



GOVERNMENT OF INDIA
**OFFICE OF THE DIRECTOR GENERAL OF CIVIL
AVIATION**
OPP. SAFDARJUNG AIRPORT, NEW DELHI-110 003

**CIVIL AVIATION REQUIREMENTS
SECTION 8 - AIRCRAFT OPERATIONS
SERIES B PART I**

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Subject: Approval for ILS Cat-II/III Operations

1. INTRODUCTION

- 1.1 As part of the modernization of airport facilities in the country, Instrument Landing System (ILS) capability is being upgraded to Cat-II and Cat-III levels at some of the airports to permit operations even in poor weather conditions. For conducting Cat-II or Cat-III operations, the operators are required to take necessary measures to meet the requirements and obtain approval from DGCA.
- 1.2 Approval for Cat-II and Cat-III operations are dependent on the following four elements in order to maintain the required level of safety:
- a) The aircraft;
 - b) The flight crew;
 - c) The airport; and
 - d) The operator

All of these elements must comply with the regulations stipulated by DGCA. An aircraft type must be approved for Cat-II/Cat-III operations with an Automatic Landing System, which provides automatic control of the aircraft during approach and landing. The flight crew should be trained for such operations and have approval for the same from DGCA. Similarly, the airport must be equipped and approved for Cat-II/Cat-III operations.

- 1.3 This CAR lays down the requirements to be met by the operators in respect of equipment, organization, staffing, training and other matters affecting the operations of aircraft for grant of approval for ILS Cat-II and Cat-III operations. Approval for Cat-II & Cat-III operations are through issuance of, or amendments to operations specifications.
- 1.4 This CAR is issued under the provisions of Rule 133 A of the Aircraft Rules, 1937.
- 1.5 CAR Section 2 Series O Part XIV is revoked as the same has been merged with this CAR.

2. APPLICABILITY

The requirements contained in this CAR are applicable to all Indian operators intending to carry out Cat-II and Cat-III operations. Before operating flights to foreign airports, the operators shall file their operating minima and other relevant documents required by the aviation authority of that country and seek their approval for commencing Cat-II and Cat-III operations after obtaining approval from DGCA India for the same.

3. DEFINITIONS

Auto Land System: The system which provides automatic control of the aeroplane during approach & landing.

Instrument approach operations. An approach and landing using instruments for navigation guidance based on an instrument approach procedure. There are two methods for executing instrument approach operations:

- a) a two-dimensional (2D) instrument approach operation, using lateral navigation guidance only; and
- b) a three-dimensional (3D) instrument approach operation, using both lateral and vertical navigation guidance.

Note. — Lateral and vertical navigation guidance refers to the guidance provided either by:

- a) ground-based radio navigation aid; or
- b) Computer-generated navigation data from ground-based, space-based, self-contained navigation aids or a combination of these.

Precision approach (PA) procedure. An instrument approach procedure based on navigation systems (ILS, MLS, GLS and SBAS CAT I) designed for 3D instrument approach operations Type A or B.

Instrument approach operations shall be classified based on the designed lowest operating minima, below which an approach shall only be continued with the required visual reference, as follows:

- a) Type A: a minimum descent height or decision height at or above 75 m (250 ft); and
- b) Type B: a decision height below 75 m (250 ft). Type B instrument approach operations are categorized as:
 - 1) Category I (CAT I): a decision height not lower than 60 m (200 ft) and with either a visibility not less than 800 m or a runway visual range not less than 550 m;
 - 2) Category II (CAT II): a decision height lower than 60 m (200 ft) but not lower than 30 m (100 ft) and a runway visual range not less than 300 m; and
 - 3) Category III (CAT III): a decision height lower than 30 m (100 ft) or no decision height and a runway visual range less than 300 m or no runway visual range limitations.

Note 1. — Where decision height (DH) and runway visual range (RVR) fall into different categories of operation, the instrument approach operation would be conducted in accordance with the requirements of the most demanding category (e.g., an operation with a DH in the range of CAT III but with an RVR in the range of CAT II would be considered a CAT III operation or an operation with a DH in the range of CAT II but with an RVR in the range of CAT I would be considered a CAT II operation). This does not apply if the RVR and/or DH has been approved as operational credits.

Note 2. — The required visual reference means that section of the visual aids or of the approach area which should have been in view for sufficient time for the pilot to have made an assessment of the aircraft position and rate of change of position, in relation to the desired flight path. In the case of a circling approach operation, the required visual reference is the runway environment.

Alert Height (AH): Alert height is a height specified for operational use by pilots (typically 30 m (100 ft) or less above the threshold), above which a Cat III operation would be discontinued and a missed approach initiated if a failure occurred in one of the required redundant operational systems in the aeroplane or in the relevant ground equipment. Below this height, the approach, flare, touchdown and, if applicable, roll-out may be safely accomplished following any failure in the aircraft or associated Cat III systems not shown to be extremely improbable. This height is based on characteristics of an aircraft and its particular fail-operational airborne Cat III system.

Decision Altitude/Height (DA/H): A specified altitude or height in a 3D instrument approach at which a missed approach must be initiated if the required

visual reference to continue the approach has not been established.

Note

i) Decision Altitude (DA) is referenced to Mean Sea Level (MSL) and Decision Height (DH) is referenced to the threshold elevation.

ii) The required visual reference means that section of the visual aids or of the approach area which should have been in view for sufficient time for the pilot to have made an assessment of the aircraft position and rate of change of position, in relation to the desired flight path. In Cat III operations with a decision height the required visual reference is that specified for the particular procedure and operation.

Low Visibility Procedures (LVP): Specific procedures applied by an aerodrome for the purpose of ensuring safe operations during Cat II and III approach operations and/or low-visibility take-offs.

Fail-passive Automatic Landing System: An Automatic Landing System is fail-passive if, in the event of a failure, there is no significant deviation of aeroplane trim, flight path or attitude but the landing will not be completed automatically.

Fail-operational Automatic Landing System: An Automatic Landing System is fail-operational if, in the event of a failure, the approach, flare and landing can be completed by the remaining part of the automatic system.

4. PROCEDURE FOR GRANT OF APPROVAL

4.1 Operational:

4.1.1 An operator applying for Cat-II or Cat-III operations shall adhere to the regulations to get the operational approval. An operator, who applies for Cat-II or Cat-III approval, shall submit a detailed proposal to the DGCA defining clearly the plans and policies on all aspects of the operations. The proposal shall include information on, amongst other aspects, the following items:

- a) **Aircraft Type:** Details of the aircraft intended to be used, its certification status with respect to Cat-II or Cat-III operations, list of required equipment for the intended mode of operations, the operating limitations, the procedures to be followed following various failures, etc.
- b) **Maintenance Programme:** Description of the maintenance programme, which is mandatory to ensure that the airborne equipment will remain at the required level of airworthiness standard, reliability and performance. It shall include training of Aircraft Maintenance Engineers, maintenance of test equipment and standards, maintenance procedures, engineering modifications and periodic checks of auto-land system.
- c) **Flight Crew Procedure:** A description of the operational procedures covering in particular crew task sharing, approach monitoring, decision-making, handling of failures and go-around. Detailed requirements in this regard are given in succeeding para 5.

- d) Flight Crew Training: Syllabi for ground training, simulator training, flight training, recurrent training and upgrade training shall be furnished in order to get the Cat- II or Cat-III approval for the flight crew.
- e) Airfield Equipment: A description of the airfield equipment in accordance with ICAO standards for Cat-II/III, including visual and non-visual aids, runway characteristics, obstacle clearance area, RVR measurements, ATC procedures, low visibility procedures, etc.
- f) Airfield Operating Minima: A proposal for airfield operating minima for each airfield intended to be used by the operator for such operations.

4.1.2 After receiving the proposal, concerned DGCA officers shall examine the information and hold discussions with the operator to ensure that the operator establishes a well laid down system and procedures for conducting and monitoring Cat II/Cat III operations.

4.1.3 On completion of the necessary actions, the operator shall submit a consolidated statement showing item-wise compliance to the requirements of this CAR. On satisfactory meeting the requirements DGCA will grant necessary approval by issuing relevant initial Operations Specifications for Cat-II operations and specifying:

- i) Minima (RVR, AH and DH) to be used;
- ii) Aeroplanes (indicated by registration numbers) which can be used;
- iii) Aerodromes to be used; and
- iv) Any limitation that may be imposed by DGCA.

4.1.4 The operator shall be required to demonstrate his ability to perform Cat-II operations with an appropriate approach success rate and level of safety. On satisfactory completion of this, the operator shall be granted standard Operations Specifications for Cat-II operations.

4.1.5 For grant of Cat-III with DH<50 ft approval, same procedure shall be followed i.e. grant of initial Operations Specifications, successful operational demonstration and grant of standard Operations Specifications through gradual reduction in meteorological minima.

4.1.6 The Operations Specifications shall form part of the operator's permit.

4.2 AIRWORTHINESS

Each operator seeking approval of aircraft for Cat II/III operations shall comply with the requirements in respect of Manuals, Instruments, Equipment and Maintenance. An applicant seeking approval for Cat II/III shall submit the application given in Annexure A of this CAR along with CAR compliance and Cat II/III Operation compliance check list attached with Chapter 24 E of Airworthiness procedure Manual available at DGCA website <http://dgca.gov.in>. The details of the procedures/instructions and methodology for continued capability to adhere conditions laid down at the time of grant of

approval shall be documented in Cat II/III manual for use by personnel involved in Cat II/III operation. Any amendment to the manual requires DGCA approval.

4.3 INSTRUMENTS AND EQUIPMENT

(a) General: The following checks need to be carried out within 6 months prior to submission of documents for approval of Cat II/III operations:

- (i) The ILS localizer and glide slope equipment shall have been bench checked according to the Manufacturer's stipulations.
- (ii) The altimeters and the static pressure systems shall have been tested and inspected in accordance with the procedure given in Appendix B of this CAR or as per manufacturer's recommendations or any other equivalent procedure acceptable to DGCA.
- (iii) All other instruments and items of equipment required for Cat II/III operations shall have been maintained/ bench checked as per manufacturer's requirements.

(b) Flight Control Guidance System: All components of flight control guidance system must have been approved for Cat II/III operations as applicable under type or supplemental type certification procedures. In addition, subsequent changes to make, model or design of these components must be approved by regulatory authority of the country of manufacture. Related systems or devices such must be approved in the same manner, if they are to be used for Cat II/III operations.

(c) Radio Altimeter: A radio altimeter must meet the performance criteria as specified in type or supplemental type certification and any subsequent amendments issued thereafter from time to time or manufacturer's requirements for Cat II/Cat III operations or any other procedure acceptable to DGCA.

(d) Modification: The operator shall ensure that any modification to systems and components approved for Cat II&III operations are not affected when incorporating software changes, service bulletins, etc. Any change to system, components shall have been approved by the manufacturer and the regulatory authority of the country of manufacture.

5. OPERATING REQUIREMENTS

5.1 Operators shall develop procedures and operational instructions to be used by their flight crew for Cat II/ III operations and Low Visibility Take-off to ensure safe conduct of the operations. These procedures and instructions shall be included in the Operations Manual. All the instructions shall be compatible with limitations and mandatory procedures contained in the approved Flight Manual and the Indian Rules, Regulations and other instructions issued by DGCA from time to time.

5.2 The procedures and the operational instructions shall cover normal and abnormal situations which can be encountered in actual operations which shall include at least the following items:

- i) Checks for satisfactory functioning of the aircraft equipment, both before departure and in flight;
- ii) Effect on minima caused by changes in the status of the groundinstallations and airborne equipment;
- iii) Procedure for take-off, approach, flare, landing, roll out and missed approach;
- iv) Procedure to be followed in the event of failures, warnings and other abnormal situations;
- v) The minimum visual reference required;
- vi) The importance of correct seating and eye position; and
- vii) Action which may be necessary arising from deterioration of the visual reference.

5.3 Crew Coordination: Appropriate procedures for crew co-ordination shall be established so that each flight crew member can carry out their assigned responsibilities. Briefings prior to the applicable takeoff or approach shall be specified to assure appropriate and necessary crew communications. Responsibilities and assignment of tasks shall be clearly understood by crew members.

5.4 Monitoring: The operator shall establish procedures and instructions for Low Visibility TakeOff and Cat-II/III operations. These procedures shall be included in the Operations Manual and contain the duties of flight crew members during taxing, take off, approach, flare, landing, roll out and missed approach as appropriate. Procedures shall assure that adequate crew attention can be devoted to control of aircraft flight path, displacements from intended path, mode annunciations, failure annunciations and warnings, and adherence to minima requirements associated with DH and AH. Procedures for calling out failure conditions shall be pre-established, and responsibility for alerting other crew members to a failure condition shall be clearly identified.

5.5 Use of the Decision Height or Alert Height: Procedure for setting various reference bugs in the cockpit shall be laid down, responsibilities for Decision Height call-outs shall be clearly defined, and visual reference requirements necessary at Decision Height shall be specified so that flight crew are aware of the necessary visual references that shall be establishedby, and maintained after passing Decision Height.

5.6 The operator shall assure that at each runway intended for Category II/III operations, the Radio Altimeter systems used to define Alert Height or Decision Height provides consistent, reliable, and appropriate readings for determination of Decision Height or Alert Height over the terrain underlying the approach path. Any adjustments to approach minima or procedures made on final approach shall be completed prior to Alert Height and applicable annunciation for fail passive operations.

- 5.7 Call-outs: Altitude/Height call-outs shall be used for Category II/III. Call-outs shall be accomplished by the flight crew or shall be automatic (e.g., using synthetic voice call-outs). Call-outs shall be specified to address any non-normal configurations, mode switches, failed modes, or other failures that could affect safe flight, continuation of the landing, or the accomplishment of a safe missed approach.
- 5.8 Aircraft Configurations: Operational procedures shall include any authorised aircraft configurations that might be required for low visibility takeoff or Category-II/III approaches or missed approaches. Examples of configurations that operational procedures which need to be included are:
- (i) Alternate Flap Settings approved for Category-II/III;
 - (ii) Use of alternate AFCS modes or configurations ;
 - (iii) Inoperative equipment provisions related to the Minimum Equipment List, such as a non-availability of certain electrical system components, inoperative Radio Altimeter, air data computers, hydraulic systems or instrument switching system components; and
 - (iv) Availability and use of alternate electrical power sources if required as a standby source.

Procedures required to accommodate various aircraft configurations shall be readily available to the flight crew and the aircraft dispatcher to preclude the inadvertent use of an incorrect procedure or configuration. Acceptable configurations and aircraft type shall be clearly identified so that the crew can easily determine whether the aircraft is or is not in a configuration to initiate a low visibility takeoff or Category-II/III approach.

- 5.9 Airport Surface Depiction for Category II/III Operations: A suitable airport surface depiction (e.g., airport diagrams) shall be available to flight crews to assure appropriate identification of visual landmarks or lighting to safely accomplish taxing in Cat-II/III conditions from the gate to the runway and from the runway to the gate. The Airport depiction shall use an appropriate scale with suitable detailed information on gate locations, parking locations, holding locations, critical areas, obstacle free zones, taxi way identifications, runway identifications, and any applicable taxi way markings for designated holding spots or holding areas.
- 5.10 The operator shall lay down procedure in their operations manual to ensure that the Commander satisfies himself that:
- i) the status of the visual and non-visual facilities is sufficient prior to commencing a Low Visibility Take Off or Cat-II or Cat-III approach;
 - ii) appropriate LVPs are in force according to information received from Air Traffic Services before commencing a low visibility take off or a Cat-II or Cat-III approach.
- 5.11 The operator shall include in the Operations Manual the minimum equipment that has to be serviceable prior to departure for the commencement of Low

Visibility Take Off or a Cat-II or Cat-III approach in accordance with the Aeroplane Flight Manual or approved document and the Commander shall satisfy himself that the status of aeroplane and the relevant airborne system is appropriate for the specific operation to be conducted.

- 5.12 The operator shall lay down dispatch procedures which shall include appropriate consideration of reported and forecast weather, field conditions, facilities status, NOTAM information, alternate airport designation, missed approach performance, crew qualifications, airborne system status (provisions of MEL and CDL) and fuel planning.
- 5.13 All the flight crew members of a flight shall hold appropriate approval for the particular type of operations to be conducted.
- 5.14 Clearance to carry out Cat-II and Cat-III approach shall be requested from ATC, who shall activate the low visibility procedures i.e., prepare the airfield and assure appropriate aircraft separation. Such an approach shall not be undertaken until the clearance has been received. ATC shall be informed when an automatic landing is intended to be performed, so that the ATC may initiate action to provide the same protection even in Cat-I or better conditions.

6 AIRWORTHINESS AND MAINTENANCE REQUIREMENTS

6.1 General Requirements

- (i) To be eligible for Cat II/III operation the specified airplane should have been certificated to the Airworthiness Standards of Transport Category aeroplanes by FAA or EASA or by any other regulator which is normally reflected by a statement in the approved Aeroplane Flight Manual (AFM) / Type Certificate Data Sheet (TCDS) or Supplemental Type Certificate (STC).
- (ii) The aircraft shall be multi engine, duly equipped with the specified equipment/instruments landing system, which provides control of the aircraft during approach and landing. The aircraft shall have been certified for Cat II/III operations by the regulatory authority of the country of manufacture acceptable to DGCA.
- (iii) Each aircraft intended to be operated for Cat II/III operations shall be identified by registration number, make and model of the aircraft and requires approval by DGCA for such operations.
- (iv) The operator shall prepare a Cat II/III manual for each type of aircraft which may form part of the Continuing Airworthiness Management Exposition and shall require approval from DGCA. The manual shall contain the registration number, make and model of the aircraft to which it applies, detailed procedures, instructions, limitations and maintenance program to ensure continued serviceability, accuracy, reliability, characteristics in case of failures and degree of redundancy of the

systems necessary for the Cat II/ Cat III operations and shall be approved by DGCA.

- (v) The instruments and equipments required for Cat II/III operations for each type and model of the aircraft shall be listed by the operator in the manual prepared for obtaining DGCA approval for above operations.
- (vi) The manual shall also contain a flight schedule for checking the performance of the aircraft in case the aircraft has not performed Cat II/III operations for a period of thirty days. Where aircraft OEM permits, the flight schedule may be replaced by a satisfactory ground check(s) which shall be included in the manual. Procedure for recording the results of the flight schedule/ ground check shall be laid down in the manual.

Note: Cat II/III system certification on most of the modern aeroplanes is maintained by performing a system ground check if permitted by the OEM. Some older generation aeroplanes still require operational flight check to confirm system operational suitability for continued Cat II/III operations.

6.2 MAINTENANCE REQUIREMENTS:

The maintenance program shall ensure that the airborne equipment is maintained at an acceptable level of performance, reliability, and availability, consistent with the Maintenance planning documents / Maintenance Review Board (MRB) or equivalent requirements.

- (i) Maintenance of the aircraft shall be carried out by an approved firm holding required approval in accordance with the procedures, instructions and limitations contained in the manual specifically prepared by the operator for Cat II/ Cat III operations and approved by DGCA.
- (ii) The instruments & equipment required for Cat II/III operations shall have been inspected and maintained in accordance with the maintenance programme contained in the approved manual.
- (iii) The operator shall ensure that tests, bench checks, overhaul, snag rectification of instruments and equipment listed in the manual are carried out by persons holding current ratings. In case the work is carried out by an outside party the operator shall ensure that such outside party is also approved by the regulatory authority of the country / DGCA India to undertake such work.
- (iv) Each operator shall keep a current copy of the Manual prepared for Cat II or Cat III operations at its principal base of maintenance and night halt stations.

6.3 Maintenance Program:

The maintenance program developed by the operator must contain the following:

- a. A list of each instrument and item of equipment required for Cat II/III operations.
- b. A maintenance program that provides for the performance of inspections under sub paragraph (e) of this paragraph within three months after the date of the previous inspection. The inspection must be performed by licensed AMEs/approved personnel, except that each alternate inspection may be replaced by a functional flight check. This functional flight check must be performed by a pilot holding at least a Cat II/III pilot authorization for the type of aircraft checked.
- c. A maintenance program for the instrument and item of equipment as listed in (a) that provides for bench check every 12 months in case the manufacturer has not given any maintenance programme. However, in case the manufacturer has provided a maintenance programme, the same may be followed.
- d. A maintenance schedule that provides for the performance of a test and inspection of each static pressure system in accordance with Appendix E of FAR Part 43 as given in Appendix B to this CAR or any equivalent method acceptable to DGCA within 12 calendar months after the date of the previous test and the inspection. However, in case the manufacturer has provided a scheduled maintenance programme, the same may be followed.
- e. The procedures for the performance of the periodic inspections and functional flight checks to determine the ability of each listed instrument and item of equipment specified in the manual of this CAR to perform as approved for Cat II or Cat III operations including a procedure for recording functional flight checks.
- f. A procedure for assuring that the pilot is informed of all defects in listed instruments and items of checks.
- g. A procedure for assuring that the condition of each listed instrument and item of equipment upon which maintenance is performed is at least equal to its Cat II or Cat III approval condition before it is returned to service for Cat II or Cat III operations.
- h. A procedure for an entry in the maintenance records that shows the date, airport indicating satisfactory Cat II & III approaches and reasons for each unsatisfactory Cat II/III operation because of a malfunction of a listed instrument or item of equipment. All such malfunctions shall be analyzed and appropriate preventive action taken to avoid recurrence. The operator shall submit a monthly return to the regional office giving required data of number of satisfactory /unsatisfactory approaches made in each month and the total number of unscheduled removals of avionics components required for Cat II/III operations.

- i. Every operator shall establish a specific maintenance program in order to be able to check and demonstrate the full capability of the aircraft to perform Cat II/III operations. A reliability program shall be developed/ extended to monitor, track and control the maintenance status of the aircraft to achieve successful Cat II/III landings.
- j. The reliability program shall establish a specific procedure to govern maintenance capability of the operator to conduct Cat II/III operations in the following conditions:
 - (i) Confirmed defect with corrective action carried out.
 - (ii) Unconfirmed defect but with corrective actions
 - (iii) Aircraft dispatch under MEL conditions.
 - (iv) Unable to correct defect and not under MEL conditions.
 - (v) Unable to perform the required test.
- k. Establish a procedure defining upgrading/downgrading capability so as to assist the dispatch of aircraft. The dispatch policy shall be based on the minimum equipment list (MEL) as it governs the basic criteria for operations. The dispatch criteria and status of aircraft must be recorded in the tech log/flight report book with reference to MEL. Any release of aircraft under MEL shall be intimated to the flight dispatch so that the flight crew is aware of the current aircraft status and its capability for CAT II/Cat III operations while accepting the aircraft.
- l. Whenever the aircraft is released under MEL a prominent placard shall be displayed in the cockpit and provisions for release of the aircraft under MEL to be strictly adhered to.

6.4 Test equipment and standards:

The operators shall submit a program for maintenance/ calibrations of line (RAMP) test equipment, shop (bench) test equipment and listing of all primary and secondary standards utilised during maintenance / calibrations of such equipment which relates to Cat II/ Cat III operations. Tractability to a national standard or the manufacturer's calibration standards shall be maintained at all times. This shall be submitted to DGCA for determination of its adequacy. Emphasis be given to standards associated with ILS receivers, flight directors, autopilot couplers, auto throttles and altimeter systems and maintenance techniques and procedures of associated redundant systems.

7 TRAINING REQUIREMENTS:

7.1 Flight Crew:

Flight crew shall be trained and equipped in all aspects of all-weather operations. Detailed requirements for the ground and flight training are contained in the CAR Section 8, Series C, Part I.

The operators shall lay down detailed training programme for initial approval,

recurrent training and for obtaining approval for an additional aircraft type. The operators are encouraged to have their training programmes higher than the minimum stipulated by DGCA, keeping in view the general level of experience of the flight crew employed by them.

7.2 Maintenance Personnel Training:

Each operator has to establish an initial and recurrent training program acceptable to DGCA for personnel performing maintenance work on Cat II/Cat III airborne systems and equipment. Recurrent training shall be accomplished at least annually or when a person has not been involved in the maintenance of aircraft approved for Cat II & III operations. The training shall include classroom and hands on aircraft training leading to a certification for Cat II & III approval. Training record of such personnel has to be kept current and made available to DGCA for inspection on demand.

8. AIRPORT REQUIREMENTS

Requirements contained in ICAO Annex 14, Manual of All Weather Operations and those stipulated by DGCA shall be complied with. Some of the salient requirements concerning airports are given below:

- a) An operator shall not use an airport for Cat-II or Cat-III operations unless it is approved for such operations.
- b) Due to very low visibility in Cat-II and Cat-III operations, each airfield shall meet stringent criteria concerning obstacle clearance to avoid any aircraft on approach, landing or go-around touching obstacles on the ground.
- c) The ILS installation shall conform to the appropriate specifications contained in ICAO Annex 10, Volume 1, Part (i), Chapters 2 & 3 and be designed and operated in accordance with the guidance material contained in attachment 'C' to Part (i) of Annex 10.
- d) During Cat-II and Cat-III approaches, the ILS beams shall be protected from unacceptable disturbances in the critical area and sensitive area.
- e) The RVR reports shall be given in increments of not more than 50m when the RVR is less than 800m and not more than 25m when the RVR is less than 150m.
- f) A system of maintenance of visual aids shall be established to ensure both lighting and marking system reliability. A system of maintenance for ILS installations shall also be established with regular ground and flight checks as stipulated. Users shall be advised as soon as possible of any degradations in ILS performance.
- g) A secondary power supply for visual aids shall be required with maximum switch-over time as indicated in ICAO Annex 14.

- h) Cat-II and Cat-III operations shall require special procedures for the ATC and all services in the aerodrome i.e., Low Visibility Procedures. The aerodrome authority shall develop the procedure in accordance with CAR Section 8 Series C Part I. Mainly, the procedures to be established are:
- i) procedures for ATC to be quickly informed of all degradations in ILS performance and to inform the pilot, if necessary;
 - ii) procedures for ATC to be quickly informed of all degradations in visual aids and to inform the pilot, if necessary;
 - iii) procedures for the protection of the Obstacle Free Zone by the control of ground movements;
 - iv) procedures for the protection of the ILS critical area and the ILS sensitive area by control of ground movements and adequate separation between two aircraft on approach or one aircraft on approach and another taking-off;
 - v) procedures for meteorological services particularly for ATC to quickly inform the crew changes in RVR;
 - vi) procedures for maintenance; and
 - vii) procedures for security.

9. OPERATIONAL DEMONSTRATION AND ISSUANCE OF OPERATIONS SPECIFICATIONS

The implementation of all-weather operations shall be achieved in stages through gradual reduction in meteorological criteria commensurate with the confidence and experience gained by the operator as stipulated hereunder:

9.1 Issuance of Initial Cat-II and CAT III with DH $\geq$ 50 ft operations specifications

- (i) The operator shall have gained minimum experience of 6 months from date of commencement of operations in Cat-I for issuance of initial Operations Specifications for Cat-II and CAT III with DH $\geq$ 50 ft operations.
- (ii) Operator shall be issued initial Operations Specifications authorising to carry out Cat-II and CAT III with DH $\geq$ 50ft operations after ensuring that an operator has prepared all the required documents, procedures, maintenance and training programmes and the flight crew have been trained and obtained necessary approval for conducting Cat-II and CAT III with DH $\geq$ 50 ft operations.

9.2 Operational Demonstration for Cat-II and CAT III with DH $\geq$ 50 ft operations:

9.2.1 The operator shall carry out operational demonstration, in order to establish that an appropriate level of safety can be met in such operations. The operator shall prove that he can perform Cat-II and CAT III with DH $\geq$ 50 ft operations with the appropriate success rate and level of safety. Particular attention shall be given to the flight and maintenance procedures as established by the operator. During this period, the operator shall successfully complete the following operations demonstrations and data collection programme in line service as part of the approval process to ensure continued performance and reliability of the system before operations down to the next succeeding lower minima are authorised:

- (i) For operational demonstration of airborne system, Scheduled/Scheduled Commuter operators shall conduct 100 landings and NSOP/GA operator shall conduct 50 landings in line operations, including training flights. The system should demonstrate reliability and performance in line operations consistent with the operational concepts and success rate of 95%.
- (ii) Minimum of 10 landings shall be accomplished under supervision of FOI(A) or DE/TRE on board. First 02 landing shall be done under supervision of FOI(A).
- (iii) Minimum of half of required landings shall be performed in demonstrated CAT III with DH $\geq$ 50ft operations.
- (iv) For collection of data during airborne system demonstration, the applicant shall provide crew flight reports and automatic flight recording data giving approach and landing performance whenever an approach and landing is attempted utilising the appropriate system, regardless of whether the approach is abandoned or concluded successfully. The completed forms and a summary of the demonstration results will be made available to DGCA. Entry must also be made in the Techlog/Flight Report Book after flight.
- (v) Approaches where the pilot was assured that the critical area protection was provided which do not result in a successful landing, are to be fully documented giving factors which result in unsuccessful approaches e.g., due to ATC factors, faulty ground station signals or other factors.

9.2.2 The operator shall provide crew flight reports and automatic flight recording data during all the operational demonstrations.

a) The flight crew reports should provide at least the following data:

- i) Airfield and runway used;
- ii) Weather conditions;
- iii) Time;
- iv) Adequacy of speed control;
- v) Any out-of-trim condition at time of Automatic Flight Control System disengagement;
- vi) Compatibility of Automatic Flight Control Systems, Flight Director and raw data;
- vii) Indication of the position of the aircraft relative to the ILS centerline when descending through 100 ft (30m);
- viii) Touchdown position;
- ix) Reason for failure leading to aborted approach, give height above runway at which approach, was discontinued; and
- x) Quality of overall system performance.

b) The automatic flight recordings shall provide at least the following:

- i) Deviation from localizer at touchdown;
- ii) Flare time;
- iii) Rate of descent at touchdown;
- iv) Pitch and bank angles at touchdown;

- v) Speed loss in flare; and
- vi) Maximum deviation during ground roll-out (for aircraft with automatic ground roll control or guidance intended for operations with no DH).

9.2.3 The operator shall develop a form for use by the flight crew to record the datalist above. A sample pro forma for crew reports is given at Annexure-I. This form shall be completed whenever an approach is attempted utilizing the airborne low visibility approach system regardless of whether it is initiated, abandoned or concluded successfully. A successful approach is one in which at 100 feet point:

- i) The airplane is in trim so as to allow for continuation of normal approach and landing.
- ii) The indicated airspeed and heading are satisfactory for a normal flare and landing. With auto throttle control system, the speed must be ± 05 knots of programmed airspeed but may not be less than computed threshold speed.
- iii) The airplane is positioned so that the cockpit is within, and tracking so as to remain within, the lateral confines of the runway extended.
- iv) Deviation from glideslope does not exceed ± 75 micro amps as displayed on the ILS indicator. The Operator may specify the equivalent scale deviation for their type of aircraft in consultation with the aircraft manufacturer.
- v) No unusual deviation in the touchdown or touchdown and roll out performance.

9.2.4 During the period following the issuance of initial Operations Specifications to conduct Cat-II and CAT III with DH ≥ 50 ft operations (as mentioned in para 9.1), the operator, when practicable, shall use the appropriate airborne system using the operator's operating and maintenance procedures. During this period, pilot reports shall be obtained for each approach with the data described above. These reports shall be analyzed and a summary report prepared and submitted to DGCA. This report shall show that, at least 95% of approaches made during this period were successful.

9.3 Issuance of Standard Cat-II and CAT III with DH ≥ 50 ft operations Specifications:

After successful completion of operations under initial Operations Specifications and approaches as indicated in para 9.2.1 above, the operator shall be issued revised Standard Operations Specifications authorizing him to carry out Cat-II and CAT III with DH ≥ 50 ft operations.

9.4 Issuance of Initial Cat-III with DH less than 50 ft Operations Specifications:

Operator shall be issued an initial Operations Specifications to carry out Cat III operations with Decision Height less than 50 feet and RVR of 300 metres after ensuring that operator has prepared all the required documents, procedures, maintenance and training programmes and the flight crew have been trained

and the operator has also successfully acquired six months experience of Cat-II and CAT III with DH $\geq$ 50 ft operations post issuance of standard Operations Specifications for such operations.

9.5 Operational Demonstration for Cat-III with DH < 50ft Operations

9.5.1 The operator shall then carry out operational demonstration, in order to establish that an appropriate level of safety can be met in such operations. The operator shall prove that he can perform Cat-III operations with Decision height less than 50 ft with the success rate of 95% and appropriate level of safety. For this purpose, he must carry out in-service proving for a period of six months. Particular attention shall be given to the flight and maintenance procedures as established by the operator. During this period, the operator shall successfully complete the following operations demonstrations and data collection programme in line service as part of the approval process to ensure continued performance and reliability of the system before operations down to the next succeeding lower minima are authorised:

- (i) For operational demonstration of airborne system, 100 successful landings are to be accomplished in line operations, including training flights, using Cat-III system. The system should demonstrate reliability and performance in line operations consistent with the operational concepts and success rate of 95%.
- (ii) Minimum of 10 landings shall be accomplished under supervision of FOI (A) or DE/TRE with on board. First 02 landings shall be done under supervision of FOI (A).
- (iii) For collection of data during airborne system demonstration, the applicant shall provide crew flight reports and automatic flight recording data in accordance with the proforma given at Annexure-I giving approach and landing performance whenever an approach and landing is attempted utilizing the Cat-III system, regardless of whether the approach is abandoned or concluded successfully. The completed forms and a summary of the demonstration results will be made available to DGCA.
- (iv) Approaches where the pilot was assured that the critical area protection was provided which do not result in a successful landing, are to be fully documented giving factors which result in unsuccessful approaches e.g., due to ATC factors, faulty ground station signals or other factors.

9.5.2 During operational demonstrations of Cat-III operations with DH < 50ft the operator shall provide crew flight reports and automatic flight data recording in accordance with para 9.2.2 and 9.2.3.

9.5.3 During the period following the issuance of initial Operations Specifications to conduct Cat-III operations with DH less than 50ft, the operator, when practicable, shall use the Cat-III airborne system using the operator's operating and maintenance procedures. During this period, pilot reports

shall be obtained for each approach with the data described above. These reports shall be analyzed and a summary report prepared and submitted to DGCA. This report shall show that, 95% of approaches made during this period were successful.

9.6 Issuance of Standard Cat-III Operations with DH < 50ft Specifications

After successful completion of operations under initial Cat-III Operations with DH less than 50ft Specifications and at least one hundred approaches as indicated in para 9.5.1, the operator shall be issued a final Operations Specifications approving him Cat-III operations with a Decision Height less than 50 ft or No Decision Height and RVR of 50 m.

9.7 Introduction of New Type of Aircraft for Experienced Operators

Whenever an operator introduces a new type of aircraft into service for Cat-II or Cat-III operations, a complete operational demonstration as stipulated in above paras shall be carried out. This demonstration process will follow the same basic sequence. It consists of a progressive introduction of lower minima with periodic reports of the approaches made during actual in-line service leading to amendment of Operations Specifications.

10 Continuous Monitoring

After obtaining the approval, the operator must continue to provide quarterly reports of in-line service. These reports must include the following information:

- i) The total number of approaches, by aircraft type, where the airborne Cat-II or Cat-III equipment was utilised to make satisfactory, actual or practice, approaches to the applicable Cat-II or Cat-III minima.
- ii) The total number of unsatisfactory approaches by aerodrome and aircraft registration-wise in the following categories.
 - a) Airborne equipment faults;
 - b) Ground facility difficulties;
 - c) Missed approaches because of ATC instructions; and
 - d) Other reasons.
- iii) The operator shall establish a procedure to monitor the performance of the Automatic Landing System of each aircraft. The continuous monitoring shall permit the detection of any decrease in the level of safety before it becomes hazardous. The operator shall continue to check his results and to take adequate actions by modifying the operating or maintenance procedures, if necessary. The monitoring shall also permit problems to be detected on a specified airfield (ILS, ATC procedures, etc.). The monitoring shall be continuous and data shall be retained for a period of at least 1 year.

11 GENERAL REQUIREMENTS

- (i) No operator shall carry out Cat-II or Cat-III operations without specific approval of DGCA and unless each aircraft concerned is equipped and

certified for operations with decision height below 60m (200 ft).

- (ii) Every operator shall file with the DGCA, minima for every airport for Cat-II and Cat-III operations keeping in view the requirements contained in relevant CAR of All Weather Operations and the operator's experience and policy.
- (iii) An operator shall verify that Low Visibility Procedure (LVP) have been established and are enforced at those aerodromes where low visibility operations are to be conducted.
- (iv) Every operator shall establish and maintain a suitable system for recording success and failure of approach and automatic landing to monitor the overall safety of the operation.
- (v) Each operator must have sufficient qualified personnel to continuously monitor and ensure the highest degree of safety in Cat-II and Cat-III operations. The operator should provide necessary training to the ground staff directly involved with flight operations.
- (vi) The approval granted to an operator for conducting Cat-II/III operations shall be valid only if the requirements contained in this CAR are complied with and the capability of the operator, its flight crew and aircraft does not degrade below the required level.
- (vii) The approval is liable to be cancelled/suspended/ withdrawn/modified at any time in the event of any of the above conditions not being complied with and/or violated by the operator and for reasons affecting safety of aircraft operations.
- (viii) Approval accorded to operators shall be deemed to be invalid if any of the requirements are not satisfied during the course of operation.
- (ix) Notwithstanding the above, DGCA may specify any additional requirements or waive off any requirements if considered necessary.

12 FEES

Fees for CAT II & CAT III operator approval on first aircraft type with the operator shall be ₹10,000/- only.

Sd/-
(Vikram Dev Dutt)
Director General of Civil Aviation

Appendix 'A'

1. Name of the operator:
2. Aircraft type, model & Registration Number:
3. Whether certified for Cat II/Cat III operations (enclosed necessary documents)
4. Type of approval required: Cat II/Cat III
5. List of Equipment required for Cat II/Cat III operations:
6. Enclose copy of the manual for Cat II /Cat III operations:
7. Bench check status of the instruments and equipment required for Cat II/Cat III operations during last twelve months:
8. Training status of personnel for certifying Cat II/ Cat III instruments and equipment:

I hereby certify that the requirements as laid down in this CAR for obtaining maintenance approval for Cat II/Cat III operation, has been complied with.

Continuing Airworthiness Manager

Appendix 'B'

ALTIMETER SYSTEM TEST AND INSPECTION

Each person performing the altimeter system tests and' inspections shall comply withthe following:

1. Static pressure system:

- i. Ensure freedom from entrapped moisture and restrictions.
- ii. Determine that leakage is within the tolerances established by the manufacturer or as per FAR 23.1325 / FAR 25.1325 or CS 23.1325 / CS 25.1325 whichever applicable.
- iii. Determine that the static port heater, if installed, is operative.
- iv. Ensure that no alterations or deformations of the airframe surface have been made that would affect the relationship between air pressure in the static pressure system and true ambient static air pressure for anyflight condition

2. Altimeter:

2.1 Test by an appropriately rated repair facility in accordance with the following subparagraphs. Unless otherwise specified, each test for performance may be conducted with the instrument subjected to vibration. When tests are conducted with the temperature substantially different from ambient temperature of approximately 25°C, allowance shall be made for the variation from the specified condition.

(i) SCALE ERROR.

With the barometric pressure scale at 29.92 inches of mercury, the altimeter shall be subjected successively to pressures corresponding to the altitude specified in Table I up to the maximum normally expected operating altitude of the airplane in which the altimeter is to be installed. The reduction in pressure shall be made at a rate not in excess of 20,000 feet per minute to within approximately 2,000 feet of the test point. The test point shall be approached at a rate compatible with the test equipment. The altimeter shall be kept at the pressure corresponding to each test point for at least 1 minute, but not more than 10 minutes, before a reading is taken. The error at all test points must not exceed the tolerances specified in Table 1.

(ii) HYSTERESIS.

The hysteresis test shall begin not more than 15 minutes after altimeter's initial exposure to the pressure corresponding to the upper limit of the scale error test prescribed in subparagraph (i); and while the altimeter is at this pressure, the hysteresis test shall commence. Pressure shall be increased at a rate simulating a descent in altitude at the rate of 5, 000 to 20, 000 feet per minute until within 3, 000 feet of the first test point (50 percent of maximum altitude). The test point shall then be approached at a rate of approximately 3, 000 feet per minute. The altimeter shall be kept at this pressure for at least 5 minutes, but not more than 15 minutes, before the test reading is taken. After the reading has been taken, the pressure shall be increased further, in the same manner as before, until the pressure corresponding to the second test point (40 percent of maximum altitude) is reached. The altimeter shall be kept at this pressure for at least 1 minute, but not more than 10 minutes, before the test reading is taken. After the reading has been taken, the pressure shall be increased further, in the same manner as before, until atmospheric pressure is reached. The reading of the altimeter at either of the two test points shall not differ by more than the tolerance specified in Table II from the reading of the altimeter for the corresponding altitude recorded during the scale error test prescribed in paragraph 2.1 (i).

(iii) AFTER EFFECT

Not more than 5 minutes after the completion of the hysteresis test prescribed in paragraph (b)(ii), the reading of the altimeter (corrected for any change in atmospheric pressure) shall not differ from the original atmospheric pressure reading by more than the tolerance specified in Table II.

(v) FRICTION.

The altimeter shall be subjected to a steady rate of decrease of pressure approximating 750 feet per minute. At each altitude listed in Table III, the change in reading of the pointers after vibration shall not exceed the corresponding tolerance listed in Table III.

(vi) CASE LEAK.

The leakage of the altimeter case, when the pressure within it

corresponds to an altitude of 18,000 feet; shall not change the altimeter reading by more than the tolerance shown in Table II during an interval of 1 minute.

(vii) BAROMETRIC SCALE ERROR

At constant atmospheric pressure, the barometric pressure scale shall be set at each of the pressures (falling within its range of adjustment) that are listed in Table IV, and shall cause the pointer to indicate the equivalent altitude difference shown in Table IV with a tolerance of 25 feet.

2.2 Altimeters which are of the air data computer type with associated computer systems, or which incorporate air data correction internally, may be tested in a manner and to specifications developed by the manufacturer which are acceptable to the DGCA.

3. Automatic Pressure Altitude Reporting Equipment and ATC Transponder System Integration Test:

The test must be conducted by an appropriately rated person under the conditions specified in paragraph (a). Measure the automatic pressure altitude at the output of the installed ATC transponder when interrogated on Mode C at a sufficient number of test points to ensure that the altitude reporting equipment, altimeters, and ATC transponders perform their intended functions as installed in the aircraft. The difference between the automatic reporting output and the altitude displayed at the altimeter shall not exceed 125 feet.

4. Records:

Comply with the provisions of this chapter as to content, form, and disposition of the records. The person performing the altimeter tests shall record on the altimeter the date and maximum altitude to which the altimeter has been tested and the persons approving the airplane for return to service shall enter that data in the airplane log or other permanent record.

(Refer: FAR PART 43-7, 43-2)

TABLE I : ALTITUDE v/s PRESSURE

ALTITUDE (FEET)	EQUIVALENT PRESSURE (INCHES IN MERCURY)	TOLERANCE (FEET)
-1000	31.018	20
0	29.921	20
500	29.385	20
1,000	28.856	20
1,500	28.335	25
2,000	27.821	30
3,000	26.817	30
4,000	25.842	35
6,000	23.978	40
8,000	22.225	60
10,000	20.577	80
12,000	19.029	90
14,000	17.577	100
16,000	16.216	110
18,000	14.942	120
20,000	13.750	130
22,000	12.636	140
25,000	11.104	155
30,000	8.885	180
35,000	7.041	205
40,000	5.538	230
45,000	4.355	255
50,000	3.425	280

TABLE II- TEST TOLERANCES

Test	Tolerance feet
Case Leak Test	+100
Hysteresis Test	
First Test Point (50% of max altitude)	75
Second Test Point (40% of max altitude)	75
After Effect Test	30

TABLE III- FRICTION

Altitude (feet)	Tolerance (feet)
1000	+70
2000	70
3000	70
5000	70
10000	80
15000	90
20000	100
25000	120
30000	140
35000	160
40000	180
50000	250

TABLE IV- PRESSURE ALTITUDE DIFFERENCE

Pressure (inches of Hg)	Altitude difference (feet)
28.10	-1727
28.50	-1340
29.00	-863
29.50	-392
29.92	0
30.50	+531
30.90	+893
30.99	+974

**SAMPLE FORM FOR FLIGHT CREW REPORT ON AUTO-APPROACH
AND AUTO-LAND PERFORMANCE**

OPERATOR _____

1. SECTION I – Complete all items				
Aircraft Type	Aircraft Registration No.	Captain	Flight No.	Date
Airport	Runway	Conditions Cat I+ ☐ Cat II ☐ Cat III ☐	Wind Direction & Speed	ATC runway Protection provided ☐ Unknown or None ☐ Cat II
The Auto-Approach Auto-Land was: ☐ Satisfactory ☐ Unsatisfactory				
If unsatisfactory you must complete Section II Auto-Land Touchdown Zone is 900 feet to 2400 feet down the runway and within 27 feet of centerline.				
Record area of touch down with an 'X' on Runway Depiction 2. SECTION II – Complete ONLY if Auto-Approach or Auto- Land was UN-SATISFACTORY.				
If the Approach was discontinued, it was due to: F Airborne Equipment Failure F Ground Facilities Difficulties F ATC Instructions F Other (Specify)				
LOCALIZER (Left/Right) GLIDESLOPE (High/Low)				
If the autopilot was disconnected the altitude was _____ ft MSL.				
Other Comments				

(Commander's Signature)