Chapter 4

Air Traffic Management, Communication, Navigation and Surveillance Facilities Infrastructure

4.1 ICAO has framed International Standards and recommended practices and procedures for communication, navigation and surveillance facilities to be provided at the airports and the requirement towards these are met by the Communication, Navigation, Surveillance (CNS) and Air Traffic Management (ATM) Directorates of the Authority. Audit observed that the existing ground infrastructure in CNS and ATM had not kept pace with the increased traffic growth leading to overcrowding, increased incidence of airprox[♣], flight delays and avoidable fuel consumption by hovering aircraft awaiting permission to land. The Authority planned for introduction of new equipment to replace/upgrade the existing equipment. But the introduction was either delayed or not put to use due to procedural problems like delayed decisions, non synchronisation of allied activities and poor contract management as discussed in the subsequent paragraphs.

4.2 Delay in commissioning of Visual Simulator

An aerodrome visual simulator valuing Rs.7.14 crore for training of Air Traffic Control staff was received at the Civil Aviation Training College, Allahabad during September 2005. Though the work order for construction of the building to house the equipment was issued in March 2005 with a scheduled completion period of three months, the building was completed only in March 2006 as there were defects in the design which were noticed only at the execution stage resulting in stoppage of work midway. The non synchronisation of the arrival of equipment with the availability of site not only resulted in blocking of funds amounting to Rs.7.14 crore over six months but also denied the benefit of visual simulation training facilities for the ATC staff. The Management stated (August 2006) that it was contemplated to synchronise completion of the building with the availability of the equipment. However, delay occurred due to defect in the design and resulting modification. It was also stated that the system was likely to be commissioned by December 2006. However, only installation of system was completed in December 2006 and it was yet to be commissioned.

4.3 Delay in installation of Voice Communication System

The Authority approved (July 2003) proposal for providing Voice Communication System (VCS) at eight stations and purchase order for supply and installation of equipment was placed (April 2004) for Rs.16.89 crore (including foreign exchange component of GBP 1387717). The equipment were received in February 2005 and were expected to be installed within three months thereafter. However due to delays in getting the sites ready, installation

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♣ ***Airprox is the code word used to give a specified position of aircraft proximity, a situation in which in the opinion of a pilot or air traffic service personnel, the distance between two aircraft as well as their relative positions and speed was such that the safety of the aircraft may have been compromised***.

could be completed at only four stations by September 2005. There were delays ranging from six months to ten months in installation at three other stations and at one Station (Mumbai), the installation was still pending (March 2006). The Management stated (August 2006) that at Mumbai, the system was commissioned from June 2006.

4.4 Delay in commissioning Dedicated Satellite Communication Network

The Authority approved (December 1998) a proposal for providing a Dedicated Satellite Communication Network (DSCN) linking 80 airports with the objective of upgrading the existing low speed, less reliable and almost saturated telecom network to support high speed data and voice connectivity. DSCN infrastructure was considered essential for the world wide implementation of the new CNS/ATM systems. The complete network was planned to be commissioned in 24 months. The annual operational expenditure for the DSCN was estimated to be Rs. four crore on hiring a satellite transponder. Compared to this, the annual savings were estimated to be substantial by way of avoided cost of leasing of existing terrestrial links (Rs.4.20 crore) and leasing of high speed data circuits for radar net working (Rs. three crore). Additional facilities like video conferencing, wide area network of various units were also envisaged. The complete network was planned to be commissioned within two years, i.e., by March 2001. However, tender action initiated twice in March 2000 and in August 2001 did not succeed and it was stated that this was due to reasons like non-conformities in the bids, technology evolution and a general falling trend in prices for electronic equipment. Only the third tender initiated in May 2003 fructified and purchase order for the supply and installation of equipment was placed in October 2004. As per the Management's reply (August 2006), the equipment had been received and installation was under progress and expected to be completed by October 2006. The installation of the equipment was still in progress (December 2006). The inordinate delay of more than five years in commissioning the network resulted in deprivation of expected benefits as the main objective of replacing the low speed telecom network had not been achieved and in the process, the Authority had also foregone net cost savings amounting to Rs.16 crore during the period April 2001 to March 2006.

4.5 Delay in providing UHF links

Communication between ATC towers and the equipment sites at various airports for transfer of data/voice information required for monitoring CNS facilities was provided on lines leased from BSNL. As the information transmitted through these lines was often interrupted by cable faults for long periods, it was decided to provide Ultra High Frequency (UHF) wireless communication links. Purchase order was placed (May 2003) for ten 10-channel and twenty 4-channel UHF links at a cost of US $ 1.293 million (Rs.5.69 crore approx.[♣]) and the links were scheduled to be installed by March 2004. However even by June 2004, only 13 links out of the 30 links were installed. In the meantime, repeat order was placed (May 2004) for an additional ten 4-channel links for a value of US $ 380888 (equivalent to Rs.1.68 crore approximately). As the installation of the links was delayed mainly due to the fact that either the masts required for installation purposes were not available or there were hindrances in the line of sight, the supplier intimated (January 2005) that the warranty period

[♣] ***At the rate of Rs.44 per US dollar***

for the first order would be over by February 2005 and it would not be possible for them to continue service under the contract. The supplier also declined to impart necessary training as required in the purchase orders. Consequently, the Authority decided to take up the work of installation of the pending links by itself and as of March 2006, out of the 27 links pending (including those of the second order), only 19 links could be installed. The failure to ensure site readiness before receipt of equipment resulted in delay of over two years in installation of the links depriving the Authority of the benefits of superior technology and improved performance as well as savings in recurring revenue expenditure on lease rent for BSNL lines. The Management while agreeing with the reasons for the delay stated (August 2006) that as on date, installation had been completed in respect of 36 links and four were pending.

4.6 Delays in installation and commissioning of ILS and DVORs

The delay in installation and commissioning of Instrument Landing System (ILS) at eight stations had already been commented in the Report of the Comptroller and Auditor General of India – Union Government (Commercial) No.3 of 2005**.** Despite a lapse of two years since then, installation and commissioning was completed only in respect of two more stations and six equipment costing Rs.9.17 crore received between January 2002 and February 2003 were still to be installed/commissioned (March 2006) at Bhavnagar, Chennai, Dimapur, Madurai, Visakhapatnam and Jammu.

Similarly in respect of Doppler Very High frequency Omni Ranges (DVORs), their non-installation at 10 stations had been commented upon in Audit Report No.12 of 2006 (Regularity Audit). Subsequently till March 2006, installation and commissioning had been completed in respect of only two stations and eight DVORs costing Rs.9.24 crore received between May 2003 and September 2003 were yet to be installed (March 2006) at Visakhapatnam, Lucknow, Katihar, Tirupathi, Surat, Dehradun, Delhi and Kolkata.

Non availability of site was stated (August 2006) to be the main reason for the delay in installation/commissioning of the equipment. The fact remains that absence of synchronisation of related activities in the procurement and installation of equipment resulted in defeating the objective of providing accurate navigational facilities.

4.7 Non replacement of ageing DMEs

The Authority accorded approval (April 2004) for procurement of 40 Distance Measuring Equipment (DME) – 33 as replacement and seven as new facility at different airports at an estimated cost of Rs.24.43 crore. Global tender notice was issued during May 2004. Even though a Central Vigilance Commission (CVC) guideline (circulated on 21 April 2004) stipulated that bids can be submitted either by the Indian supplier on behalf of the foreign supplier or the foreign supplier directly but not by both, tender forms were sold to two foreign suppliers, THALES and FERNEU in addition to their Indian suppliers, BEL and ECIL respectively. The matter was examined on receipt of a complaint from another bidder that the sale of tender forms to BEL and ECIL was not in order. It was then decided (May 2005) to cancel the tender and issue fresh NIT as per the guideline. Fresh tender was then issued (October 2005) and the tender evaluation process was still under process (March 2006). Due to non-observance of an existing CVC guideline at the initial stage, the

Authority was forced to cancel the original tender and invite fresh quotations resulting in delay in finalising the order. The installation of DME originally planned in April 2004 was therefore incomplete and the 33 DMEs which had already completed more than 10 years were not replaced with the result that these stations are still employing the old DMEs which have serious maintenance problems and associated safety risks. The Management stated (August 2006) that the DME equipment are maintained by procuring spares and establishing specialised maintenance units.

4.8 Delay in commissioning FANS

ICAO recommended (1991) implementation of the Future Air Navigation System (FANS) through a new CNS and ATM concept involving airspace planning methodology. The objective was application of available technologies in satellite and computers, data links and advanced flight avionics to cope with the growing future operational needs. The implementation of the system would make obsolete much of the present day ground based equipment. As per plan, the transition to the new CNS/ATM should be completed by 2009. The Authority approved (October 2003) that the FANS would be installed at Delhi and Mumbai primarily to cover the airspace beyond the radar coverage, which would enable more accurate surveillance in a non radar airspace. The total cost of the project was Rs.17.69 crore and the contract for the project was signed with M/s Raytheon Company in January 2004. The equipment was installed by the supplier and the site and stability acceptance test[♣] were also completed by June 2005. The Management stated (August 2006) that the system was made operational at Delhi and Mumbai airports on trial basis with effect from March 2006 and July 2006 respectively. Audit observed that the system at Mumbai had been made operational from September 2006 and in Delhi, it was still under trial run (December 2006).

4.9 Implementation of GAGAN project

ICAO endorsed (1994) Global Satellite Navigation as a primary future system for aviation industry to provide worldwide coverage for seamless aircraft navigation. Satellite transmission along with enhanced ground based equipment would enable the users to perform 'on board' position determination for enroute, terminal, non precision and precision approaches. The Authority decided (May 2001) to implement the indigenous satellite based regional Global Positioning System (GPS) augmentation as part of this CNS/ATM plan. An MoU was signed (25 August 2001) between the Authority and the Indian Space Research Organisation (ISRO) for design, development and implementation of GPS and Geo Augmented Navigation (GAGAN) in three phases, Technological Development System phase (TDS), Initial Experimental phase (IEP) and Fully Operational phase (FOP). The Authority approved (May 2001) expenditure of Rs.80 crore for the TDS phase to be equally shared between the Authority and ISRO and an amount of Rs.40 crore was paid in March 2005 to ISRO. During execution, the scope of the TDS phase was widened to include state of the art hardware for ground based elements etc. and the resultant increase in cost (Rs. 68

♣ ***Site acceptance test means the test conducted on the operational site hardware equipment using test procedures and simulated exercises of test scenarios. Stability acceptance test means the test conducted on the operational hardware equipment at site using test procedures under 'live' operational environment.***

crore) was to be funded wholly by the Authority. Approval of Board for incurring the additional expenditure was accorded in March 2006. Even though the GAGAN payload was expected to be carried in the GSAT-IV satellite, which was scheduled for launching by ISRO by February 2007, only the TDS phase of the project was under execution till March 2006. The Management stated (August 2006) that cost estimate of Rs.496 crore for the remaining phases had been submitted to the Project Investment Board.

4.10 Infructuous expenditure of Rs.7.65 crore on indigenous manufacture of Radars

The Authority signed a tripartite Technical Collaboration Agreement (TCA) in December 1992 with BEL and M/s Westinghouse Overseas Services Corporation, USA (WOSCO). As per the agreement, BEL would absorb the technology for indigenous manufacture of Airport Surveillance Radar (ASR) and Monopulse Secondary Surveillance Radar (MSSR) from WOSCO, produce the same indigenously and offer it to the Authority. The Authority also signed a separate MoU with BEL (June 1993) whereby the Authority agreed to bear the cost of transfer of technology and BEL would provide necessary price adjustment so as to enable the Authority amortise the cost of investment over a quantity of 20 MSSRs and 10 ASRs. In case the Authority did not place orders as above, the unabsorbed portion of BEL investment would be compensated by the Authority by a suitable arrangement to be mutually agreed upon. BEL obtained the technology incurring an expenditure of Rs.14.14 crore and the Authority paid an amount of Rs.10.35 crore towards part of its share. BEL claimed (July 2004) the balance of Rs.3.79 crore which was yet to be paid. The Authority placed orders only for two ASRs and six MSSRs; further orders were not placed due to unsatisfactory performance and failure of BEL to upgrade the technology and also due to the high cost quoted by BEL compared to directly imported radars. BEL allowed only Rs.2.70 crore as price adjustments towards amortisation of costs based on the orders placed, and the Authority has a further contingent liability to pay the balance of Rs.3.79 crore claimed by BEL. The Management stated (August 2006) that the decision on payment of claimed balance was pending. The decision of the Authority to enter into an agreement with BEL without assessing the latter's capability to upgrade technology and produce radars at reasonable price resulted in the Authority incurring infructuous expenditure of Rs.7.65 crore in the project.

4.11 Delay in integrating Flight Data Processing System

The main function of Flight Data Processing System (FDPS) was to receive, process and disseminate flight data. The system provided a facility to display as well as print flight progress strips as per the needs of the ATC officers. M/s ECIL, Hyderabad had developed an integrated Automatic Dependent Surveillance System (ADS)[♣] of which FDPS was a sub system. The Authority procured two ADS for Chennai and Kolkata airports. The Authority further accorded (April 1999) sanction for procurement of four more FDPS for installation at Nagpur, Varanasi, Ahmedabad and Thiruvananthapuram. As these FDPS systems being

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[♣] ***A surveillance technique in which aircraft automatically provide, via a data link, data derived from on-board navigation and position fixing systems, including aircraft identification, four dimensional position and additional data as appropriate.***

procured would eventually be linked to the ADS systems installed at Chennai and Kolkata airports, purchase order was placed (August 2001) on ECIL on single tender basis for Rs. 8.26 crore. As per the purchase order, installation and commissioning of the FDPS would be completed before February 2002. During installation it was noticed that ECIL was not able to integrate the FDPS with the existing radar system at all the six sites as it did not have the knowledge of data exchange protocol. These data formats were available only with NGOSCO, the supplier of the radar systems. As ECIL did not either procure the formats from NGOSCO or develop them in-house, the project was delayed. The Management replied (August 2006) that the formats were now available with ECIL and the integration had been completed at Chennai and was under evaluation. It was also stated that at Kolkata, the integration was presently underway. As the integration of the FDPS with the radar system was not complete, the benefits of advance surveillance technique contemplated could not be derived even four years after the scheduled completion of the project.

4.12 Idling of Flight Inspection System due to delay in procurement of aircraft

Radio navigational and surveillance aids available for use by aircraft are subject to periodic ground and flight tests. Flight inspection, i.e., calibration of navigation and surveillance systems verifies that certain technical parameters remain within precisely defined tolerances as laid down in international guidelines. The systems like ILS and VOR are required to be inspected at periodic intervals as per requirements of ICAO.

The Authority accorded (July 2003) approval for acquisition of one aircraft along with one Automatic Flight Inspection System (AFIS) to be fitted therein. The proposal for the new aircraft was made due to the fact that the present fleet of two dornier aircraft were not capable of flying at an altitude of 35000 ft. which was the mandatory requirement for radar calibration and were also incapable of calibrating VORs in airfields like Leh having elevation of more than 10000 ft. In the procurement advisory meeting (January 2004), which approved the proposal, it was clearly mentioned that the receipt of the AFIS should be synchronised with the receipt of the aircraft so as to ensure that the AFIS did not remain idle at any point of time. Purchase order was placed (February 2004) for the AFIS at a total cost of Euro 3663500 (equivalent to Rs.25.23 crore) and the equipment was received during November 2004. The synchronisation contemplated was however not achieved as the order for the aircraft was placed only during August 2005. The AFIS was lying idle since November 2004 resulting in blocking up of Rs.19.50 crore being cost of the equipment paid so far (March 2006) and consequent interest loss was Rs.1.82 crore upto March 2006. The Management while conceding the fact that there was considerable delay in placement of the order for procurement of the aircraft stated that the delay was due to various issues. It also stated that the aircraft was likely to be received by August 2006. It was observed (December 2006) in audit that though the aircraft was received in August 2006, the AFIS was yet to be fitted in it. (December 2006).

As a consequence, in the absence of the new aircraft capable of flying at high altitudes, the Authority had to engage the services of outside agencies through ICAO to conduct DVOR calibration at Leh and at Port Blair during December 2005 incurring an expenditure of Rs.65.10 lakh.

Recommendation

- All allied activities necessary for installation and commissioning of equipment should be synchronised with the procurement of equipment to avoid delays.
- Sites for installation of equipment should be ready before receipt of the equipment.