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Manual of All Weather Operations

(CATEGORIES II AND III)

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FOREWORD

TP 1490, Manual of All Weather Operations (Categories II and III), is published by Transport Canada Safety and Security under the authority of the Director General, Civil Aviation by the Director, Standards (AART) in coordination with the Director, Aircraft Certification (AARD).

This publication is enacted for the use of Canadian air operators and private operators conducting, or seeking authority to conduct, Category II and/or III operations.

Any queries regarding the contents of this manual should be referred to the Chief of Certification and Operational Standards (AARTF), Ottawa, Ontario, K1A 0N8.

Jacqueline Booth
A/Director
Standards

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GENERAL

Abbreviations

AARD . . . . . Aircraft Certification
AARJ . . . . . International Aviation and Technical Programs
AARN . . . . . Aerodromes and Air Navigation
AARNB . . . . . Standards Division of the Aerodromes and Air Navigation Branch
AARP . . . . . Aircraft Maintenance and Manufacturing
AART . . . . . Commercial Flight Standards
AC . . . . . Advisory Circular
ACP . . . . . Approved Check Pilot
AFGS . . . . . Automatic Flight Guidance System
AFM . . . . . Aircraft Flight Manual
AHRS . . . . . Attitude Heading Reference System
AIS . . . . . Aeronautical Information Services
AMM . . . . . Aircraft Maintenance Manual
AOM . . . . . Aircraft Operations Manual
APU . . . . . Auxiliary Power Unit
AQP . . . . . Advanced Qualification Program
ATC . . . . . Air Traffic Control
ATIS . . . . . Automatic Terminal Information System
CASS . . . . . Commercial Air Services Standards
CARs . . . . . Canadian Aviation Regulations
CAT . . . . . Category
DA/DH . . . . . Decision Altitude or Decision Height
DME . . . . . Distance Measuring Equipment
EADI . . . . . Electronic Attitude Director Indicator
EHSI . . . . . Electronic Horizontal Situation Indicator
FAA . . . . . Federal Aviation Administration
FAF . . . . . Final Approach Fix
HUD . . . . . Heads-Up Display System
ICA . . . . . Instruction for Continuing Airworthiness
ICAO . . . . . International Civil Aviation Organization
IMC . . . . . Instrument Meteorological Conditions
ILS . . . . . Instrument Landing System
IRS . . . . . Inertial Reference System
LOE . . . . . Line Operational Evaluation
LOFT . . . . . Line Oriented Flight Training
MEL . . . . . Minimum Equipment List
MT . . . . . Manoeuvre Training
MV . . . . . Manoeuvre Verification

NOTAM . . . . . Notice to Airmen
PFD . . . . . Primary Flight Display
PMI . . . . . Principal Maintenance Inspector
POI. . . . . Principal Operations Inspector
POPTS. . . . . Private Operator Passenger Transportation Standard
RVR . . . . . Runway Visual Range
STC . . . . . Supplemental Type Certificate
TC . . . . . Transport Canada
TCC . . . . . Transport Canada Centre
TCCA. . . . . Transport Canada Civil Aviation
VHF . . . . . Very High Frequency
VMC. . . . . Visual Meteorological Conditions

Definitions

Aborted landing –See “Rejected landing”.

Alert height – An alert height is a height above the runway based on the characteristics of the aeroplane and its fail operational automatic landing system, above which a Category III approach would be discontinued and a missed approach initiated if a failure occurred in one of the redundant parts of the automatic landing system or in the relevant ground equipment. *(Hauteur d’alerte)*

Automatic landing system – The airborne equipment which provides automatic control of the aeroplane during the approach and landing. *(Système d’atterrissage automatique)*

Balked landing –See “Rejected landing”.

Category I (CAT I) operation – A precision instrument approach and landing with a decision height not lower than 200 feet (60 m) and with either a visibility of not less than ½ statute mile (800 m) or a runway visual range of not less than 2600 feet (800 m). *(Exploitation de catégorie I (CAT I))*

Category II (CAT II) operation - A precision instrument approach and landing with:

a) a decision height lower than 200 feet (60 m) but not lower than 100 feet (30 m);

b) a runway visual range not less than 1,200 feet (350 m) at RVR A; and

c) a runway visual range not less than 600 feet (175 m) at RVR B. *(Exploitation de catégorie II (CAT II))*

Category III (A) “CAT III (A)” operation - A precision instrument approach and landing with:

a) a decision height lower than 100 feet (30 m), or no decision height: and

b) a runway visual range not less than 600 feet (175 m) at each of RVR A, RVR B and RVR C. *(Exploitation de catégorie IIIA (CAT IIIA))*

Category III (B) “CAT III (B)” operation - A precision instrument approach and landing with:

a) a decision height lower than 50 feet (15 m), or no decision height: and

b) a runway visual range less than 600 feet (175 m) but not less than 150 feet (50 m) at each of RVR A, RVR B and RVR C. *(Exploitation de catégorie IIIB (CAT IIIB))*

Category III (C) “CAT III (C)” operation - A precision instrument approach and landing with no decision height and no runway visual range limitation. *(Exploitation de catégorie IIIC (CAT IIIC))*

NOTE: Where the decision height (DH) and runway visual range (RVR) do not fall within the same Category, either the DH or the RVR may determine in which Category the operation falls. The operation will be in the Category with the lower minima.

Decision Altitude or Decision height (DA/DH) – Means an altitude or height specified in the Canada Air Pilot or the route and approach inventory at which a missed approach must be initiated during a precision approach or an approach procedure with vertical guidance, if the required visual reference necessary to continue the approach to land has not been established. *(Altitude de décision ou hauteur de décision (DA/DH))*

Fail Operational System.- A system capable of completing the specified phases of an operation following the failure of any single system component after passing a point designated by the applicable safety analysis (e.g., Alert Height). *(Système opérationnel après une panne)*

Fail Passive System - A system, which in the event of a failure, causes no significant deviation of aircraft flight path or attitude. *(Système passif après une panne)*

Go-around – A transition from an approach to a stabilized climb. A go-around may occur at any time during an approach or may result from a rejected landing. A go-around which is accomplished by an autopilot following pilot selection and initiation of the appropriate autopilot mode is referred to as an automatic go-around. *(Remise des gaz)*

Head-up Display (HUD) – An airplane system which provides head-up guidance to the pilot during flight and may receive inputs from an airborne navigation system or flight guidance system. (*Affichage tête haute (HUD))*

Landing rollout – For the purpose of this manual, rollout starts from the first contact of the wheels with the runway and finishes when the aeroplane has slowed to a safe taxi speed. *(Course à l'atterrissage)*

Missed approach – Means the procedure to be followed if, for any reason after conducting an instrument approach, a landing is not effected (CAR 101.01(1)). *(Approche interrompue)*

Non-normal conditions – Conditions other than those considered to be normal (failure conditions, certain kinds of error conditions, etc.). *(Conditions non normales)*

Rejected landing (Balked Landing, Aborted Landing) – A discontinued landing attempt. A rejected landing typically is initiated at low altitude (below DA/DH in the case of a precision instrument approach) and can be caused by various factors e.g. configuration, winds, obstructed runway, etc. A rejected landing leads to a go-around and if following an instrument approach, a missed approach procedure. *(Atterrissage interrompu)*

Required visual reference - in respect of an aircraft on an approach to a runway, means that portion of the approach area of the runway or those visual aids that, when viewed by the pilot of the aircraft, enable the pilot to make an assessment of the aircraft position and rate of change of position, in order to continue the approach and complete a landing. *(Référence visuelle requise)*

Rollout control system – A component system of an automatic landing system which provides either automatic control or instrument guidance for manual control of lateral steering during rollout until manual control of the aircraft by visual reference is assured. *(Système de maintien d'axe pendant la course à l'atterrissage)*

RVR or runway visual range - means the range over which the pilot of an aircraft on the centre line of a runway can expect to see the runway surface markings or the lights delineating the runway or identifying that centre line. *(RVR ou portée visuelle de piste)*

RVR A - in respect of a runway, means RVR detection equipment that is located adjacent to the runway threshold. *(RVR A)*

RVR B - in respect of a runway, means RVR detection equipment that is located adjacent to the runway mid-point. *(RVR B)*

RVR C - in respect of a runway, means RVR detection equipment that is located adjacent to the runway roll out area. *(RVR C)*

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CHAPTER 1 – INTRODUCTION

1.1 General

This document is incorporated by reference in subsection 602.128(4) of the *Canadian Aviation Regulations* (CARs). This manual is the standard for Cat II/III operations and provides policy and procedures for the certification of aircraft systems and flight crews approved or seeking approval to conduct CAT II/III operations. CAT II/III operations require authorization in the air operator's certificate in accordance with the requirements of CARs 704.36 and 705.47, or in the private operator certificate in accordance with the requirements of CAR 604.06.

1.2 Criteria

Requests for authorization to conduct CAT II/III operations will be considered if the following criteria (set out in greater detail in the chapters which follow) are met:

a) the aircraft is certified for CAT II/III operations, has an approved list of equipment and a maintenance control system per section 2.2 of this manual;

b) the aircraft is operated by a qualified flight crew in conformity with Part VII or Subpart 4 of Part VI of the CARs, and this manual; and

c) the airport is equipped and maintained for CAT II/III operations in accordance with Part III and Part VIII of the CARs.

1.3 Application

This manual applies to Canadian air operators and private operators that have been authorized in their Operating Certificate to conduct CAT II/III operations at airports that are equipped to support these operations. Operators of foreign registry whose aircraft and crews meet or exceed the criteria described in Chapters 2 and 3 of this manual may apply to the Director of International Operations (AARJ) for authority to conduct CAT II/III operations at Canadian airports equipped for these operations. In such cases, approval for CAT II or CATIII (A), CAT III (B) or CAT III (C) operations in the State of Registry must be a prior condition for approval to conduct CAT II or III operations in Canada.

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CHAPTER 2 – AIRCRAFT REQUIREMENTS

2.1 Certification

Aircraft Certification

In general, aircraft certification for CAT II and CAT III operations must be in accordance with the applicable editions of the Federal Aviation Administration (FAA) Advisory Circulars (AC) 120-29A Appendix 3 (Airborne Systems for Category II) and 120-28D Appendix 3 (Criteria for Approval of Category III Weather Minima for Takeoff, Landing and Rollout) respectively.

Certification Requirements for CAT II

The aircraft must first meet the aircraft certification requirements of Part V of the CARs. Table 2-1 indicates the airborne equipment requirements for older aircraft previously certified for CAT II operations which were specified in the previous version of this manual (TP 1490 Third Edition, October 1990). Newer aircraft are typically being certified to the requirements of Table 2-2.

Table 2-1: Typical Airborne Equipment Requirements for CAT II Certification of older aircraft

AIRBORNE EQUIPMENT	ORIGINAL REQUIREMENT
Single Flight Director with dual displays and single automatic approach coupler; or two independent Flight Director Systems	Required, except for 2 engine propeller aircraft and rotorcraft, which require a single Flight Director or a single automatic Approach Coupler
Dual Instrument Landing System (ILS) localizer and Glide Slope Receivers	Required
Equipment to identify Decision Height	Radio Altimeter Required
Avionics Failure Warning System	Required
Missed Approach Attitude Guidance	Required. May be: a) Attitude gyros with calibrated pitch markings; or b) Flight Director pitch command; or c) Computed pitch command.
Auto-Throttle System	Required for all turbojets if operations based on dual flight directors or if split axis coupler used. Not required for propeller aircraft unless split axis couplers used.

AIRBORNE EQUIPMENT	ORIGINAL REQUIREMENT
Ice and Rain Protection	Required. To include: a) a protection system for windshield; and b) a heat source for each airspeed system pitot tube installed.
Communication Equipment	Two independent very high frequency (VHF) air-ground communication systems are required.
Duplicated Instruments: a) two gyroscopic pitch and bank indicating systems; b) two gyroscopic direction indicating systems; c) two airspeed indicators; d) two sensitive altimeters adjustable for barometric pressure; e) two vertical speed indicators.	Required

NOTE: The equipment in this table is representative of some installations previously certified by Transport Canada. See Table 2-2 for typical certified installations in newer aircraft.

Table 2-2: Typical Equipment Installations for CAT II Certification Approval of newer aircraft

ITEM	TYPICAL INSTALLATION
Two independent Flight Directors	Required.
Two ILS receivers	Required.
Two Air Data Computers	Required.
Two Gyro Platforms	Required. To include two inertial reference systems (IRS) or two attitude and heading reference systems (AHRS) or two gyro systems.
Two Radar Altimeters	Required. To include independent displays.
Two Flight Director mode enunciations	Required. To include independent enunciation systems.
Duplicated Flight Instruments	Required. To include two primary flight displays (PFDs) or two sets of electronic attitude director indicators (EADI) / electronic horizontal situation indicators (EHSI) or two full sets of primary flight instruments.
Avionics Failure Warning system	Required. To include ILS comparator and avionics equipment warning system.
Missed Approach guidance	Required. To include two independent Flight Director Go-around modes.
Communication Equipment	One VHF communication radio required.
Duplicated equipment to enunciate DH	Required. To include two displays of DH enunciation.
Ice and Rain Protection	Required. To include a protection system for each windshield.
Excessive deviation monitor	Required. To include two independent monitors.

NOTE: The equipment in this table is representative of installations recently certified by Transport Canada

Certification Requirements for CAT III

Airborne equipment certification requirements will vary depending on whether the operation is CAT III (A), (B) or (C). Such certifications will be dealt with on an individual aircraft type basis.

2.2 Maintenance

2.2.1 General

a) The air operator's maintenance control system must address all applicable equipment listed in the component concordance tables (table 2-1 and 2-2 of this chapter for CAT II, see reference 2.1.3 for CAT III) which includes the quantity required, the minimum required and all applicable aircraft maintenance tests as applicable in the AFM and/or Maintenance Manual.

b) While there may be differences in the operational capability, avionics equipment capability level and required maintenance, between aircraft certified for CAT II operation and those certified for CAT III, this section does not distinguish between those differences; i.e., the details provided in the operator's maintenance control system will be predicated on the level of operation for which the program is developed.

2.2.2 Equipment Approval

The configuration or specifications of the equipment installed for CAT II or III operation must be certified. For Cat I certified aircraft, additional avionics equipment and/or modification to or substitution of installed equipment may be necessary in an upgrading program leading to CAT II or III certification. This may be accomplished by an OEM modification or by STC as part of a modification. The instructions for continued airworthiness (ICA) for the aircraft must include supplemental ICAs which address these modifications.

A newer aircraft may be type certificated for CAT II/III when delivered to an operator and consequently will already have applicable ICA that address CAT II/III maintenance requirements.

2.2.3 Maintenance Control System

The following general requirements relate to the development of an operator's maintenance control system in support of CAT II/III operations.

a) to ensure the high level of performance and reliability required for aircraft automatic flight control and related systems for CAT II/III certification and operation, the operator's technical dispatch procedures and maintenance schedule(s) must take into account the requirements of CAT II/III operations. A copy of the Maintenance Control Manual and affected maintenance schedules must be submitted to the local Transport Canada Center (TCC) for approval.

b) An operator may apply for approval of their proposed maintenance schedule in advance of a formal application being submitted for CAT II/III approval. When submitting the proposed maintenance schedule for approval, the operator should indicate that Cat II/III operation is intended. The responsible TCCA inspector will review the maintenance schedule development to become familiar with it and to provide guidance to the operator.

c) It is not the intent of this section to establish a fixed approved maintenance schedule format for all operators conducting CAT II/III operations; however, sufficient data relating to at

least the items detailed in paragraph 2.2.4 of this document must be provided, so that a comprehensive evaluation can be made.

2.2.4 Maintenance Control Manual

The Maintenance Control Manual must address at least the following:

a) maintenance, calibration and verification of the accuracy of the aircraft systems related to CAT II or III operation, in accordance with the type certificate holder's ICAs, any applicable supplemental ICAs and requirements included in the approved maintenance schedule;

b) technical dispatch procedures for CAT II or III operations that includes;

   i) de-rating of the aircraft from CAT II or III status because the integrity of one or more of the systems required for such operation is in doubt, or when required by paragraph 2.2.5;

   ii) de-rating of the aircraft because of a defect, inspection or calendar criteria, if applicable; and

   iii) returning the aircraft to CAT II or III status following required maintenance;

c) initial and update training for all personnel that have tasks related to CAT II/III maintenance schedule including log book entries, placarding and returning to service criteria; and

d) reliability monitoring program that includes procedures for reporting findings.

2.2.5 De-rating of Operational Status

2.2.5.1 The aircraft CAT II or III operational status must be de-rated, (i.e., CAT III to CAT II or CAT I, or CAT II to CAT I), in accordance with the requirements of the AFM, the AFM supplement, AOM, ICAs and/or the MEL as appropriate, under any of the following conditions:

a) the discovery of any defect to an aircraft system essential to CAT II or III operation;

b) when the integrity of an aircraft system essential to CAT II or III operation is in doubt;

c) when maintenance is undertaken that disturbs a system required for CAT II or III operation;

d) when required by either the AFM, the AFM supplement, the MEL or a maintenance requirement, and the aircraft has not performed a successful approach in actual CAT II or III conditions or *in VMC, or in IMC not lower than CAT I minima, conducted to CAT II minima, CAT III minima, or to an autoland as the case may be, done with a fully capable and equipped airplane on a fully functioning facility with no aircraft or vehicle within the ILS sensitive area while following a procedure that is focussed on annunciation, functionality and overall performance of the equipment* during the previous thirty days by a CAT II/III qualified flight crew, which must be supported by a journey log entry;

NOTE 1: Although CAT II/III system certification on most modern aeroplanes is maintained by performing a system ground check, some older generations of aeroplane still require operational flight checks for CAT II/III. This option is intended for these older aeroplanes and systems for which the performance of a successful CAT II or III approach during the previous 30 days is

the preferred method to confirm systems operational suitability and for aeroplanes and systems for which this option is allowed as an alternative to the system ground check in the AFM, AFM supplement, MEL or Instructions for Continuing Airworthiness (ICAs). Since these approaches may be done in conditions other than CAT II/III weather conditions, it is expected that the air operator will develop a procedure that will ensure that the appropriate level of safety (including monitoring for traffic in VMC) is maintained throughout the approach.

NOTE 2: The intent of the reference to aircraft or vehicle within the ILS sensitive area is intended for the flight crew members to understand that if they become aware, either from ATS or by their own observation, that an aircraft or vehicle is/was within the ILS sensitive area during the approach, the aeroplane need not be downgraded, even if the approach and/or autoland were unsuccessful. However, a successful approach is still required within the 30 day period. Alternatively, if the operator has a maintenance procedure (AFM, MEL or other approved process) in place that provides an alternative for the need for operational confirmation of system performance, then no approaches are required.

e) when the flight crew reports an unsuccessful landing due to poor aircraft systems performance; or

f) when the aircraft has failed a CAT II/III required systems ground check.

2.2.5.2 The procedures specified in the AFM, the AFM supplement, AOM and/or the MEL as appropriate, must apply in respect of de-rating the operational status of an aircraft, and information relating to the de-rated status, including the reason for de-rating, must be entered in the appropriate aircraft record(s).

2.26 Upgrading of Operational Status

Following de-rating and defect rectification, the aircraft CAT II or III system may be returned to a higher operational status, or to full operational status in accordance with the requirements of the AFM, the AFM supplement, AOM and/or the MEL as appropriate . In the absence of the preceding requirements, the aircraft CAT II/III system may be returned a higher operational status, or to full operational status by:

a) an appropriate system ground check conducted in accordance with the applicable AMM, and certified by the issuance of a maintenance release; and/or

b) a successful approach, as applicable, flown by a CAT II/III qualified flight crew *in VMC, or in IMC not lower than CAT I minima, conducted to CAT II minima, CAT III minima, or to an autoland as the case may be, done with a fully capable and equipped airplane on a fully functioning facility with no aircraft or vehicle within the ILS sensitive area while following a procedure that is focussed on annunciation, functionality and overall performance of the equipment* and certified by a statement to that effect entered in the aircraft journey log. Following CAT II/III systems upgrading and provided all appropriate certifications and related

aircraft record entries have been made, the placard installed in respect of the de-rating must be removed or the status annunciator set to indicate the current operational status; and/or

c) successful completion of calendar criteria as applicable.

NOTE 1: Aircraft equipped with older CAT II/III system may require both a ground check and a successful CAT II or III approach performance confirmation, while other generation of equipment may require one or the other.

NOTE 2: A CAT II or III approach referred to in Sections 2.2.5.1 and 2.2.6 consists of a coupled ILS approach with an autoland (if the aircraft is equipped with an autoland system) and this approach may be flown on any category ILS facility. In the case of upgrading of operational status (Section 2.2.6), the approach must be flown in meteorological conditions at or above those required for CAT I operations.

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CHAPTER 3 – OPERATION OF THE AIRCRAFT

3.1 Operational Certification

To conduct CAT II/III operations, an Operations Specification is required in accordance with CAR 704.36 or CAR 705.47 for air operators, and CAR 604.24 for private operators. In order to grant the applicable Operations Specification, the operator must comply with the following requirements:

a) the flight crew have completed an approved training program in accordance with section 3.3 of this manual;

b) procedures for the conduct of CAT II/III operations have been included in the company operations manual;

c) flight crew procedures for the conduct of CAT II/III operations have been included in the Standard Operating Procedures;

d) the aircraft are certified for CAT II/III operations in accordance with the requirements of Part V of the CARs and Chapter 2 of this manual; and

e) an air operator's approved maintenance control system in accordance with Chapter 2 of this manual has been implemented.

Operators intending to apply for a CAT II/III Operations Specification should contact their Principal Operations Inspector (POI) and Principal Maintenance Inspector (PMI) to initiate the approval process.

3.2 Pilot Qualifications

3.2.1 The minima prescribed for CAT II/III operations are authorized only for those pilots-in-command who have:

a) received initial certification for CAT II/III operations by a TC inspector or ACP during the conduct of a Pilot Proficiency Check or, in the case of an air operator authorized in accordance with an Advanced Qualification Program, by a TC inspector or an AQP evaluator during LOE, LOFT, MV; or,

b) been re-certified for Cat II/III operations by a TC inspector or ACP during the conduct of a Pilot Proficiency Check or, where the validity period of a Pilot Proficiency Check expires as specified in CAR 705.113(2)(b), by a TC inspector, a ACP or a simulator instructor during the intervening recurrency training, or during the training that has been approved as a substitute for the Pilot Proficiency Check, or in the case of an air operator authorized in accordance with an Advanced Qualification Program, by a TC inspector or an AQP evaluator during a LOE session, or by a TC inspector, an AQP evaluator, a LOFT facilitator or a simulator instructor during the intervening MT/LOFTsessions.

3.2.2 No pilot-in-command is authorized to conduct CAT II/III operations in turbo-jet aircraft unless he has had at least 300 hours as pilot-in-command in turbo-jet aircraft. The pilot-in-command must also have completed 100 hours of line flying on the aircraft type, in command unless otherwise authorized in an operating certificate or operations manual. No pilot-in-command

is authorized to conduct CAT II/III operations in turbo-prop aircraft or rotorcraft unless he has had 100 hours as pilot-in-command on the type of turbo-prop aircraft or rotorcraft for which he is approved. Further, the second-in-command must have completed the required CAT II/III training program and have been certified by the operator to act as second-in-command during CAT II/III operations.

3.2.3 When the requirements of paragraph 3.1.1 have been met, pilots of the applying air operator who have successfully undergone a certification as described below will be authorized for CAT II/III.

3.3 Flight Crew Training

General

The increased dependence on the use of automatic systems requires increased emphasis on the role of the pilot as a supervisor of the operation and on the decision making process involved. Flight crews must be able to make full use of ground and airborne equipment intended for use during CAT II/III operations and understand fully the limitations of the total system, including both ground and airborne elements.

The requirements for flight crew training for CAT II/III operation is specified in paragraphs 725.124(37) or 724.115(29) of the *Commercial Air Services Standards* (CASS) or 624.26(2) of the *Private Operator Passenger Transportation Standard* (POPTS), as the case may be.

3.4 Flight Crew Certification

3.4.1 705 Operations

a) Pilot in Command certification for CAT II/III operations will be in accordance with PPC Schedule I of CASS 725.106 and will be valid for:

   i) a period of 6 months; or

   ii) where an operator has an approved advanced qualification program (AQP) the validity period will be as authorized in an approved AQP up to 8 months.

b) Re-certification may be accomplished during the six month Pilot Proficiency Check or, where the validity period of a Pilot Proficiency Check expires as specified in CAR 705.113(2)(b), during the intervening six month recurrency training or during the training that is approved as a substitute for the Pilot Proficiency Check (LOFT), or in the case of an air operator authorized in accordance with an Advanced Qualification Program, during a LOE session or during the intervening MT/LOFT sessions.

c) Where both CAT II and CAT III approaches are authorized in the operator certificate, successive 6 month PPCs or up to 8 month LOE or MT/LOFT, as the case may be, must be done in an approved simulator and will alternate CAT II and CAT III certification checks.

d) Where a certification is renewed within the last 90 days of its validity period, its validity period is extended by six months in the case of a conventional training program, or up to 8 months as appropriate, in the case of an AQP.

e) The Minister may extend the validity period of a certification by up to 60 days where the Minister is of the opinion that aviation safety is not likely to be affected.

f) Where the pilot-in-command is certified for CAT II or III operations in an aircraft type, which has an auto-coupled system and a HUD system, and either category of approach can be flown manually using the HUD system, the flight certification must include at least one approach, with each system used, to either minima, as applicable.

3.4.2 704 Operations

Certification for CAT II/III operations will be in accordance with PPC Schedule I of CASS 724.108 and will be valid for a period of 12 months.

3.4.3 604 Operations

Certification for CAT II/III operations will be in accordance with the private operator's pilot training and proficiency certification program. The flight crew will successfully complete that program and the pilot-in-command will be certified proficient for CAT II/III operations by the chief pilot, and the certification will be valid for a period of 12 months.

3.5 Operating Limitations

3.5.1 An approach to CAT II/III minima on an ILS facility that is appropriate for the approach to be flown, must not be commenced unless the following requirements are complied with:

a) the flight crew qualification, training and checking requirements specified in sections 3.2, 3.3 and 3.4 respectively of this Manual have been met;

b) CAT II/III operations are in effect at the aerodrome and runway to which the approach will be conducted;

c) the required airborne equipment is serviceable;

d) the crosswind component on the landing runway is not greater than the limit specified in the AFM for CAT II/III approaches or, if no limit is specified in the AFM, 15 knots, or such lesser amount determined by equipment and runway limitation.

NOTE: Wind limitations are considered to apply to the point of touchdown. If a report of a crosswind component value greater than the AFM limit or 15 knots, as applicable, is received while on approach, the aircraft may continue the approach, but a subsequent report indicating the winds are within limits or a pilot determination that winds are within limits must be made prior to touchdown.

e) the tailwind component on the landing runway is not greater than the limit specified in the AFM for CAT II/III approaches or, if no limit is specified in the AFM, 10 knots, or such lesser amount determined by equipment and runway limitations;

f) except for rotorcraft, 15% additional runway is available for dispatch over the authorized normal field length tables in the AFM;

g) unless otherwise authorized in the Company Operations Manual, all CAT II/III approaches are to be conducted in an autopilot-coupled mode; and

h) a missed approach must be initiated when:

   i) the pilot-in-command, upon reaching the authorized minima, has not established the required visual reference,

   ii) the pilot-in-command determines that a safe landing cannot be accomplished within the touchdown zone and the aircraft stopped within the confines of the runway,

   iii) any equipment required to complete an approach in the AFM/AOM or AFM supplement for CAT II/III operations becomes inoperative, or

   iv) any of the required elements of the airport system specified in Part III or Part VIII of the CARsbecomes inoperative during a CAT II/III approach, except that, if the RVR reporting system or the standby power system should fail after the aircraft is established on the glidepath, the approach may be continued at the pilot's discretion provided the RVR readings from the commencement of the approach have not been less than those authorized.

3.5.2 The operator should use the airborne system to approved minima as frequently as feasible to ensure continued performance and reliability of the system and to build up pilot experience in approaches to authorized limits. Operators and flight crew members should be aware of the potential differences in aircraft and ILS performance when utilizing CAT I rather than CAT II, or CAT II rather than CAT III facilities for approaches to lower minima or to perform an autoland.

NOTE: Subject to AFM limitations, practice autolands may be conducted on CAT I facilities or on CAT II/III facilities when low visibility procedures are not in effect. In these cases, the operator and the flight crew members are considered solely responsible for these practice autolands. Operators and flight crew members must recognize that, in these circumstances, changes in the ILS signal may occur rapidly and without warning from the ILS monitoring equipment. Pilots must be prepared to take appropriate action should unsatisfactory automatic flight control guidance system performance occur.

3.5.3 Company operations manuals must provide guidance to flight crew members on the conduct of CAT II/III approaches with all aircraft configurations authorized for CAT II/III operations and abnormal situations such as engine failure. Operational procedures may be required to accommodate:

a) alternate flap settings approved for CAT II/III;

b) the use of alternate automatic flight guidance system (AFGS) modes;

c) the use of HUD;

d) inoperative equipment provisions related to the minimum equipment list (MEL); and

e) the availability and use of alternate electrical power sources [auxiliary power unit (APU) for example].

3.5.4 If a failure occurs in the ILS facility standby power system (commercial power), the runway must be declared unavailable for CAT II or III operations. However, if an aircraft is on final approach when the failure occurs, the pilot may complete the approach, and the ban then applied to subsequent approaches until standby power is restored.

3.5.5 CAT II/III ILS installation could be downgraded to Cat I status under certain conditions such as:

a) the annual or routine flight inspection is delayed more than 30 days; or

b) if there has been a significant change in ground conditions since the last flight inspection.

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CHAPTER 4 – REQUIREMENTS

4.1 General Requirements

Section 4.2(b) of the Aeronautic Act states that: The Minister is responsible for the development and regulation of aeronautics and the supervision of all matters connected with aeronautics and, in the discharge of those responsibilities, the Minister may construct, maintain and operate aerodromes and establish and provide other facilities and services relating to aeronautics.

Approval of an airport is a requirement for CAT II/III operations. Approval is the responsibility of the Regional Manager Aerodromes and Air Navigation. Official recording of such approval will be by suitable annotation of the Airport Operations Manual (AOM). This annotation will stipulate that CAT II/III approaches may be accepted at that airport when the following elements have met or exceeded the stated requirements :

a) Obstacle Protection Requirements;
b) Instrument Landing System;
c) Visual Aids;
d) Meteorological Services;
e) Air Traffic Control Services;
f) Standby Power;
g) Runway and Pre-threshold Terrain Profile;
h) NOTAM Procedures; and
i) Low Visibility.

When an airport has met the requirements for CAT II/III operations, the information will be published in the appropriate Aeronautical Information Publications.

4.2 Obstacle Protection Requirements

Clearance protection requirements at Canadian airports will be those contained within TP 312, *Aerodrome Standards and Recommended Practices* and the associated instrument procedures will be in accordance with the *Criteria for the Development of Instrument Procedures* (TP 308).

The instrument approach procedure designer will be responsible for determining the governing obstacle clearance limit, which will determine the minimum CAT II/III DH, in accordance with the criteria contained in the *Criteria for the Development of Instrument Procedures* (TP 308).

4.3 Instrument Landing System

The ILS installation must conform with the specification for facility installation and performance for CAT II/III ILS contained in Subpart 802 of the CARs.

The required components of a CAT II/III ILS are:

a) localizer (dual channel);

b) glide path (dual channel); and

c) an approved means to determine and navigate to the final approach fix (FAF).

A brief description of the inspections required to establish and maintain certification of an ILS facility is included in Appendix “A”. Also included in this appendix are guidelines for maximum snow accumulations at the glide path antenna site, and the minimum area around the localizer and glide path antennas that must be protected from ground interference.

4.4 Visual Aids

4.4.1 The requirements for Runway markings are contained in Part III of the CARs.

4.4.2 Runway lighting for CAT II/III operations must meet the requirements of the *Aerodrome Standards and Recommended Practices* (TP 312) for low visibility operations for:

a) approach, threshold, touchdown zone and runway centre line lighting;

b) runway edge and end lights;

c) taxiway center line lights, taxiway edge lights, stop bars and road holding position lighting; and

d) CAT II/III signage lighting.

4.4.3 The following operational standards have been established for CAT II/III ILS lighting systems:

a) Approach Lights: Outage of 5% will be permitted but must not include consecutive outages on centre line barrettes or the 1,000 foot bar.

b) Runway Centre Line Touchdown Zone Lights: Outage of 5% will be permitted outside the touchdown zone. Within the touchdown zone area (the first 3,000 ft.), outages must be confined to one light per touchdown zone bar, and any outages in the centre line must not be consecutive.

c) Runway Edge, Threshold and End Lights: Outage of 5% will be permitted, but no more than two consecutive edge lights may be out at one time, and no more than one threshold/end light.

d) When corrective action cannot be taken, with reference to paras. (a), (b) and (c), then the CAT II/III operations will be downgraded to CAT I status, or shut down as applicable.

4.5 Meteorological Services

Meteorological services are provided in accordance with Subpart 4 of Part VIIIof the CARs. In addition to the normal meteorological information in routine hourly and special reports, RVR values must be known at the touchdown and mid-point prior to commencement of a CAT II/III approach. Accordingly, two RVR sensors are required for each CAT II/III runway, one near the touchdown point, designated the “A” system, and one near the mid-point, normally half-way down the runway, designated the “B” system. In addition to the aforementioned requirements for CAT II, an additional RVR sensor designated as the “C” system, located near the rollout end of

the runway is required for CAT III operations. Readouts from all systems are to be continuously available at the Air Traffic Services specialist position.

4.6 Air Traffic Services

Air Traffic Services are provided in accordance with Subpart 1 of Part VIII of the CARs. Air Traffic Services are the focal point on the airport insofar as CAT II/III operations are concerned. Air Traffic Services should, therefore, be immediately aware if any essential airport element, as listed below, becomes unserviceable or is not operating to prescribed standards and tolerances (see para. 4.9 for NOTAM Procedures):

a) approach, threshold, touchdown zone, centreline, edge and end lights, or essential taxiway lights;

b) ILS localizer, glide path or any navaid associated with the approach;

c) RVR reporting system;

d) commercial (electrical) or standby power supply.

The status of those items listed in para. (b), (c) and (d) above is available continuously by status indicators in the control tower. The lighting elements listed in para. (a) above is checked at established intervals by airport maintenance personnel, and Air Traffic Services is advised if all lighting is not within acceptable tolerances.

An aircraft overflying the localizer at close range or exiting the runway near the runway end may cause interference which could jeopardize a CAT II/III signal used by an approaching aircraft. To minimize this risk, departing aircraft should have started their takeoff run, and landing aircraft should be clear of the runway and the ILS sensitive area, before the approaching aircraft is within 4 NM of the threshold. In the case of consecutive approaches, enough separation is provided to ensure the preceding aircraft cannot adversely affect the localizer signal for the following aircraft; the minimum separation in such cases is 5 NM.

4.7 Standby Power

Standby power for airport lighting is addressed in TP 312, section 8.1, paragraph 8.1.3. Requirements for standby power for radio navigation aids and aeronautical communications systems are addressed under Subpart 2 of Part VIII of the CARs. This section is intended to provide information with respect to the standby power requirements for the essential elements of the ILS.

When a runway is placed on CAT II/III status, the standby power system becomes the primary source of electrical power, and commercial power will revert to the standby power source status. In this way the backup power source, commercial power, is available without interruption if the standby power supply should fail.

At airports with CAT II/III runways, a switching arrangement is installed in the control tower enabling the controller to select standby or commercial power, at will. One of the controller’s actions when placing a runway on CAT II/III status is the selection of standby power as the primary source of electrical power.

4.8 Runway and Pre-Threshold Terrain Profile

The requirement for the provision of runway and pre-threshold terrain profile falls under the requirements for the provision of Aeronautical Information Services (AIS), which is addressed under Subpart 3 of Part VIII of the CARs.

While terrain under the approach path should be relatively level, with respect to the runway surface, there will usually be irregular contours ahead of the threshold. Since DH/alert height for CAT II/III approaches will be determined by radio altimeters, two requirements emerge with regard to terrain.

Firstly, the terrain must be level enough to ensure the radio altimeter will not "unlock" during a critical phase of descent, from a distance taken to be at least 3,000 ft. ahead of threshold, and a width of 100 ft. either side of the extended runway centre line. As a guide, acceptable irregularities in this area, tentatively agreed to by ICAO, are as follows:

> "Gentle changes of ground height up to ±5 ft. may be acceptable, as are isolated abrupt changes such as objects of 10 ft. or depressions of 10 ft. Repetitive abrupt changes should be restricted to less than 3 ft., and preferably should be avoided. Single buildings of heights up to 10 ft. can be tolerated if their length is less than 50 ft. measured parallel to the centre line".

In the case of airports which fail to meet these requirements, any restrictions on the use of radio altimeters, and the resultant effect on DH/alert height and automatic landings, will be determined by the Director, Standards (AART) and the Regional Directors Civil Aviation. Any such restriction will be reflected in the approach procedure for the runway concerned.

The second requirement is for height information above the ground at the point DH is reached. The DH will be the approved minimum above the highest elevation of the first 3,000 ft. of the runway, but the radio altimeter will, at that point on the glide path, be measuring the height distance immediately below the aircraft. To determine the require radio altimeter reading when DH is reached, profile charts are required which provide elevation information for the first 3,000 ft. of the runway, and a similar distance ahead of the runway threshold. Then, knowing the glide path angle and the glide path intercept point, the required reading on the radio altimeter at DH/alert height can be calculated.

Responsibility for production of the Runway and Pre-Threshold Terrain Profile charts is with NAVCANADA Aeronautical Information Services (AIS), in accordance with ICAO Annex 4, Chapter 6. NAV CANADA AIS will provide them, on request, to operators intending to produce their own approach charts or to validate their aircraft performance.

4.9 NOTAM Procedures

4.9.1 NOTAMS are issued and published by NAV CANADA in accordance with the requirements of the Canadian NOTAM Procedures Manual. A NOTAM will be issued in the event of any of the following malfunctions:

a) CAT II/III approach and runway lighting;

b) RVR system appropriate to the category;

c) commercial electrical or standby power supply;

d) ILS outside CAT II/III tolerances;

e) outage of localizer, glide path or any navaid associated with the approach

f) downgrade of ILS equipment such that it cannot support CAT II/III operations.

CAT II or III approaches can be downgraded to CAT I ILS approach or shut down if there have been successive pilot reports that the glide path angle is too high or too low. This may be due to a significant change in ground conditions, such as the presence of ice or snow.

Example: 040001 NOTAMN CYVR VANCOUVER INTL
CYVR CAT II AND III APCH 26R NOT AUTH. GP ANGLE
REPORTED HIGH BY PILOTS.
TIL APRX YYMMDDHHMM

4.9.3 If the glide path or localizer of a CAT II/III approach fails, there is no need to specify CAT II AND III APCH NOT AUTH since CAT I is no longer available. CAT II or III approaches can be shut down if there have been successive pilot reports that the glide path angle is too high or too low.

Example: 040001 NOTAMN CYYZ TORONTO/LESTER B. PEARSON INTL
CYYZ ILS GP 06L U/S
TIL YYMMDDHHMM

4.10 Low Visibility

4.10.1 When an airport initiates low visibility operations it should be done in accordance with subpart 2 of Part III of the CARs. These requirements are further expanded in the following Advisory Circulars;

a) *302-001, Publication of the Level of Service with Respect to Departure Below RVR 2600 (½ Statute Mile)*

b) *TC AC 700-007 Airport Taxi-in, Taxi-Out Requirements in Reduced/Low Visibility,*

c) *CBAAC 0256 Low Visibility Airport Take Off Airport Requirements*.

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APPENDIX “A”: CATEGORY II/ III ILS CRITERIA

1) General

The performance criteria for CAT II/III ILS in Canada, and the periodic checks of these systems, must meet or exceed those referred to in Subsection 802 of the CARs. The wide fluctuations in climatic conditions experienced in Canada impose some unique problems, requiring special steps beyond those envisaged in international publications. Chief among these is the effect of snow, particularly standing snow in the vicinity of the ground antennas.

2) Flight Inspection

Flight inspection is an essential periodic check of an ILS system performance. It is intended to confirm that the system is still operating within the specified parameters and continues to meet its intended function.

a) Commissioning Inspection

This inspection is performed before the facility is certified for use. It is normally performed once at the beginning of a facilities life cycle, however, if major changes have been made to a previously commissioned system, the facility would then require a commissioning type inspection. The nature of these changes is detailed in the appropriate manuals for the maintenance and operation of equipment referred to in paragraph 3.5.5 of this manual.

b) Annual Inspection

This inspection is performed once a year on commissioned systems and provides a verification of facility performance capabilities.

c) Routine Inspection

This is an inspection normally conducted at four month intervals, to confirm that the facility performance continues to meet its technical requirements and to satisfy its operational requirements.

d) Special Inspection

This type of inspection is made if circumstances require system verification (i.e. major system repairs, suspected malfunctions or modifications).

3) ILS Critical Sensitive Areas

When CAT II/III operations are in progress, unauthorized vehicles and/or aircraft will not be permitted within the critical or sensitive areas. Examples of critical or sensitive areas are outlined in Figure C-3A and C-3B. Current regulatory requirements mandated in subpart 2 of Part VIII of the CARs are contained in ICAO Annex 10, vol. 1 Critical areas are defined as those where the presence of a vehicle or taxiing aircraft may possibly affect ILS signals.

The depicted areas are theoretical, and will probably vary with individual sites. Actual critical areas can be defined only by experimentation and experience. When any portion of a designated sensitive area becomes suspect as a likely source of interference, that portion must be included as part of the critical area. “CAT II/III Hold” signs are posted on taxiways and must be observed by aircraft and vehicles when CAT II/III operations are being conducted.

a) When snow clearance is necessary, snow removal equipment may enter and remain in these areas. It is expected that vehicles must vacate these areas before an aircraft using the ILS for a CAT II/III approach has passed the Final Approach Fix (FAF) (usually a point 4 NM from threshold); such vehicles may not reenter until the aircraft has landed or commenced a missed approach.

b) A telecommunications vehicle may be authorized to proceed to the ILS equipment buildings provided that an aircraft on a CAT II/III approach has not passed the FAF. If already at the building however, such a vehicle must remain parked there until authorized to move by ATC.

c) No vehicle or aircraft will be permitted to cross or remain on an active CAT II/III runway, or on any other runway or taxiway where their presence could affect ILS signals, when an aircraft on a approach has passed the FAF.

d) If there is a roadway in the glide path sensitive areas, no vehicle will be permitted to stop or park on that roadway. Signs must be posted to indicate these restrictions.

4) Snow Removal – Category II/III Glide Path Sites

Accumulation of snow beyond certain depths in the monitor area may result in the monitor indicating alarm conditions, whereas the actual path parameters along the approach may not change significantly. A heavy accumulation of snow outside the monitor area may result in an increase in glide slope angle of approximately 0.1º per foot of snow. Under these conditions, snow clearing in the monitor area only would result in normal monitor indications, when in fact, the glide slope angle may have increased along the approach path. At the same time, a change in the coefficient of reflection and the relative heights of the transmitting antenna may also affect course structure.

NAV CANADA delivers mandatory annual briefings to airport personnel responsible for snow measurement and removal at all of its ILS sites, regardless of precision approach category. Responsibilities for removal of snow and vegetation are as outlined in site specific agreements between the ILS owner/operator and the airport authority.

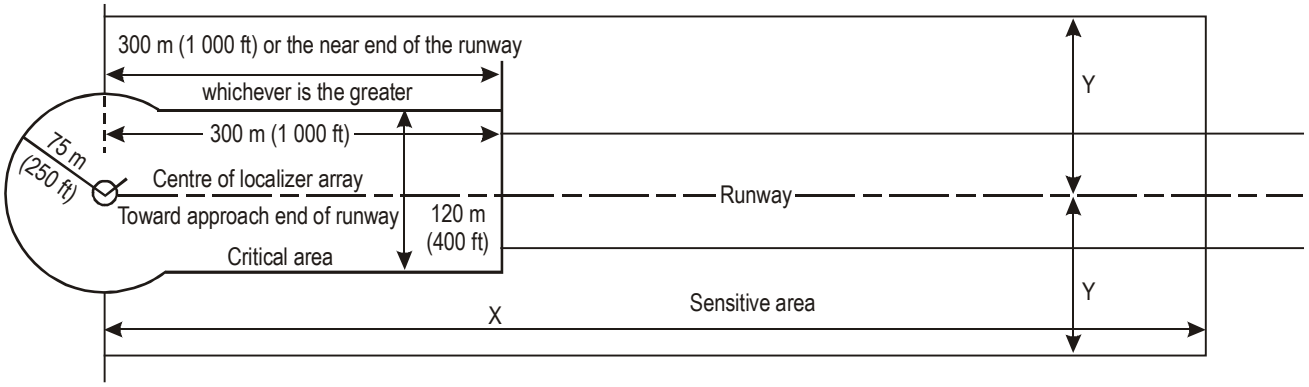
The critical area is shown in Figure C-3A and C-3B. This area is considered to be critical in terms of ground conditions, vehicles intrusion, etc.

The critical area must be prominently marked with signs to restrict the unauthorized entry of vehicles.

The removal of snow and vegetation is the responsibility of the Local Airport Authority (LAA). Excessive snow banks and vegetation along the approach and access roads at some locations may affect course structure, the degree being dependent on location of the

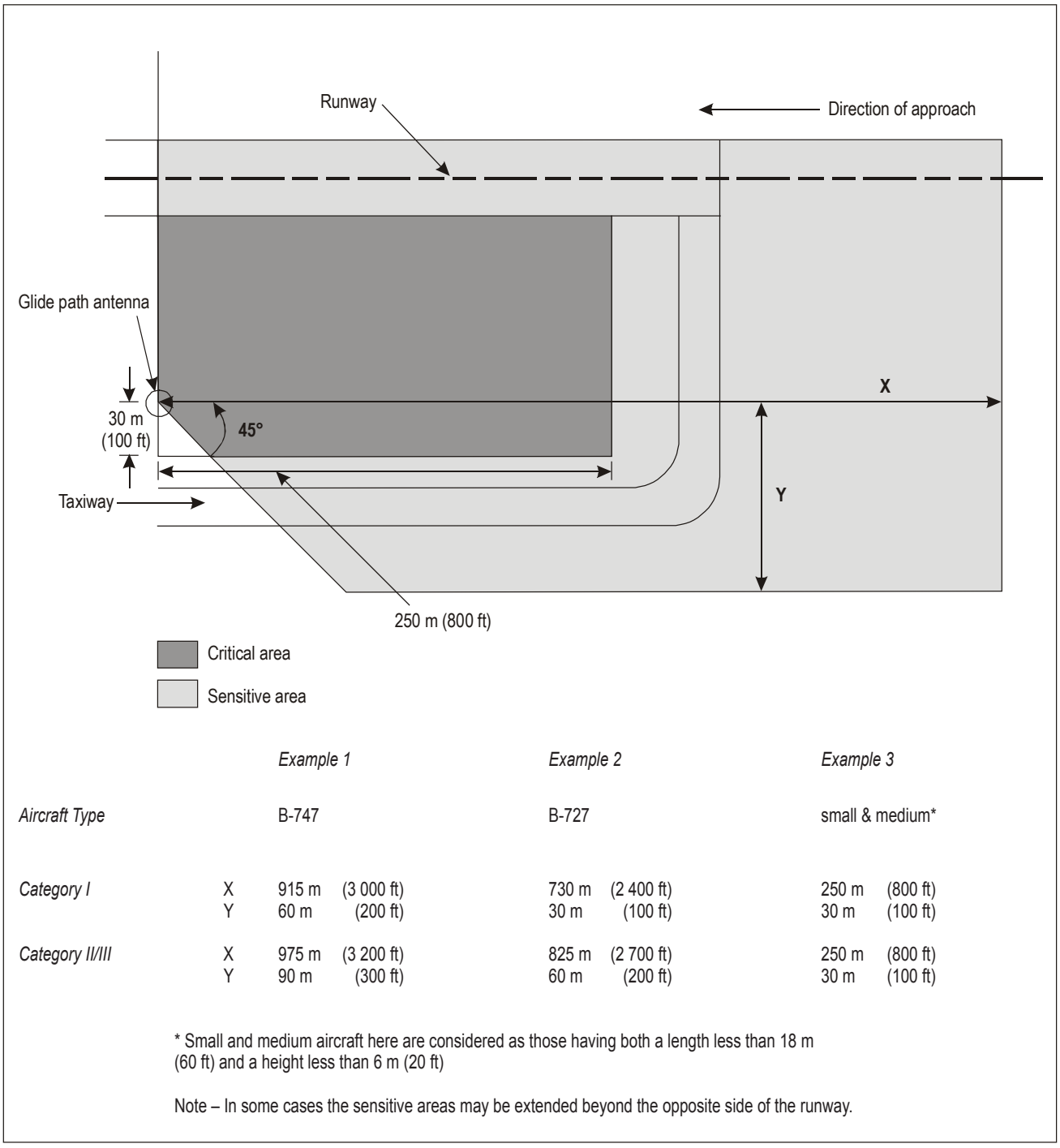
approach road. Following a period of heavy snowfall and subsequent plowing, it may be necessary to have the banks cut down. This is particularly important in areas where snow blowing operations have created vertical snow cuts. Similarly, snow drifts or banks in the monitor area may affect monitor operation and must be tapered.

Figure C-3A (From ICAO Annex 10) **Typical localizer critical and sensitive areas dimension variations for a 3 000 m (10 000 ft) runway**



		Example 1	*Example 2*	*Example 3*
Aircraft type		B-747	B-747	B-727
Localizer antenna aperture		Typically 27 m (90 ft) (Directional dual frequency, 14 elements)	Typically 16 m (50 ft) (Semi-directional, 8 elements)	Typically 16 m (50 ft) (Semi-directional, 8 elements)
Sensitive area (X, Y)				
Category I	X	600 m (2 000 ft)	600 m (2 000 ft)	300 m (1 000 ft)
	Y	60 m (200 ft)	110 m (350 ft)	60 m (200 ft)
Category II	X	1 220 m (4 000 ft)	2 750 m (9 000 ft)	300 m (1 000 ft)
	Y	90 m (300 ft)	210 m (700 ft)	60 m (200 ft)
Category III	X	2 750 m (9 000 ft)	2 750 m (9 000 ft)	300 m (1 000 ft)
	Y	90 m (300 ft)	210 m (700 ft)	60 m (200 ft)

Figure C-3B (From ICAO Annex 10). **Typical glide path critical and sensitive areas dimension variations**



		Example 1	*Example 2*	*Example 3*
Aircraft Type		B-747	B-727	small & medium*
Category I	X	915 m (3 000 ft)	730 m (2 400 ft)	250 m (800 ft)
	Y	60 m (200 ft)	30 m (100 ft)	30 m (100 ft)
Category II/III	X	975 m (3 200 ft)	825 m (2 700 ft)	250 m (800 ft)
	Y	90 m (300 ft)	60 m (200 ft)	30 m (100 ft)

* Small and medium aircraft here are considered as those having both a length less than 18 m (60 ft) and a height less than 6 m (20 ft)

Note – In some cases the sensitive areas may be extended beyond the opposite side of the runway.