

**PUBLIC ACCOUNTS COMMITTEE**  
**(1978-79)**

**(SIXTH LOK SABHA)**

**NINETY-SIXTH REPORT**

**MINISTRY OF DEFENCE**

**[Action taken by Government on the recommendations of the Public Accounts Committee contained in their 2nd Report (Sixth Lok Sabha)]**



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

**LOK SABHA SECRETARIAT**  
**NEW DELHI**

*October, 1978/Asvina, 1900 (Saka)*

*Price : Rs. 2.55*

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CORRIGENDA TO 96TH REPORT OF THE  
PUBLIC ACCOUNTS COMMITTEE

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**MEMBERS OF PUBLIC ACCOUNTS COMMITTEE**  
(1978-79)

Shri P. V. Narasimha Rao—*Chairman.*

**MEMBERS**

*Lok Sabha*

2. Shri Halimuddin Ahmed
3. Shri Balak Ram
4. Shri Brij Raj Singh
5. Shri C. K. Chandrappan
6. Shri Asoke Krishna Dutt
7. Shri K. Gopal
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22. Shri Gian Chand Totu

**SECRETARIAT**

1. Shri H. G. Paranjpe—*Joint Secretary.*
2. Shri Bipin Behari—*Senior Financial Committee Officer.*

## INTRODUCTION

I, the Chairman of the Public Accounts Committee, as authorised by the Committee, do present on their behalf this Ninety-Sixth Report on action taken by Government on the recommendations of the Public Accounts Committee contained in their Second Report (6th Lok Sabha) on Defence Services commented upon in paragraphs 9 and 10 of the Report of the Comptroller & Auditor General of India for the year 1974-75, Union Government (Defence Services) relating to the Ministry of Defence.

2. On 31 May, 1978 an 'Action Taken Sub-Committee' consisting of the following Members was appointed to scrutinise the replies received from Government in pursuance of the recommendations made by the Committee in their earlier Reports:

1. Shri P. V. Narasimha Rao—*Chairman*.
2. Shri Asoke Krishna Dutt—*Convener*.

### *Members*

3. Shri Vasant Sathe
4. Shri M. Satyanarayan Rao
5. Shri Gauri Shankar Rai
6. Shri Kanwar Lal Gupta

3. The Action Taken Sub-Committee of the Public Accounts Committee (1978-79) considered and adopted the Report at their sitting held on 17 October, 1978. The Report was finally adopted by the Public Accounts Committee (1978-79) on 10 November, 1978.

4. For facility of reference the conclusions|recommendations of the Committee have been printed in thick type in the body of the Report. For the sake of convenience, the conclusions|recommendations of the Committee have also been appended to the Report in a consolidated form.

5. The Committee place on record their appreciation of the assistance rendered to them in this matter by the Comptroller & Auditor General of India.

NEW DELHI;  
November 10, 1978.  
Kartika 19, 1900 (S).

P. V. NARASIMHA RAO,  
*Chairman,*  
*Public Accounts Committee.*

## CHAPTER I

### REPORT

1.1. This Report of the Committee deals with the action taken by Government on the conclusions|recommendations of the Committee contained in their 2nd Report (Sixth Lok Sabha) presented to the Lok Sabha on 22 December 1977 on paragraphs 9 and 10 of the Report of the Comptroller and Auditor General of India for the year 1974-75, Union Government (Defence Services).

1.2. Action Taken Notes in respect of all the 30 conclusions/recommendations contained in the Report have been received from the Government and these have been categorised as follows:

(i) *Conclusions|recommendations that have been accepted by Government:*

S. Nos. 1-5, 7, 9-11 and 25-27.

(ii) *Conclusions|recommendations which the Committee do not desire to pursue in view of the replies received from Government:*

S. Nos. 6, 8, 12-15, 17-18, 21-22, 23-24 and 28-30.

(iii) *Conclusions|recommendations replies to which have not been accepted by the Government and which require re-iteration:*

S. Nos. 16 and 19-20.

(iv) *Conclusions|recommendations in respect of which Government have furnished interim replies:*

NIL

1.3. The Committee will now deal with the action taken by Government on some of their recommendations.

*Project for the development of an indigenous aircraft (Paragraph 244—S. No. 16)*

1.4. Commenting on the closure of the Project HF-24 which rendered large expenditure incurred on it infructuous, the Committee in above paragraph had observed as under:

“The Committee find that as a result of cancellation of orders placed on HAL for HF-24 trainer aircraft, the redundancy

account of material and labour is estimated at Rs. 3.64 crores. The detailed assessment of the redundancy is being made by HAL. It is stated that this redundancy was 'inescapable and arose mainly out of the difficulties involved in successful development of an improved version of Marut Mk.II'. The Committee hope that it would be possible for the Undertaking to gainfully utilise the material rendered redundant on account of cancellation of orders."

1.5. In their reply dated 20 June 1978, the Ministry of Defence (Department of Defence Production) have stated as under:

"Out of the redundancy of Rs. 3.64 crores, the materials are worth Rs. 1.77 crores, the balance being Tooling and Development Cost. HAL have made an assessment of the materials that could be used on various projects on hand. According to them, material worth Rs. 28 lakhs only could be utilised on various projects. The balance material (value Rs. 1.49 crores) will have to be disposed of after complying with the normal procedure applicable for disposal of imported materials and HAL is working on this.

The balance amount of Rs. 1.87 crores representing Tooling and Development cost cannot be gainfully utilised unless HAL receives further orders for the manufacture of these items. However, no new orders are contemplated at present."

1.6. The Committee find that out of the total redundancy of Rs. 3.64 crores, the tooling and development cost constituted Rs. 1.87 crore. These, it is stated, cannot be gainfully utilised unless Hindustan Aeronautics Ltd., receives further orders for the manufacture of these items and no new orders are at present contemplated. It can thus be safely concluded that the amount of Rs. 1.87 crores on account of tooling and development has gone waste. Out of the balance amount of Rs. 1.77 crores representing the cost of materials, the materials worth Rs. 28 lakhs only could be utilised on various projects and the balance material worth Rs. 1.49 crores will have to be disposed of. The total wasteful expenditure, therefore, comes to Rs. 3.36 crores. At this stage the Committee cannot do anything except expressing their displeasure at this colossal waste of public money which could have been avoided with a little foresight on the part of the Ministry of Defence.

(Paragraphs 2.93 and 2.94—S. Nos. 19 and 20).

1.7. Referring to the fact that the Government persisted with the project for development of reheat variant of orpheus 703 engine



and its fitment in the HF-24 airframe when it came to their notice as early as in 1965 that it caused the problem of base drag which reduced the performance of the aircraft far below the operational requirements, the Committee had, in the above paragraphs, commented as under:

"2.93. The Committee observe that since the existing HF-24 aircraft fell considerably short of the then operational requirements of the Air Force, Gas Turbine Research Establishment (GTRE) of the Research and Development Organisation of the Ministry of Defence took up a project for the development of reheat variant of Orpheus 703 engine (already in use) for fitment to the HF-24 airframe. They also note that as early as in February 1965, the Technical Study Group (headed by Air Cdr. Moolgavakar) reported that although the reheat engine would meet the then existing operational requirements, it would have 'some deficiency in the radius of action'. The Study Group had accepted the reheat variant of Orpheus 703 engine as 'the only expeditious solution'. It has been admitted that in March 1966 it came to light that the test-bed performance of HF-24 Mk. IA (later redesigned as Mk. IR) fitted with reheat version of Orpheus 703 engine 'was inferior even to Mk. I fitted with Orpheus 703 engine in dry climb and cruise due to base drag'. It is further admitted that in 1969 the prototype aircraft fitted with reheat variant of Orpheus 703 engine was flown and this prototype finally crashed in January 1970. The Committee find that in spite of these results, the GTRE was allowed to continue with the reheat development project incurring expenditure which ultimately proved largely infructuous. In February 1973, when Air Headquarters suggested abandonment of the project for manufacture of MK. II aircraft with reheat engine on the grounds, *inter alia*, of financial stringency and instead proposed retro-modification of the existing Mk.I aircraft, the retro-modification of the existing aircraft with reheat variant of Orpheus 703 engine continued to be a subject of research and development in the GTRE even though it was well-known that reheat variant of Orpheus 703 engine had the problem of base drag. The Committee are unable to appreciate as to why the Government persisted with the project for development of reheat variant of Orpheus 703 engine and its fitment in the HF-24 airframe when it came to their notice as early as in 1965 that it caused the pro-

blem of base drag which reduced the performance of the aircraft for below the operational requirements.”

“2.94. The Committee also fail to understand why the proposals for development of other variants, such as the one conceived by HAL was not given a chance to prove its efficacy when it came to be known that the reheat variant developed by GTRE had not proved a success.”

1.8. In their reply dated 21 July and 20 June 1978, the Ministry of Defence (Department of Defence Production) have stated as under:

*Paragraph 2.93*

“The Public Accounts Committee are aware that Technical Study Group had accepted the reheat variant of Orpheus 703 engine as ‘the only expeditious solution’ because of the improvements in the characteristics in respect of combat effectiveness and survivability which were considered to override the small limitation in radius of action on account of drag increase. This was in consonance with the view that the selection of the engine should be governed primarily by consideration of high combat qualities rather than the radius of action as indicated by Air Headquarters in June 1971. The question of continuance of the development of reheat engine was examined in the 11th meeting of the . . . Steering Committee held on 19th June 1968 wherein it was decided that GTRE should continue to work on all the reheat engines for the Mk.IR prototype pending the completion of the study being carried out by the HAL. In 1969 the prototype Mk.IR with reheat engine was flown and this prototype also showed some shortcomings. Before the matter could be analysed further, the only prototype of Mk.IR crashed during its 10th flight in January 1970 and as such no further assessment could be made at that stage.

Air Headquarters had submitted a modified plan for HF-24 Mk. II development because of paucity of resources and to exercise utmost economy in the Defence Expenditure. Accordingly HAL carried out feasibility study in March 1973 and submitted a report which was examined by the Government. In July 1973 the project was reviewed in a meeting chaired by Raksha Utpadan Mantri where pros and cons of three alternative proposals were discussed. It was viewed that development of HF-24 with reheat

engine should not be dropped. Even at the Apex Group discussions, it had been agreed that the project for the development of HF-24 with reheat 703 engine, with a view to retromodification should continue.

The Orpheus reheat engine successfully completed extensive type approval test as per international standards and was type certified, thereby clearing it for production. The performance of airframe and engine was found to be superior in support of combat effectiveness and survivability. It cannot, therefore, be inferred that the expenditure on the reheat project proved to be largely 'infructuous'. On the contrary, if the project had not been pursued, Government would have been open to criticism for not continuing and preserving the development of reheat system, which showed, from the very beginning considerable promise for making the HF-24 a better fighter aircraft. In the meeting held in July 1973 referred to above, a view was also taken that expenditure incurred should be regarded as on 'competence building' in Research and Development Organisation. Further, in a Research and Development Organisation like Gas Turbine Research Establishment, the expenditure on such projects cannot be regarded as infructuous as the technical feasibility of incorporating the high degree reheat system on an actual engine has been achieved and the data generated and the expertise developed and actually being utilised for the engine development programme currently in hand at the Gas Turbine Research Establishment."

*Paragraph 2.94*

"The alternative proposal for Orpheus reheat engine conceived by HAL had emerged in the context of changed requirement of IAF. Apart from the increased radius of action, Air Force had insisted (in September 1973) that it should be possible to complete the development of the engine in a time frame so that Mk.II version of the aircraft can be induced in 1978-79. In the meanwhile (May 1973), the original programme of manufacture of a large number of aircraft had undergone a change and it was limited to retromodification of small numbers of aircraft. It was found that the design and development of the alternative engine proposed by HAL was not as simple as it appeared and HAL did not have the resources to under-

take it within an accepted time frame (above five years). of resources, the alternative proposal of HAL was not Considering the long gestation period and non-availability of resources, the alternative proposal of HAL was not considered feasible (August 1974)."

1.9. The Committee are unable to appreciate the claim of the Gas Turbine Research Establishment (GTRE) that the performance of the airframe and the Orpheus reheat engine developed by them was superior in respect of combat effectiveness and survivability when the problem of 'base drag' was still persisting. They are also not convinced with the argument that the alternative proposal of Hindustan Aeronautics Ltd. (HAL) was not considered feasible "considering the long gestation period and non-availability of resources". The Committee feel that instead of spending time and energy on the unsuccessful GTRE project more resources should have been provided to HAL to undertake the project which had rich potentialities for success. Even assuming, for the sake of argument, the aforesaid contention of the Ministry, the Committee fail to understand why GTRE could not produce an engine which would have made the aircraft operationally successful. This discloses a lack of co-ordination by the Ministry between the activities of the GTRE and HAL which has ultimately resulted in avoidable wasteful expenditure.

## **CHAPTER II**

### **CONCLUSIONS/RECOMMENDATIONS THAT HAVE BEEN ACCEPTED BY GOVERNMENT**

#### **Recommendation**

Having considered the written as well as oral evidence submitted to them the Committee are led to the conclusion that the project for development of an indigenous engine to replace the Viper engine being imported for the Kiran airframe being manufactured by HAL, involving an expenditure of nearly Rs. 82 lakhs failed due to a variety of factors, the principal among them being the lack of a clear objective of the whole project the inability of the Government in making available adequate funds in time and absence of adequate expertise in HAL leading to considerable delays in development. The vacillation displayed by Government right from the time the project was conceived till its abandonment is inexcusable. The various lacunae and deficiencies in the implementation of the project have been discussed in the following paragraphs.

[Sl. No. 1 (Para 1.45) of Appendix to 2nd Report of the P.A.C. 1977-78 (6th Lok Sabha)]

#### **Action Taken**

The observation of the P.A.C. contained in para 1.45 has been noted for future guidance.

2. D.A.D.S. has seen.

[Deptt. of Defence Production O.M. No. 48/42/(18)/78/D (HAL/MDN)/DOIB dated 20 June, 1978].

#### **Recommendation**

The proposal for the design and development of the aero-engine (HJE-2500 Turbo Jet) was initiated by HAL (then known as Hindustan Aircraft Ltd.) in February 1960 with the object of replacing the imported Viper engine for the Basic Jet Trainer then being manufactured by it. Since the aircraft was meant for service in the IAF, the Air Headquarters and the Directorate of Technical Development and Production (Air) were also consulted at the project report stage who had suggested that the delivery schedule of the

engine should be speeded up as much as possible so that there was no delay in the production of the jet trainer aircraft. This shows that the prime objective of the project was to get an indigenous engine for the aircraft as early as possible. The other purpose of 'competence building for future needs' appears to have been only secondary, if not incidental, which would have been achieved as the development work proceeded. However, in course of time as the project proceeded, it became clear that development of the engine could not be completed and productionised to synchronise with the production schedule of the Kiran Airframe which was then under production to which the engine being developed (HJE-2500) was to be fitted in. Consequently the authorities chose to designate it as an 'educational' project thereby affecting its priority in the matter of allotment of funds. It was not that this project was *ab initio* 'educational'. It appears to the Committee that it was made to look as an 'education project' when the chances of its materialisation appeared remote. In the opinion of the Committee the decision to accord this project a low priority in the matter of allotment of funds on the ground that it was 'educational' was wholly unjustified, particularly in view of the fact that Kiran Production itself was running several years behind schedule.

[Sl. No. 2 (Para 1.46) of Appendix to 2nd Report of the P.A.C. 1977-78 (6th Lok Sabha)]

#### **Action Taken**

The observation of the P.A.C. contained in Sl. No. 2 (Para 1.46) has been noted for future guidance.

2. Necessary instructions have been issued to all Defence Public Sector Undertakings including HAL and R & D Organisation *vide* Ministry of Defence letter No. 48/42/(28)/78/D(HAL/MDN)/DOIB dated 14th June, 1978 (Annexure) which inter-alia prescribe that the aims and objectives of the development project should be clearly defined while formulating and implementing the development project.

3. D.A.D.S. has seen.

[Deptt. of Defence Production O.M. No. 48/42/(19)/78/D (HAL/MDN) DOIB, dated 11 July, 1978].

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## ANNEXURE

No. 48/42(28)/78/D(HAL/MDN)/DOIB  
GOVERNMENT OF INDIA  
MINISTRY OF DEFENCE  
(DEPT. OF DEFENCE PRODUCTION)

New Delhi, the 14th June, 1978.

To,

The Chairman,  
Hindustan Aeronautics Ltd.,  
Bangalore.

**SUBJECT:—2ND REPORT OF THE PUBLIC ACCOUNTS COMMITTEE (6th LOK SABHA) ON DEFENCE SERVICES—GENERAL PRINCIPLES TO BE OBSERVED FOR FORMULATION AND IMPLEMENTATION OF THE DEVELOPMENT PROJECTS.**

Sir,

I am directed to say that in the 2nd Report of the Public Accounts Committee (6th Lok Sabha) on Defence Services, the Committee has made the following recommendations for formulation and implementation of the development projects:—

- (i) The aims and objectives of the development project should be clearly defined.
- (ii) The project report should be comprehensive covering all aspects. The technical and management problems in the implementation of the project should be clearly envisaged and an attempt should be made in the report itself to find possible solutions for them.
- (iii) The cost estimates for the project should be worked out carefully and as realistically as possible so as to obviate the need for its revision from time to time.
- (iv) Once the project and the cost estimates therefor have been approved and the project finally cleared, it should not be allowed to languish for want of funds. The flow of the funds should be free and regular.
- (v) Firm targets for stage-by-stage completion of the project should be laid and these should be adhered to.
- (vi) Proper control mechanism and procedures should be evolved for monitoring the progress of the implementation of

the project. If any bottleneck is observed, the matter should be considered at the appropriate level and remedial measures should be taken promptly.

- (vii) As the foreclosure [abandonment] of a continuing project renders the amount expended upon it and resources built up, largely infunctuous, such a course should be decided upon after a very careful consideration at the highest level.

2. It is requested that the recommendations made by the Public Accounts Committee may kindly be kept in view while formulating and implementing the development projects.

Yours faithfully,

(D.N. PRASAD)

*Joint Secretary to the Govt. of India.*

Copy forwarded to:—

1. The Chairman & Managing Director,  
**Bharat Electronics Ltd.,**  
BANGALORE.
2. The Chairman & Managing Director,  
Bharat Earth Movers Ltd.,  
BANGALORE.
3. The Chairman & Managing Director,  
Mazagon Dock Limited, BOMBAY.
4. The Chairman & Managing Director,  
Garden Reach Shipbuilders & Engineers Ltd, CALCUTTA.
5. The Chairman & Managing Director,  
Mishra Dhatu Nigam Ltd., HYDERABAD.
6. The Chairman & Managing Director,  
Goa Shipyard Ltd, GOA.
7. The Managing Director,  
Bharat Dynamics Ltd., HYDERABAD.
8. The Managing Director,  
Praga Tools Ltd., SECUNDERABAD.
9. Director of Aeronautics,  
(R&D Organisation).
10. Director of Administration,  
(R&D Organisation).
11. Director (P & C).



12. All Sections in the Department of Defence Production.
13. D (BUDGET).
14. Integrated Finance (Pror.)
15. Integrated Finance (R&D).
16. All DOs in D (HAL|MDN).

### Recommendation

The Committee observe that the project report prepared by the undertaking suffered from many deficiencies. It did not assess correctly the cost of development of the project, so much so that the cost of development of the engine assessed originally at Rs. 41 lakhs (F.E.—Rs. 11 lakhs) had to be revised to Rs. 100 lakhs (FE—Rs. 12 lakhs) in October 1967 and to Rs. 150 lakhs (FE—Rs. 40 lakhs) in May, 1970. Moreover, it did not set any firm time targets for the completion of the project. It is admitted that the reasons for the 'sketchiness' of the project report was due to lack of technical expertise and also because there was no cross-check available. The Committee feel that while entrusting the project of such magnitude and importance to HAL, Government should have taken care that technical competence was available in the undertaking to execute the project. The sketchy nature of the project report and its other deficiencies should have forewarned the Government of the inadequacies of technical talent with the undertaking and steps should have been taken to overcome the shortcomings. This was not done.

[Sl. No. 3 (Para 1.47) of Appendix to 2nd Report of the P.A.C.  
1977-78 (6th Lok Sabha)]

### Action Taken

The observation of the P.A.C. contained in Para 1.47 has been noted for future guidance.

2. Necessary instructions have been issued to all Defence Public Sector Undertakings including HAL and R&D Organisation vide Ministry of Defence letter No. 48|42| (28) |78|D (HAL|MDN) |DOIB dated 14th June, 1978 (Annexure) which *inter-alia* prescribe that (i) the project report should be comprehensive covering all aspects. The technical and management problems in the implementation of the project should be clearly envisaged and an attempt should be made in the report itself to find possible solutions for them; (ii) the cost estimates for the project should be worked out carefully and as realistically as possible so as to obviate the need for its revision from

time to time; and (iii) firm targets for stage-by-stage completion of the project should be laid and these should be adhered to.

3. D.A.D.S. has seen.

[Deptt. of Defence Production O.M. No. 48/42(20)/78/D(HAL/MDN)/DOIB dated 11 July, 1978].

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**ANNEXURE**

No. 48/42(28)/78/D(HAL/MDN)/DOIB  
GOVERNMENT OF INDIA  
MINISTRY OF DEFENCE  
(DEPT. OF DEFENCE PRODUCTION)  
New Delhi, the 14th June, 1978.

To,

The Chairman,  
Hindustan Aeronautics Ltd.,  
Bangalore.

**SUBJECT:—2ND REPORT OF THE PUBLIC ACCOUNTS COMMITTEE (6th LOK SABHA) ON DEFENCE SERVICES—GENERAL PRINCIPLES TO BE OBSERVED FOR FORMULATION AND IMPLEMENTATION OF THE DEVELOPMENT PROJECTS.**

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Sir,

I am directed to say that in the 2nd Report of the Public Accounts Committee (6th Lok Sabha) on Defence Services, the Committee has made the following recommendations for formulation and implementation of the development projects:—

- (i) The aims and objectives of the development project should be clearly defined.
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- (iii) The cost estimates for the project should be worked out carefully and as realistically as possible so as to obviate the need for its revision from time to time.

- (iv) Once the project and the cost estimates therefore have been approved and the project finally cleared, it should not be allowed to languish for want of funds. The flow of the funds should be free and regular.
- (v) Firm targets for stage-by-stage completion of the project should be laid and these should be adhered to.
- (vi) Proper control mechanism and procedure should be evolved for monitoring the progress of the implementation of the project. If any bottleneck is observed, the matter should be considered at the appropriate level and remedial measures should be taken promptly.
- (vii) As the foreclosure/abandonment of a continuing project renders the amount expended upon it and resources built up, largely infructuous, such a course should be decided upon after a very careful consideration at the highest level.

2. It is requested that the recommendations made by the Public Accounts Committee may kindly be kept in view while formulating and implementing the development projects.

Yours faithfully,

(D. N. PRASAD)

*Joint Secretary to the Govt. of India.*

Copy forwarded to:—

1. The Chairman & Managing Director,  
Bharat Electronics Ltd.,  
BANGALORE.
2. The Chairman & Managing Director,  
Bharat Earth Movers Ltd.,  
BANGALORE.
3. The Chairman & Managing Director,  
Mazagon Dock Limited, BOMBAY.
4. The Chairman & Managing Director,  
Garden Reach Shipbuilders & Engineers Ltd., CALCUTTA.
5. The Chairman & Managing Director,  
Mishra Dhatu Nigam Ltd., HYDERABAD.
6. The Chairman & Managing Director,  
Goa Shipyard Ltd., GOA.
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Bharat Dynamics Ltd., HYDERABAD.

8. The Managing Director,  
Praga Tools Ltd., SECUNDERABAD.
9. Director of Aeronautics,  
(R&D Organisation).
10. Director of Administration,  
(R&D Organisation).
11. Director (P&C).
12. All Sections in the Department of Defence Production.
13. D (BUDGET).
14. Integrated Finance (Prop.)
15. Integrated Finance (R&D).
16. All DOs in D-(HAL|MDN).

#### Recommendation

The Committee also note that no machinery was created for regularly monitoring the progress of this important project and that the entire exercise was left to HAL. The Committee hope that Government will learn a lesson from the fate of this project and see that while undertaking any major project, monitoring agencies are invariably established and if any bottleneck is observed by them, immediate remedial action should be taken so that the progress is not clogged unnecessarily.

[Sl. No. 4 (Para 1.48) of Appendix to 2nd Report of the P.A.C. 1977-78 (6th Lok Sabha)]

#### Action taken

The observation of the P.A.C. has been noted.

2. The Government have already started the practice of regularly monitoring the progress of important projects and in fact have appointed high level Steering Committees in respect of all the major development projects recently approved.

3. D.A.D.S. has seen.

[Deptt. of Defence Production O M. No. 48|42 (21) |78|D (HAL|MDN)/DOIB dated 20th June, 1978]

#### Recommendation

The Committee have been informed that against the estimated cost of development of the project of Rs. 41 lakhs, the Board of Dir-

ectors of HAL sanctioned for the project Rs. 5 lakhs in February 1960, Rs. 10 lakhs in December 1962 and Rs. 5 lakhs in January, 1969, aggregating Rs. 20 lakhs, pending the sanction of the development grant by the Government. It was only in June 1972 that the development grant of Rs. 150 lakhs was sanctioned by Government. This indicates that Government were not attaching to the development project the importance that it deserved right from the very beginning. If it was desired that the undertaking should develop an engine quickly so that its production could be synchronised with the production schedule of the Kiran engine airframe, Government should have placed at the disposal of the undertaking adequate resources to bring the development project to early fruition. Having denied to the undertaking adequate resources for the development project, Government have to bear the blame for the delay in the execution of the project which rendered the initial objective of the project, namely, to replace the imported Viper engine by an indigenous engine, completely out of focus. The Committee feel that if Government had shown a little more enthusiasm and keenness to have the project successfully executed and to achieve its desired objective, by making available adequate resources to the undertaking in time, perhaps the project would not have ended in a fiasco and the country would have achieved a breakthrough in the manufacture of aero-engine which could replace the imported engines for aircraft being manufactured by us.

[Sl. No. 5 (Para 1.49) of Appendix to 2nd Report of the V.A.C. 1977-78)6th Lok Sabha]

#### **Action taken**

The observation of the P.A.C. contained in Para 1.49 has been noted for future guidance.

2. Necessary instructions have been issued to all Defence Public Sector Undertakings including HAL vide Ministry of Defence letter No. 48|42(28)|78|D(HAL|MDN)|DOIB dated 14th June, 1978 (Annexure) that once the project and the cost estimates thereof have been approved and the project finally cleared, it should not be allowed to languish for want of funds and that the flow of the funds should be free and regular.

3. D.A D.S. has seen.

[Department of Defence Production OM No. 48|42.(22)|78D (HAL|MDN)|DOIB, dated 11 July, 1978]

## ANNEXURE

No. 48/42 (28) /78/D (HAL/MDN) /DOIB  
GOVERNMENT OF INDIA  
MINISTRY OF DEFENCE  
(DEPTT. OF DEFENCE PRODUCTION)

New Delhi, the 14th June, 1978.

To

The Chairman,  
Hindustan Aeronautics Ltd.,  
Bangalore.

SUBJECT:—2ND REPORT OF THE PUBLIC ACCOUNTS COMMITTEE (6th LOK SABHA) ON DEFENCE SERVICES—GENERAL PRINCIPLES TO BE OBSERVED FOR FORMULATION AND IMPLEMENTATION OF THE DEVELOPMENT PROJECTS.

Sir,

I am directed to say that in the 2nd Report of the Public Accounts Committee (6th Lok Sabha) on Defence Services, the Committee has made the following recommendations for formulation and implementation of the development projects:—

- (i) The aims and objectives of the development project should be clearly defined.
- (ii) The project report should be comprehensive covering all aspects. The technical and management problems in the implementation of the project should be clearly envisaged and an attempt should be made in the report itself to find possible solutions for them.
- (iii) The cost estimates for the project should be worked out carefully and as realistically as possible so as to obviate the need for its revision from time to time.
- (iv) Once the project and the cost estimates therefor have been approved and the project finally cleared, it should not be allowed to languish for want of funds. The flow of the funds should be free and regular.

- (v) Firm targets for stage-by-stage completion of the project should be laid and these should be adhered to.
- (vi) Proper control mechanism and procedures should be evolved for monitoring the progress of the implementation of the project. If any bottleneck is observed, the matter should be considered at the appropriate level and remedial measures should be taken promptly.
- (vii) As the foreclosure/abandonment of a continuing project renders the amount expended upon it and resources built up, largely infructuous, such a course should be decided upon after a very careful consideration at the highest level.

2. It is requested that the recommendations made by the Public Accounts Committee may kindly be kept in view while formulating and implementing the development projects.

Yours faithfully,

Sd-

(D. N. PRASAD)

*Joint Secretary to the Govt. of India.*

Copy forwarded to:—

1. The Chairman & Managing Director,  
Bharat Electronics Ltd., BANGALORE.
2. The Chairman & Managing Director,  
Bharat Earth Movers Ltd., BANGALORE.
3. The Chairman & Managing Director,  
Mazagon Dock Limited, BOMBAY.
4. The Chairman & Managing Director,  
Garden Reach Shipbuilders & Engineers Ltd., CALCUTTA.
5. The Chairman & Managing Director,  
Mishra Dhatu Nigam Ltd., HYDERABAD.
6. The Chairman & Managing Director,  
Goa Shipyard Ltd., GOA.
7. The Managing Director,  
Bharat Dynamics Ltd., HYDERABAD.
8. The Managing Director,  
Praga Tools Ltd., SECUNDERABAD.
9. Director of Aeronautics,  
(R&D Organisation).

10. Director of Administration,  
(R&D Organisation).
11. Director (P&C).
12. All Sections in the Department of Defence Production.
13. D(Budget).
14. Integrated Finance (Proj.)
15. Integrated Finance (R&D)
16. All DOs in D(HAL/MDN).

### **Recommendation**

It transpired during evidence that the delay in the execution of the project was also due to inadequate expertise available with HAL in the matter of development of aero-engines and wrong system procedures adopted for testing of the prototype engine. While the Committee can appreciate the pace of development being retarded on account of inadequate expertise and technical know-how, they find it rather disquieting that no guidance was available to those responsible for executing the development project regarding testing of individual components and systems in the first instance before final assembly of the engine and putting it to final tests which is held out to be partially responsible for the delay in development. That such a venture was undertaken without the assurance of an inflow of technical know-how and expertise speaks poorly of the mechanism for project planning and execution that was then prevalent.

[Sl. No. 7 (Para 1.51) of Appendix to 2nd of the P.A.C.  
1977-78(6th Lok Sabha)]

### **Action Taken**

The observation of the PAC has been noted.

2. D.A.D.S. has seen.

[Department of Defence Production O.M. No. 48/42 (24)/78/D (HAL/  
MDN)|DOIB dated 20th June, 1978]

### **Recommendation**

The Committee were informed during evidence that the development project for HJE-2500 was taken up by HAL in 1960 because at that time it was only there that whatever technical know-how for engine development that the country had was available. Gas



Turbine Research Establishment was then in its infancy and was incapable of taking up the project. In April 1969 the Aeronautics Committee had in their report recommended the merger of the GTRE and the Aero-engine Design Division of HAL with a view to pool at one place the technical know-how and expertise available in the field of engine development. This recommendation of the Aeronautics Committees came to be discussed at a high level only in July/August 1972, i.e., after a lapse of more than three years. A decision was then reached not to merge the two establishments. It was argued that over the years substantial investment of resources had been made in GTRE where a nucleus aero-engine design team had been created and that in comparison the man-power and resources available at HAL aero-engine design centre were modest. It was further argued that a major project involving development of advance technology for aero-engines should be handled by GTRE where sufficient facility and expertise in handling such projects were available. The Committee note that while in 1960 the state of technical competence as between GTRE and the aero-engine design centre of the HAL was weighted in favour of the latter, by 1972 GTRE had been built up with Central Government funds into a strong nucleus aero-engine design team, so much so that it claimed an exclusive role in the development of the aero-engines. At this stage the Committee can hardly do anything more than emphasise that there is a need for effective coordination and liaison between all major institutions, industries and R&D organisations in the field of aeronautics including the Development and Research Wing of HAL and GTRE and to make every effort to pool all the available technical know-how in identical and related fields so as to avoid unnecessary duplication of effort. The Committee have no doubt that if the technical know-how available in different institutions/organisations in the country in the field of aeronautics engineering is pooled and development jobs are assigned to those who are technically competent to execute the same, the country will soon be able to develop self-reliance and obviate the necessity of imports.

[Sl. No. 9 (Para 1.53) of Appendix to 2nd Report of the P.A.C. 1977-78 (6th Lok Sabha)].

### **Action Taken**

The recommendation of the PAC contained in Para 1.53 has been noted.

2. Effective Coordination and liaison among all major institutions, Industries and R&D Organisations in the field of aeronautics is ensured by Aeronautics Research and Development Board. Different

panels of the ARDB for various scientific and technology disciplines have representatives from R&D Organisation and Educational Institutions like Aeronautical Development Establishment, Gas Turbine Research Establishment, National Aeronautical Laboratory, Hindustan Aeronautics Limited, Indian Institute of Science, Indian Institute of Technology Indian Space Research Organisation etc. A fair amount of coordinations on a bilateral basis is also carried out between the various institutions. As and when necessary separate committees are also appointed consisting of members drawn from various aeronautical establishments, institutions and industries and also experts in the field, to examine the major proposals in the field of aeronautics.

3. As has been observed by the P.A.C. with a view to avoiding duplication of efforts, all available technical know-how in identical and related fields is pooled in the field of aeronautics. The establishment of the HAL-ISRO Standing Group (HISTAG) for technology transfer between the different Divisions of HAL and the Indian Space Research Organisation for the work relating to Satellite and launching Vehicles of ISRO and Telemetry System for HAL, is an instance of this type of coordination.

4. D.A.D.S. has seen.

[Deptt. of Defence Production O.M. No. 48/42/(26)/D(HAL/MDN)/DOIB dated 21 June, 1978]

### **Recommendation**

The Committee have been informed that a viable proposal to develop a modified (de-rated) version of Orpheus 701 engine to suit Kiran Mark-II had been formulated in 1975. The cost of this project is estimated as Rs. 2.08 crores and the time-frame as three years from 'go-ahead'. It is claimed that with the successful completion of this project the need to import the engines for jet trainer aircraft will be eliminated. In view of the fact that the foreign suppliers of the engine for Kiran Aircraft have taken advantage of our total dependence upon them, substantially raised the prices for this engine, there is need for redoubling our developmental efforts to produce indigenous replacement for the imported engines. The Committee hope that Government will commit adequate resources for this project and devise suitable control and monitoring systems so as to ensure that the project does not suffer from any deficiencies which had marred the successful completion of the earlier project.

[Sl. No. 9 (Para 1.53) of Appendix to 2nd Report of the P.A.C: 1977-78 (6th Lok Sabha)]

### Action Taken

The derated Orpheus 701 engine for Kiran MK.II aircraft has been developed and cleared for flight on 15-7-76. Flight testing of the aircraft with this engine is in progress and is expected to be completed by April, 1980. The engine-aircraft combination has performed satisfactorily in all the tests including the acrobatic test of spin trials. Further testing is envisaged to determine the engine life side by side with the development work on the aircraft. Resources for this project will be provided to HAL depending upon the need and taking into account the over-all requirements of the Air Force.

2. Necessary instructions have been issued on 14-6-78 to HAL to evolve a proper control mechanism and procedures for monitoring the progress of the development projects, at an appropriate level and to take remedial measures promptly, as soon as any bottleneck is observed. The progress of the project will be monitored in the Ministry by revising the progress report on the project to be received from HAL.

3. D.A.D.S. has seen.

[Deptt. of Defence Production O.M. No. 48/42(27)/78/D(HAL|MDN)|  
DOIB dated 21st July, 1978]

### Recommendation

In the light of the shortcomings and lacunae noticed in regard to this project, the Committee would like to make the following suggestions for formulation and implementation of development projects:—

- (i) The aims and objectives of the development project should be clearly defined.
- (ii) The project report should be comprehensive, covering all aspects. The technical and management problems in the implementation of the project should be clearly envisaged and an attempt should be made in the report itself to find possible solutions for them.
- (iii) The cost estimates for the project should be worked out carefully and as realistically as possible so as to obviate the need for its revision from time to time.

- (iv) Once the project and the cost estimates therefor have been approved and the project finally cleared, it should not be allowed to languish for want of funds. The flow of the funds should be free and regular.
- (v) Firm targets for stage-by-stage completion of the project should be laid and these should be adhered to.
- (vi) Proper control mechanism and procedures should be evolved for monitoring the progress of the implementation of the project. If any bottleneck is observed, the matter should be considered at the appropriate level and remedial measures should be taken promptly.
- (vii) The assessment of the utility of the project should be made in the light of the results contemporaneously being obtained, after a period of 2 years from 'go-ahead' and a decision regarding further continuance of the project taken accordingly.
- (viii) As the foreclosure/abandonment of a continuing project renders the amount expended upon it and resources built up, largely infructuous, such a course should be decided upon after a very careful consideration at the highest level.

[Sl. No. 11 (Para 1.55) of Appendix to 2nd Report of the P.A.C. 1977-78 (6th Lok Sabha)].

#### **Action Taken**

The recommendations of the Public Accounts Committee contained in sub-Paras (i) to (vi) and (viii) of Para 1.55 have been circulated amongst Defence Public Sector Undertakings including HAL and R&D Organisation for compliance *vide* Ministry of Defence letter No. 48/42(28)/78/D(HAL|MDN)|DOIB dated 14th June, 1978 (Annexure). As regards sub-para (vii), reply to Sl. No. 30 (Para 2.109) refers.

2. D.A.D.S. has seen.

[Deptt. of Defence Production No. 48/42(28)/78/D(HAL|MDN)|DOIB dated 21st July, 1978].

**ANNEXURE**

**No. 48/42(28)/78/D (HAL/MDN)/DOIB  
GOVERNMENT OF INDIA  
MINISTRY OF DEFENCE  
(DEPTT. OF DEFENCE PRODUCTION)  
New Delhi, the 14th June 1978.**

To,

**The Chairman,  
Hindustan Aeronautics Ltd.,  
BANGALORE.**

**SUBJECT:—2ND REPORT OF THE PUBLIC ACCOUNTS COMMITTEE (6th LOK SABHA) ON DEFENCE SERVICES—GENERAL PRINCIPLES TO BE OBSERVED FOR FORMULATION AND IMPLEMENTATION OF THE DEVELOPMENT PROJECTS.**

Sir,

I am directed to say that in the 2nd Report of the Public Accounts Committee (6th Lok Sabha) on Defence Services, the Committee has made the following recommendations for formulation and implementation of the development projects:—

- (i) The aims and objectives of the development project should be clearly defined.
- (ii) The project report should be comprehensive covering all aspects. The technical and management problems in the implementation of the project should be clearly envisaged and an attempt should be made in the report itself to find possible solutions for them.
- (iii) The cost estimates for the project should be worked out carefully and as realistically as possible so as to obviate the need for its revision from time to time.
- (iv) Once the project and the cost estimates therefor have been approved and the project finally cleared, it should not be allowed to languish for want of funds. The flow of the funds should be free and regular.
- (v) Firm targets for stage-by-stage completion of the project should be laid and these should be adhered to.

- (vi) Proper control mechanism and procedures should be evolved for monitoring the progress of the implementation of the project. If any bottleneck is observed, the matter should be considered at the appropriate level and remedial measures should be taken promptly.
- (vii) As the foreclosure/abandonment of a continuing project renders the amount expended upon it and resources built up, largely infructuous, such a course should be decided upon after a very careful consideration at the highest level.

2. It is requested that the recommendations made by the Public Accounts Committee may kindly be kept in view while formulating and implementing the development projects.

Yours faithfully,

D. N. PRASAD,  
*Joint Secretary to the Govt. of India.*

Copy forwarded to:—

1. The Chairman & Managing Director,  
Bharat Electronics Ltd., BANGALORE.
2. The Chairman & Managing Director,  
Bharat Earth Movers Ltd., BANGALORE.
3. The Chairman & Managing Director,  
Mazagon Dock Limited, BOMBAY.
4. The Chairman & Managing Director,  
Garden Reach Shipbuilders & Engineers Ltd., CALCUTTA.
5. The Chairman & Managing Director,  
Mishra Dhatu Nigam Ltd., HYDERABAD.
6. The Chairman & Managing Director,  
Goa Shipyard Ltd., GOA.
7. The Managing Director,  
Bharat Dynamics Ltd., HYDERABAD.
8. The Managing Director,  
Praga Tools Ltd., SECUNDERABAD.
9. Director of Aeronautics,  
(R&D Organisation).
10. Director of Administration,  
(R&D Organisation).
11. Director (P&C).
12. All Sections in the Department of Defence Production.

13. D (Budget).
14. Integrated Finance (Proj.)
15. Integrated Finance (R&D)
16. All DOs in D (HAL|MDN).

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### Recommendation

The Committee have been informed that the Air Headquarters have not been communicating their views in regard to the suitability of reheat engine for the HF-24 aircraft in writing. It is maintained that the expression of views by the representatives of the Air Force at the Steering Committee meetings was thought sufficient. This is rather unusual. The Committee feel that as the development project was to cater for the operational requirements of the Air Force, the Air Headquarters had a special responsibility in regard to the development project and their views in regard to the suitability of the end-product should have received the importance that they deserved. The Air Headquarters should also have followed up the views expressed during Steering Committee meetings by written communication to that effect to the Defence Ministry so as not to leave ambiguity of any sort as far as the stand of the Air Headquarters was concerned. That this was not done is regrettable.

[Sl. No 25 (Para No. 2.99) of Appendix to the 2nd Report of the Public Accounts Committee 1977-78 (6th Lok Sabha)].

### Action Taken

The observation of the PAC that "Air Headquarters should also have followed up the views expressed during Steering Committee meetings by written communication to the effect to the Defence Ministry" has been noted by the Air Headquarters and is now being complied with. Necessary instructions in this regard have been issued vide Air HQrs. note No. Air HQ/S. 96056/6/1/ASR dated 22nd March 1978 (Annexure).

2. D.A.D.S. has seen.

[Deptt. of Defence Production O.M. No. 48/42/5/78/D (HAL/MDN) dated 20th June, 1978].

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## ANNEXURE

Tele: 370231/429

Air HQ/S. 96056/6/1/ASR

22 Mar.. 1978.

## ASSISTANT CHIEF OF THE AIR STAFF (PLANS)

ACTION ON THE RECOMMENDATIONS CONTAINED IN THE  
2ND REPORT OF THE PUBLIC ACCOUNTS COMMITTEE  
1977-78 (6th LOK SABHA).

1. The above report has adversely commented on the fact, that views expressed by Air HQ representative during the HF-24 Steering Committee meetings were not subsequently followed up in writing to the Ministry of Defence. This is in spite of the fact that during evidence Air H.Q., had taken the stand that since the function of the Steering Committee was to remove with despatch any technical/administration bottlenecks and since the committee consisted of representatives of the Ministry of Defence and other organisations concerned with the development of project, any formal reference to the committee amounted to keeping the Ministry of Defence informed.

2. In view of the PAC observation, it is to be ensured that any major views expressed by Air H.Q. representatives at various Steering Committees or any other meetings held to discuss aircraft projects are immediately followed up in writing to the concerned authorities in the Government.

3. The contents of this letter may be brought to the notice of all officers working under you.

Sd/-  
(H R. CHITNIS)  
AVM  
ACAS (Plans)

DASR  
DPG  
D PLANS  
D TRG

Copy to:—

ACAS (OPS)	
ACAS (ENG)	ACAS (SYS)
ACAS (FS&I)	ACAS (IGS)



### Recommendation

Although it was known as early as in 1969 that the fitment of Orpheus 703 reheat engine developed by GTRE on HF-24 airframe had the problem of drag, the Aeronautics Research and Development Board sanctioned in March 1972 further development work in the reheat system and a total amount of Rs. 35 lakhs was sanctioned upto February 1976 for the purpose. The Committee are informed that this project was for the development of 2000° K reheat system on the Orpheus 703 engine and it was sanctioned by Aeronautics R&D Board as an independent research project and was not specifically related to development of HF-24 MK II. The task envisaged at the time of sanctioning the project is stated to be "to design and develop the system upto demonstrator stage to establish technical feasibility".

[Sl. No. 26 (Para No. 2. 103) of Appendix to the 2nd Report of the Public Accounts Committee 1977-78 (6th Lok Sabha)].

### Action Taken

1. Noted.

2. The primary aim of the project has been successfully achieved and the data generated is being used for engine development programme in hand at GTRE.

3. D.A.D.S. has seen.

[Deptt. of Defence Production O.M. No. 48/42/29/78/D(HAL/MON) dated 20th June, 1978].

### Recommendation

As to the achievements under the project, it is stated that "the system has been successfully tested under stimulated life condition in the high altitude test facilities at National Gas Turbine Establishment, U.K.". It is further stated that this 2000°K system is being adopted for another engine development project now in hand. The Committee would like Government to assess this project in the light of their experience in regard to the other project for the development of the reheat system for HF-24 aircraft and ensure that the amount spent on the project is purposefully directed to achieve definite fruitful results.

[Sl. No. 27 (Para. No. 2.104) of Appendix to the 2nd Report of Public Accounts Committee 1977-78 (6th Lok Sabha)].

### Action Taken

The experience gained through successful development of the

Orpheus reheat engine and its extension to 2000°K reheat research is being fully utilised in the reheat system for the GTX engine which is currently under test and development.

2. A Steering Committee to monitor and assess the progress of the development has been constituted for this Project. Instructions have also been issued with reference to para 2.109 of the Public Accounts Committee's Report to the effect that the Steering Committee will be required to carry out a detailed technical evaluation after every two years and make an appraisal of the Project from the point of view of assessing the progress as well as from the point of view of deciding the further continuance of the Project. A copy of this circular is enclosed (Annexure).

3. D.A.D.S. has seen.

**Encl. 1 sheet.**

[Deptt. of Defence Production O.M. No. 48/42/29/78/D(HAL/MON)  
dated 21st July, 1978].

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#### ANNEXURE

No. Aero/RS-134/100/208/S/D(R&D)  
Government of India  
Ministry of Defence  
New Delhi-11, the 15th July 1978.

To

The Scientific Adviser to Raksha Mantri and  
Director General, Defence Research & Development  
New Delhi.

Subject:—P.A.C. 1977-78 (6th Lok Sabha—recommendations of  
Sir,

Public Accounts Committee in their Second Report (6th Lok Sabha) has recommended that "the progress and achievements of a development project should be analysed and appraised after every two years by a technical team and continuance of the project should be decided upon in the light of the findings of the technical team indicating a distinct progress and a clear possibility of ructification for the developmental efforts in the near future."

2. The Steering Committees for major projects which have already been constituted and are responsible for monitoring the progress of projects may therefore be directed to keep a note of the above recommendation of the Public Accounts Committee. They will be required to carry out a detailed technical evaluation after every two years and make an appraisal of the project from the point of view of assessing the progress as well as from the point of view of deciding the further continuance of the project.

3. This requirement may also be brought to the notice of the Steering Committees which may be constituted in future for the projects taken up hereafter.

Yours faithfully,

Sd/-

(R. M. GUPTA)

Under Secretary to the Government of India.

Copy to:—

CCR&D(G); CCR&D(E);

All Technical Directorates

Tech Corrd; RD. 26.

## CHAPTER III

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

#### Recommendation

In this context, the Committee take a serious note of the comments of the Aeronautics Committee in their report (April 1969) that "the existence of two separate teams (GTRE and HAL) was an impediment to the sanction of expenditure for the development project". They are also unhappy to note that it took the Government as long as three years even after the development project was recommended by the Aeronautics Committee in April 1969 to sanction the grant of Rs. 150 lakhs for the project in June, 1972.

[Sl. No. 6 (Para 1.50) of Appendix to 2nd Report of the PAC 1977-78 (6th Lok Sabha)]

#### Action Taken

The observation of the Public Accounts Committee has been noted for future guidance.

2. As regards three years' time taken by the Government to sanction (in June 1972) the grant of Rs. 150 lakhs for the project even after the recommendation of the project by the Aeronautics Committee in April, 1969, the Government had already taken a decision in December, 1967 i.e., before the report of the Aeronautics Committee was out that this project had only an educational value. In view of this, the project got low priority and finances could not be made available immediately.

3. D.A.D.S. has seen.

[Deptt. of Defence Production O.M. No. 48/42(23)/78/D(HAL/MDN) | DOIB dated 20th June, 1978.]

#### Recommendation

~~E~~ HJE-2500 project was recommended by the Aeronautics Committee in April, 1969. The Aeronautics Research and Development Board (ARDB) which was set up on the recommendations of the

Aeronautics Committee also scrutinised and approved this project as its meeting held on the 8th January, 1972. In May, 1972 the Board appointed a Technical Committee to assess various projects of propulsion systems including the HJE-2500 project. The Technical Committee, however, in its report submitted in December 1974, did not deal with this project. During evidence the Committee were informed that the Technical Committee had, on the advice of the Air Headquarters, confined itself to the consideration of engine proposals in respect of another aircraft and due to paucity of time the consideration of HJE-2500 project could not be taken up by them. The Committee are unhappy at the Technical Committee skipping over the HJE-2500 project although it was within the terms of reference drawn up for the Technical Committee.

[Sl. No. 8 (Para 1.52) of Appendix to 2nd Report of the PAC 1977-78 (6th Lok Sabha)]

### **Action Taken**

The observation of the Committee has been noted.

2. We would, however, like to apprise the Public Accounts Committee that the Technical Committee had, in their interim report submitted in December, 1973, an occasion to make the following observation in respect of the HJE-2500 project:

“In the area of design, a certain capability is reflected in the successful development of HJE-2500 engine by HAL engine factory and in the development of BOR-703 re-heat system by GTRE. This confidence augurs well, and can be made the starting point, for the future indigenous growth of Aero Engine Technology.”

3. However, after it received a request in June, 1973 from the Air Headquarters that in view of the urgency of selecting a suitable power plant for the Marut Mark-II Aircraft, the Technical Committee should give its assessment of terms of reference concerning HJE-6 and TS-16 engines, the Technical Committee concentrated on these terms of reference. In view of this, the Technical Committee seems to have not made any recommendation in respect of HJE-2500 engine in its final report submitted in December, 1974.

4. D.A.D.S. has seen.

[Deptt. of Defence Production O.M. No. 48(42)|25|78|D(HAL/MDN), dated 21st July, 1978.]

### Recommendation

The Committee note that the project, approved by Government in 1956, to develop and produce the aircraft (Mark-I) with a readily available but less powerful engine to be undertaken by the Hindustan Aircraft Ltd. (HAL), was an interim arrangement pending the development of a more powerful engine for which a improved version (Mark-II) was to be designed. Since the various proposals and project for a more powerful engine could not materialise, HAL continued to work on the development of Mark-I aircraft. The Committee also observe that the cost of this project, which was initially estimated at Rs. 1.99 crores, was revised from time to time so much so that the total expenditure by March 1975 reached the figure of Rs. 8.12 crores.

[Sl. No. 12 (Para 2.36) of Appendix to the 2nd Report of the PAC  
1977-78 (6th Lok Sabha)]

### Action Taken

The observation of the Public Accounts Committee has been noted.

2. Improvements have been made in the procedure of the cost estimates of HAL. The cost estimates will be made in two phases. In the first phase, the estimates will be mostly done by empirical method using a proven cost model, suitably adopted for Indian conditions. This forecast will be used only for budgetary purposes. In the next phase, in "Extended Feasibility Study" or "Project Definition Phase", a method called "Grass Roots" will be adopted for preparing a detailed estimate. Under this method, project is broken down into various work-elements and the work breakdown structure is further sub-divided into work packages which will form the basis for estimating the Design and Development Cost of the project.

3. There has also been established a full-fledged Project Planning and Costing Group in the Design and Development Complex of HAL. This will enable HAL to periodically review the programmes and cost of the project and to bring the salient features to the attention of its Board of Directors/Government.

4. While the above action has been taken to prepare estimates as realistically as possible and to have control over the costs in the process of Design & Development, it is submitted that in the very

nature of Design & Development work, the cost estimates may vary from the original ones for two reasons:—

- (a) due to changes as proposed by the customers, and
- (b) unanticipated development problems may crop up requiring greater efforts.

5. D.A.D.S. has seen.

[Deptt. of Defence Production O.M. No. 48|42|30|78|D(HAL/  
MDN) dated 20th June, 1978.]

### **Recommendation**

The Committee note that in 1964 another project for the development of a trainer version of Mark I aircraft was approved at an estimated cost of Rs. 78 lakhs. The estimated cost of this project also was revised to Rs. 3.70 crores in May 1971 and the actual expenditure on the project upto March 1975 amounted to Rs. 3.27 crores. In March 1975 the two development projects (*viz.* Mark I and Mark I trainer) were combined into a single project with an estimated cost of Rs. 11.40 crores. A further expenditure of Rs. 1.02 crores was authorised by Government on improvements to this aircraft making a total of Rs. 12.42 crores. The Committee are not satisfied with the plea advanced before them for multi-fold escalation of cost estimates that "enough expertise and experience to anticipate the nature of problems that would be encountered with the development of this aircraft" was not available with HAL. They feel that in the course of implementation of the project which was spread over a long time HAL should have developed adequate expertise and technical know-how to assess fairly the technological and financial implications of the project.

[Sl. No. 13 (Para No. 2.37) of Appendix to 2nd Report of the Public Accounts Committee 1977-78 (6th Lok Sabha)].

### **Action taken**

The observation of the Public Accounts Committee contained in Para 2.37 has been noted for guidance. Action has already been taken to establish a full-fledged Project Planning and Costing Group in the Design and Development Complex of HAL. This will enable HAL to periodically review the programme and cost of the projects and to bring the salient features to the attention of its Board of Directors/Government.

2. It has, however, to be appreciated that in any design & development project, the cost variations may take place on account of:—

(a) Changes in design becoming necessary as a result of detailed investigations and studies or on account of change in customer's requirements.

(b) Unanticipated development problems.

3. At the Government level, Steering Committees are constituted for every major design & development project representing HAL, user and the Government to review periodical progress and their adherence to the original schedules and cost estimates.

4. D.A.D.S. has seen.

[Deptt. of Defence Production O.M. No. 48/42/1/78/D (HAL/MDN)  
dated 7th July, 1978]

### **Recommendation**

The Committee also observe that though the development project for HF-24 Mark I had a time-frame of 4 years ending in 1960, the project has continued and even on the 1 July 1976, an expenditure of Rs. 1.02 crores was authorised for further improvements and modifications. The Committee emphasise the need for laying down definite time-schedules for completion of projects and for their observance in actual practice by means of proper controls and monitoring systems.

[Sl. No. 14 (Para No. 2.38) of Appendix to 2nd Report of the Public Accounts Committee 1977-78 (6th Lok Sabha)]

### **Action Taken**

We accept the views of the PAC emphasising the need for laying down definite time-schedules for completion of projects and for their observance in actual practice by means of proper controls and monitoring systems. We have in fact started following this procedure in respect of the recently approved design and development projects by appointing a high level Steering Committee in each case, to review the progress periodically and take decision on various Design and Development problems.

2. We would, however, like to bring to the notice of the PAC that although the sanction of July 1976 for Rs. 1.02 crores was issued in continuation with the Design & Development on HF-24 which com-



menced as early as 1956, the expenditure was intended to be incurred on certain modifications or additional fitments considered necessary by the user to the aircraft already manufactured. This kind of product improvement is a normal continuing feature and should not be regarded as part of development project.

3. D.A.D.S. has seen.

[Deptt. of Defence Production O.M. No. 48|42|9/78/D (HAL/  
MDN) dated 20th June, 1978.]

### **Recommendation**

The Committee find that in July 1976, a further expenditure of Rs. 1.02 crores was sanctioned by Government to carry out "certain essential improvements and modifications in the Marut (HF-24) fleet now in service with the IAF". The Committee would like Government to exercise strict control on expenditure on this account so as to ensure that further expenditure on improvements and modifications to HF-24 (Marut fleet) produces definite results and is not allowed to go waste as heretofore.

[Sl. No. 15 (Para. No. 2.39) of Appendix to 2nd Report of the  
Public Accounts Committee 1977-78 (6th Lok Sabha)]

### **Action taken**

Against the sanction of Rs. 102 lakhs for conducting various improvements/modifications to the HF-24 Marut fleet, a sum of about Rs. 70 lakhs has been spent as on 31st March, 1978. All tests except Spinning Trials etc. but including flutter testing and further fatigue testing to increase the life to 2500 hours have already been completed. Many of the findings of these tests have been acted upon through necessary modifications and the others have been intimated to the users. The gains of this development effort have been in the field of safety, better flight panel, instrumentation display, higher fuel capacity, better aircraft handling etc. and commensurate with the money spent. The tasks which have already been attended to are detailed below:—

1. Modification to Trim Circuit.
2. Integral Fuel Tank leaks.
3. Fitment of SFENA Artificial horizon and SFIM Gyro Compass.
4. Flexible Fuel Tank.

5. 150 Gallons Drop Tank Trials.
  6. Trial with RATO Motor.
  7. Wing Fuel Transfer Indication.
  8. Aileron trim tab—reduction of sensitivity.
  9. Four gun firing trials.
2. Action for Spinning Test of the Wind Tunnel Model is in progress.
3. The entire programme of modifications|improvements to HF-24 fleet is expected to be completed by 1979-80.
4. The control on the expenditure connected with the project is exercised by HAL by issue of separate work orders for essential items of work and the expenditure is reviewed by the Divisions on a monthly basis.
5. HAL are also required to furnish a monthly report on further expenditure incurred on the project and the results achieved. These monthly reports are reviewed and thus control is exercised by the Ministry.
6. D.A.D.S. has seen.

[Deptt. of Defence Production O.M. No. 48/42/10/78,D (HAL| MDN) dated 20th June, 1978.]

### **Recommendation**

The Committee note that an expenditure of about Rs. 2.34 lakhs incurred upto March, 1976 by HAL on certain projects under execution remained uncovered by sanctions 'on account' payments approved by Government. It has been pointed out to the Committee that HAL had incurred this expenditure out of its own resources and had recently requested the Government for reimbursement. They also note that large payments of about Rs. 3.50 crores were made by way of 'on account' payment though the project estimate had not been sanctioned. The Committee would like Government to examine the propriety of making such large payments without sanction of the project estimates.

[Sl. No. 17 (Para No. 2.50) of Appendix to the 2nd Report of the Public Accounts Committee 1977-78 (6th Lok Sabha)]

### Action Taken

The Government have examined the propriety of making "on account" payments in respect of certain variants of HF-24 for which no specific sanctions for project estimates had been obtained.

2. The "on account" payments were made in respect of development of Mk. I-R (Rs. 315.58 lakhs), Mk. II-Old (Rs. 8.17 lakhs) and MK. II-New (Rs. 29.66 lakhs). As regards Mk. I-R, it was in a way an extension of Mk. I-A (which was the flying test bed for Mk. I-R) for which specific sanction had been obtained. In September, 1965, approval in principle of the then Finance Minister to the proposal for undertaking the project (HF-24 Mk. I-R) was obtained and the cost of this project was then indicated as Rs. 333 lakhs (inclusive of a foreign exchange component of Rs. 60 lakhs). It was also agreed as an interim measure to release Rs. 30 lakhs only in foreign exchange for ordering from abroad certain essential items. It was decided in a high level meeting held in April, 1968 that the Steering Committee appointed for HF-24 Project should make a fresh assessment regarding the probability of successful deployment of Mk. I-R and on receipt of this assessment, the case should be progressed further. Pending assessment by the Steering Committee, the proposal for obtaining approval to the project estimates for MK. I-R was excluded from the Paper submitted to the Defence Committee of the Cabinet in November, 1968. Unfortunately, however, in January, 1970 the only prototype on which development work was being progressed at that time, crashed. Thereafter, alternative arrangement for producing an improved version of Marut within an acceptable time frame was under protracted discussion between the Department of Defence, Department of Defence Production, Air Headquarters and Defence Research and Development Organisation.

3. The "on account" payments for Mk. I-R, Mk. II-Old and Mk. II-New development project had been made over a number of years. These payments were made in consultation with the Ministry of Finance (Defence) at the appropriate highest level. Action is in hand to issue formal Government orders closing the project relating to Mk. I-R and Mk. II.

4. It may be mentioned that it has now been decided that for every development project, a detailed feasibility study should be prepared which would, *inter-alia*, identify milestones against which the progress of the project could be reviewed. Based upon the feasibility study, Government sanctions will be issued indicating the estimated cost of the Project. "On account" payments will be made in future only after the formal Government sanction indicating the estimated cost of the project is issued.

5. D.A.D.S. has seen.

[Deptt. of Defence Production O.M. No. 48/42/11/78/D (HAL/MDN) |DO-IIIB dated 21st July, 1978.]

### **Recommendation**

From the facts placed before them, the Committee cannot help concluding that the agreement with a foreign country entered into in 1964 in-regard to the use of the aero-engine under development in that county in the airframe being produced in this country was, to say the least, not economic or mutually advantageous. The fact that it had to be foreclosed four years later in 1968 after incurring an expenditure to the tune of Rs. 94.29 lakhs goes to show that the joint venture project had been undertaken without a proper assessment of the economic advantage likely to accrue to the country. The most disturbing aspect of the venture is the fact that while foreclosing the agreement, we left with the foreign Government an air-frame and two Orpheus engines of the type even now in service with the Air Force. The Committee are unable to appreciate the contention of the Government that in leaving the air-frame and the engines in the foreign country "no security risk was stipulated." The Committee also note that no information is available with the Government as to the use and ultimate disposition of the air-frame and engines left by them with the foreign country. The Committee are of the opinion that the Government's decision in leaving the air-frame and the engines was not in keeping with the national interest.

[Sl. No. 18 (Para No. 2.62) of Appendix to 2nd Report of the Public Accounts Committee 1977-78 (6th Lok Sabha)]

### **Action Taken**

The information regarding the air-frame and engines gifted to UAR has now been collected. It is learnt that the aircraft is stored in one of the hangars and has not been put to any use.

2. As regards the security risk involved in leaving the air-frame and the engines in UAR, it is submitted that the Orpheus engines are of British origin and the performance parameters of these engines are well known. The air-frame was designed by the West German designer and as such its specifications and design could be presumed to be already known to the Western Countries. Leaving the air-

frame and engines therefore would not by itself constitute any security risk. In any case since the air-frame and the engines had been left in UAR as far back as 1969, they may not be of any practical military utility to any foreign power now in view of its likely deteriorated condition.

3. D.A.D.S. has seen.

[Deptt. of Defence Production O.M. F. No. 48/42/12/78/D (HAL/MDN) dated 20th June, 1978.]

### **Recommendation**

The Committee find that Government had sanctioned the development of reheat system for Orpheus 703 engine which was then in use in HF-24 aircraft by GTRE in January 1963. The test trials of the reheat engine were, however, completed only in October 1970. It has been explained that though Bench development of the engine proceeded according to schedule and was completed in 4 years' time in May 1967, the flight development on a suitable prototype aircraft took a long time on account of the fact that there was initially one prototype aircraft available and extensive changes and developments had to be made in the airframe. The Committee feel that the execution of the project was done in a leisurely fashion and the development could have been expedited by a well organised monitoring system. They consider that if the availability of only one prototype aircraft for trial purposes was found to be a handicap resulting in inordinate delays in development, GTRE should have pointed it out to Government at the appropriate time so that Government could have thought of meeting the requirement in the interest of speedy development of the required engine.

[Sl. No. 21 (Para No 2.95) of Appendix to the 2nd Report of Public Accounts Committee 1977-78 (8th Lok Sabha)]

### **Action Taken**

We have noted the PAC's observations.

2. We would, however, like to apprise the Public Accounts Committee that there were, in fact, two Committees, one the Steering Committee presided over by the Air Chief which oversaw the overall development of HF-24 Project and another the Technical Committee which reviewed the progress of development work on Orpheus Reheat Engine. As regards the handicap on account of availability of only one prototype aircraft initially for trials, it may be mentioned that the development programme for the HF-24 Mk. I-R envisaged construction of 2 such prototypes. The question of an additional pro-

totype aircraft was subsequently examined in the meeting of the Steering Committee held on the 19th June, 1968 and it was decided not to take it up till the result of flight trials on the first prototype had become available. This prototype, unfortunately, crashed and was totally destroyed and so the result of flight trials was not available.

3. D.A.D.S. has seen.

[Deptt. of Defence Production O.M. No. 48/42/13/78/D (HAL MDN) dated 15th July, 1978]

### **Recommendation**

The Committee note that the development cost of the Orpheus 703 reheat engine was initially (January 1963) estimated by GTRE at Rs. 14 lakhs. However, according to Audit, the total cost of development of the reheat variant by December 1973, had come to Rs. 2.02 crores. It is held that the sum of Rs. 2.02 crores includes also the cost of establishment and the cost of the engines which were loaned by HAL which were to be returned to them. According to Government, the expenditure on the project had been only Rs. 77.41 lakhs out of which Rs. 76.4 lakhs is stated to have been paid to HAL for various facilities and services while the remaining Rs. 1 lakh was spent on local purchase of items from sources other than HAL. As for escalation of cost from Rs. 14 lakhs in January 1963 to Rs. 77.41 lakhs in December 1973, it is stated that the project was not sanctioned in its entirety right at the very beginning. It was carried out in progressive stages and each stage was taken up only after the successful execution of the preceding stage. As regards the exclusion of the cost of establishment from the cost of the project, it is stated that since the Defence Research and Development Organisation is an agency for evaluating and developing weapon system for all the three Services and since even without any specific project the expenditure on regular establishment would have been incurred, it is not proper to include this man-power cost in project cost. The Committee do not consider this plea as tenable and feel that for correct appreciation of cost of development of a project, it is desirable to include in the cost of the project the cost of establishment allocated for the project. This procedure for computation of cost is also desirable in order to have a fair assessment of comparative economics of development projects being proposed by GTRE and HAL. It may be pointed out that HAL being a commercial organisation has to include in the cost of the development project not only the cost of establishment committed for the project but also profit margins.

[Sl. No. 22 (Para No. 2.96) of Appendix to the 2nd Report of the Public Accounts Committee 1977-78 (6th Lok Sabha)]

### Action taken

R & D activity by its very nature is not similar to any normal production activity amenable to application of detailed costing. Costing in Research & Development would become relevant actually only at the stage when the first prototype is ready and the bulk production is contemplated. At the development stage, all that can be done is to assess a fairly close estimate of the cost of a project which invariably is indicated at the sanction stage itself. It is certainly possible to assign to a project, costs relating to the use of manpower, facilities, etc. of the establishment, but this involves considerable accounting work and will need additional manpower on the administrative side—since accounts establishment matters are not computerized. This would not be justified since in the case of any major project, the development costs incurred by DRDO will be a very small part (10 per cent) of the total cost of the project upto the point where a successful product is delivered to the user. However, it is for the information of the Committee that for computing the project cost in respect of large projects, Research & Development Organisation has now started including the cost of manpower, contingencies, etc. on the basis of a separate specific sanction for the project over and above the normal permanent establishment, the latter being sanctioned to the Laboratories for their day to day research work.

2. D.A.D.S. has seen.

[Department of Defence Production O.M. No. 48/42/88/D (HAL/MDN) dated 21st July, 1978].

### Recommendation

The Committee note that in February 1973, the Air Headquarters suggested abandonment of the project for the manufacture of HF-24 aircraft with Orpheus 703 reheat engine on the ground, *inter alia*, of financial stringency and proposed instead retromodification of the existing HF-24 Mk. I aircraft already in service with the Air Force. The proposal for retromodification of the existing HF-24 Mk. I aircraft to a higher standard involving an outlay of Rs. 70.14 crores was approved by the Apex Planning Group and Government in May 1973. A couple of months later in July, 1973, the various proposals for development of a suitable engine to be used in retromodification were considered at a meeting in the room of Raksha Utpadan Mantri

and certain decisions regarding various alternative proposals for engine development were taken. At this meeting, Air Headquarters indicated that the aircraft was required to be of a standard higher than that notified in January 1972 and that this was confirmed by them in September 1973. Subsequently, at a meeting in August 1974, the Air Headquarters stated that the aircraft fitted with reheat engine would not meet the current operational requirements. The alternative proposals of engine development were not considered justifiable in view of "high costs and long gestation periods" and the "limited requirement of retromodification". It was, therefore, decided that the retromodification programme should be given up. A month later i.e., in September 1974, the Air Headquarters recommended that further effort on the improved version of HF-24 aircraft be abandoned and since then no expenditure is being incurred by any agency on this behalf, although no formal Government orders closing the project have so far been issued. The closure of the project has thus rendered largely infructuous a total expenditure to be of the order of Rs. 21.46 crores upto the end of March 1975. The Committee are unable to appreciate the reasons advanced before them for a sudden foreclosure of the project specially when huge expenditure had already been incurred on the project and, as stated by the Ministry of Defence themselves, "operational necessity for induction of an aircraft with an adequate range still remains".

[Sl. No. 23—(Para No. 2.97) of Appendix to 2nd Report of the Public Accounts Committee 1977-78 (6th Lok Sabha)]

### **Action taken**

It is submitted for the information of the PAC that expenditure of Rs. 21.46 crores referred in para 2.97 covered the expenditure on development of all the variants of HF-24 aircraft. HF-24 Mk. I & Trainer were successfully developed and also productionised in large numbers. The expenditure incurred in respect of these two variants cannot, therefore, be considered as infructuous. The expenditure incurred on these two variants is of the order of Rs. 12 crores.

2. It is also submitted that, though technically HF-24 development project under examination by the PAC is closed, we have not yet given up the idea of exploiting the potentialities of HF-24. In fact, it is in this context that the Government have approved (in



August 77) the HF-25 project which is based on the principle of using HF-24 air-frame with an Engine of a foreign country's origin.

3. D.A.D.S. has seen.

[Deptt. of Defence Production O.M. F. No. 48/42/15/78/D (HAL/MDN) dated 20th June, 1978.]

### **Recommendation**

The Committee also note that the requirement standard I of 1972 for MK II with reheat engine was issued by the Air Headquarters in January, 1972. The reheat variant of Orpheus 703 engine developed by GTRE met this requirement, but when fitted to the HF-24 airframe it caused the problem of base drag which reduced the performance of the aircraft to even lower than that of HF-24 fitted with ordinary Orpheus 703 engine. In July-September, 1973, the requirement standard was raised upwards by the Air Headquarters rendering the reheat variant developed by GTRE far short of the new requirements. It was explained to the Committee that the raising of the requirement standard became necessary as a result of the experience of December 1971 War, the import of certain types of aircraft from abroad and a new role envisaged for the HF-24 aircraft. The Committee feel that the action of the Air Headquarters in issuing the "Requirement Standard I of 1972" for MK II reheat engine in January 1972, when the experience of 1971 War were still being analysed, was a little hasty. The Committee would, however, like to point out that the revision of the operational requirement in July-September, 1973 could not have had any decisive impact on the development project as even with the requirement standard I of 1972, which the GTRE developed reheat engine is claimed to have met, the aircraft had experienced the problem of base drag which had rendered it below the mark from operational point of view. Since the project was for development of an engine of required specifications and standard for fitment in a particular airframe the claim that "the reheat system designed by GTRE had met the full specifications in respect of thrust, specific fuel consumption etc." is pointless inasmuch as the engine could not produce the required results when fitted in the particular airframe.

\*[Sl. No. 24 (Para No. 2.98) of Appendix to the 2nd Report of the Public Accounts Committee 1977-78 (6th Lok Sabha)]

### **Action taken**

The observation of the Committee that "action of Air Headquarters in issuing the Requirement Standard I of 1972 for MK II with reheat

engine in January, 1972, when the experience of 1971 war were still being analysed, was little hasty" has been noted by the Air Headquarters as guideline for future projects.

2. With regard to the latter part of the observation of the Committee that "the claim that reheat system designed by Gas Turbine Research Establishment has met the full specifications in respect of thrust, specific fuel consumption etc. is pointless in as-much-as the engine could not produce the required results when fitted in the particular airframe," we would like to appraise the Committee with certain facts. In para 2.93, the Committee have themselves noted that the fact that HF-24 with reheat Orpheus engine would have "some deficiencies in the radius of action" was known and in spite of that, GTRE was allowed to continue with the project. The position is that Orpheus reheat engine was accepted on an overall assessment of its merits and demerits.

3. D.A.D.S. has seen.

[Deptt. of Defence Production O.M. F. No. 48/42/4/78/D (HAL/MDN) dated 21st July, 1978.]

#### **Recommendation**

The Committee note that the Aeronautics Committee and later on a Study Group constituted by it had made a careful study of HF-24 development project and have made certain observations. The more important of these observations have been summarised as follows:

- (i) The magnitude of the work had not been properly appreciated While preparing the initial estimates
- (ii) The elements of material and labour costs had not been properly allowed for in the initial estimates.
- (iii) The Indian design staff had not been experienced enough to make effective contribution in the earlier years. The absence of previous experience in the development of aircraft was a serious handicap and a necessary allowance for this deficiency had not been made in the estimates of cost and time.
- (iv) In the Government, there was no critical examination of the project reports submitted by HAL in 1957 and 1960. There was also a failure to keep a close watch on the progress in the development of HF-24.
- (v) The management organisation in HAL for the project was inadequate.
- (vi) The organisation in the Ministry of Defence to monitor development projects was inadequate.

- (vii) The methodology followed of a small number of prototypes followed by comparatively large number of preproduction aircraft has not given satisfactory results. The consensus of studies carried out in UK, France and USA was that the alternative of production of a larger number of prototypes followed by regular production would yield better results.
- (viii) The decision to relate the development of an aircraft to the successful completion of an engine under development abroad was not wise.
- (ix) Throughout the history of the development of HF-24 aircraft, policy changes were made regarding the choice of the engine. Each of the changes involved considerable design effort and diverted attention from the development of HF-24 MK I. Also concurrent with the programme of development of the HF-24 MK I aircraft, HAL had been engaged in building and supporting the flight development of several versions including HF-24 MK I with airpass, HF-24 MK IA, HF-24 IBX and HF-24 MK IR.

[Sl. No. 28 (Para No. 2.107) of Appendix to the 2nd Report of the Public Accounts Committee 1977-78 (6th Lok Sabha)]

Indicating the action taken on the observations of the Aeronautics Committee, Government have stated that "the criticism contained in the observations is accepted and that the lessons learnt from the experience gained over these projects are being applied to new development projects under execution." The Committee are in agreement with the observations made by the Study Group and would like Government to ensure that the defects pointed out are not repeated in formulating and executing development projects in future.

[Sl. No. 29 (Para No. 2.108) of Appendix to the 2nd Report of the Public Accounts Committee 1977-78 (6th Lok Sabha)]

#### **Action taken**

In pursuance of the recommendations of the Aeronautics Committee, the Aeronautics Research and Development Board was constituted in February 1971. The Board makes a detailed examination of every major development project before it is approved by the Government. The Aeronautics Research & Development Board also reviews the progress of these projects from time to time. A decision has also been taken to authorise large number of prototypes and in

fact the large number of prototypes has been authorised in the recently approved Design & Development Projects. To compress the time-frame it has been decided that:

- (a) Pre-production Phase in respect of those components which are not likely to be modified subsequently to be eliminated;
- (b) as many components as possible should be produced on jigs for the later prototypes and production;
- (c) production engineers from the designated production agency should be associated with a design team on a whole time basis during the development phase. Likewise right at the start of the production phase, a few design engineers should be associated on a whole time basis with the production agency for an initial period of two years.
- (d) to avoid the variation between original cost estimates and the final cost estimates, it has been decided that no long term commitments should be given in respect of either licenced or indigenous projects unless sufficient information has been compiled and necessary sanction obtained.

2. D.A.D.S. has seen.

[Deptt. of Defence Production O.M. F. No. 48/42/16/78/D (HAL/MDN) dated 20th June, 1978. ]

#### **Recommendation**

They would however, like to add that the Government should ensure that the development projects are not allowed to be dragged on for years together with the result that more and more money is pumped in the project and by the time the scheme materialises the model may become obsolete. The progress and achievements of a development project should be analysed and appraised after every 2 years by a technical team and the continuance of the project should be decided upon in the light of the findings of the technical team indicating a distinct progress and a clear possibility of fructification of the development effort in the near future.

[Sl. No. 30 (Para No. 2.109) of Appendix to 2nd Report of the Public Accounts Committee 1977-78 (6th Lok Sabha)].

#### **Action Taken**

The observation of the Public Accounts Committee has been noted.

2. There are development panels in the Defence Research Development Organisation which cover various disciplines; Armaments, Electronics, Materials, Naval Research and Development, Rockets & Missiles etc. These panels review the various research and development activities undertaken in their respective disciplines and recommend changes that are desirable, viz., enhancement of funds or time, closure of the project etc. In addition in the case of all large projects, Steering Committees are appointed with representatives on it from the design and development group, the production agency, the user, Finance and sometimes appropriate experts. These Steering Committees have the responsibility for monitoring the progress of the development projects and making recommendations to Government regarding their continuance or otherwise as well as changes needed in terms of investments, timeframes, technical aspects, etc. In order to accomplish this function the Steering Committees may appoint specific Technical Groups to go into details which the Steering Committee itself may not have time to go into. The Steering Committees have been requested to keep a note of the recommendation of the Committee that they are required to carry out a detailed technical evaluation after every two years and make an appraisal of the project from the point of assessing the progress as well as from the point of view of deciding further continuance of the project. A copy of the instructions issued is enclosed. (Annexure).

3. D.A.D.S: has seen.

[Deptt. of Defence Production O.M. No. 48/42/17/78(D(HAL|MDN)  
dated 20th July, 1978.]

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#### ANNEXURE

No. Aero/RD-134/100/208/S/D(R&D)  
Government of India  
Ministry of Defence  
New Delhi-11, the 15th July 1978.

To

The Scientific Adviser to Raksha Mantri and  
Director General, Defence Research & Development  
New Delhi.

Subject:—P.A.C. 1977-78 (6th Lok Sabha)—  
recommendations of

Sir,

Public Accounts Committee in their Second Report (6th Lok Sabha) has recommended that "the progress and achievements of a

development project should be analysed and appraised after every two years by a technical team and continuance of the project should be decided upon in the light of the findings of the technical team indicating a distinct progress and a clear possibility of fructification of the developmental efforts in the near future."

2. The Steering Committees for major projects which have already been constituted and are responsible for monitoring the progress of projects may therefore be directed to keep a note of the above recommendation of the Public Accounts Committee. They will be required to carry out a detailed technical evaluation after every two years and make an appraisal of the project from the point of view of assessing the progress as well as from the point of view of deciding the further continuance of the project.

3. This requirement may also be brought to the notice of the Steering Committees which may be constituted in future for the projects taken up hereafter.

Yours faithfully,

Sd|-

(R M. GUPTA)

*Under Secretary to the Government of India.*

Copy to.—

CCR&D(G); CCR&D(E);  
All Technical Directorates  
Tech Coord; RD-26

## CHAPTER IV

### “CONCLUSIONS/RECOMMENDATIONS REPLIES TO WHICH HAVE NOT BEEN ACCEPTED BY THE GOVERNMENT AND WHICH REQUIRE REITERATION

#### Recommendations

The Committee find that as a result of cancellation of orders placed on HAL for HF-24 trainer aircraft, the redundancy on account of material and labour is estimated at Rs. 3.64 crores. The detailed assessment of the redundancy is being made by HAL. It is stated that this redundancy was “inescapable and arose mainly out of the difficulties involved in successful development of an improved version of Marut MK II”. The Committee hope that it would be possible for the Undertaking to gainfully utilise the material rendered redundant on account of cancellation of orders.

[Sl. No. 16 (Para No. 2.44) of Appendix to the 2nd Report of the Public Accounts Committee 1977-78 (6th Lok Sabha)].

#### Action Taken

Out of the redundancy of Rs. 3.64 crores, the materials are worth Rs. 1.77 crores, the balance being Tooling and Development Cost. HAL have made an assessment of the materials that could be used on various projects on hand. According to them, material worth Rs. 28 lakhs only could be utilised on various projects. The balance material (value Rs. 1.49 crores) will have to be disposed of after complying with the normal procedure applicable for disposal of imported materials and HAL is working on this.

2. The balance amount of Rs. 1.87 crores representing Tooling and Development cost cannot be gainfully utilised unless HAL receives further orders for the manufacture of these items. However, no new orders are contemplated at present.

3. D.A.D.S. has seen.

[Deptt. of Defence Production O.M. No. 48/42-2/78/D (HAL MDN) dated 20th June, 1978].

#### Recommendation

The Committee observed that since the existing HE-24 aircraft fell considerably short of the then operational requirements of the

Air Force, Gas Turbine Research Establishment (GTRE) of the Research and Development Organisation of the Ministry of Defence took up a project for the development of reheat variant of Orpheus 703 engine (already in use) for fitment to the HF-24 air-frame. They also note that as early as in February 1965, the Technical Study Group (headed by Air Cdr. Moolgavakar) reported that although the reheat engine would meet the then existing operational requirements, it would have "some deficiency in the radius of action". The Study Group had accepted the reheat variant of Orpheus 703 engine as "the only expeditious solution". It has been admitted that in March 1966 it came to light that the test-bed performance of HF-24 Mk. I A (later redesigned as Mk. IR) fitted with reheat version of Orpheus 703 engine "was inferior even to Mk. I fitted with Orpheus 703 engine in dry climb and cruise due to base drag". It is further admitted that in 1969 the prototype aircraft fitted with reheat variant of Orpheus 703 engine was flown and this prototype also showed some shortcomings. This prototype finally crashed in January 1970. The Committee find that in spite of these results, the GTRE was allowed to continue with the reheat development project incurring expenditure which ultimately proved largely infructuous. In February 1973, when Air Headquarters suggested abandonment of the project for manufacture of Mk. II aircraft with reheat engine on the grounds, *inter alia*, of financial stringency and instead proposed retromodification of the existing Mk I aircraft, the retromodification of the existing aircraft with reheat variant of Orpheus 703 engine continued to be a subject of research and development in the GTRE even though it was well-known that reheat variant of Orpheus 703 engine had the problem of base drag. The Committee are unable to appreciate as to why the Government persisted with the project for development of reheat variant of Orpheus 703 engine and its fitment in the HE-24 air-frame when it came to their notice as early as in 1965 that it caused the problem of base drag which reduced the performance of the aircraft far below the operational requirements.

[SL No. 19 (Para No. 2.93) of Appendix to the 2nd Report of the Public Accounts Committee 1977-78 (6th Lok Sabha)].

#### **Action taken**

The Public Accounts Committee are aware that Technical Study Group had accepted the reheat variant of Orpheus 703 engine as "the only expeditious solution" because of the improvements in the characteristics in respect of combat effectiveness and survivability which were considered to override the small limitation in radius of action on account of drag increase. This was in consonance with the view that the selection of the engine should be governed primarily



by consideration of high combat qualities rather than the radius of action as indicated by Air Headquarters in June 1971. The question of continuance of the development of reheat engine was examined in the 11th meeting of the Marut Steering Committee held on 19th June, 1968 wherein it was decided that GTRE should continue to work on all the reheat engines for the Mk. IR prototype pending the completion of the study being carried out by the HAL. In 1969 the prototype Mk. IR with reheat engine was flown and this prototype also showed some shortcomings. Before the matter could be analysed further, the only prototype of Mk. IR crashed during its 10th flight in January 1970 and as such no further assessment could be made at that stage.

2. Air Headquarters had submitted a modified plan for HF-24 Mk.II development because of paucity of resources and to exercise utmost economy in the Defence Expenditure. Accordingly HAL carried out feasibility study in March 1973 and submitted a report which was examined by the Government. In July 1973 the project was reviewed in a meeting chaired by Raksha Utpadan Mantri where *pros and cons* of three alternative proposals were discussed. It was view that development of HF-24 with reheat engine should not be dropped. Even at the Apex Group discussions, it had been agreed that the project for the development of HF-24 with reheat 703 engine, with a view to retromodification, should continue.

3. The Orpheus reheat engine successfully completed extensive type approval test as per international standards and was type certified, thereby clearing it for production. The performance of airframe and engine was found to be superior in support of combat effectiveness and survivability. It cannot, thereby be, inferred that the expenditure on the reheat project proved to be largely "infructuous". On the contrary, if the project had not been pursued, Government would have been open to criticism for not continuing and preserving the development of reheat system, which showed from the very beginning considerable promise for making the HF-24 a better fighter aircraft. In the meeting held in July 1973 referred to above, a view was also taken that expenditure incurred should be regarded as on "competence building" in Research & Development Organisation. Further, in a Research and Development Organisation like Gas Turbine Research Establishment, the expenditure on such projects cannot be regarded as infructuous as the technical feasibility of incorporating the high degree reheat system on an actual engine has been achieved and the data generated and the expertise developed are actually being

utilised for the engine development programme currently in hand at the Gas Turbine Research Establishment.

4. D.A.D.S. has seen.

[Department of Defence Production O.M. No. 48/42/3/78/D  
(HAL/MDN) dated 21st July, 1978].

### Recommendation

The Committee also fail to understand why the proposals for development of other variants, such as the one conceived by HAL was not given a chance to prove its efficiency when it came to be known that the reheat variant developed by GTRE had not proved a success.

Sl. No. 20 (Para No. 2.94) of Appendix to the 2nd Report of the Public Accounts Committee 1977-78 (6th Lok Sabha).

### Action Taken

The alternative proposal for Orpheus reheat engine conceived by HAL had emerged in the context of changed requirement of IAF. Apart from the increased radius of action, Air Force had insisted (in September 73) that it should be possible to complete the development of the engine in a time frame so that Mk.II version of the aircraft can be inducted in 1978-79. In the meanwhile (May, 1973), the original programme of manufacture of a large number of aircraft had undergone a change and it was limited to retromodification of small numbers of aircraft. It was found that the design and development of the alternative engine proposed by HAL was not as simple as it appeared and HAL did not have the resources to undertake it within an accepted time frame (about five years). Considering the long gestation period and non-availability of resources, the alternative proposal of HAL was not considered feasible (August 1974).

2. D.A.D.S. has seen.

[Department of Defence Production O.M. No. 48/42/14/78/D (HAL/MDN) dated 20th June, 1978].

**CHAPTER V**

**CONCLUSIONS/RECOMMENDATIONS IN RESPECT OF WHICH  
GOVERNMENT HAVE FURNISHED INTERIM REPLIES:**

—N I L—

NEW DELHI;  
November 10, 1978  
Kartika 19, 1900 (S).

P. V. NARASIMHA RAO,  
Chairman,  
Public Accounts Committee.

## APPENDIX

### STATEMENT OF CONCLUSIONS/RECOMMENDATIONS

Sl. No	Para No. of the Report	Ministry/Deptt. concerned.	Conclusion/Recommendation
1	2	3	
1.	1.6	Deptt. of Defence Production	<p>The Committee find that out of the total redundancy of Rs. 3.64 crores, the tooling and development cost constituted Rs. 1.87 crores. These, it is stated, cannot be gainfully utilised unless Hindustan Aeronautics Ltd. receives further orders for the manufacture of these items and no new orders are at present contemplated. It can thus be safely concluded that the amount of Rs. 1.87 crores on account of tooling and development has gone waste. Out of the balance amount of Rs. 1.77 crores representing the cost of materials, the materials worth Rs. 28 lakhs only could be utilised on various projects and the balance material works Rs. 1.49 crores will have to be disposed of. The total wasteful expenditure, therefore, comes to Rs. 3.36 crores. At this stage the Committee cannot do anything except expressing their displeasure at this colossal waste of public money which could have been avoided with a little foresight on the part of the Ministry of Defence.</p>
2	1.9	-do-	<p>The Committee are unable to appreciate the claim of the Gas Turbine Research Establishment (GTRE) that the performance of</p>

the airframe and the Orpheus reheat engine developed by them was superior in respect of combat effectiveness and survivability when the problem of 'base drag' was still persisting. They are also not convinced with the argument that the alternative proposal of Hindustan Aeronautics Ltd. (HAL) was not considered feasible "considering the long gestation period and non-availability of resources". The Committee feel that instead of spending time and energy on the unsuccessful GTRE project more resources should have been provided to HAL to undertake the project which had rich potentialities for success. Even assuming, for the sake of argument, the aforesaid contention of the Ministry, the Committee fail to understand why GTRE could not produce an engine which would have made the aircraft operationally successful. This discloses a lack of coordination by the Ministry between the activities of the GTRE and HAL which has ultimately resulted in avoidable wasteful expenditure.

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