs. 70 lakhs for attack version and Rs. 65 lakhs for utility version.

Requirement of the Army

Even before the issue of the revised ASR for the twin-engine configuration, Army HQ had pointed out (October 1978) that the multipurpose helicopter as proposed had been allotted too many roles. On detailed consideration and after examining the prototype that was being developed at the PSU, they were of the view that it would not meet their tactical requirement in the AOP role. Subsequently in November 1979, the Army HQ stated that they had three different types of requirements for AOP, assault/attack role and airlifting of troops and material. While for the AOP role a small and easily manoeuvrable light helicopter was required, for the other two roles they required larger helicopters for airlifting of troops and material. According to them, Cheetah helicopter adequately fulfilled the AOP role and hence it was decided to continue with it for AOP role. In April 1980, Army HQ emphasised that they required at least two types of helicopters, one for attack role and the other for air assault and logistic support role. In the attack version the requirement was for two pilots plus weapons pay load and for the air assault/logistics support version two pilots plus ten combat troops.

Requirement of the Air Force

The ALH as conceived by the Air HQ was a small, light weight, fast and highly manoeuvrable multirole helicopter. It was pointed out by Air HQ that if the capacity of the ALH was to be enhanced as required by the Army, it would become too heavy causing unacceptable loss in performance. The PSU, however, informed in May 1980 that it would be able to accommodate and satisfy the Army's requirements, meeting at the

same time the ASR. This was not found feasible by the IAF who opined that if they were to accept the ALH as envisaged by the PSU, they would have to use a vulnerable heavy and slow helicopter for the anti-tank role in place of a light weight, high speed manoeuvrable one. According to them, with a larger and heavier helicopter which would be expensive to own and operate, it was not a viable proposition to assign to it the training role stipulated in the ASR and they would have to induct a smaller helicopter for training requirements. It was, therefore, the considered opinion of the Air HQ that the ALH as proposed by the PSU would not meet the ASR.

Design and development of twin-engine ALH

The ALH that was being developed under ten year collaboration agreement of September 1970 was a single-engine helicopter. However, due to the experience gained in operations and with the availability of data and the relative merits of the twin-engine helicopter, Air HQ proposed in August 1977 a change from single to twin-engine configuration. Approval of the Cabinet Committee on Political Affairs was obtained in December 1978 and sanction to this effect was issued in January 1979. The revised ASR was issued in May 1979. To cater for the needs of the twin-engine configuration, it was decided to enter into a fresh consultancy agreement. Proposals were received from firms 'A', 'B' and 'C'. The offer of firm 'C' was not pursued as it involved manufacture of an existing helicopter under licence. Of the remaining two proposals, firm 'B' was favoured based on technical considerations even though it was costlier. An agreement at a total cost of Rs. 36.04 crores was signed with firm 'B' in July 1984 (subsequently enhanced in December 1985 to Rs. 39.19 crores), after a lapse of nearly four years of the expiry of the first collaboration agreement. Thus, even though the relative merits of twin-engine helicopter were known to IAF in 1977 itself, it took seven years for entering into an agreement for their development. As a result of the change over to twin-engine configuration and entering into an agreement for its development, a revenue expenditure of Rs. 7.56 crores on account of pay and allowances of technicians and acquiring of tools, incurred in respect of the earlier ten-year collaboration agreement for the design, development and production of a single-engine helicopter was rendered largely redundant. This was inclusive of the payment of Rs. 61.95 lakhs made to foreign firm 'A' as technical assistance fees. The Ministry stated in January 1992 that revenue expenditure of Rs. 7.56 crores was not wholly infructuous as helicopter design and development was attempted for the first time and the earlier project resulted in acquiring certain amount of experience in the basic concepts of helicopter design. It was, however, agreed that tools worth Rs. 20.74 lakhs were specific for the single-engine helicopter and could not be used for twin-engine configuration. The agreement with firm 'A' was not foreclosed and was allowed to continue till its expiry in September 1980 despite specific provisions in the agreement for its foreclosure resulting in an avoidable payment of Rs. 10.67 lakhs to the firm from 1977

onwards. The Ministry stated in December 1990 that the agreement with firm 'A' was not terminated in 1977 as their offer was also being considered for the twin-engine configuration. However, the offer could have been pursued with firm 'A' even after foreclosing the existing agreement by invoking the provisions therein.

The agreement with the foreign firm 'B' provided for the design, development and establishment of production facilities within seven years by the PSU. There were 13 milestones to be achieved within this span of seven years. The agreement also provided for the production of four prototype and one ground test vehicle (GTV). The prototype was scheduled to fly in November 1988 and production helicopter expected to enter into service by 1991.

In September 1984, Government issued a fresh sanction for implementation of twin-engine ALH in collaboration with firm 'B' which inter alia stipulated incurring of the following expenditure:

- capital expenditure upto a limit of Rs. 19.44 crores by the PSU which included actual expenditure of Rs. 8.05 crores already incurred.
- design and development expenditure upto a limit of Rs. 67.87 crores in addition to the expenditure of Rs. 7.56 crores already incurred.

Unsuitability of ALH for multi-role requirements

Notwithstanding the disagreement of Air Force on the conceptual change in the design of the ALH prior to the conclusion of the agreement with firm 'B' in July 1984, the configuration was changed to two plus ten troops from two plus six troops stipulated in the ASR on the insistence of the Army. Further, on the assertion of the Army that Chetah helicopter adequately fulfilled the requirement of AOP role, the development of the ALH for this role was dispensed with. The ASR, however, was not amended.

In September 1986, the Army pointed out that ALH under development would be sub-optimal in the attack role because of its increased weight and volume. The IAF viewed that the ALH would be unsuitable in the attack role owing to its size, weight and limited manoeuvrability. On these being pointed out, the PSU stated that it would be possible to develop an attack variant of the ALH as a follow on programme within two years after the completion of design of ALH. It was, therefore, decided to develop the utility version of helicopter first, with weapon system integration (WSI) as a separate follow on programme. However, Government is yet to accord sanction for the WSI. According to the Ministry, the programme of WSI would be taken up at an appropriate time. The Ministry stated (January 1992) that as and when the first prototype carries out successful flight trials, the subject would be reviewed.

In March 1988, in a meeting held to consider the requirements of the three services, IAF pointed out that apart from the fact that the attack

capability of the ALH was only sub-optimal due to its vulnerability on account of its size, it had also limitations in its capacity to carry adequate number of missiles. They added that as no work on WSI had yet been started, the attack variant of the ALH would be ready only by 1994-95 by which time it would be too late for them to use it and they could not wait till that time. Hence, the IAF and the Army had no use for ALH as an armed helicopter. IAF also viewed that spending of scarce resources towards WSI on the ALH, whose size was sub-optimal for the attack role, would be a waste of resources and infructuous. They suggested that if a successor to the ALH could be designed as an agile Light Attack Helicopter (LAH), it would be acceptable to them. The Navy who had required ALH for specific role also found it unsuitable for that role. They had even suggested that the requirement of Navy should be dropped as the ALH would not meet the requirement in terms of Anti Submarine Warfare (ASW) capability. Thus, the ALH which was being developed from 1970 onwards for meeting the multi-role requirements of the three services including attack AOP and training would now be used only for utility roles.

The Ministry, while conceding that ALH would be sub-optimal as a dedicated attack helicopter stated (December 1990) that it would still be multirole helicopter having performance parameters required for general attack and utility purposes. This is not borne out by the facts as AOP role had already been dispensed with. For attack role, both Army and IAF had expressed that it would not be suitable in the armament role due to its vulnerability and limitations in its capacity to carry adequate number of missiles. IAF had not considered it suitable even for the training role. Further, the Ministry themselves have stated that it would be preferable to develop a LAH for a dedicated attack role. As per latest projections, while the IAF envisaged the ALH to be utilised in utility roles with limited fire power, the Army envisaged it to be utilised primarily in utility roles.

Light Attack Helicopter

Taking into account the peculiar situation arising out of the inability of the ALH in meeting the attack role requirements, the IAF formulated a fresh ASR for a Light Attack Helicopter in December 1987. Primarily, the helicopter which was estimated to cost Rs. 6.5 crores was meant for anti-tank role and IAF wanted it to enter into service by 1988-89. However, the feasibility study carried out by the PSU was still under discussion between Air HQ and the PSU and the work had not yet been started (March 1991).

Present status of the project

According to schedule prescribed in the collaboration agreement with firm 'B', all the thirteen milestones including prototype delivery to IAF should have been completed by May 1991. However, by March 1991, only GTV construction, pertaining to the seventh milestone which should have

actually been over by May 1988, had been completed. Thus, even the twin-engine ALH project is running 34 months behind schedule. The first ALH is expected to be made available by the PSU in 1992-93 and the estimated cost was assessed at Rs. 9 crores including cost of ground servicing, test equipment and spares. But taking into account the delay that has already taken place, the prototype is now likely to be delivered to IAF by March 1994 and production activities could commence only thereafter. This would further inflate the cost. The Ministry attributed the delay mainly to delayed supplies from foreign vendors.

Cost and time overrun

The cost of design and development of ALH which was originally sanctioned in February 1976 at Rs. 27.36 crores and revised to Rs. 67.87 crores (FE Rs. 46.92 crores) in September 1984 for the twin-engine configuration went upto Rs. 251.90 crores (FE Rs. 153.46 crores) in January 1990. Of the increase of Rs. 184.03 crores over the revised cost estimates of 1984, the Ministry attributed Rs. 58.77 crores to price escalation, Rs. 53.86 crores to variations in exchange rates, Rs. 27.62 crores to change in scope of work and Rs. 15.24 crores to cost overrun as a result of slippage of 27 months. The cost of the ALH originally envisaged at Rs. 35 lakhs in 1971 and revised to Rs. 70 lakhs in May 1979 would now be Rs. 9 crores. Also, the production and induction of ALH which was initially expected to commence from 1981-82 and revised to 1986-87 in May 1979 was now likely to commence only after 1994-95 and that too with the diluted utility role as against the multi-role configuration projected throughout. The Ministry stated in December 1990 that while the cost overrun was mainly due to the foreign exchange (FE) fluctuations, price escalation and design changes, the time overrun was occasioned mainly due to problems with vendor's delays in technology absorption.

Payments

Against the ten-year collaboration agreement with firm 'A', an amount of Rs. 61.95 lakhs was paid to them. In respect of the agreement with firm 'B', an amount of Rs. 66.37 crores had been paid to the firm till March 1991 covering the amount due upto the tenth milestone.

In respect of the collaboration agreement with firm 'B', payments were to be made on achievement of each of the 13 milestones prescribed in the agreement. The achievement of milestones was to be indicated in documents to be executed by firm 'B' and the PSU and if any extension of time Schedule was involved, payment for the milestone was to be made at the end of such extension which in any case was not to exceed 120 days. The cost of the agreement and payment terms were subsequently amended in December 1985 by the Government which stipulated that the milestone payments were to be made only upon achievement of each of the milestones. The Government also stipulated from time to time that release

of payment against each milestone would be made only after documents certifying the achievement of the respective milestone were executed jointly by firm 'B' and the PSU. Despite these provisions, payments upto the tenth milestone were made to firm 'B' even though works upto the seventh milestone only were completed. The overpayment on this account amounted to Rs. 29.18 crores.

On this being pointed out by Audit, the Ministry admitted the overpayment and stated that while withholding further payments to the firm, the possibility of linking the payments with actual achievements of the milestones was being examined.

Impact of delay

The delay in the development of the armed version of ALH, apart from denying a suitable weapon system to the IAF also led to the continued deployment of the available helicopters for the roles for which they were not designed. As far as the Navy was concerned, the requirements that were to be carried out by the ALH were being met by stretching the existing resources with them and thus accepting a certain degree of reduction in the performance level. As regards the Army, they could not deploy the helicopters in all formations requiring them, due to non-availability of adequate number of helicopters. Accepting the facts, the Ministry stated that the delay in the availability of the ALH has led to the continued use of Chetak helicopters for the roles for which they were not designed.

Monitoring

A Steering Committee was constituted by the Ministry in June 1976 to review the quarterly progress of the project development and manufacture of ALH. The Committee was to meet at least once in every quarter. In December 1984, the periodicity of the meeting was revised to once in every six months. The details regarding the number of meetings held, issues considered, recommendations made etc. by the Committee were not furnished by the Ministry in the absence of which the efficacy of the monitoring mechanism could not be examined in audit.

APPENDIX II

Conclusions and Recommendations

Sl. No.	Para No.	Ministry/ Department concerned	Conclusion/Recommendation
1	2	3	4
1	65	Ministry of Defence (Deptt. of DP&S)	The Aeronautics Committee constituted by the Government of India in 1967 had envisaged an increasingly important role for helicopters and in keeping with the national policy of acquiring indigenous capabilities and self-reliance had recommended in 1969 that steps should be initiated to develop a design organisation in the country in this field. Based on this recommendation and the decision taken by the Defence Committee of the Cabinet in this regard at their meeting held in February 1970 the Government of India entered into a 10 year collaboration agreement in September 1970 with a foreign firm, SNIAS of France (firm A) for the design, development and production of an Armed Light Helicopter (Ar. L.H.) to meet the requirements of the 1980s as a successor to Chectah and Chetak helicopters. This project was assigned to Hindustan Aeronautics Ltd. (HAL) for implementation on behalf of the Government of India. The project was finally approved by Government in January 1976 and sanction issued in February 1976. The design work on the Armed Light Helicopter with single engine configuration was initiated soon after the approval of the project in February, 1976. The first mock-up conference was held at Bangalore in April 1977. Subsequently, in August 1977, based on the experience gained from the Vietnam war and Arab-Israeli conflict, Air Headquarters submitted a proposal to the Armed Light Helicopter Steering Committee for

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			changing the helicopter to twin engine configuration.
2	66	Ministry of Defence (Deptt. of DP&S)	<p>The development of the Armed Light Helicopter had engaged the attention of the Public Accounts Committee on an earlier occasion also. In their 76th Report (1981-82 Seventh Lok Sabha) presented in the Lok Sabha on 26th March 1982, the Committee had observed that due to the delay of 5-1/2 years in sanctioning the project, the cost of setting up of the design facilities and for development had escalated from Rs. 31.84 crores in 1972 to Rs. 41.05 crores in 1976. The development cost had gone up from Rs. 23.04 crores in 1972 to Rs. 37.50 crores in 1979. Referring to the further delay caused by the decision to change-over from single engine to twin engine configuration, the Committee had observed that it was unfortunate that a technological gap was allowed to develop and the Ministry of Defence failed to incorporate the advanced technology already available since 1960s. Deprecating this lacuna in defence planning with reference to vital projects of this nature, the Committee had suggested that active steps should be taken to overcome this deficiency. In their 130th Report (1982-83, Seventh Lok Sabha) presented in the Lok Sabha on 25th March, 1983, while reviewing the action taken on 76th Report, the Committee had expressed their concern over the delay in finalising the proposals for design collaboration agreement and had emphasised the need for expeditious manufacture of the helicopter. The Committee's examination of the present Audit Paragraph has revealed several disquieting aspects arising out of the progress of the project, performance of collaboration agreements, the impact of delays and the</p>

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			current status which are dealt with in the succeeding paragraphs.
3	67	Ministry of Defence (Deptt. of DP&S)	<p>The Committee are concerned to note that despite the fact that the relative merits of twin engine helicopters were known in early 1977, sanction to switch over from single to twin engine helicopter was issued only in January 1979 i.e. after a delay of 20 months. The Ministry of Defence failed to convince the Committee of the reasons for this inordinate delay. What has further caused concern to the Committee is that the agreement with firm 'A' was not foreclosed even after change in the configuration by invoking provisions to this effect in the agreement. It was simply allowed to expire in September 1980 resulting in an avoidable payment of over Rs. 10 lakhs to the firm. While explaining the position, the Ministry of Defence stated that the collaboration agreement with firm 'A' was not foreclosed as the issue of change-over from single to twin engine version continued to be negotiated with that firm. In the opinion of the Committee, the argument is somewhat specious as the matter could have been discussed with firm 'A' even after foreclosing the existing agreement. The Committee deprecate this omission on the part of the authorities concerned.</p>
4	68	-do-	<p>The Committee note that the change in the concept from single to twin engine helicopter necessitated the formulation of a revised Air Staff Requirement (ASR) which was issued in May, 1979, the helicopter was re-named as Advanced Light Helicopter (ALH) and was planned to be inducted into service by 1986-87. The Government also decided to enter into a fresh collaboration agreement to cater to the needs of the twin engine configuration. The 10 year collaboration agreement with firm 'A' expired in September 1980. Unfortunately, by that time even the design parameters of the twin engine helicopters had not been decided.</p>

Eventually the second collaboration agreement was concluded with another firm M/s. MBB of West Germany (firm 'B') on 21 July, 1984 after a lapse of four years. Thus, the Committee find to their dismay that the revenue expenditure of Rs. 7.56 crores incurred on pay and allowances of technicians, collaboration fee and acquiring of tools valuing more than Rs. 20 lakhs under the 10 years agreement with firm 'A' was rendered largely infructious.

Ministry of Defence (Deptt. of DP&S)

The Committee note that from the very inception of the project, the development of the Advanced Light Helicopter was aimed at developing a multi role helicopter with different standard of equipment fit for attack, utility, Air Observation Post (AOP) and other roles including training. However, in pursuance of the assertion and insistence of particularly the Army, who had their own reservations about the multi-utility of the ALH, certain vital structural changes were effected in the design during the course of development which had an important bearing on its multi-purpose utility. These conceptual changes, in turn, brought out substantial variations in the size, weight and manoeuvrability of the multi role helicopter. Different services had reacted to these deviations as per their own perceptions. The ASR, however, was not amended. Consequently, the AOP role of the ALH had to be dispensed with due to its increased weight and IAF did not find it suitable for training purposes. Even for attack role, it was not considered suitable by the services. While conceding these shortcoming, the Ministry of Defence maintained that ALH would still be used for a number of roles like casualty evacuation, communication, logistic support and assault, offshore operations, counter insurgency operations, etc. The representatives of the

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Army and Air Force also admitted during evidence that the helicopter as presently developed would meet their requirements "with certain compromises". The Committee wonder whether such compromises are proper in designing advanced equipments for purposes of Defence. They regret to note that despite the enormous amount of money and time spent on ALH, the helicopter now being sought to be developed will not meet the projected requirements of the services and will only be a diluted version of the one which was originally envisaged. The Committee strongly deprecate the manner in which the project was allowed to under go general deviations from its original perception at various stages. The Committee expect the authorities concerned responsible for the planning process in such projects which are strategically vital from the point of view of defence preparedness of the country, to be more careful while conceiving projects of such magnitude and importance.

- 6 70 Ministry of Defence (Deptt. of DP&S) One of the sorry fall outs of the failure of ALH to perform its intended multi-role purpose is that the AOP roles would now continue to be performed by Cheetah/Chetak helicopters. The attack requirement of the services in the form of the armed helicopters is being met by MI-35 helicopters and by re-equipping the existing units of Chetak helicopters.

Significantly, IAF incurred an additional expenditure of 88.26 million roubles in acquiring MI-35 helicopters in 1989-90. The Committee have been informed that the attack role will gradually be performed by the integration of the weapon system to the ALH named ALH (WSI) by developing an attack variant of the ALH as a follow on programme

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within two years after the completion of the design of ALH. An alternate proposal is to develop a Light Attack Helicopter (LAH). While sanction has not been accorded to weapon system integration to ALH so for the AIR Headquarters have issued ASR for LAH in December, 1987 which has been concurred in by army headquarters. However, according to the Ministry only after the performance of LAH proto-type was fully assessed and design freeze for production taken place, the proposals would be further considered. The Committee would like to be informed of the further developments in the matter.

- 7 71 Ministry of Defence (Deptt. of DP&S) The Committee find that the cost of design and development of ALH which was envisaged as Rs. 27.36 crores in 1976 and revised to Rs. 67.87 crores in 1984 went up to Rs. 251.90 crores in 1990. The Committee have been informed that the present estimate of design and development cost of ALH based on April, 1992 level is Rs. 390.68 crores. Similarly, the cost of ALH which was originally estimated at Rs. 35 lakhs in 1971 and revised to Rs. 70 lakhs in 1979 would now cost Rs. 9 crores. In other words the design and development cost had gone up to about five times of the original estimates and the cost of the helicopter to about 30 times of the original estimates. The Committee are deeply distressed to note that the inordinate delay in the development and production of ALH has resulted in huge cost overruns. The overall delay in the availability of ALH particularly with attack role capability, apart from denying a vital weapon system to IAF, led to the continued deployment of available helicopters for roles for which they were not fully equipped. They are of the considered view that the lack of adequate planning at different levels has resulted in this cost and time overruns of immense magnitude

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which is deplorable. The Committee suspect that there is a tendency to underestimate the cost to enable the organisation to get sanctions from the Ministry. This should be looked in to in all future estimates.

- 8 72 Ministry of Defence (Deptt. of DP&S) The Committee note that as per the schedule prescribed in collaboration agreement executed with firm 'B' all the 13 milestones including proto-type delivery to IAF should have been completed by 1991. However, only 7 out of the 13 milestones were achieved till November, 1991 when the original agreement with the firm 'B' had expired. Explaining the reasons for delay in achieving the milestones, The Secretary (DP&S) during evidence *inter alia* stated that there was a certain amount of overambitiousness in setting the milestones at the initial stage. In the opinion of the Committee it is good to be ambitious but it should not be to such an extent as to mislead the authorities. The Committee have been informed that a further collaboration with firm 'B' has now been concluded and the extended contract will expire in December, 1994 with a provision for extension of the same for a further period of one year if the need arises involving an additional amount of Rs. 42.95 crores (at the 1992 exchange rate) payable to the firm. While apprising the Committee of the present status of the project the Ministry have stated that HAL has completed 8 milestones out of a total number of 13. The Committee were informed during evidence that on present reckoning the development activities are expected to be completed by December, 1994 and the exercise of commencing series production of the ALH is likely to take place from 1996-97. The Committee, however, found to their dismay, that even in terms of the

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▶			<p>revised schedule of achievement of milestones as per the extended collaboration contract, the project is still lagging behind. The Committee, therefore, recommend that with a view to obviating chances of any further cost and time overruns, concerted efforts should be made by all concerned to ensure that the remaining part of the developmental activities on this project is completed expeditiously and that the production of the helicopters commences as per the time schedule now worked out. The Committee would like to be informed of the latest position of the project.</p>
9	73	<p>Ministry of Defence (Deptt. of DP&S)</p>	<p>The Committee find that as per the original agreement with the firm 'BS' payments were required to be made to them on achievement of each of the 13 milestones prescribed in the agreement. It was also stipulated from time to time that release of payment against each milestone would be made only after documents certifying the achievement of the respective milestone were executed jointly by the firm and HAL. The Committee are concerned to find that inspite of these provisions, payments upto the 10th milestone were made to the firm even though works upto the 7th milestone only were completed which resulted in over payment on this account to firm A to the tune of Rs. 29.18 crores. While admitting this lapse during evidence the Secretary, Defence Production & Supplies explained that a clause in the agreement was revised in December, 1985 with a limited objective of converting certain payments in kind into cash and inadvertently at that stage this provision relating to payment being connected with the achievement of milestone was overlooked. The Committee are not satisfied with this explanation. They desire that the matter should be thoroughly inquired into with a view to fixing responsibility.</p>

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10	74	Ministry of Defence (Deptt. of DP&S)	<p>The Committee note that a Steering Committee was constituted by Government on 28 June, 1976 to review the quarterly progress of the project development and manufacture of ALH. This was later amended <i>vide</i> Government order of 4 December, 1984 to the effect that the Steering Committee will review the progress at least once in six months. The said Committee was <i>inter alia</i> required to review the fulfilment of the contractual obligations, assess progress towards successful and timely completion of the project <i>vis-a-vis</i> the expenditure and time frame and recommend further course of action. From the information made available to the Committee it was seen that the Steering Committee had met only 11 times between its reconstitution in 1984 and June, 1992. Astonishingly, before its reconstitution, the Steering Committee had met only once during the period October, 1980 to June, 1984. While explaining the reasons for the deviations in the periodicity of the meetings held by the Steering Committee with reference to the prescribed norms, the Ministry of Defence maintained that even though the meetings were not formally convened, the ALH project was kept under constant review through close interaction between the Ministry and HAL. The Committee are not satisfied with this and are of the view that the quality of monitoring effected by the Steering Committee leaves a lot to be desired. They recommend that the Ministry of Defence should look into the matter and take necessary steps so as to ensure that the progress of ALH is effectively monitored.</p>
11	75	Ministry of Defence (Deptt. of DP&S)	<p>In this context, the Committee recall their recommendation made in Para 1.105 of their</p>

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12	76 Ministry of Defence (Deptt. of DP&S)	<p data-bbox="387 218 967 945">87th Report (Seventh Lok Sabha) presented in the Lok Sabha on 16 April, 1982 wherein they had recommended a review of important defence development projects sanctioned during the last 15 years. In pursuance of the recommendation Government constituted a study team. Amongst other recommendations, the study team had suggested that a Steering Committee with specific powers should be constituted for each major project. According to the Ministry of Defence, Steering Committees have since been constituted by the Department of Defence Production & Supplies for all major projects under execution. In the light of the dismal progress in the development of the Advanced Light Helicopter as discussed in this Report, the Committee desire that the Ministry of Defence should have a fresh look at the functioning of the mechanism for monitoring the progress in the execution of important development projects to make it more effective. The Committee would like to be informed of the precise action taken in the matter.</p> <p data-bbox="387 984 961 1483">The facts stated in the foregoing paragraphs clearly bring out that the development and manufacture of an advanced technology multi-role light helicopter which was mooted as early as in 1970 to succeed Cheetah and Chetak helicopters and whose induction was to commence from 1981-82 is still to take off even after a lapse of over 23 years. The ALH developed by HAL was found unsuitable by the users for the intended multi-role requirements and had led to the decision to develop only a general purpose version of the ALH. This change in project perception clearly defeated the original purpose of developing a multi-rule ALH. It also necessitated formulation of a fresh ASR to develop an attack version of the ALH.</p>	

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work for which is yet to commence. The overall delay in the availability to ALH particularly with attack role capability, apart from denying a vital weapon system to IAF, led to the continued development of available helicopters for roles for which they were not fully equipped. There had also been inordinate delay in concluding the second collaboration agreement for development of ALH and the expenditure of sizeable magnitude incurred under the first agreement being rendered largely infructuous. The Committee take a serious view of the manner in which the project has been developed so far and recommend that the reasons for the inordinate delay in the execution of this project should be thoroughly analysed at the highest level and remedial steps should be taken to ensure that the deficiencies experienced in the execution of this project are obviated in the future defence projects.
