

VOLUME-1 | ISSUE-1 | JAN-MAR 2017

AIBM

एयरपोर्ट्स इण्डिया बिजनेस मैगजीन
Airports India Business Magazine

INAUGURAL ISSUE

*PPP MODEL IN AIRPORTS
A Blossoming Partnership*

*AIR CARGO
AAI Turns To Moving Heavy Weights*

*INSTRUMENT LANDING SYSTEMS
Clearing the Air*



REGIONAL CONNECTIVITY SPREADING THE WINGS

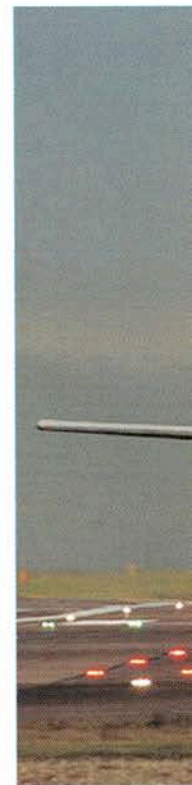
पंख पसारने को तैयार



An initiative of Airports Authority of India

Instrument Landing Systems Clearing the Air

To overcome foggy conditions that lead to massive disruptions of flight operations at various airports around the country, the Airports Authority of India has taken several measures, mainly to upgrade the Instrument Landing Systems in place.



**TO MINIMISE
DISRUPTIONS,
CAUSED BY
LOW VISIBILITY,
THE AIRPORTS
AUTHORITY
OF INDIA HAS
UNDERTAKEN A
COMPREHENSIVE
MODERNISATION
OF THE AIRPORT
INFRASTRUCTURE**

If you are a frequent traveller, chances are that you must have suffered the vagaries of climate in winter as several airports in India, especially in the northern plains, are invaded by extremely dense fog in the winter months, severely disrupting the flight schedules, which often do not recover in the entire day.

Airports such as Chandigarh, Amritsar, New Delhi and many other airports in north India are vulnerable to disruptions caused by dense fog, especially in the period between December-March each year. But fog or related weather conditions that impact flight operations are not exclusive to India. Many other airports around the world also suffer severe disruptions due to inclement weather. A recent example was the entire disruption of operations at the Heathrow airport in London in early November last year, causing disruption to

hundreds of flights, which had to be diverted to several European airports or simply cancelled. The trouble lasted for almost 12 hours, impacting hundreds of thousands of travellers. The disruptions lead to millions of dollars of losses each year to the global economy, including India.

To minimise disruptions, which are essentially caused by extremely low visibility, and in order to boost safety and efficiency of the Indian airports, the Airports Authority of India has undertaken a comprehensive modernisation of the airport infrastructure in the country.

The AAI has been upgrading the Instrument Landing Systems (ILS) installed at all the major airports in the country. To counter fog, the first ILS to be upgraded by AAI was ILS RWY 28 at IGIA New Delhi which was upgraded to meet ILS CAT-II operational requirements in 1999. This was subsequently upgraded to ILS



CAT-IIIA in 2001. However, over the last decade, as incidents of extremely severe fog became more frequent and visibility during winter months often dropped below 200m, the AAI upgraded one of the country's busiest airports – New Delhi – with the installation of CAT IIIB ILS, which allows landing and take offs in conditions with only about 50 m of visibility.

In addition, AAI has installed and operationalised ILS CAT-III (B) at Jaipur and Lucknow Airport in 2016. AAI is also in process of upgrading ILS at Kolkata (RWY 01R) and Amritsar airports to CAT-III B level and work is in progress. The ILS CAT-III (B) at these airports, is likely to be commissioned before start of winter season 2017.

Unravelling the secrets of ILS

Landing in low visibility is perhaps one of the most 'exciting' ways to operate an aircraft but is certainly the most demanding. Significant improvements in aircraft automatic control systems and the ground

communication set up, besides extremely well-trained crew, have permitted landing in near zero visibility today.

For instance, in a landing using a Category III ILS, it is the ILS equipment which guides the pilots for almost entire landing sequence. The pilots see the runway lights only about five seconds before the actual touchdown and hence they have practically no margin for error.

On January 9, 1969, a French airline, Air Inter, operating a Caravelle aircraft, became the first to achieve a landing in category IIIA conditions during a commercial flight from Lyon to Paris. Subsequently, a number of other aircraft types were certified for Category IIIA.

It is certain that installing CAT II or CAT III equipment on their aircraft is a huge financial burden for the airlines, but this investment can be easily recovered as it dramatically improves the efficiency of the aircraft by cutting sharply the time that it may be blocked due to bad weather conditions. This investment also sharply reduces

the need for expensive diversions of aircraft due to bad weather; as actual CAT II or CAT III conditions may occur at any airfield at certain times during the year.

Over the years, new technology has led to a rapid increase in the ability of pilots to operate aircraft under practically any weather conditions and with almost zero visibility. The first to arrive on scene was of course Category II which allowed a precision instrument approach and landing with a runway visual range of more than 350 m. It also permitted the aircraft to descend to anywhere between 30-60 m in height.

Besides automatic guidance, CAT II operating conditions also allow a manual landing or a missed approach – where the aircraft descends to land, but then regains altitude to make another attempt at landing.

The Big CATs

A CAT III operation is, of course, with lower visibility and lower height than the CAT II. CAT III has been divided into three categories – CAT IIIA, CAT IIIB and CAT IIIC, where CAT IIIC is the most advanced and with least visibility and height requirements.

Category III A approach involves landing when the runway visual range is at least 200 m and the aircraft decision height of not lower than 30 m. A category III B approach is with a minimum height of 15 m and runway visibility exceeding 50 m. And, the best technology standard available today, Category IIIC approach allows a plane to land or take off without any minimum limits. It means an aircraft can take off or land in zero visibility conditions.

Though CAT III B is fairly widespread in many developed nations, many large and key airports in the developed countries, especially in areas where fog or other weather conditions can impede normal operations, have been fitted with CAT IIIC Instrument Landing System.

Working of ILS

As part of navigational aids infrastructure, the AAI has installed conventional and space

Airports with operational Instrument Landing System

CAT-III B ILS

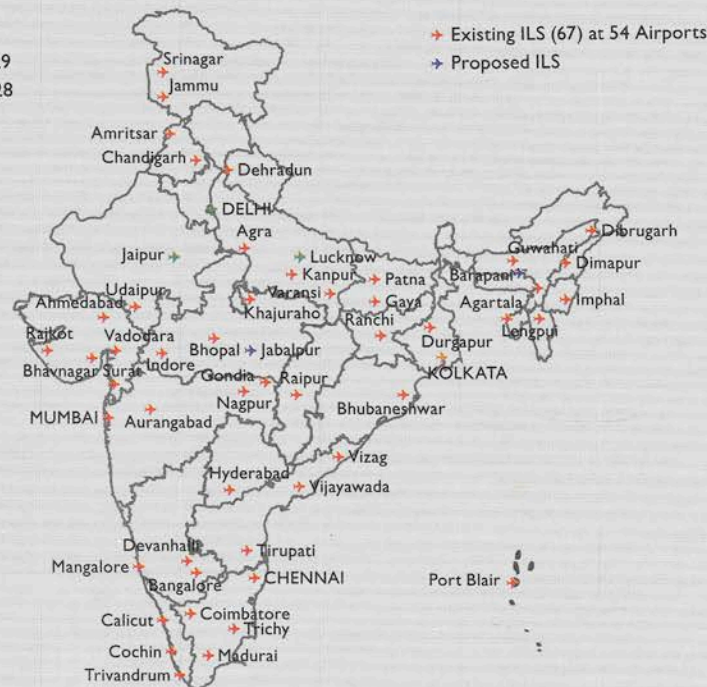
1. Delhi ILS RWY 29
2. Delhi ILS RWY 28
3. ILS RWY Delhi RWY II
4. Lucknow
5. Jaipur

CAT-II ILS

1. Kolkata 19L

CAT-I ILS

All other ILSs are CAT-I



*Not to scale

base navigational aids at various airports across India. The infrastructure is being updated continuously considering the fact that it ensures enhanced operations and better planning, thus avoiding flight disruptions.

AAI has been constantly upgrading CNS/ATM infrastructure at the airports to meet enhance air traffic capacity and operational requirements. To this endeavor AAI has integrated radars and is in the process of upper air space harmonisation. AAI has installed and commissioned, Airport Surface Movement Guidance Systems (ASMGCS), Additional Radars and ADS-B systems.

The ILS has two main sub-systems to guide an aircraft's landing; the localiser provides for a lateral guidance and the glide path comes handy for a vertical guidance. These guidance help the pilot analyse the distance to the touch ground from the landing aircraft.

The ILS also reduces the minimum altitude required for a pilot to sight the runway end before making a decision to

land or divert to an alternate airport. The system does this by giving the details of what is the 'decision height' that the pilot can use to make the decision of landing or re-routing to another airport.

On ground, the Air Traffic Safety Electronic Personnel (ATSEP) monitors the ILS through a Remote Control and Status Unit (RCSU).

The RCSU also provides status of the system to the Air Traffic Controllers (ATCOs) in the ATC operational units. The Aircrafts, in order to access the ILS for landing uses the Instrument Approach Procedures, which are flight paths complying with DGCA Civil Aviation Requirements (CARs) and ICAO standard and recommended practices.

With continued focus on safety and security, the AAI has been investing in bringing the latest equipment to ensure that the era of spending hours of uncertainty at foggy airports is behind the passengers and the airlines. **TIBAY**

J B Singh, Joint General Manager (CNS)