

# CHAPTER II: Functioning of the Aviation Arm of the Indian Navy





# HIGHLIGHTS

1. *Indian Navy's Aviation arm is holding a depleted force level. Availability of aircraft was a mere 26 per cent of asset strength on account of the high number of aircraft undergoing repair / overhaul and sluggish progress in acquisition programme.*

*(Paragraph 2.2.1.6)*

2. *Indian Navy's Air Combat capability has weakened drastically as the available aircraft carrier is almost half a century old and is running on borrowed time since it was to be decommissioned in 2007-08. The replacement of another carrier, decommissioned in 1997 will not be in position until 2013.*

*(Paragraph 2.2.1.4)*

3. *Attack capability of the already depleted fighter aircraft fleet on-board the carrier is significantly eroded as they have not been kept in full combat readiness in the absence of a fully functional fitted radar and limited firing of practice missiles. The bombs fitted became obsolescent and the guns are underutilised.*

*(Paragraph 2.2.1.4)*



4. *Reconnaissance activities have been curtailed due to drastic depletion in the force level and limited capability as a result of ageing of the aircraft, outdated equipment and sub-optimal functioning of other equipment.*

*(Paragraph 2.2.1.3 and 2.2.1.5)*

5. *No induction of aircraft for combat, LRMR and ASW role has been done during the period 1990 to 2005.*

*(Paragraph 2.2.3)*

6. *Despite an ESM system remaining unproven even after a decade, Navy again procured the same system at a cost of Rs 51.72 crore for other eight aircraft.*

*(Paragraph 2.2.3.3)*

7. *Modernisation programmes will have limited benefits. Delayed upgradation of an aircraft at a cost of Rs 641.62 crore may not yield the desired results due to short residual life.*

*(Paragraph 2.2.2.1)*



*8. Despite the establishment of facilities for overhauling and repair, engines and components are still being sent abroad for repair on account of inefficiencies in functioning of these facilities.*

*(Paragraph 2.2.4.3)*

*9. Lack of synchronisation of acquisitions with setting up of infrastructure facilities has led to delays in operationalising equipment. This has already occurred with the Unmanned Aerial Vehicles and will be repeated in the induction of aircraft MiG -29K.*

*(Paragraph 2.2.3.5)*

# KEY RECOMMENDATIONS



1. *The Government may expedite finalisation and approval of Navy's Long Term Perspective Plan to give a firm direction towards acquisition and induction of aircraft, management of assets and flow of funds.*
2. *Any change in the Unit Establishment of aircrafts by Indian Navy should be brought to the notice of the Government in order to ensure accountability in utilisation of assets.*
3. *Proactive steps need to be taken to ensure the improved serviceability of the aircraft through timely supply of essential spares. IHQ (N) should take measures to minimise delays in the commencement and completion of inspection so that aircraft down-time can be avoided.*
4. *Fitment of a new system which directly affects the operational capability should be undertaken only when the prototype is proved successfully.*



5. *While encouragement and support to the indigenisation effort should be continued, the limitations, if any, of such efforts should be clearly recognised and should not be at the cost of operational preparedness.*
6. *Second-hand platforms should only be acquired for well-established reasons and should not become liabilities as such equipment will have limited serviceability and maintenance would be a challenge due to obsolescence of spares.*
7. *Creation of repair/overhaul facilities should be planned at the time of induction of aircraft itself so that benefits accrue timely. Feasibility of repair by local agencies should be ascertained before concluding contracts with foreign sources.*
8. *Project management and monitoring should be accorded priority so that civil works facilities essential for the operation and up-keep of the aircraft are created in time.*



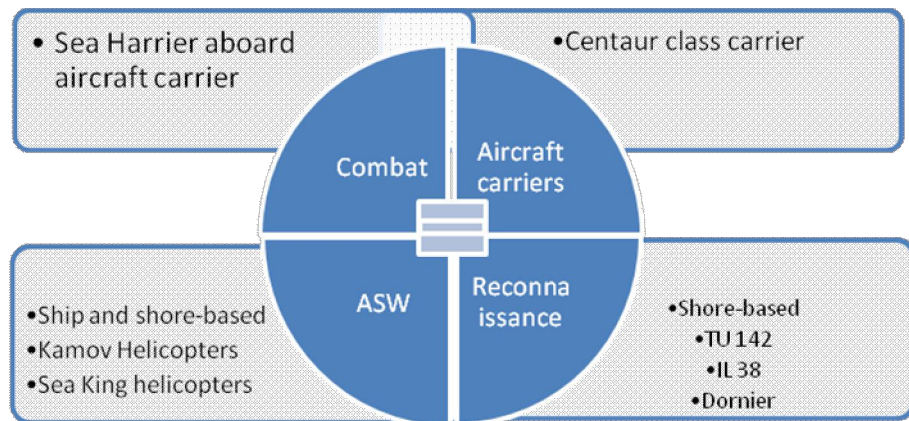
9. *Vital training aids like simulator should be made available to impart quality training.*

# Part I

## Introduction

### 2.1 Naval Aviation

Naval Aviation, i.e. the use of manned air power by a sea-based military force, is a critical element in armed conflicts. The Indian Naval Aviation wing not only significantly augments naval capability but also impacts over-all defence preparedness. The **Naval Air Arm** is, thus, a vital component of the Indian Navy (IN), contributing to combat capability in key areas beyond the reach of conventional land-based Air Force aircraft through aircraft carrier-borne strikes against maritime targets and air defence of fleet. The Wing also performs different roles of reconnaissance and anti-submarine warfare (ASW) using a variety of manned and unmanned aircraft and helicopters which are shore and / or ship-based.



#### 2.1.1 Organisational Structure

The Naval Aviation Arm is manned by a four-tiered organisational structure with the Integrated Headquarters (Navy)- IHQ (N) at the apex level followed by various Directorates, Flag Officers Commanding-in-Chief (FOCs-in-C)/Headquarters Naval Aviation, Naval Air Stations/Aircraft Carriers/Ships and Naval Air Squadrons/Flights. While three technical



Directorates<sup>1</sup> are responsible for selection, operation, maintenance and acquisition of aircraft, the FOCs-in-C are responsible for administrative and logistics support for Naval Air Stations. Flag Officer, Naval Aviation (FONA) is responsible to the Chief of Naval Staff on all matters concerning aviation training, maintenance, flight safety and operational tactics. The Squadron /Flights are controlled and supported by the respective Air Stations/Ships. The Squadron Commander is responsible for the functioning and operational status of his squadron.

### 2.1.2 Scope of Audit

This Performance Audit covers the period 2003-08, later updated up to December 2009 and examines the activities of the aviation arm of the IN. Audit selected 48 *per cent* of the squadrons located across 50 *per cent* of the Naval Air Stations based on their operational importance viz., Combat, Long Range Maritime Reconnaissance (LRMR) and Anti Submarine Warfare (ASW) roles.

Audit acknowledges with gratitude the support provided by the Ministry of Defence, Naval Headquarters and all subordinate offices during the course of the Performance Audit and subsequent interactions for the collection of information for updation of the Report.

### 2.1.3 Audit Objectives

Audit of Naval Aviation Wing was taken up to assess the efficiency and effectiveness with which the planning, asset management, operation, repair and maintenance activities were conducted and to assure that they were conducive to achieving the Naval Aviation Wing's objectives in a cost-effective manner. In particular, the audit reviewed:

- Adequacy of required force level;
- Efficiency and effectiveness with which the assigned tasks were performed;
- Efficiency of execution of capital acquisition projects;
- Timeliness of modernisation/ up gradation programmes to meet future requirements;
- Efficiency of repair and maintenance of aircraft;
- Adequacy of infrastructure at Naval Air Stations for supporting aircraft operations;

<sup>1</sup> Directorate of Naval Air Staff, Directorate of Naval Air Material, Directorate of Aircraft Acquisition

- Availability and serviceability of fleet; and
- Quality of training of pilots and observers.

#### 2.1.4 Audit Criteria

The audit criteria for performance evaluation were derived from:

- Envisaged force level as per the Perspective Plan;
- Naval Headquarters/Government papers/policy in respect of acquisition/up gradation and modernisation of aircraft;
- Authorised holding as per Ministry of Defence orders for each type of aircraft and assigned tasks;
- Maintenance procedure/repair schedule prescribed by Original Equipment Manufacturer (OEM)/ IHQ(N);
- Defence Procurement Procedure / existing guidelines for procurement; and
- Prescribed training programmes and training schedules.

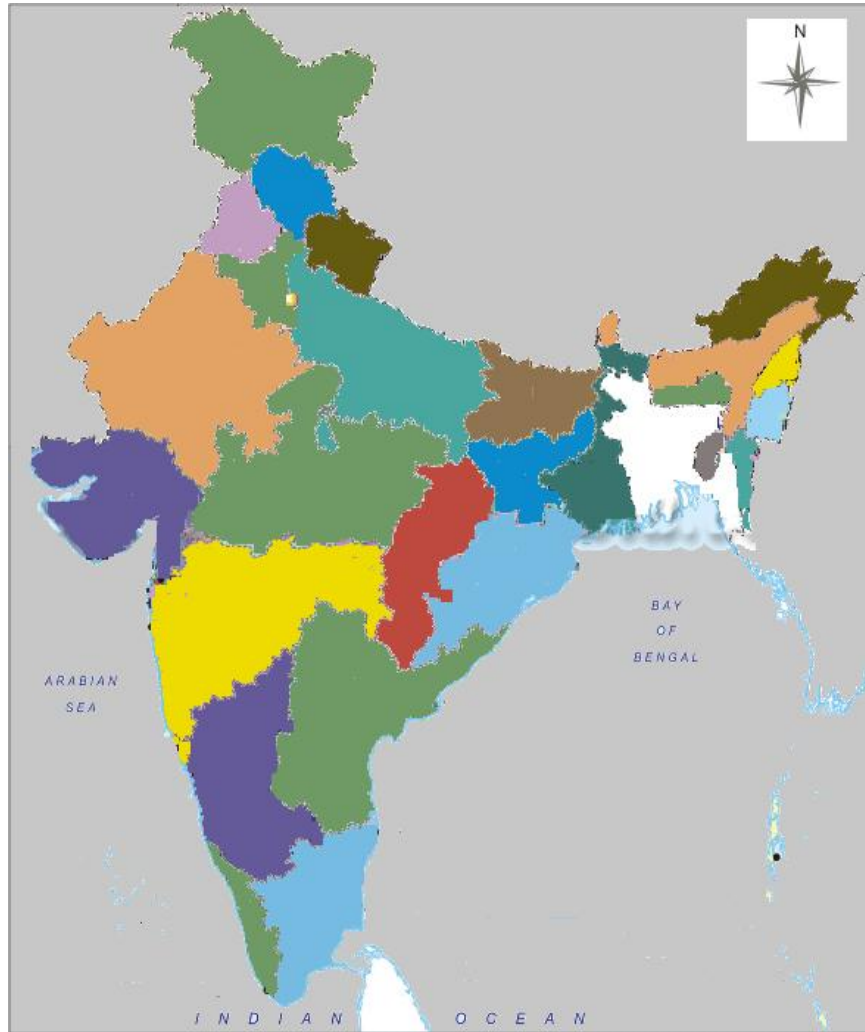
#### 2.1.5 Audit Methodology

An 'Entry Conference' was held on 23 May 2008 with officials from the Ministry of Defence and Naval Directorates dealing with Aviation Wing wherein the scope, audit objectives and criteria were discussed. Field audit was conducted through examination of records, issue of questionnaire and interaction with the concerned officers at the Naval Aviation Directorates at New Delhi, Headquarters Naval Aviation at Goa and selected Naval Air Stations, Material Organisations and Naval Aircraft Yards.

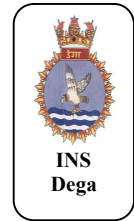
An 'Exit Conference' was held on 5 December 2008 wherein the main findings of audit and related recommendations were discussed.



# NAVAL AIR STATIONS



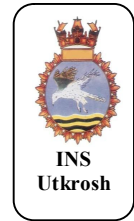
**INS Shikra**



**INS Dega**



**INS Hansa**



**INS Utkrosh**



**INS Garuda**



**INS Rajali**



**INS Parundu**

## Part II

### Audit Findings

#### 2.2 Audit Findings

The audit findings have been categorised under (i) Strength and Capability, (ii) Modernisation and Upgradation, (iii) Acquisitions, (iv) Repair, Maintenance and Spare Management, and (v) Aviation Training.

##### 2.2.1 Strength and Capability

The Naval Aviation Arm is faced with the challenging task of achieving its military goals with appropriate induction of state-of-the-art aircraft carrier, operational aircraft and modernisation of existing assets to effectively respond to ever-changing threat perceptions.

###### 2.2.1.1 Ad hoc planning

In order to fulfill the military objectives of the Naval Aviation Arm, IN requires realistic and rational planning for force levels, its organisation and timely acquisition of equipments. Such planning has to necessarily take into account the present context as also the foreseeable future with respect to induction and de-induction of various aircraft/equipment.

As per the Defence Procurement Procedure (DPP), proposals for acquisition of capital assets flow from the defence procurement planning process. The outcome of the planning process, covering the long-term, medium-term and short-term perspectives, is detailed in (a) the 15 years Long Term Perspective Plan (LTPP), (b) five years Services Capital Acquisition Plan (SCAP) and (c) Annual Acquisition Plan (AAP). Although the Navy has prepared a Long Term Perspective Plan (LTPP) for the period 2002-2017 (revised to 2007-22), this has not yet been formally approved by the Government (as of December 2009). This was noted by the Parliamentary Committee on Defence (2006-07 and 2009-10) which expressed its concern over the delay in preparation and finalisation of the long term plan of the forces as this had a corresponding impact on operational preparedness. The Ministry, in its reply to the Committee, stated that preparation of LTIPP is a pioneering effort and involves seeking and incorporating comments from a host of agencies involved.

In the absence of approved plans, audit noted that decision-making has been geared towards staving off present crises rather than meeting the aims of a long-term structured plan as discussed below:

- Despite knowing that the INS ‘Vikrant’ and INS ‘Viraat’ were to be decommissioned in 1997 and 2008 respectively and that indigenous building of a substitute could take a decade, contract for repair and refit of a second-hand replacement carrier for INS Vikrant was concluded with a foreign country in 2004 whereas the Letter of Intent (LOI) for the indigenous aircraft carrier was placed in August 1999 on Cochin Shipyard Ltd. As of December 2009, while the replacement carrier was expected to be inducted in Indian Navy by 2013, only 35 *per cent* work on the indigenous carrier had been completed.
- Although 100 *per cent* of the LRMR and major portion of the ASW fleet has already outlived its prescribed life and is nearing the end of its extended life, no significant inductions were planned and made during the X<sup>th</sup> plan (2002-07).
- Despite the age and high rate of attrition of the combat aircraft fleet, replacements were planned to be acquired only during 2007-08.
- Modernisation / upgradation decisions have been taken towards the end of the life cycle of crucial and sensitive fleets of combat and LRMR aircraft, e.g. in the case of aircraft Tu-142<sup>1</sup>, IL-38 and Sea Harrier. Such decisions became necessary to maintain force levels despite the limited benefits on account of low residual life.

### 2.2.1.2 Non- achievement of force levels

The five years Capital Acquisition Plan, indicating the list of equipment to be acquired, keeping in view operational exigencies and the overall requirement of funds has been prepared for various periods. At present, Navy is seeking to achieve the objectives of the XI<sup>th</sup> Plan for the period 2007-12. Audit, however, noted that though some major contracts were signed as envisaged in the X<sup>th</sup> Plan (2002-07), a number of schemes have been carried over to the XI<sup>th</sup> Plan. As a result, achievement of the planned force level as per the XI<sup>th</sup> Plan would be difficult in respect of combat, ASW and LRMR aircraft.

<sup>1</sup> Modernisation was, however, not taken up ultimately.

### **I Category-wise Force levels likely to be achieved by end of the XI<sup>th</sup> Plan**

<b>Category</b>	<b>Percentage of anticipated force level likely to be achieved</b>
Combat	33
Anti Submarine Warfare (ASW)	63
Long Range Maritime Reconnaissance (LRMR)	26

This is because the acquisition process for these aircraft has either not been initiated or is still at the nascent stage. Anticipated levels may also not be realised in certain cases, such as the ASW group where indigenous development of the Advanced Light Helicopter (ASW version) has not proved successful. Similarly, for combat aircraft, the Indian Navy plans to have a force level comprising the Sea Harrier, MiG-29K and indigenously developed Light Combat Aircraft (LCA). Audit noted that:

- ⇒ The Sea Harrier fleet is planned to be decommissioned by 2012;
- ⇒ In the case of the MiG-29K, a contract has been concluded but it will meet only 19 *per cent* of the required force level; and
- ⇒ In the case of the LCA, the prototype is still being tested.

#### **2.2.1.3 Ageing fleet**

The multi-faceted responsibilities of the Naval Aviation Wing are carried out through a variety of aircraft. However, the fleet is ageing as shown below and requires induction of newer platforms and technologies.

## 2 Age of Naval Aviation fleet

Type of aircraft carrier/aircraft	Vintage/ Year of Induction	Life as on 31-03-09	Remarks
<b>Aircraft Carrier</b>			
INS Viraat	1959 (UK)	50 years	Acquired in 1987 and was to be decommissioned in 2008.
<b>Combat Aircraft</b>			
Sea Harrier	1983 – 86	23 – 26 years	More than 50 per cent fleet lost due to accidents. Obsolete aircraft presenting considerable challenges with respect to maintenance and serviceability.
<b>LRMR</b>			
IL-38	1977	32 years	Planned to be phased out in the year 2002. Government cleared a proposal in 2001 to refurbish and modernise aircraft with 15 years extension of life.
Tu-142	1988	21 years	Total Technical Life (TTL) of 16 years or 5000 flying hours. Outlived its TTL which has been extended from 20 to 25 years.
<b>Anti Submarine</b>			
KA-25	1980	29 years	Recommended for phasing out.
KA-28	1986	23 years	Shelf life was 20 years/3000hours. Life was extended upto 28 years.
Sea King 42-A	1980	29 years	Shelf life was 20 years /3000 hours.
Sea King 42-B	1988	21 years	Shelf life was 20 years/ 3000 hours.

#### 2.2.1.4 Naval Air Combat capability adversely impacted

An aircraft carrier is the corner-stone of the Naval Aviation Wing as its primary mission is to act as a seagoing airbase. The Indian Navy has consistently projected the need for at least two aircraft carriers and, in fact, has sought approval for another carrier as well in order



*INS Viraat was originally commissioned in the Royal Navy as the HMS Hermes on November 18, 1959. The vessel was acquired by the Indian Navy in April 1986. It is likely to remain in service till 2012.*

to meet its full requirements. Indian Navy was able to meet its need of two carriers during the late 1980s and early 1990s. Since 1997, however, there has been a sharp decline in the force level, both in the number of fighter aircraft and aircraft carrier. The replacement for INS Vikrant, decommissioned in 1997, the Admiral Gorshkov is not likely to be inducted before 2013 and construction of the indigenous aircraft carrier is delayed till 2014. In respect of the aircraft carrier in-service, INS Viraat, the ship was not available from March 2008 to August 2009 on account of special refit and repairs to extend its life from 2007 to 2012. As a result, the Navy was without an aircraft carrier in operation for a significant length of time.

More importantly, for INS Viraat to be effective, it has to possess a quality strike force, which it does not. Sea Harriers, IN's only combat aircraft, were procured during the period 1979-1986 to be deployed in one squadron on-board INS Viraat with a Unit Establishment<sup>2</sup> (UE) of 'X' aircraft. During the audit period, on an average, only 42 *per cent* of the UE was available with the squadron. The total inventory itself has also been depleted. Eight accidents took place in the combat aircraft fleet during the audit period. As of December 2009, 65 *per cent* of the Sea Harriers acquired had either crashed or

<sup>2</sup> Number of aircraft authorised by Ministry for holding at the unit



been rendered ineffective. The aircraft also had an alarming number of 18 incidents<sup>3</sup>. High rate of accidents were stated to be due to pilot error or material failure. Although the Indian Navy has received four MiG-29K aircraft by December 2009, however, these aircraft cannot operate from INS Viraat.

Weak operational capabilities were also reflected in the performance of existing avionics, namely the fire control radar, which was unsatisfactory. Audit also noticed that even the practice firing of the on-board 'Magic' missile has not been done since 2003. Bombs required to be carried by the aircraft have been declared obsolete in 2007 and practice bombs have not been utilised during years 2004-05 and 2007-08. Utilisation of the 30 mm guns was negligible.

#### 2.2.1.5 Depletion in ASW and reconnaissance capabilities

An analysis of the force level in ASW and reconnaissance capabilities disclosed that there had been a drastic depletion in the force level and limitation in role capability over a period of time.



*The Ilyushin IL-38 (NATO reporting name "May") is a maritime and anti submarine warfare aircraft designed in erstwhile Soviet Union.*

The situation with the Long Range Maritime Reconnaissance (LRMR) aircraft, i.e. IL-38 and Tu-142, was particularly bleak. As regards the IL-38, not even one aircraft was available for operation during 2003-04 and 2004-05 as they were undergoing a Mid-Life Upgradation (MLU). Four aircraft were received after completion of their MLU mid-way during the audit period between January 2006 and November 2009. The remaining aircraft (one) is still under MLU. Even after the MLU, the aircraft is unable to achieve the desired level of performance in the maritime reconnaissance/ anti-submarine warfare (MR/ASW) role (See Para 2.2.2.2 for details).

<sup>3</sup> Aircraft accidents which are not of major nature are called incidents

In respect of the second LRMR aircraft, Tu-142, only 50 *per cent* of the sanctioned UE was available in the squadron with the available aircraft functioning in a restricted manner.



*The Tupolov (Tu-142), NATO reporting name “Bear F/J”, is a Russian-origin maritime reconnaissance/anti-submarine warfare turboprop aircraft.*

Six aircraft were constantly under repair / overhaul, one aircraft was phased out while the remaining aircraft were nearing completion of their extended life.

Audit observed that the lack of accuracy of the navigational equipment and an outdated weapon sensor fit made the aircraft unsuitable for locating and destroying modern submarines. In fact, during the audit period, 30 *per cent* of the sonobuoys<sup>4</sup> deployed were unserviceable leading to sub-optimal performance. Additionally, the 1970s origin communication and navigation suites and the obsolescence of sensors and equipment fit has resulted in the aircraft being exploited to a much lesser extent than its total technical life.

Short-range maritime reconnaissance (SRMR) is carried out by the Dornier aircraft which are a relatively new induction in the Indian Navy. However, the functioning of the ‘Eagle’ Electronic Support Measures (ESM) system fitted on-board has been sub-optimal.

#### **2.2.1.6 Dilution of Unit Establishment (UE)**

The Naval Aviation Wing is authorised 25 squadrons of different aircraft types, each with its own UE sanctioned by Government. Naval Headquarters

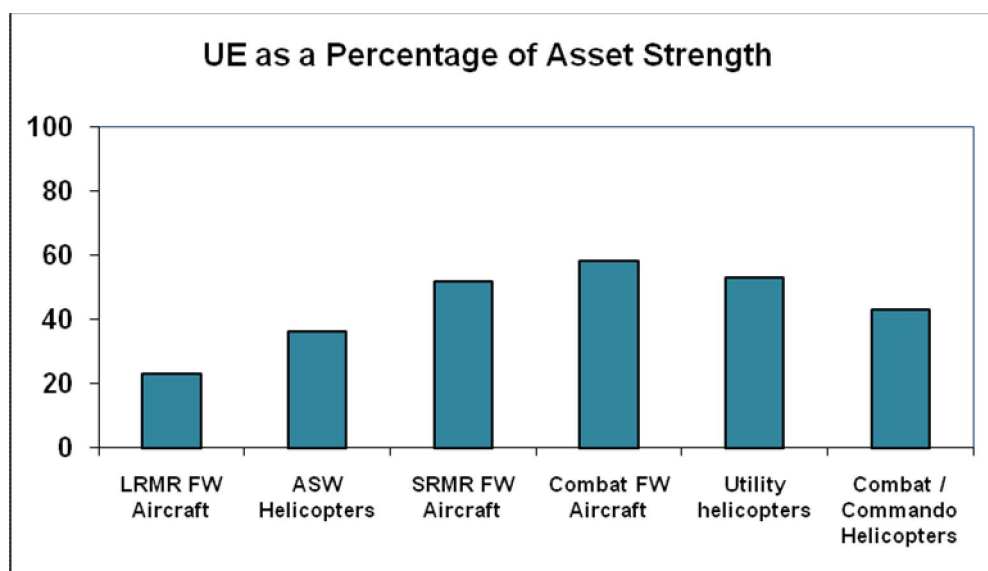
<sup>4</sup> Equipment to detect submarines

(NHQ) has, on its own, decreased the UE prescribed by the Government. The impact of this can be clearly seen from the representative sample given in the table where the percentage reductions range from 38 *per cent* to 67 *per cent*. As a result, while squadrons were being maintained, they did not have an adequate number of aircraft to retain their operational advantages.

### 3 Dilution of UE in selected squadrons

Squadron	Aircraft	UE sanctioned by Government = 100	UE fixed by NHQ
INAS 'A'	Sea Harrier	100	62.5
INAS 'B'	IL-38	100	33.3
INAS 'C'	Tu-142	100	50

On account of the high number of aircraft undergoing repair / overhaul / storage NHQ fixed UEs did not even correspond to 50 *per cent* of their asset strength<sup>5</sup> in most cases, as shown below. The authority and reasons for reducing the UE at the level of NHQ *vis-a-vis* fixed by Government was not clear.

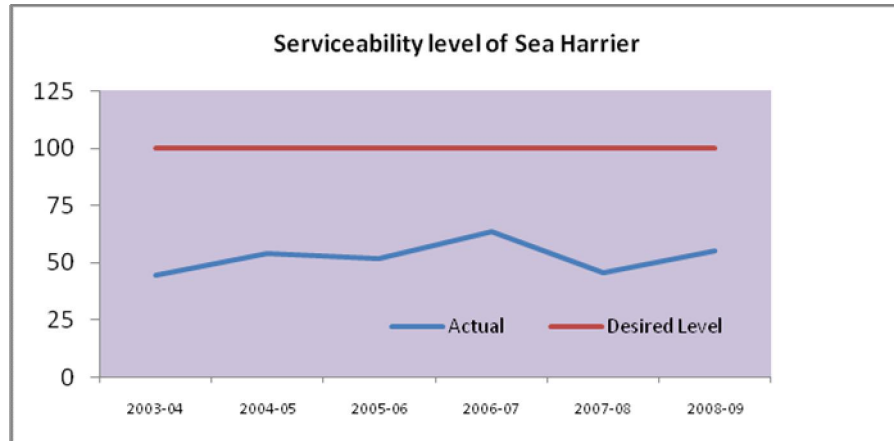


Verification by audit of actual holdings during 2007-08 revealed that out of the total assets of aircraft for combat, ASW, LRMR/SRMR role, only 41 *per cent* could be allotted to squadrons/ flights /ships against the specific UE. This figure fell to 26 *per cent* for the entire Wing including all assets.

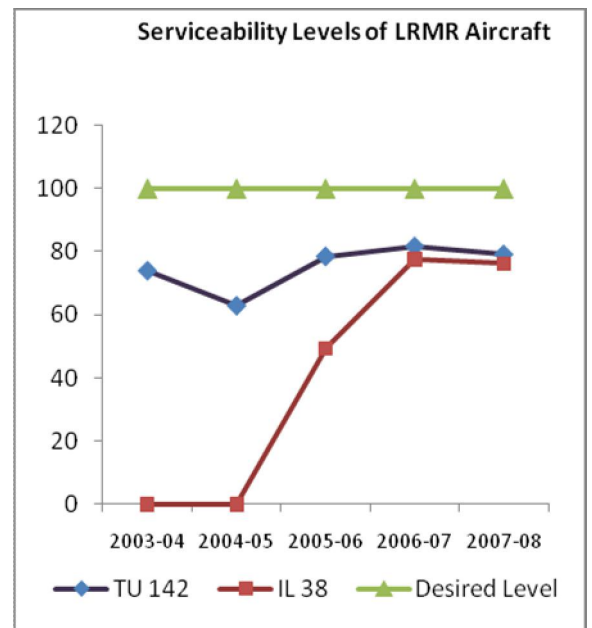
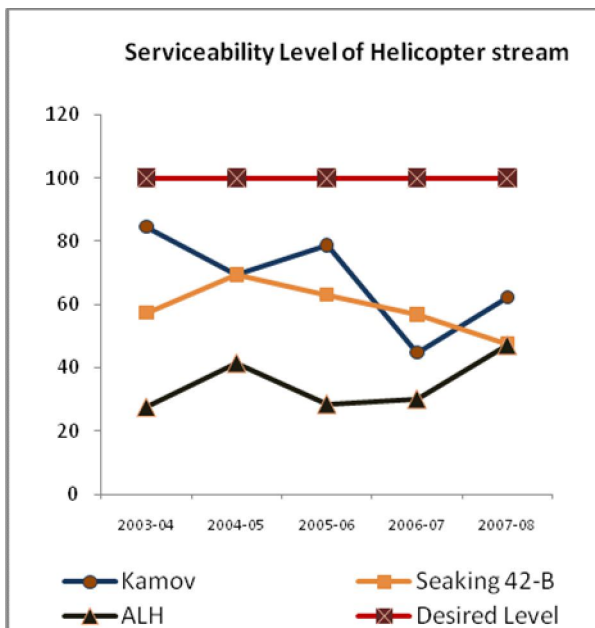
<sup>5</sup> For the purposes of this report, audit has taken 'asset strength' as the complete inventory possessed by IN.

**2.2.1.7 Availability of aircraft**

‘Serviceability’ implies that the aircraft is technically available and is not undergoing a scheduled repair or overhaul at any level. Audit found that the allotted aircraft for UE were not available for operational utilisation at all times during the entire period as the serviceability rates for the aircraft were poor ranging from 27 per cent to 84 per cent.



The main reason for low serviceability was the age of the aircraft or repeated failure of LRUs<sup>6</sup> and also due to non-availability of spares. In the case of the Advanced Light Helicopter, however, poor serviceability was due to technical issues, long repair lead time by the OEM etc. Serviceability of aircraft IL-38 was zero in 2003-04 and 2004-05 as no aircraft were available.



<sup>6</sup> LRU – Line Replaceable Unit – a part which, if not functioning, can be easily and quickly replaced by the squadron itself.

### 2.2.1.8 Achievement of Annual Flying Tasks

Annual Flying Tasks (AFTs) are directives issued to each squadron prescribing the number of hours of flying required to be undertaken each year. At the time of the induction of the aircraft, AFTs are fixed by the Government. However, it was noticed that AFTs were being revised by NHQ based on the availability of the aircraft, aircrew and ships. Data was made available only in two cases as shown below:

#### **4** Annual Flying Task of select squadrons

Aircraft	AFT fixed by Government	AFT fixed by NHQ (2007-08)	Actually Achieved
KA-25	1200 hrs	300 hrs	300 hrs
IL-38	1800 hrs	600 hrs	306 hrs

In audit opinion, not only did this dilute Government directive but also weakened control and supervision mechanisms which would have indicated actual short-falls. Government approved AFTs were not produced to audit except for two squadrons, on the premise that management of assets on behalf of Government is a Service Headquarters function. However, the authority for reducing the AFT at the level of NHQ *vis-a-vis* fixed by Government was not clear.

### 2.2.1.9 Aircraft accidents and incidents

Force levels have also been affected by an increasing number of accidents and incidents during the audit period. From April 2003 to March 2009, there were 36 accidents involving 33 aircraft with the maximum number<sup>7</sup> of accidents taking place in the Sea Harrier and Chetak (helicopter) fleets. The main reason attributed to the accidents has been air crew error including judgment error and material failure/maintenance error. Besides incurring huge financial loss the accidents also affected combat strength in terms of equipment and manpower. Audit also observed that the Sea Harriers were being flown without Flight Data Recorder (FDR) which is of primary importance in accident investigation and has immense training value.

<sup>7</sup> Eight in each fleet

It was also noted that incidents to aircraft continued to rise due to foreign object damage (FOD), ground accident and bird hits from 15 in 2004 to 31 in 2007. In 2008-09, total number of incidents due to all causes across fleets was 215. Such incidents have resulted in aircraft down-time of 592 days thereby affecting availability with attendant cost implications. Navy attributed the increase in aircraft incidents to the unauthorised expansion in human habitation in and around the airfield including hotels and eating joints with non-existent waste disposal systems, slums and other constructions with poor drainage systems and indiscriminate garbage dumping and landfill sites.

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### Recommendations

- *The Government may expedite finalisation and approval of Navy's Long Term Perspective Plan to give a proper and firm direction towards acquisition and induction of aircraft, management of assets and flow of funds.*
  - *Measures should be taken to expedite acquisition process for combat, ASW and LRMR aircraft.*
  - *Proactive steps need to be taken to ensure improved serviceability of the aircraft by timely supply of essential spares.*
  - *Any change in the Unit Establishment of an aircraft by Indian Navy should be brought to the notice of the Government in order to ensure accountability in utilisation of assets.*
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### 2.2.2 Modernisation and Upgradation

Due to lack of materialisation of planned inductions, Navy has had to keep its aircraft in service beyond their normal service life, extend the average life of front-line aircraft making them maintenance intensive. This has adversely impacted combat availability of aircraft. Though the life of the airframe can be enhanced, it is not possible to extend the electronic life of the equipment. In order to make the aircraft role worthy, upgradation and modernisation programmes were planned for the Tu-142, Sea Harrier, Seaking 42-B and KA-28 fleets during the Xth Plan period. However, upgradation of only the Sea Harrier and IL-38 has been taken up as of December 2009. Audit review of the programmes disclosed that the projects may not yield the operational benefits as discussed below.

### 2.2.2.1 Imprudent upgradation of an aircraft

The 1970s vintage avionics of the aircraft Sea Harrier necessitated that the aircraft be modernised to retain operational advantages. Accordingly, the upgradation programme proposed replacement of the existing radar with a current generation ‘Look Down’ radar and integration of a new Beyond Visual Range (BVR) missile. As the aircraft had a limited residual life and was due for phase-out in 2012, the project was proposed in October 2001 to be carried out on a fast-track basis as time was of utmost essence. However, Naval HQ decided (June 2002) not to go in for complete upgradation given the low residual life of aircraft.

Later, the contract for limited upgradation was concluded but only in March 2005. The delay was mainly on account of finalising technical requirements, issuing the Request for Proposal, conducting Technical Evaluation for the missile and associated radar. Not only did this delay defeat the very purpose of execution of the project on fast track basis but the Navy would also be able to exploit the upgraded Sea Harrier aircraft for a very limited period only, i.e about three years or less.

Even subsequently, there were delays in the execution of the programme by Hindustan Aeronautics Limited (HAL) and the first milestone of handing over two prototypes to Navy by February 2007 could not be achieved. Consequently, delivery of the remaining aircraft, scheduled for February 2008 was postponed to December 2009. Audit observed the following:

- The Sea Harrier has had, over the past few years, a very high attrition rate. In fact, subsequent to the time of mooting the proposal, in October 2001, Navy lost two aircraft in August 2003 and December 2004. Despite being aware of these facts, Navy initially committed all its aircraft for the upgradation though they ultimately reduced one aircraft



*Originated in UK, the BAe Systems Sea Harrier is a Naval VTOL/STOVL jet fighter, reconnaissance and attack aircraft*

from the final contract. Further they did not include any provision in the contract for payment on pro-rata basis depending on the number of aircraft upgraded by the vendor. As a result, after conclusion of contract, when more aircraft were lost in accidents, Navy had no option but to make payment of Rs 204.30 crore to HAL towards upgradation of these non-existent aircraft lost in the interim period. Navy would, however, be able to set-off only Rs 16.16 crore payable to HAL for their services.

- In view of the extensive integration requirements, additional flight tests, defects in radar and its integration and the grounding of the fleet, the first milestone of handing over two prototypes to Indian Navy by February 2007 could not be achieved with the initial prototype being delivered in October 2008 and the second in August 2009. The delivery of the remaining aircraft scheduled for February 2008 has been postponed to December 2009. This is, however, optimistic as the original contract envisaged delivery of remaining aircraft 12 months after upgradation of two prototypes. Thus, in all likelihood deliveries of the remaining aircraft will be postponed to mid-2010.
- Only 57 *per cent* aircraft of the total number contracted for upgradation at a cost of Rs 641.62 crore would, thus, be available for operation for about three years since the effective life of the Sea Harrier aircraft is intrinsically linked to the residual life of INS Viraat, which is likely to be in service till 2012 after its mid-life refit-cum-modernisation in 2008-09.
- Furthermore, the success of the upgradation programme is also affected by the equipment already installed on-board. Thus, the age and repeated failure of Line Replaceable Units (LRUs), lack of reliable repairs and non-availability of avionics spares will continue to affect the role worthiness of the aircraft even after the upgradation. Moreover, even though the missile and radar are being upgraded to the latest standard, their successful performance requires that associated equipment like Head Up Display, Navigational Horizon Altitude Reference System and Electronic Unit Weapon Aiming Computer be of an equally high standard. However, the upgrade program does not encompass either modernisation of the existing equipment or procurement of updated versions of the same.



### 2.2.2.1.1 Shortcomings/Limitations of BVR Missile

In pursuance of Naval Staff Qualitative Requirements (NSQR) framed for Beyond Visual Range (BVR) missiles in September 2000, NHQ concluded a contract in March 2005 for 'Y' numbers Derby missiles with M/s Rafael, Israel, the only vendor to respond to the Request for Proposal (RFP) issued in August 2003.

Audit observed that the IN was predisposed towards Derby missiles manufactured by M/s Rafael, Israel even though the missile procured did not fulfill the needs of IN. In fact, the RFP issued in August 2003 stipulated that the IN's requirement was for the Derby missile. As no corrigendum to the RFP was issued, clearly, competition in procurement was ruled out. As a result, although the RFP was issued to seven firms and an extension was granted till October 2003, only the Original Equipment Manufacturer (OEM) of the Derby missile responded.

The trial directives were issued in March 2008 after scaling down the NSQRs at the instance of vendor. Consequently, the acceptable maximum range of the missile was reduced from 'A' Km to 'B' Km, which was 54 *per cent* of the original accepted range. Actual live firing of missile was conducted, in March 2008, on an upgraded prototype Sea Harrier aircraft at a range of 'B' Km for missile in Mid envelope scenario (33 - 67 *per cent*). The vendor was unwilling to guarantee performance of the missile beyond the scaled down range of 'B' Km.

One of the basic aims of the acquisition of BVR Air-to-Air missile was to destroy targets at beyond visual ranges of up to 'C' Km<sup>8</sup>. However, the missiles acquired failed to achieve the desired ranges in the live firing. The capability of the seeker, at the range prescribed in NSQR ('A' Km) was also not demonstrated in live firing. Moreover, the missile launcher design is being used for the first time for airborne operations.

### 2.2.2.2 Refurbishment and modernisation of IL-38

The IL-38 fleet was due for phasing out from the year 1997 onwards but Navy opted, in 2001, to undertake a modernisation programme for these aircraft at a cost of USD 144.5 million. The programme envisaged installation of a maritime reconnaissance / anti-submarine warfare suite, *viz.* the Sea Dragon suite. The aircraft were to be delivered after modernisation by December 2004. Mention was made earlier in Para 2.2 of C&AG's Report No. 5 of 2007

<sup>8</sup> This was twice the scaled down range of 'B' Km.

about the delays in upgradation and the lack of essential avionics and weapon systems in two refurbished aircraft received in January and April 2006. Although a third aircraft was received in June 2008, all three refurbished aircraft did not carry a successfully integrated/proven Sea Dragon Suite in Indian conditions. The Indian Navy received the fourth refurbished aircraft in November 2009. The Sea Dragon Suite could be proven only in 2009. Notwithstanding the refurbishment, there are serious deficiencies related to the fitment of weather radar and communications system, which have restricted the performance of aircraft. Besides, the aircraft is without associated equipment like sonobuoys, missiles and bombs. The reduced availability of the MR aircraft has severely compromised the vigil on the western naval front as Navy could not achieve even one-sixth of the flying hours prescribed by Government during the period 2003-08.

### **2.2.2.3 Unnecessary expenditure on LRMR aircraft**

Eight LRMR/ASW aircraft Tu-142 were inducted into the Navy during 1987-88 with Total Technical Life (TTL) of 16 years or 5000 flying hours. Routine overhauls are to be undertaken after 1500 flying hours or five years whichever is earlier in the assigned TTL. Though the aircraft have been exploited below optimum performance level they have undergone several overhauls at Russia and extension of TTL of five aircrafts has been obtained extending their life ranging from 17 years to 24 years. The overhaul and life extension has been done at a total cost of Rs 902.63 crore. Audit observed that:

- The aircraft have been sent for overhaul even without completing the prescribed flying hours and much beyond the prescribed period of five years in all the cases.
- Till date, the total flying hours achieved by each aircraft in the 20/21 years of service ranged from 1648:37 hrs to 3648:49 hrs.
- In one case, the first overhaul of the aircraft was undertaken after 14 years in 2001 at a cost of Rs 44.91 crore. The aircraft had flown only 792 hours during this period. Nonetheless, just after two years of the overhaul and on completion of TTL, the aircraft was phased out in 2003.

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### Recommendations

- *Modernisation of the aircraft should be planned timely so that operational aircraft are kept with state-of-the-art equipment to meet any operational eventuality and to obtain value for money spent.*
  - *Fitment of a new system which directly affects the operational capability should be undertaken only when the prototype is proved successfully.*
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### 2.2.3 Acquisitions

The period 1990 to 2005 could be termed as the lost decades in so far as expansion of aviation assets is concerned. Although nine KA-31 helicopters for the Advanced Electronic Warfare (AEW) role and ten aircraft Dornier for SRMR role were inducted, there was no induction in the combat, LRMR and ASW fleets during this period.



*Kamov KA-31 (NATO reporting name 'Helix') is a military helicopter developed for the Soviet Navy and currently in service in Russia and India for the air borne early warning role.*

This gap has put tremendous strain on the Aviation Arm of the Navy. However, from 2000 onwards, contracts have been concluded / are being finalised for the acquisition of 16 MiG- 29K aircraft for combat role (January 2004), 11 Dornier aircraft for SRMR/ Para drop role (March 2005), 10 Advanced Light Helicopters (ALH) from HAL (without any formal contract), and six helicopters UH-3H (November 2006) from USA for the utility<sup>9</sup> role. Audit found that the acquisitions compromised the operational interests of the Wing as plans were delayed, aircraft procured did not possess required capabilities and final objectives remained unachieved as discussed below.

<sup>9</sup> Utility role is a general purpose role, usually used for transporting people or freight, but also for other duties when more specialised aircraft are not required / available.

### 2.2.3.1 Problems in induction of indigenously developed helicopter

The Navy, since 1984, has projected a provisional requirement for 120 ALH with 51 *per cent* being of the Utility type and remaining being ASW/Anti-Surface Vessel version. These helicopters, to be manufactured by HAL, were to be completely inducted by 2010 to replace the Chetak helicopter and Match role aircraft<sup>10</sup>. Selection of the ALH was done with a view to promote indigenisation and to standardise the types of helicopters in the Indian Navy. Induction of this helicopter was to begin by 1991 but there was a slippage of ten years in the development of the helicopter by HAL. After spending Rs 283.78 crore on design and development of the ALH helicopters and



*A multi role helicopter manufactured by Hindustan Aeronautics Ltd., also known as Dhruv was initially designed with assistance from MBB, Germany*

supply of two helicopters of 'Limited Series' by February 2002, IN reviewed its acquisition plans for the aircraft. It was decided that a reduced quantity (49) of these helicopters (both utility and ASW) of 'Series Production' would be acquired over a period of time till 2017. Notwithstanding HAL's poor track record, IN continued to release payments amounting to Rs 287.92 crore with attendant extensions in delivery dates, without signing a formal contract with HAL.

As of December 2009, only six utility helicopters had been delivered by HAL and these, too, were accepted by Navy with concessions. The helicopter is yet to prove its operational capabilities for off-shore operations in its main utility role viz., Search and rescue operations at sea, since the Automatic Flight Control System is not performing optimally and there are other inherent problems like blade folding. This has prevented IN from gainfully utilising even the limited exploitation potential of this aircraft in utility role. Parts of the associated equipment to be delivered along with the helicopter are yet to be supplied as some of the equipment is still under development. At present,

<sup>10</sup> Certain Chetak Helicopters which performed limited ASW role were called Match Role aircraft

Navy has no plans to induct any more ALH till all outstanding issues are liquidated by HAL.

Although the Utility version has been supplied by HAL, the ASW version of ALH has not materialised at all due to the inability of HAL to meet the laid down NSQRs<sup>11</sup>. Consequently, Navy decided in August 2005 to procure four more Utility variants in lieu of the ASW variants for which Government approval is yet to be obtained. The reason cited for the failure of ASW version was that the weapons and sensors as envisaged in the NSQRs could be met only by a 10 tonne class helicopter and not by a 5.5 tonne class of helicopter like ALH. Audit, however, observed that this was a fact long known to the IN and HAL. This indicates failure on the part of both IN and HAL to visualise the capability of the ALH as per requirements. Non-realisation of the ASW version also had its fall-out on related role equipment. For instance,

- An amount of Rs 137.58 crore was spent on the weapon system integration which has become unfruitful.
- Expenditure of Rs 11.99 crore incurred on a Research and Development Project for developing an Integrated Sonar System became infructuous due to non-availability of the platform for trials even though the project was completed in March 2002. Navy now has also decided against inducting the sonar due to its outdated technology.

### 2.2.3.2 Acquisition of phased out helicopters

The IN acquired six UH-3H helicopters under the Foreign Military Supply (FMS) programme, of a foreign Government, in November 2006, along with training and support facilities at an approximate cost of Rs 182.14 crore. These helicopters were acquired for utility purpose to be used on-board the Landing Platform Dock (LPD), INS Jalashwa, also acquired from the foreign Navy. The helicopters were received in September 2007, embarked on INS Jalashwa's maiden trip to India. Audit examination revealed that the helicopters procured were life-expired and had many defects which would ultimately compromise operational effectiveness.

The helicopters were manufactured between January 1961 and July 1965 and were decommissioned by the foreign Navy in 2005. These aircraft were on the verge of completing their air frame life and are on extended life.

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<sup>11</sup> Naval Staff Qualitative Requirements

- The joint visual inspection of the helicopters as well as the facilities carried out by an IN team in May 2006 reported that the overall condition of the helicopters was good enough to meet the requirements of Indian Navy for the next 10 years. However, citing time constraints, only two helicopters out of the six offered were subjected to minimum strip condition for inspection in the foreign country. The flight evaluation of all six helicopters proposed for purchase was not carried out in the foreign country by IN before acceptance as these were in fully preserved state and had to be regenerated prior to carrying out any flight evaluation. Hence, the actual flight evaluation of the UH-3H helicopter was carried out on



*The Sikorsky SH-3 Sea King (company designation S-61) is a twin-engined anti-submarine warfare (ASW) helicopter of US origin. It has been designed as an all-weather amphibious helicopter.*

*another* helicopter of the foreign Navy of similar make, type and of the same vintage.

- These helicopters were bought in ‘as is where is’ condition with no guarantee of supportability and replacement of defective rotables due to obsolescence. Further, the foreign Government would not be responsible for functioning of any ‘on board’ systems or equipment.
- These helicopters were delivered with many defects including Category A<sup>12</sup> defects resulting in non-availability of the helicopters leading to delay in training and the operationalisation of the squadron.
- The helicopters are devoid of any type of weather/surface surveillance radar, the most important sensor of a utility helicopter during its SAR operations.

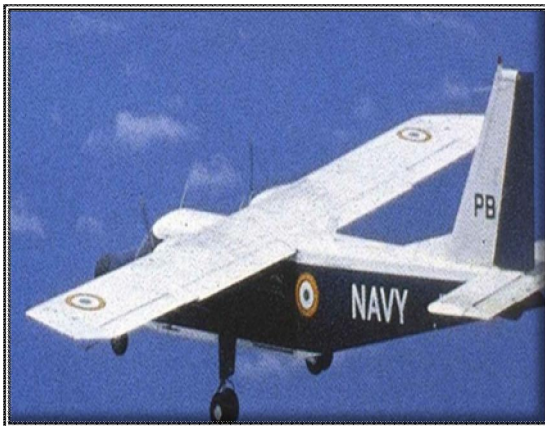
<sup>12</sup> Serious defect which requires replacement

- Delay on the part of Navy in pursuing receipt of LOA<sup>13</sup> before August 2006 resulted in extra payment of Rs 2.28 crore (USD 490,029) to the foreign Government due to enhanced administrative surcharge effective from 1<sup>st</sup> August 2006.

Considering the vintage of the helicopters and the obsolescence of spares, maintenance of the six refurbished helicopters by Indian Navy would be a challenging task and in fact, one helicopter has already been cannibalised to ensure serviceability of the other five helicopters.

### 2.2.3.3 Acquisition of MR Aircraft and its role equipment

In order to replace seven piston-engine Islander aircraft and four other Islanders lost due to attrition, IN concluded a contract with HAL for the supply of 11 Dornier aircraft in May 2005 along with role equipment and maintenance spares at a total cost of Rs 726 crore. These aircraft were delivered between March 2006 and November 2008. The aircraft are to be primarily used for the MRIW<sup>14</sup>/Para drop role.



*The Britten-Norman BN-2 Islander is a light transport aircraft and was designed and originally manufactured by Britten-Norman of the United Kingdom.*

<sup>13</sup> Letter of Offer and Acceptance

<sup>14</sup> Maritime Reconnaissance and Information Warfare

In 2005, the Maritime Capability Perspective Plan recommended that future Medium Range reconnaissance inductions would be those having greater endurance and range. IN already possessed 15 aircraft Dornier for performing the SRMR role and was aware that the aircraft lacked critical role capabilities, were of 1980s design and did not have weapon capability. Despite this, IN did not lay down NSQRs for an advanced MR aircraft and instead, went in for augmentation of their Dornier fleet. Further, although, the Dornier were being acquired in order to replenish the IN's fleet of SRMR due to loss/phasing out of the Islander, the Dornier cannot be termed as an exact replacement of the Islander as it lacks weapon capability.



*Dornier is a German-origin twin engine feeder transport and maritime patrol aircraft. Currently, worldwide sales and marketing rights for Dornier 228 are held by HAL.*

As per contract, HAL had to supply the aircraft after integration of special equipment, in a role-worthy state by the scheduled date of delivery. The aircraft without integration of such equipment was not acceptable to Navy. However, though 11 aircraft were supplied by HAL between March 2006 and November 2008, the aircraft were not (December 2009) role-worthy as the evaluation trials of the role equipment are likely to be completed by March 2010 only. For instance, in the case of the Eagle Electronic Support Measure equipment, although the system procured earlier in October 1999 at a cost of Rs 38.30 crore was yet to be proved, eight more Eagle ESM systems had been procured at a cost of Rs 51.72 crore for eight Dorniers under the current procurement. The performance of Eagle Electronic Support system continues to remain poor and inconsistent (December 2009). A decision was, therefore, taken to fit Time Difference of Arrival Antenna (TDOA) as an “add on equipment” on the Dorniers.

#### **2.2.3.4 Delay in acquisition of new combat aircraft and aircraft carrier**

A contract was concluded with the Russian Federation for a refitted aircraft carrier (Admiral Gorshkov) along with ‘J’ number of MiG-29K aircraft.



The aircraft, to be embarked on the carrier, were to be delivered between November 2007 and November 2008. However, due to delay in the delivery<sup>15</sup> of the aircraft carrier, the aircraft are scheduled for revised delivery between



*The Mikoyan MiG-29K (NATO reporting name “Fulcrum D”) is an all weather carrier based multi role fighter aircraft developed in Russia in the late 1980s.*

December 2009 and October 2010. Four MiG-29K aircraft have since been received (December 2009). The delay in delivery of the aircraft, however, was also attributable to the fact that the prototypes along with the weapon and equipment fit were yet to be proved and certified by the Russian Certification Agencies. Since these aircraft are to be used on the refitted aircraft carrier (Admiral Gorshkov), which is likely to be inducted by 2013 only, they will hardly be used optimally for the next three years.

#### **2.2.3.5 Non-synchronisation of works for establishment of facilities with acquisition of aircraft**

Adequate infrastructure needs to be in place for the operation of aircraft. Audit found that there were slippages in this area rendering the induction less effective for long periods. For instance, the contract for acquisition of ‘J’ MiG-29K aircraft from Russia was concluded in January 2004 with original delivery date as November 2007. However, sanctions amounting to Rs 52.28 crore for civil works to operate the aircraft were accorded only in March 2006, March 2007 and October 2007. Certain works were necessary to meet the urgent limited operational requirement of the first few batches of the MiG-29K and had to be completed by November 2007. However, as of December 2009, physical progress ranged from 73 per cent to 100 per cent in respect of these work services amounting to Rs 25 crore.

<sup>15</sup> Reported in Para no 2.1 of C&AG’s Report No.CA 18 of 2008-09



Similarly, Unmanned Aerial Vehicles (UAVs) procured between December 2002 and March 2004 at a cost of Rs 567 crore could not be operationalised optimally as of December 2009 due to delay in creation of infrastructure for their operation. Mention of this was made in Para 2.2 of Audit Report for the year ended March 2005. Thus, non-synchronisation of the civil works with the receipt of UAVs has resulted in their non-utilisation to the optimum level for a period of six to eight years.

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#### Recommendations

- *While encouragement and support to the indigenisation effort should be continued, the limitations, if any, of such efforts should be clearly recognised and should not be at the cost of operational preparedness.*
  - *Timeliness in completion of indigenous R&D projects may be improved in order for the expenditure to be fruitful.*
  - *Second-hand platforms should be acquired for well-established reasons and should not become liabilities since such equipment will have limited serviceability and maintenance would be a challenge due to obsolescence of spares.*
  - *Improve project management and monitoring so that civil works facilities essential for the operation of the aircraft are created in time*
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#### 2.2.4 Repair, Maintenance and Spare Management

The first and second line servicing of aircraft is carried out at the Squadron/Air Station itself while the third and fourth line servicing is carried out at Naval Aircraft Yards (NAY) /Base Support Facility. Overhauling of the engines is carried out either at the OEM<sup>16</sup> abroad or at the facilities created indigenously.

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<sup>16</sup> Original Equipment Manufacturer

### 2.2.4.1 Delay in repair

Repair/ maintenance and overhaul of aircraft in Naval Aviation is termed as inspection. The repair/maintenance of the aircraft is to be carried out on a fixed schedule as prescribed by the OEMs and published by the Naval Aircraft Servicing Development Organisation (NASDO). The duration of the inspections is also prescribed.



*Seaking is a British-made anti-submarine warfare system with fully computerised control systems.*

Out of the total 92 repair and overhaul inspections carried out during 2003-08, it was found that 80 *per cent* of the cases were delayed. Details of the delayed cases are tabulated below:

#### **5** Extent of delay in inspections

Aircraft/ helicopter	No. of delayed cases	Days to be taken as per rules	Days actually taken
Sea King	12	1386	3849
KA-28	13	396	1393
KA-31	10	924	1919
Islander	14	1080	4135
TU-142	20	774	1479
IL-38	5	210	637

\* Inspection in progress has not been taken into account.

### 2.2.4.2 Uneconomical recovery programme for Helicopters

IN had acquired 20 ASW helicopters, Seaking 42-B, from a foreign firm between 1986 and 1989. Seven of the helicopters were placed under Long Term Storage<sup>17</sup> during the period ranging from July 1995 to February 2000.

<sup>17</sup> Storage periods exceeding one year are deemed to be Long Term Storage

These helicopters subsequently became unserviceable due to extensive removal of spares after the post-Pokhran sanctions. In 2003, IN approached the OEM to explore the feasibility of recovery of these helicopters. To avoid the delay involved in provisioning and delivery of a sizeable number of rotables and spares, IN decided to offload the work to OEM (M/s Westland Helicopters, UK) on a “turnkey” basis for timely recovery. Accordingly, IN concluded a contract with the OEM in July 2006 at a total cost of Rs 256 crore. As per the contract, the first helicopter was to be recovered by July 2008 and remaining helicopters by March 2009. However, only two helicopters have so far (February 2010) been repaired and the work is in progress on the remaining 5 helicopters. The total payment made till February 2010 is UKP 28.42 million (Rs 241.03 crore) including UKP 21.71 million<sup>18</sup> (Rs 184.11 crore) for spares and ground support equipments. Audit examination of the papers leading to recovery programme revealed the following:

- Facility and expertise exist at Naval Aircraft Yard (NAY), Kochi for in-house repair of these helicopters, without external assistance of OEM. Nonetheless, the contract for recovery was awarded to the OEM without assessing the feasibility of getting the helicopter repaired by NAY. Subsequently, it was found that the available facility and manpower of NAY would be able to handle the recovery of all the seven helicopters if spares, rotables and BDS<sup>19</sup> were procured. Had this option been examined earlier, the helicopter could have been repaired in a more economical and timely manner and an amount of Rs 58.78 crore paid for administrative<sup>20</sup> services would have been avoided.
- Spares constitute almost 75 per cent of the cost of recovery programme. Defence Procurement Manual stipulates that price reasonableness should be ascertained, especially in single tender cases, based on the last purchase price (LPP), material component, technology involved etc. However, in this case, no such comparison was made. To have a better appreciation, audit selected 35 spares of high value comprising about 45 per cent of the total cost of spares and found that in respect of 14 items where LPP were available (2001- 07), the prices accepted were abnormally high to the extent of 2640 per cent resulting in an extra payment of approximately Rs 26 crore in these cases alone.

<sup>18</sup> 1 UKP = Rs 84.80

<sup>19</sup> Break Down Spares

<sup>20</sup> Process and Programme Planning, Aircraft Recovery Programme Management and Engineering Support

### 2.2.4.3 Delayed setting up of repair / overhaul facilities

Audit noticed that in two cases, repair / overhaul facilities were established when the TTL of the aircraft was about to expire. Despite the creation of these facilities, the assigned overhaul tasks could not be achieved and intended benefits could not be derived as the components are still being sent abroad for repair/overhaul.

#### Case I: Helicopter Seaking 42-A/Seaking 42-B Transmission System

Limited repair / overhaul facilities set up for the Seaking 42-A/Seaking 42-B helicopters at NAY Kochi and HAL Bangalore did not include facilities for the overhaul of certain equipments. Consequent to US sanctions post-Pokhran, repair/overhaul of these items could not be done abroad affecting the operational availability of the helicopter. To overcome such situations, approval was accorded in October 2001 for setting up repair/overhaul facility at HAL for the transmission system components at an estimated cost of Rs 71.68 crore. Thus, the facility was commissioned in July 2004, 20 years after the induction of the last helicopter. Even after such delay, the infrastructure was not able to meet the requirement and could complete only 72 per cent of task allotted and the remaining had to be sent abroad.

#### Case II: Pegasus engine of aircraft Sea Harrier

Sea Harrier aircrafts were inducted during the period 1979-86. However, the facilities for overhaul of four Pegasus engines in a year were commissioned in September 2002 at NAY, Kochi. Audit observed that during the years 2002-03 to 2007-08, NAY, Kochi was tasked to overhaul a total of 21 engines against which only 14 engines could be overhauled. Three engines were also repaired during this period. During this period, three engines were off-loaded to M/s Rolls Royce UK for overhauling at a cost of Rs 88 crore. Thus, even though facilities were set up after a gap of 16 to 23 years, the facilities were not sufficient to cater to the needs of the Navy.

### 2.2.4.4 Inordinate delay in repair of rotables

Rotables<sup>21</sup>, for which repair facilities are not set up in India, are first sent abroad for assessing the extent of repairs required. After the technical evaluation, a financial quote is submitted by the vendor / firm to Navy and accordingly, repair orders are placed. Audit observed that out of 1,779 rotables

<sup>21</sup> Component or inventory item that can be repeatedly and economically restored to a fully serviceable condition

sent for repair after such evaluation, 376 are lying with various agencies for a period ranging from two to more than ten years. In reply, Navy stated that rotables were held with the repair agencies and repair was being expedited by IHQ in respect of foreign agencies and by Material Organisation, Kochi in respect of PSUs and other repair agencies. In audit opinion, the holding of such a large number of costly rotables for long periods indicates a lackadaisical approach on the part of Naval authorities in effectively pursuing timely repair of rotables. Non-availability of the rotables also impacts the availability of aircraft for operational use.

#### **2.2.4.5 Injudicious Provisioning of Spares**

Provisioning of spares in respect of certain aircraft was not rational as the aircraft were either being decommissioned or there existed a large stock, thereby leading to unwarranted expenditure. Details are discussed below.

##### **Case I: Islander aircraft**

The Islander aircraft is more than 30 years old and was envisaged, in 2003, to be phased out by 2008. Nonetheless, orders worth Rs 40.09 crore for minor spares were placed during the period 2004-06 in respect of three Annual Reviews of Demand. Besides the fact that the requirement for these spares should have been examined *de novo*, audit also noticed that as a result of lack of due diligence there was wide variation in rates accepted for same items within nine days of conclusion of two separate contracts, resulting in an avoidable payment of Rs 33 lakh. In response, Naval authorities replied that the spares procured would be consumed as the Islander is expected to be in service till 2012. Audit, however, observed that costly spares received against one order had been sparingly used and based on their Annual Consumption Level (ACL), the existing stock of these spares would last for another 25 years. IHQ, therefore, in July 2008, reviewed the ordered quantity against the purchase order and cancelled the outstanding order for 72 items costing Rs 2.90 crore.

##### **Case II: Sea Harrier aircraft**

Against 'X' number aircraft, Navy is holding 26 engines which become due for overhaul after flying 800 hours each. In the last five years, the total annual flying task for all squadrons of the fleet has been 6500 hours. Of the 26 engines, the engines already fitted on the aircraft have 4,810 hours before the next overhaul. There are another six serviceable engines in inventory with 4,800 hours before the next overhaul. This implies that together the engines

already fitted and those lying in inventory would suffice for the next five years. Ignoring the fact that the aircraft is likely to be in operation only upto 2012, Navy entered into a contract in February 2007 for purchase of spares for overhauling 20 engines at a cost of Rs 387.81 crore which was avoidable.

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## Recommendations

- *IHQ (N) should take effective measures to minimise delays in the commencement and completion of inspection by ensuring timely supply of essential spares and manpower so that aircraft down time can be avoided.*
  - *Creation of repair/overhaul facilities should be planned simultaneously at the time of induction of aircraft itself so that maximum benefits accrue timely.*
  - *Feasibility of repair by local agencies should be ascertained before concluding contracts with foreign sources.*
  - *IHQ (N) should ensure the optimal utilisation of the facilities created by setting the benchmarks for repair and overhaul.*
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### 2.2.5 Aviation Training

*Ab initio* training for naval pilots is imparted at the IAF training academy. Subsequently, Naval Aviation imparts conversion/ re-familiarization training on the specified aircraft. The training is aircraft oriented and carried out on as-required basis.

#### 2.2.5.1 Training of Pilots

In recent years, IN has sent pilots abroad for training. Mention was made in Paragraph No. 2.3 of C&AG's Report for the year ended March 2006 about Navy's failure to synchronise pilot training abroad with the acquisition schedule of the newly-acquired fighter aircraft. In another contract with the Government of the same country, audit noticed that Indian Navy could not sign the Letter of Acceptance in time. As a result, a truncated training programme was agreed upon which was almost half the size of the original programme.

#### 2.2.5.2 Instructors

Although dedicated training squadrons exist in IN, the number of instructors required has neither been identified nor sanctioned. Navy stated that aircrew officers are trained as instructors viz., Qualified Flying Instructors (QFI) and Qualified Navigation Instructors (QNI) based on operational requirements. In

the absence of sanctioned number of QFI and QNI, adequacy of instructors could not be ascertained in audit.

### 2.2.5.3 Achievement of Flying Tasks

In training squadrons imparting training on the Sea Harrier and ALH, there was a shortfall in achieving the authorized flying tasks due to non-availability and poor serviceability of the aircraft held during the period 2003-08. The shortfall ranged from 5 per cent to 57 per cent in the case of the Sea Harrier and 6 per cent to 75 per cent in case of the ALH.

### 2.2.5.4 Training Equipment and Other Aids

- Out of six trainer Sea Harriers procured during 1984-2003, three were lost due to attrition and only one was available in the training squadron with 29.42 per cent serviceability.
- Mention was made at Para 2.8 of Audit Report for the year ended March 2007 regarding delay in upgradation of a Seaking 42-A simulator. The upgradation of the simulator has not progressed further and contract for upgradation is being re-negotiated by IHQ. Meanwhile, during the period 2003-04 to 2007-08, training for 20 pilots and seven observers has been imparted on the helicopter. In the absence of a serviceable simulator, the entire training<sup>22</sup> is being carried out on the aircraft resulting in avoidable expenditure as well as lowered safety levels.

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#### Recommendations

- *A policy for number of instructors, their qualifications and duties in a squadron needs to be promulgated.*
  - *Vital training aids like simulator should be made available to impart quality training.*
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## 2.3 Conclusion

Naval Aviation holds the key to achieving the 'blue water' aspirations of the Indian Navy. This report, however, discloses that the current status of the Naval Aviation Wing's fleet would not only render it ineffective in achieving these goals but would rather make it vulnerable to the growing sophistication of enemy capability. The aircraft fleet and carrier are characterized by

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<sup>22</sup> 55/40 hours of training on a simulator before undertaking training on the aircraft.



shortfalls in availability and life-expired assets. Quality of aircraft for reconnaissance and other roles is relatively poor as at any given point, almost two-thirds of the aircraft assets are under repair, maintenance or storage. Several operational assets are functioning sub-optimally with either obsolescent equipment or unproven modifications. Serviceability levels are also low for the approved UE of combat, ASW and MRSR aircraft and these levels have also been achieved by decreasing the flying tasks to ensure that the assets are not stretched rather than by increasing efficiency. Despite the fact that the age of the assets requires quick and effective repair and maintenance, audit found that these activities need greater focus and better management. Finally, augmentation of the Wing's assets both with respect to technology and numbers is critical as delayed and flawed modernisation programmes have not yielded desired benefits.

The matter was referred to the Ministry in October 2008; their reply was awaited as of February 2010.

**New Delhi**  
**Dated:**

**(C.M.SANE)**  
**Principal Director of Audit**  
**Air Force and Navy**

**Countersigned**

**New Delhi**  
**Dated:**

**(VINOD RAI)**  
**Comptroller and Auditor General of India**