DIREKTORAT JENDERAL PERHUBUNGAN UDARA
KEMENTERIAN PERHUBUNGAN

PERATURAN DIREKTUR JENDERAL PERHUBUNGAN UDARA

NOMOR : KP 253 TAHUN 2014

TENTANG

PETUNJUK PELAKSANAAN PERATURAN KESELAMATAN PENERBANGAN SIPIL BAGIAN 8900-4.2 (*STAFF INSTRUCTION*) TENTANG PENGOPERASIAN PESAWAT UDARA DALAM KATEGORI SEMUA CUACA (*ALL WEATHER OPERATIONS*)

DENGAN RAHMAT TUHAN YANG MAHA ESA

DIREKTUR JENDERAL PERHUBUNGAN UDARA,

Menimbang :

a. bahwa dalam Keputusan Menteri Perhubungan Nomor KM 41 Tahun 2011 tentang Peraturan Umum Pengopeasian Pesawat Udara (*General Operating And Flight Rules*) telah diatur mengenai pengoperasian pesawat udara dalam kategori semua cuaca (*all weather operations*);

b. bahwa untuk melaksanakan hal sebagaimana dimaksud pada huruf a, perlu ditetapkan Peraturan Direktur Jenderal Perhubungan Udara tentang Petunjuk Pelaksanaan Peraturan Keselamatan Penerbangan Sipil Bagian 8900-4.2 (*Staff Instruction*) Tentang Pengoperasian Pesawat Udara Dalam Kategori Semua Cuaca (*All Weather Operations*);

Mengingat : 1. Undang-Undang Nomor 1 Tahun 2009 tentang Penerbangan (Lembaran Negara Republik Indonesia Tahun 2009 Nomor 1, Tambahan Lembaran Negara Republik Indonesia Nomor 4956;

2. Peraturan Presiden Nomor 47 Tahun 2009 tentang Pembentukan dan Organisasi Kementerian Negara Republik Indonesia sebagaimana telah diubah terakhir dengan Peraturan Presiden Nomor 55 Tahun 2013;

3. Peraturan Presiden Nomor 24 Tahun 2010 tentang Kedudukan , Tugas dan Fungsi Kementerian Negara Serta Susunan Organisasi , Tugas , dan Fungsi Eselon 1 Kementerian Negara sebagaimana telah diubah terakhir dengan Peraturan Presiden Nomor 56 Tahun 2013;

4. Keputusan Menteri Perhubungan Nomor KM 41 Tahun 2011 tentang Peraturan Umum Pengopeasian Pesawat Udara (*General Operating And Flight Rules*) sebagaimana telah diubah terakhir Peraturan Menteri Perhubungan Nomor PM 80 Tahun 2011;

5. Peraturan Menteri Perhubungan Nomor KM 60 Tahun 2010 tentang Organisasi dan Tata Kerja Kementerian Perhubungan sebagaimana telah diubah terakhir Peraturan Menteri Perhubungan Nomor PM 68 Tahun 2013;

M E M U T U S K A N

Menetapkan : PERATURAN DIREKTUR JENDERAL PERHUBUNGAN UDARA TENTANG PETUNJUK PELAKSANAAN PERATURAN KESELAMATAN PENERBANGAN SIPIL BAGIAN 8900-4.2 (*STAFF INSTRUCTION*) TENTANG PENGOPERASIAN PESAWAT UDARA DALAM KATEGORI SEMUA CUACA (*ALL WEATHER OPERATIONS*).

.

Pasal 1

Memberlakukan Petunjuk Pelaksanaan Peraturan Keselamatan Penerbangan Sipil Bagian 8900-4.2 *(Staff Instruction)* Tentang Pengoperasian Pesawat Udara Dalam Kategoti Semua Cuaca *(All Weather Operations)* sebagaimana tercantum dalam Lampiran Peraturan ini.

Pasal 2

Direktur Kelaikan Udara dan Pengoperasian Pesawat Udara mengawasi pelaksanaan Peraturan ini.

Ditetapkan di : JAKARTA
pada tanggal : 25 April 2014

DIREKTUR JENDERAL PERHUBUNGAN UDARA

ttd

HERRY BAKTI

Salinan sesuai dengan aslinya
KEPALA BAGIAN HUKUM DAN HUMAS,

ISRAFUL HAYAT
Pembina (IV/a)
NIP.19680619 199403 1 002

Staff Instruction

SI 8900 - 4.2

All Weather Operations

Amendment : -
Date : 25 April 2014

REPUBLIC OF INDONESIA – MINISTRY OF TRANSPORTATION
DIRECTORATE GENERAL OF CIVIL AVIATION
JAKARTA – INDONESIA

AMENDMENT RECORD LIST

Amendment No	Issue Date	Inserted By	Insertion Date
Original Issue	**SKEP No.**		

SUMMARY OF AMENDMENT

Amendment No	Sources	Subjects	Approved
Original Issue	FAA Order 8900, Vol. 4, Chapter 2	All weather terminal area operations	
	ICAO Manual of Doc 9365-AN/910	All Weather Operations	

FOREWORD

1. PURPOSE : This Staff Instruction prescribes responsibilities, policies, and procedures to be used by the Directorate General of Civil Aviation (DGCA) for the assesment of applications for All Weather Operations to conduct CAT I, CAT II and CAT III Operations. This Staff Instruction may be made available to the public so that they may better understand the authority and responsibility of the DGCA.

2. REFERENCES : This Staff Instruction should be used in accordance with the applicable regulations.

3. AMENDMENT : The amendment of this Staff Instruction shall be approved by the Director General of Civil Aviation

DIREKTUR JENDERAL PERHUBUNGAN UDARA

ttd.

HERRY BAKTI

Salinan sesuai dengan aslinya
KEPALA BAGIAN HUKUM DAN HUMAS,

ISRAFULHAYAT
Pembina (IV/a)
NIP. 19680619 199403 1002

TABLE OF CONTENTS

AMENDMENT RECORD LIST i

SUMMARY OF AMENDMENT ii

FOREWORD iii

TABLE OF CONTENTS iv

DEFINITIONS viii

REFERENCES, FORMS, AND JOB AIDS xii

CHAPTER 1 INTRODUCTION 1

1.1 GENERAL BACKGROUND 1

1.2 BASIC TYPES OF AWO APPROACH AND LANDING OPERATIONS 2

1.3 CURRENT CATEGORIES OF IAPs 4

1.4 INSTRUMENT APPROACH PROCEDURES (IAPs) 5

1.5 CONSIDERATIONS FOR APPROACH AND LANDING OPERATIONS 7

1.6 CONCEPT OF CIRCLING MANEUVERS 8

1.7 LOOK-SEE APPROACHES 9

1.8 CONCEPTS OF DA/DH 10

1.9 CONCEPT OF MDA AND MAP 11

1.10 MINIMUM INSTRUMENT FLIGHT ALTITUDES 13

1.11 OPERATING MINIMUMS 14

1.12 MAXIMUM SINK RATES 16

1.13 EFFECTS OF AIRCRAFT/COCKPIT DESIGN ON SEEING-CONDITIONS 17

1.14 SAFETY DURING MISSED APPROACHES AND GO-AROUNDS 19

1.15 FUNCTION OF EXTERNAL VISUAL REFERENCES 20

1.16 MINIMUM VISIBILITY, RVV, AND/OR RVR 21

1.17 CONCEPT OF RVR 21

1.18 VISUAL AIDS AND RUNWAY ENVIRONMENT 23

1.19 THRESHOLD CROSSING HEIGHT (TCH) CONCEPT 24

1.20 AIRPORT FACILITIES AND SERVICES 25

CHAPTER 2 APPROVAL OF R.O.I. OPERATORS FOR SPECIAL AUTHORIZATION CATEGORY I AND ALL CATEGORY II/III OPERATIONS—CASR PARTS 91 (LARGE AIRCRAFT), 121, AND 135 29

2.1 OVERVIEW 29

2.2 APPLICABILITY 29

2.3 PREREQUISITES AND COORDINATION REQUIREMENTS 29

2.4 OPERATOR AUTHORIZATION—SA CAT I, SA CAT II, CAT II RVR 1000 (300 METERS) 30
2.5 CAT II/III ILS OPERATOR AUTHORIZATION PROCESS 31
CHAPTER 3 APPROVAL OF SMALL CATEGORY A AIRCRAFT FOR CATEGORY II OPERATIONS—PART 91 65
3.1 OVERVIEW 65
3.2 APPLICABILITY 65
3.3 PREREQUISITES AND COORDINATION REQUIREMENTS 65
3.4 OBJECTIVE 65
3.5 APPROVAL METHOD 66
3.6 SMALL CATEGORY A AIRCRAFT CAT II AND COPTER ILS OPERATIONS 66
3.7 APPLICATION FOR DEVIATION 66
3.8 REVIEW OF APPLICATION PACKAGE 70
3.9 EVALUATION PROGRAM 72
3.10 SMALL CATEGORY A AIRCRAFT SPECIAL PROVISIONS 76
3.11 TASK OUTCOMES 77
3.12 FUTURE ACTIVITIES 77
CHAPTER 4 LOW VISIBILITY SURFACE MOVEMENT AND TAKEOFF OPERATIONS 78
4.1 OVERVIEW 78
4.2 APPLICABILITY 78
4.3 OPERATOR REQUIREMENT—LOW VISIBILITY TAXI AND TAKEOFF OPERATIONS 78
CHAPTER 5 NON-PRECISION, APPROACH PROCEDURES WITH VERTICAL GUIDANCE, AND CATEGORY I PRECISION APPROACH AND LANDING OPERATIONS 80
5.1 OVERVIEW 80
5.2 APPLICABILITY 80
5.3 APPROVAL METHOD 80
5.4 GENERAL 82
5.5 OPERATIONAL AUTHORIZATION 83
5.6 CONTINUOUS DESCENT FINAL APPROACH (CDFA) 86
5.7 VISUAL APPROACH 87
5.8 OTHER APPROACH OPERATIONS 87
5.9 OPERATING MINIMUMS 88
5.10 CONTROLLING MINIMUM CONCEPT 88
5.11 AIR CARRIER OPERATING MINIMUMS 89

5.12 AUTOLAND OR HUD TO TOUCHDOWN OPERATIONS 91
CHAPTER 6 CATEGORY II OPERATIONS 94
6.1 OVERVIEW 94
6.2 APPLICABILITY 94
6.3 APPROVAL METHOD 94
6.4 GENERAL 94
6.5 CAT II OPERATIONAL CONCEPTS 95
6.6 STANDARD CAT II OPERATIONS 98
6.7 SA CAT I OPERATIONS 99
6.8 CAT II RVR 1000 (300 METERS) OPERATIONS 99
6.9 SA CAT II OPERATIONS 100
6.10 OPERATIONAL CREDIT FOR CAT III EQUIPMENT 101
CHAPTER 7 CATEGORY III OPERATIONS 102
7.1 OVERVIEW 102
7.2 APPLICABILITY 102
7.3 APPROVAL METHOD 102
7.4 GENERAL 102
7.5 CAT III OPERATIONAL CONCEPTS 103
7.6 RA AND PRETHRESHOLD TERRAIN 105
7.7 FOREIGN CAT III INSTRUMENT APPROACH PROCEDURES (IAP) 106
7.8 CAT I AUTOLAND OR HUD TO TOUCHDOWN OPERATIONS 107
CHAPTER 8 MAINTENANCE/INSPECTION PROGRAMS FOR LOW APPROACH AND LANDING MINIMUMS 110
8.1 OBJECTIVE 110
8.2 GENERAL 110
8.3 PREREQUISITES AND COORDINATION REQUIREMENTS 111
8.4 CAT I OPERATIONS 111
8.5 CAT II EQUIPMENT APPROVAL UNDER PARTS 91 AND/OR 135 (9 OR FEWER) 111
8.6 CAT II/III EQUIPMENT APPROVAL UNDER PART 121/135 112
8.7 CONTINUOUS AIRWORTHINESS PROGRAM (CAP) FOR LLM 113
8.8 PROGRAM DEVELOPMENT 114
8.9 MAINTENANCE/INSPECTION PROGRAMS 115
8.10 MAINTENANCE TRAINING PROGRAMS 115
8.11 TEST EQUIPMENT AND STANDARDS 116
8.12 MAINTENANCE PERIOD EXTENSIONS—GENERAL AVIATION 117

8.13 FUNCTIONAL FLIGHT CHECKS 117
8.14 REPORTS AND RECORDS 117
8.15 PROCEDURES 118
8.16 TASK OUTCOMES 119

DEFINITIONS

Category (CAT) I Operations. CAT I operations are defined as precision approach and landing operations conducted under instrument flight rules (IFR) using CAT I operating minimums. CAT I operating minimums consist of a specified IFR decision altitude (DA)/decision height (DH) that is not lower than the equivalent of 200 feet (60 meters) above the touchdown zone (TDZ), and a visibility or a Runway Visual Range (RVR) that is not lower than one-half statute mile or RVR 550, respectively.

Special Authorization (SA) CAT I. CAT I with SA authorizes SA CAT I approaches to a radio altimeter (RA) DH as low as 150 feet and a visibility minimum as low as RVR 1400 (400 meters) to runways that do not have touchdown zone (TDZ) or runway centerline (RCL) lighting when the approach is flown using an aircraft with a HUD to DH.

> Note: To be approved for SA CAT I, each airplane and HUD must be authorized and maintained for CAT II or CAT III operations.

Category (CAT) II Runway Visual Range (RVR) 1000 (300 meters). CAT II with RVR 1000 (300 meters) authorizes CAT II approaches with a DH as low as 100 feet and visibility minimums of RVR 1000 (300 meters) to runways that meet all CAT II equipment, performance, and lighting requirements. The operator must use either autoland or head-up display (HUD) authorized to touchdown.

Standard CAT II Operations. CAT II operations are approach and landing operations conducted with a DH of less than 200 feet (60 meters) but not less than 100 feet (30 meters), and an RVR of not less than 1200 feet (350 meters).

> Note: For rotorcraft, CAT II authorization in accordance with this chapter also permits Copter ILS operations to a DH of less than 200 feet.

SA CAT II. CAT II with SA authorizes CAT II approaches with a DH as low as 100 feet and visibility minimums of RVR 1200 at runways that do not meet all of the lighting requirements (Approach Lighting System With Sequenced Flashing Lights (ALSF)-2, TDZ, RCL lights) for standard CAT II. The operator must use either autoland or HUD authorized to touchdown.

Categorgy III Operations. CAT III operations are separated into three subcategories: CAT IIIa, CAT IIIb, and CAT IIIc.

Category IIIa Operations. CAT IIIa is an approach and landing operation with an RVR of not less than 700 feet (200 meters) without a DH, or with a DH of less than 100 feet (30 meters), or an alert height (AH) that is typically between 50 and 200 feet, depending on aircraft certification and operator preferences. Both fail passive (FP) and fail operational (FO) airborne equipment can be used in CAT IIIa operations.

Category IIIb Operations. CAT IIIb is an approach and landing operation with an RVR of less than 700 feet (200 meters) but not less than 150 feet (50 meters) and a DH of 50 feet (15 meters) or less, or an AH that is typically between 50 and 200 feet, depending on aircraft certification and operator preferences. Both FP and FO airborne equipment can be used for CAT IIIb operations.

Category IIIc Operations. CAT IIIc is an approach and operation landing without a DH and without RVR limitations (zero-zero).

Category (CAT) A Aircraft. A grouping of aircraft based on a speed of 1.3 times the stall speed in the landing configuration at the maximum certificated landing weight, and that speed must be less than 91 knots. The DGCA authorizes deviation for an operator of a small Category A aircraft (less than 12,500 pounds certificated takeoff weight) to use such an aircraft in CAT II operations without meeting the requirements of CASR part 91, 91.189, 91.191, and 91.205(f).

Copter Instrument Landing System (ILS) Approach Approval. An authorization issued after a successful demonstration of this capability provides the holder the authority to descend to a DH of less than 200 feet with a visibility as low as Runway Visual Range (RVR) 1200, while conducting a Copter ILS approach or a CAT II ILS procedure. Operations of this type are currently considered only in the case of Copter ILS approaches as described in subchapter 3.6.

Standard Category (CAT) II Operations. CAT II operations are approach and landing operations conducted with a DH of less than 200 feet (60 meters), but not less than 100 feet (30 meters), and an RVR of not less than 1,200 feet (350 meters).

Clearance Bar. A clearance bar consists of three in-pavement, steady-burning yellow lights

Gate Designator Markings. Pavement markings used to identify an aircraft parking position/gate(s).

Geographic Position Markings. Pavement markings used to identify the location of aircraft or vehicles during low visibility conditions. They are referred to as “spots” by air traffic control (ATC).

Judgmental Over-Steering. When the taxiway centerline does not provide an adequate turn radius, the pilot may intentionally over-steer the aircraft nose wheel to keep the aircraft’s main gear within the defined edges of the taxiway.

Movement Area. Refers to the runways, taxiways, and other areas of an airport that are used for taxiing, hover taxiing, air taxiing, takeoff, and landing of aircraft, exclusive of loading ramps and aircraft parking areas.

Non-Movement Area. Refers to taxiways and apron areas that are not under ATC.

Runway Guard Lights—Elevated. Fixture consists of a pair of elevated flashing yellow lights installed on both sides of a taxiway at the runway hold position marking. Their function is to confirm the presence of an active runway and assist in preventing runway incursions

Runway Guard Lights—In-Pavement. Fixture consists of a row of in-pavement, flashing yellow lights installed across the entire taxiway at the runway hold position marking. Their function is to confirm the presence of an active runway and to assist in preventing runway incursions

Stop Bar. Stop bar lights consist of elevated and in-pavement red fixtures that are installed at the runway holding position or instrument landing system (ILS) critical area holding position marking. Stop bars may be controllable by ATC and will include a

system of in-pavement, green taxiway centerline/lead-on lights at locations where aircraft will enter or cross a runway.

Surface Movement Guidance and Control System (SMGCS). A SMGCS system consists of the provision of guidance to, and control or regulation of, all aircraft, ground vehicles, and personnel on the movement area of an aerodrome. Guidance relates to facilities, information, and advice necessary to enable the pilots of aircraft or the driver of ground vehicles to find their way on the aerodrome and to keep the aircraft or vehicle on the surfaces or within the areas intended for their use. Control or regulation means the measures necessary to prevent collisions and to ensure that the traffic flows smooth and freely (see International Civil Aviation Organization (ICAO) Doc 9476-AN/927, Manual of Surface Movement Guidance and Control Systems (SMGCS)).

Surface Movement Surveillance System (SMSS). A system which provides positive identification and accurate positional information on all aircraft and vehicles.

Surface Painted Holding Position Sign. Pavement marking that is used to identify a specific runway. These markings are configured the same as the associated sign

Surface Painted Direction Sign. Pavement markings that are configured the same as the associated sign and provided when it is not possible to provide taxiway direction signs at intersections

Surface Painted Location Sign. Pavement markings that are configured the same as the associated sign, and which are used to supplement the signs located alongside the taxiway and assist the pilot in confirming the designation of the taxiway on which the aircraft is located

Taxi Route. In this chapter, a specific sequence of lighted taxiways used by aircraft during low visibility operations.

Unserviceable. In this chapter, refers to equipment that is inoperative, obscured (i.e., by ice, snow, sand), degraded, not operating normally (e.g., abnormally low intensity), or not performing its intended function.

Approach Procedures with Vertical Guidance (APV). APV approach and landing operations are three-dimensional operations conducted under IFR that provide both lateral and vertical guidance, but that do not meet all of the accuracy requirements and navigation specifications to be classified as CAT I precision approaches. APV operations are conducted using decision altitude/height (DA/H). Examples of APV approaches include RNAV (lateral approach procedures with vertical guidance (LPV) or LNAV/vertical navigation (VNAV) minimums) and localizer-type directional aid (LDA) with glideslope (G/S).

Non-Precision Approach and Landing Operations. Non-precision approach and landing operations are two-dimensional operations conducted under IFR using lateral guidance but not vertical guidance. Very high frequency (VHF) omnidirectional range (VOR), non-directional radio beacon (NDB), LDA, Localizer (LOC), Localizer Back-Course (LOC-BC), Area Navigation (RNAV) (lateral navigation (LNAV) minimums or initial RNAV distance measuring equipment (DME)-DME approaches), and airport surveillance radar (ASR) approaches are examples of NPAs. Non-precision operations are conducted using a minimum descent altitude (MDA) and a specific missed approach point (MAP).

Precision Approach and Landing Operations. Precision approach and landing operations are three-dimensional operations conducted under IFR using ILS, MLS, or GLS, which provides both lateral and vertical guidance. Precision operations are conducted using a DA/H, or which have no DA/H and support operation to touchdown. GLS operations use a Local Area Augmentation System (LAAS) or GBAS to augment the standard Global Positioning System (GPS) signal for more precise navigational guidance.

REFERENCES, FORMS, AND JOB AIDS

A. References (current editions):

- CASR parts 91, 97, 121, 129, 135, and 139.
- CASR parts 23, 25, and 61.
- AC 120-28, Criteria for Approval of Category III Weather Minima for Takeoff, Landing and Rollout.
- AC 120-29, Criteria for Approval of Category I and Category II Weather Minima for Approach.
- SI 21-08 Acceptance of TSO and TSO Equivalent Appliances
- FAA AC 120-57, Surface Movement Guidance and Control System.
- International Civil Aviation Organization (ICAO) Doc 9476-AN/927, Manual of Surface Movement Guidance and Control Systems (SMGCS).

B. Forms.

- Figure 2.2, Category II/III Approval Job Aid (Operations), and
- Figure 2.3, Category II/III Approval Job Aid (Avionics/Airworthiness.

C. Job Aids.

- Figure 2.2 is a blank CAT II/III operations job aid.
- Figure 2.3 is a blank CAT II/III airworthiness Job Aid.
- A partial example of a completed CAT II/III operations job aid is included in Figure 2.5, Example of Completed Flight Operations Job Aid.
- Figure 3.1, Small Category A Category II Job Aid.
- Job Task Analysis (JTA): 3.3.33, 3.3.144.

BLANK

CHAPTER 1 INTRODUCTION

The description of All Weather Operations (AWO) and the approval process are divided into 8 chapters:

- Chapter 1 introduces AWO, providing an overview of concepts and evolution of AWO, as well as various factors affecting AWO. This chapter is historical and conceptual information only. For specific authorizations and requirements, see the following sections;
- Chapter 2 provides the five-step process for operator approval to conduct Category (CAT) II/III operations (except small Category A aircraft);
- Chapter 3 provides an approval process for conducting CAT II operations in small Category A aircraft CASR Part 91;
- Chapter 4 provides guidance for Surface Movement Guidance and Control Systems (SMGCS), including operator requirements and airport authorization by All Weather Operations Specialists (AWOS);
- Chapter 5–7 provide respective overviews of CAT I, CAT II, and CAT III operational requirements; and
- Chapter 8 provides specific approval guidance for maintenance and inspection programs for low visibility approach landing minimums.

1.1 GENERAL BACKGROUND

AWO include all terminal area operations conducted under instrument flight rules (IFR), including certain operations conducted in visual conditions. Terminal area operations conducted under visual flight rules (VFR) in visual weather conditions are not addressed in this chapter. This chapter discusses concepts, national direction, and guidance to be used by Directorate General of Civil Aviation (DGCA) inspectors when evaluating, approving, or denying requests for authorization to conduct AWO operations. This chapter also covers operational approvals for an operator proposing to use new aircraft, AWO operating systems, lower-than-standard takeoff minimums, and approach and landing operating minimums. The basic principle for AWO takeoff, approach, and landing operations is that operating minimums are permitted to be reduced through improvements in operational capabilities. This principle is valid only if an acceptable alternative maneuver is maintained or if an extremely high probability of safely completing the maneuver exists. All IAPs are constructed to permit safe instrument flight to the missed approach point (MAP), followed by an instrument missed approach. The safety of conducting an instrument approach to a published minimum and executing the missed approach is not dependent on establishing visual reference with the landing surface. The criteria for constructing an instrument approach are based on the premise that an instrument missed approach will be necessary under certain circumstances. Visual reference with the landing surface, however, becomes a safety factor when the flight descends below the published IFR minimum height or altitude. The visibility or Runway Visual Range (RVR) minimum for a particular runway becomes a safety consideration in both fuel planning and selection of alternate airports.

A. AWO. AWO in domestic and international operations are complex, with many variations in aircraft and ground equipment, as well as procedures and standards.

DGCA inspectors must evaluate proposed AWO, giving due consideration to the following:

- Operator's type of operation (CASR part 91, 91 subpart F, 121, 129, and 135—fixed-wing);
- Type of proposed AWO (takeoff, landing, etc.);
- Type of operator's aircraft and equipage;
- Airports proposed for use;
- Operating minimums proposed; and
- Operator's experience, both in similar or other aircraft, and in the type of operation proposed.

B. Specific Standards. Specific standards are provided in this chapter to evaluate operations using aircraft and equipment that have well-understood operational characteristics and limitations in specific AWO.

C. Authority and Responsibility for Approval of AWO.

1) The complex nature of AWO in domestic and international environments, the wide variation of airborne and ground-based equipment, and the variation in procedures and standards used in these operations, require a broad-based evaluation and approval process. Due to operational and technical complexities, it is essential for this evaluation and approval process to use a systems approach (big picture approach).

2) This systems approach must involve many personnel who are knowledgeable in their respective areas. When the safety of a proposed operation is being evaluated, personnel knowledgeable in such areas as aircraft certification, instrument landing system (ILS)/microwave landing system (MLS) ground equipment design and maintenance, visual aid concepts and criteria, IAP design criteria, airport design criteria, flight inspection, air traffic control (ATC) procedures, flight operational programs, and aircraft maintenance programs must be involved.

3) This broad-based systems approach process is particularly important in the evaluation and approval of CAT II and CAT III approach and landing operations. Although approval of CAT I operations is relatively straightforward due to the high level of CAT I operational experience and international standardization, CAT II and CAT III operations must be examined and approved on a runway-by-runway and an operator-by-operator basis.

1.2 BASIC TYPES OF AWO APPROACH AND LANDING OPERATIONS

There are two general classes of approach and landing operations: those conducted under VFR, and those conducted under IFR. There are three basic types of IFR approach and landing operations: visual approaches, contact approaches, and instrument approaches.

A. Visual Approaches. A visual approach can be authorized by ATC if the aircraft is being operated under IFR in visual meteorological condition (VMC) (reported weather at airport must have ceiling at or above 1000 feet and visibility 3 miles or greater). Although a pilot conducting a visual approach is expected to proceed to the destination airport by pilotage or visual reference to another aircraft, the flight remains under an

instrument flight plan. ATC retains responsibility for both traffic separation and wake/vortex separation, unless the pilot reports the preceding aircraft in sight and is instructed to follow it. ATC will provide flight-following and traffic information until the aircraft is instructed to contact the control tower. Either ATC or the pilot may initiate a request for a visual approach.

Note: Charted visual flight procedures (CVFP), a subset of visual approaches, are also considered to be visual approaches.

B. Contact Approach. A contact approach can only be authorized by ATC when requested by the pilot. The flight must be operated clear of clouds, the pilot must have at least 1 mile of flight visibility, and can reasonably expect to be able to continue to the airport in those conditions. The pilot must be on an IFR flight plan, and the ground visibility at the destination airport must be reported to be at least 1 statute mile. A contact approach is an approach procedure that may be used by a pilot (with prior ATC authorization) instead of a published Standard Instrument Approach Procedure (SIAP) or special IAP. ATC will not authorize a contact approach at an airport that does not have a functioning IAP. Although ATC provides separation services to a flight during a contact approach, the pilot must assume full responsibility for obstacle clearance and navigation to the destination airport.

C. Instrument Approaches. IAPs are provided to permit descent in instrument conditions from the en route environment to a point where a safe landing can be made at a specific airport.

1) The types of SIAPs include the following approaches based on International Civil Aviation Organization (ICAO) standard NAVAIDs, such as an ILS, MLS, Global Positioning System (GPS), very high frequency (VHF) omnidirectional range (VOR), and non-directional radio beacon (NDB). IAPs using these NAVAIDs may require, or may be supplemented by, use of distance measuring equipment (DME).

2) In addition to NAVAID IAPs, there are also IAPs based on ATC radar services such as airport surveillance radar (ASR) and precision approach radar (PAR). SIAPs also include Performance-based Navigation (PBN) procedures that are developed in accordance with Republic of Indonesia (R.O.I) Terminal Instrument Procedures (TERPS) or ICAO Procedures for Air Navigation Services Aircraft Operations (PANS-OPS).

3) Area Navigation (RNAV) and Required Navigation Performance (RNP) concepts are consistent with the performance characteristics of systems such as GPS, DME/DME/Inertial Reference Units (IRU), GPS/DME/DME/IRU, or flight management system (FMS)/GPS, or FMS/GPS/IRU.

D. Lighting System Credits. All straight-in operating minimums are based on the use of ground-based visual aids to enhance seeing-conditions during the final stages of approach and landing operations. These reductions are known as lighting system credits and cannot be used to reduce operating minimums for circling maneuvers due to the large area required for safe maneuvering (turn radius) at the various speeds used. Therefore, operating minimum reductions based on lighting credits can only be authorized for instrument approaches to runways that provide a straight-in landing capability. The standard minimum IFR altitudes cannot be reduced due to obstacle limitations, NAVAID signal limitations, and/or navigation system limitations. As such,

reductions in operating minimums below the basic values established for each type of approach are expressed only as reductions in the visibility/RVR required to safely conduct the approach.

1.3 CURRENT CATEGORIES OF IAPs

Various categories of instrument approach operations have been established to accommodate a wide variety of airborne and ground- or space-based capabilities. These operational categories are necessary for granting credit to operators choosing to install airborne equipment with additional capabilities. These operational categories also provide the distinction between operational capabilities and ground support system configurations. CAT I, CAT II, and CAT III are the three basic categories of instrument approach operations.

A. CAT I Operations. CAT I operations are defined as precision approach and landing operations conducted under IFR using CAT I operating minimums. CAT I operating minimums consist of a specified IFR decision altitude (DA)/decision height (DH) that is not lower than the equivalent of 200 feet (60 meters) above the TDZ, and a visibility, Runway Visibility Value (RVV), or an RVR that is not lower than one-half statute mile or RVR 1800 feet (550 m), respectively.

B. SA CAT I. DGCA authorizes SA CAT I approaches to an RA DH as low as 150 feet and a visibility minimum as low as RVR 1400 (400 meters) feet to runways that do not have TDZ or RCL lighting when the approach is flown using an aircraft with a HUD to DH.

C. Standard CAT II Operations. CAT II operations are approach and landing operations conducted with a DH of less than 200 feet (60 meters) but not less than 100 feet (30 meters), and an RVR of not less than 1,200 feet (350 meters).

D. CAT II RVR 1000 (300 meters). DGCA authorizes CAT II approaches with a DH as low as 100 feet and visibility minimums of RVR 1000 (300 meters) to runways that meet all CAT II equipment, performance, and lighting requirements. The operator must use either autoland or HUD to touchdown.

E. SA CAT II. DGCA authorizes CAT II approaches with a DH as low as 100 feet and visibility minimums of RVR 1200 (350 meters) at runways that do not meet all of the lighting requirements (Approach Lighting System with Sequenced Flashing Lights (ALSF)-2, TDZ, RCL lights) for standard CAT II. The operator must use either autoland or HUD to touchdown.

F. CAT III Operations. CAT III operations are separated into three subcategories: CAT IIIa, CAT IIIb, and CAT IIIc.

1) CAT IIIa Operations. CAT IIIa is an approach and landing operation with an RVR of not less than 700 feet (200 meters) without a DH, or with a DH of less than 100 feet (30 meters), or an AH that is typically between 50 and 200 feet, depending on aircraft certification and operator preferences. Both FP and FO airborne equipment can be used in CAT IIIa operations.

2) CAT IIIb Operations. CAT IIIb is an approach and landing operation with an RVR of less than 700 feet (200 meters) but not less than 150 feet (50 meters) and a DH

of 50 feet (15 meters) or less, or an AH which is typically between 50 and 200 feet, depending on aircraft certification and operator preferences. Both FP and FO airborne equipment can be used for CAT IIIb operations.

3) CAT IIIc Operations. CAT IIIc is an approach and landing operation without a DH and without RVR limitations (zero-zero). CAT IIIc operations are currently not authorized.

All navigation systems can be described in terms of performance. For example, a ground based navigation aid such as VOR delivers a measurable level of performance which is applied in terms of accepted navigational tolerances.

PBN operations are similarly based on navigation performance, but the concept of performance is fundamentally different. Whereas an operation based on a ground based navigation aid is dependent upon the performance of the radiated signal and the ability of an aircraft to accurately utilise that signal, in Performance Based Navigation the performance itself is specified and the navigation system is required to meet the minimum level of performance. In principle any method of navigation that achieves the specified level of navigation performance is acceptable. However, in practice a particular navigation system is required in some cases in order to meet the requirements of a particular navigation specification. For example RNP 4 requires the mandatory carriage of GNSS as no other current navigation system is available to meet the requirements of the navigation specification. In theory at least, if another means of navigation became available which met the performance requirements for RNP 4 without GNSS, then the requirement for GNSS could be removed from the navigation specification.

1.4 Instrument Approach Procedures (IAPs)

A. Standard Instrument Approach Procedure (SIAP).

1) SIAPs that are published in accordance with CASR part 97 without Authorization Required (AR) or RNP AR APCH restriction are approved for all users and are incorporated in the standard ACLs by reference.

2) If an IAP is published in CASR part 97 and designated as an AR or RNP AR APCH procedure, it is only available to those operators, aircraft, and aircrews that meet the special qualification requirements for that procedure and that are approved to use it. An IAP is a series of predetermined maneuvers for the orderly and safe transfer of an aircraft under instrument flight conditions, from the beginning of the initial approach to one of the following:

- An automatic landing.
- A position from which a landing can be made visually.
- A position from which a missed approach can be executed and completed if external visual references necessary to complete the landing are not established before passing DA/DH or minimum descent altitude (MDA)/MAP.

B. IAPs and Its Operating Minimums. An instrument approach and its operating minimums are usually prescribed and approved for a specific airport and/or runway by the aviation authority (AA) that has jurisdiction over flight operations at that airport. The

DGCA is responsible for developing all civil IAPs There are various types of IAPs that are or may be approved for use by R.O.I. air carriers. These types of IAPs include the following:

- IAPs published in accordance with CASR part 97.
- IAPs authorized in ACLs.
- DGCA-approved special IAPs (DGCA, Special Instrument Approach Procedures).
- IAPs published by a foreign country.

C. OTHER IAPs. If, however, an IAP and its operating minimums are not published in accordance with CASR part 97, other means have been established to authorize their use. In such cases, the IAP is incorporated into standard ACLs by reference (either with or without additional restrictions). This group of instrument procedures that are not published in CASR part 97 includes IAPs developed by the DGCA, third party developers.

1) Foreign Government IAPs. At foreign airports, the authority having jurisdiction over flight operations at the airport establishes the IAPs and their operating minimums. In general, the IAPs and operating minimums (if specified) at most foreign airports are developed in accordance with ICAO PANS-OPS criteria.

2) IAPs Developed by an Air Carrier. At some foreign airports, an air carrier may need to develop or choose to develop an IAP. The standard ACLs enable an air carrier to exercise this option, provided the developed procedure meets ICAO PANS-OPS criteria. In such cases, the IAP developed by the air carrier may be authorized for use by approved DGCA criteria

3) Special IAPs. Special IAPs are those procedures evaluated and approved by the DGCA but not published in accordance with part 97. These special IAPs are not approved for general use due to the special training, private facilities, procedures, knowledge, and/or equipment required to safely conduct them. Due to these special requirements, the use of special IAPs must be authorized on an operator-by-operator basis. Special IAPs are issued on DGCA and authorized in ACL C081.

4) IAPs Outside of Controlled Airspace. Since ATC separation services are an important element of safe instrument approach operations, special consideration and evaluation is required before operations can be authorized outside of controlled airspace (no ATC separation services available). This situation occurs when conducting an IAP at an airport that is in Class G airspace (e.g., does not have an operating control tower or when a control zone is not active). The airports, at which portions of IAPs are outside of controlled airspace, must be authorized by the standard ACL C064.

5) Offshore Standard Approach Procedures (OSAP). OSAPs are helicopter specials that are designed for use to offshore platforms. OSAPs are based on the use of GPS and the airborne radar systems and are established and approved in accordance with the criteria in AC 90-80. These special procedures are developed for individual operators and are issued and authorized through ACLs, management specifications (MSpecs), or letters of authorization (LOA).

1.5 CONSIDERATIONS FOR APPROACH AND LANDING OPERATIONS

These criteria allow for safe instrument approach and landing capabilities for aircraft equipped with ICAO standard NAVAIDs (ILS, GPS, VOR, VOR/DME, and NDB) and performance-based approaches based on RNP concepts. Many operators have chosen to use airborne equipment exceeding the minimum capabilities required for instrument flight. A means of granting operational credit for using equipment with these increased capabilities has been established. The standard ACLs provide the method to approve approach and landing operations using such airborne equipment. Examples of airborne equipment with increased capabilities include automatic landing systems (autoland) and manually flown electronic landing systems (HUD), ARA systems, and RNAV systems with RNP and RNP AR capabilities. The following subchapters briefly discuss these systems.

A. Autoland.

1) Autoland Approach. An autoland approach is an instrument approach to touchdown, and in some cases, through the landing rollout. An autoland approach is performed by the aircraft AP, which is receiving position information and/or steering commands from onboard navigation equipment. Autoland approaches are flown in VFR and IFR. It is a commonly accepted safe operating practice for operators to require their aircrews to fly coupled approaches and autoland approaches (if certified) on suitable runways when the weather conditions are less than approximately RVR 4000 (1200 meters).

2) Automatic Landing Systems. As an example of modern airborne equipment, the autoland is often standard on many new airplanes. This modern system gives the aircrew increased capabilities by enabling them to make safer instrument approaches and landings than those being done without the autoland. Autoland also refers to the landing that is accomplished with the autoland engaged. The aircrew is required to constantly monitor this system to ensure safe operation of the aircraft.

3) General Information. Many large transport category airplanes are equipped with autoland systems and a few helicopters are equipped with automatic deceleration and hover systems. As technology evolves, the trend of using autoland systems is increasing. Autoland systems are already standard features on many new airplanes. An air carrier, however, is not authorized to use autoland systems to touchdown in CASR parts 121 and 135 operations unless the particular flight control guidance system is authorized for autoland by the ACLs. CASR 121.579 and CASR 135.93 prohibit the use of most APs below certain heights (50 feet or greater) during approach and landing operations, even during VFR weather conditions. The intent of these rules is to provide pilots with the terrain or obstacle clearance and the reaction time necessary to safely intervene if the AP malfunctions.

4) Pilot Intervention. This is especially critical if the AP abruptly commands a hard-over, nose-down condition. Many APs (“single channel” APs) used in CASR parts 121 and 135 operations are not designed to provide the redundancy necessary to automatically detect all failure combinations. If such failures occur, the pilot must intervene, disconnect the AP, and recover manually. Since an aircraft will lose altitude if a hard-over, nose-down condition occurs, the AP must be routinely disengaged before descending below the height above terrain specified by CASR 121.579 or CASR 135.93, as appropriate. Failure to disconnect the AP before descending below

these heights could lead to ground contact during a recovery attempt if a malfunction occurred. Many aircraft are now equipped, however, with an automatic flight control guidance system (AFCGS) designed to provide the performance, redundancy, and reliability necessary to detect all significant failure combinations and to prevent the AP from failing in a hard-over, nose-down condition (zero height loss). With these aircraft and equipment combinations, the safety objective of CASR 121.579 and 135.93 can be met even if the system is used to touchdown. Fail Passive (FP) and Fail Operational (FO) automatic landing systems provide this capability and can be approved for use to touchdown. The operator's approved training curriculum must include training on autoland operations and the autoland equipment must be properly certificated and maintained. Principal operations inspectors (POI) shall authorize the use of autoland to touchdown by issuing ACL C061 in accordance with CASR 121.579(c) or CASR 135.93(d).

B. Manually Flown Flight Control Guidance Systems Certificated for Landing Operations (HUD). Historically, pilots have not had Flight Director (FD) systems and other instrument information that enabled safe manual control of an aircraft to touchdown in instrument conditions. The development of flight control guidance systems such as HUD provides the pilot with instrument information in a manner that enables safe manual control of the aircraft through touchdown and rollout. The flight guidance provided by these systems enables a pilot to duplicate the performance and functions of an autoland system. These systems provide flight guidance information equivalent to the performance, redundancy, reliability, and the hard-over, nose-down protection provided by autoland systems, which are approved for use to touchdown. Manually flown flight control guidance systems certified for landing operations can be approved for use to touchdown. The operator's approved training curriculums must include training on such manually flown operations, and the equipment must be properly certificated and maintained. Use of these manually flown systems to touchdown can be authorized by the issuance of ACL C062 in accordance with this order.

1.6 CONCEPT OF CIRCLING MANEUVERS

A. Instrument Approach Design Criteria. In many situations, instrument approach design criteria will not permit a straight-in approach to the landing runway. In these situations, a circling procedure is necessary to maneuver the aircraft to a landing on the intended runway. Circling maneuvers are usually necessary when there is an obstacle or terrain problem. Circling maneuvers are also required when a NAVAID is located in a position that precludes a straight-in approach to the intended landing runway. If a circling maneuver inbound course is offset more than 30 degrees from the RCL. Unless specifically restricted in the procedure, a circling maneuver can be initiated from any IAP and must be conducted entirely by external visual references. Electronic course or glidepath guidance cannot be used to perform a circling maneuver.

B. The Circling Maneuver. A circling maneuver is not an instrument maneuver. Sufficient visual references for manually maneuvering the aircraft to a landing must be maintained throughout a circling maneuver. The pilot must keep the aircraft's position within the established maneuvering area while performing the circling maneuver. The circling MDA must be maintained until an aircraft (using normal maneuvers) is in a position from which a normal descent (less than 1,000 feet per minute) can be made to

touchdown (decelerate to air taxi or hover for helicopters) within the TDZ. It is critical for pilots to understand that the published missed approach procedure may not provide adequate obstacle clearance, especially during the initial portion of a missed approach executed during a circling maneuver. The published missed approach is designed to provide obstacle clearance only when the missed approach is executed on the published final approach course at or above the MDA, and before passing the MAP. A published missed approach may not guarantee the necessary safety margin when a missed approach is executed past the MAP and/or below the MDA. The aircraft must remain within the established circling maneuvering area until the aircraft is at or above the MDA and established on the missed approach course. The following statements summarize the basic concepts of a circling maneuver:

- A circling maneuver is a visual maneuver.
- Sufficient visual references to manually maneuver the aircraft to a landing must be maintained throughout a circling maneuver.
- The aircraft must be maintained at the MDA until it is at a position from which a safe landing can be made.
- A missed approach must be executed when external visual references are lost or sufficient visual cues to manually maneuver the aircraft cannot be maintained.

C. Missed Approach Procedure. The traditional published missed approach procedure does not guarantee obstacle clearance during the initial phases of a missed approach if initiated during a circling maneuver after descending below MDA or after MAP. When a pilot loses visual reference while circling to land, follow the missed approach specified for the approach procedure. An initial climbing turn toward the landing runway will ensure that the aircraft remains within the circling obstruction clearance area. Continue to turn until established on the missed approach course. An immediate climb must be initiated because obstacle clearance is not guaranteed beyond the MAP.

1.7 LOOK-SEE APPROACHES

A look-see approach is not an actual type of approach, such as ILS or RNAV (GPS). Rather, it is a term used to describe the operation of commencing and continuing an instrument approach to DA/DH or MDA to determine if the seeing-conditions actually available at those points are sufficient to continue to a landing. Look-see approaches are approaches that can be started and then continued to the DA/DH or the MDA and the MAP, even when the weather conditions are reported to be below the authorized IFR landing minimums. This operation applies domestically only to CASR part 91 operators. This operation may be conducted in certain foreign countries by CASR part 121 operators. Upon arrival at the MDA and before passing the MAP, or upon arrival at the DA/DH, the approach may be continued below DA/DH or MDA if the seeing-conditions required by CASR 121.651(c) or CASR 91.175(c) and 91.175(l) are met. A pilot can continue to land using external visual reference if the necessary seeing-conditions are established before passing DA/DH or MDA/MAP. The operational need for look-see approaches is created by wide variations among foreign countries in weather observing, weather reporting practices, and because of limitations associated with manually derived and forwarded weather reports (especially during rapidly

changing weather conditions). The weather observation is often taken from a location that is several miles from the landing surface, and may not be representative of seeing-conditions encountered at DA/DH, MDA/MAP, or during landing. CASR Part 121 operators may conduct look-see approaches at foreign airports (civil and military) unless the foreign country specifically prohibits them. CASR Part 135 operators are prohibited from conducting look-see approaches at all airports, both domestic and foreign, by CASR 135.225.

1.8 CONCEPTS OF DA/DH

A. DA/DH Concept. The DA/DH concept is the foundation for CAT I and CAT II approach and landing operations. It is also an essential concept in certain CAT III operations. This concept evolved after the introduction of turbojets in 1958. It was established to resolve problems created by the use of a ceiling as an element of operating minimums, especially during rapidly changing weather conditions. The use of the DA/DH concept also enhances safety of operations in degraded seeing-conditions. A DA/DH is established to require that the pilot, at the specified height, decide whether adequate visual references are available for accomplishing the following actions:

- Verifying that the aircraft is in a position that will permit a safe landing in the TDZ.
- Determining that sufficient external visual references are available to manually maneuver the aircraft (or assess AP maneuvering in CAT II and CAT III operations) into alignment with the RCL.
- Determining that the aircraft can be maneuvered to touchdown within the TDZ, that directional control can be maintained on the runway, and that the aircraft can be stopped within the available runway length.
- For helicopter operations, determining that sufficient visual references are available to maneuver the helicopter to align with the landing area; to decelerate to air taxi or to hover; and to maintain directional control while air taxiing.

B. Operational Viewpoint. From an operational viewpoint, DA/DH is the limit to which a pilot can descend before having to decide to continue the approach by visual means. If the visual references required to safely continue the approach have not been established before passing DA/DH, a missed approach must be executed at DA/DH. This does not mean that a pilot waits until arriving at DA/DH before deciding to go around or to continue the approach based on visual references.

1) Operational Viewpoint. From an operational viewpoint, DA/DH is the limit to which a pilot can descend before having to decide to continue the approach by visual means. If the visual references required to safely continue the approach have not been established before passing DA/DH, a missed approach must be executed at DA/DH. This does not mean that a pilot waits until arriving at DA/DH before deciding to go around or to continue the approach based on visual references.

2) Although DA/DH is a specified point in space (PinS) at which a pilot must make an operational decision, the pilot accumulates the information required to make that decision throughout the approach. It is incorrect to assume that all aspects of the decisionmaking process are delayed until the critical instant the aircraft arrives at

DA/DH. The visual cues, which become available during the descent to DA/DH, enhance the pilot's formulation of the decision, which must be made at DA/DH.

3) The operational decision to continue the approach by visual means, however, must be made before passing DA/DH. At DA/DH, a decision to continue the approach by reference to visual cues is appropriate if a pilot is satisfied that the total pattern of the visual cues provides sufficient guidance and that the aircraft is in a position and tracking so as to remain within a position from which a safe landing can be made. However, if a pilot is not satisfied that all of these conditions exist, a missed approach must be executed.

C. Before Passing DA/DH. The decision that the pilot must make before passing DA/DH is not a commitment to land. It is a decision to continue the approach based on visual cues. This distinction is important since the possibility exists that, after passing DA/DH, visual cues may become inadequate to safely complete the landing, or the aircraft may deviate from the flightpath to a point where a safe landing cannot be assured. Since many variables are involved, the final decision to commit to a landing is the PIC's and is primarily a judgment based on all the relevant operational factors. The PIC shall usually delay the decision to commit to a landing until the final stages of flare and landing.

1) The following is a list of statements that describe what DA/DH is.

- DA/DH is a specified decision point.
- DA/DH is the point at which a specific action must be initiated (either continue the approach by reference to visual aids or go-around).
- DA/DH is the limit to which a pilot can descend before having to decide to continue the approach using external visual references.

2) The following is a list of statements that describe what DA/DH is not.

- DA/DH is not a point where the decisionmaking process begins.
- DA/DH is not the latest point at which a go-around could or should be made.
- DA/DH is not a point where all aspects of the decision are instantaneously formulated.

D. Vertical Navigation (VNAV) Approach Procedures Using DA/DH—ACL C073. Based on near-term safety benefits of using a continuously defined Vertical Path (VPATH) to the runway, and a long-term goal of simplifying approach training and qualification standards, users have indicated their intent to begin additional use of VNAV capability for instrument approaches.

1.9 CONCEPT OF MDA AND MAP

The MDA/MAP concept is the foundation for safe CAT I approach operations that do not have VPATH guidance (e.g., VOR or lateral navigation (LNAV)). Electronic glidepath information cannot be provided at certain locations because of obstacle or terrain problems, NAVAID sighting problems, and cost benefit factors. The MDA/MAP concept provides for safe approach operations in instrument conditions at locations that do not have VPATH guidance.

A. MDA. An MDA is the lowest permissible height (for a Nonprecision Approach (NPA) procedure) at which an aircraft can be controlled by reference only to instrument information. After passing the final approach fix (FAF), a pilot should descend on a VPATH that will enable a stabilized approach and, if the visual conditions are adequate, a descent to the runway without any intermediate level-off at the MDA. If the visual conditions are not adequate, the pilot must level off at the MDA until sufficient visual references are available to safely complete the approach and landing. For unusual approach procedures and environmental conditions (offset final course, crosswinds, icing, etc.) a pilot may descend to the MDA at an expedited rate (not to exceed 1000 feet per minute).

B. Establish an MDA. An MDA is established to require that the pilot, before descending below the specified height and before passing the MAP, determines that adequate visual references are available for accomplishing the following actions:

- Verifying that the aircraft is in a position that will permit a safe landing in the TDZ.
- Determining that sufficient visual references are available to manually maneuver the aircraft to align it with the RCL, touchdown within the TDZ, and maintain directional control on the runway.
- For helicopter operations, determining that sufficient visual references are available to maneuver the helicopter to align with the landing area, decelerate to air taxi or hover, and maintain directional control while air taxiing.

1) The following is a list of statements that describe what MDA is.

- MDA is the lowest permissible height at which an approach can be continued by reference solely to flight instruments.
- MDA is the limit to which a pilot can descend before having to decide whether or not to continue the approach by using external visual references.
- MDA is the minimum height above the surface to which the aircraft can descend, unless the pilot determines that the aircraft is in a position from which it can be safely maneuvered using normal rates of descent (less than 1,000 feet per minute) to a touchdown within the TDZ (decelerate to air taxi or hover for helicopters).

2) The following is a list of statements that describe what MDA is not.

- MDA is not a specified decision point.
- MDA is not a point at which a specific action is initiated.
- MDA is not a point where the decision process begins.
- MDA is not the latest point at which a go-around could or should be made.
- MDA is not a point where all aspects of the decision are instantaneously formulated.

C. MAP. For an approach that does not have vertical guidance, it is necessary to define a point on or near the airport where a missed approach must be executed, if adequate external visual references for safely continuing the approach are not available. This point is specified as the MAP. A MAP is a three-dimensional airborne position where the MDA passes over a specified geographic fix.

1) The following is a list of statements which describe what MAP is.

- MAP is a specified decision point.
- MAP is the last point at which the approach can be continued by reference solely to flight instruments. After the MAP, the instrument approach must be discontinued.
- MAP is the last point at which the published missed approach can be safely executed in instrument conditions.

2) The following is a list of statements which describe what MAP is not.

- MAP is not always the last point at which a pilot can decide to continue the approach by external visual references. Often, the MAP is located at a point where a pilot cannot safely descend and land if the MDA is maintained until arriving at the MAP (for example, when the MAP is located over the VOR on the airport).
- MAP is not a point where a decision or commitment to land is made.
- MAP is not a point where the decision process begins.
- MAP is not a point where all aspects of the decision are instantaneously formulated.

1.10 MINIMUM INSTRUMENT FLIGHT ALTITUDES

Except for certain CAT III operations, all instrument approach and landing operations have limitations related to obstacles, airborne instrumentation and equipment, ground-based navigation equipment, and/or visual aids. Because of these limitations, external visual information is required to safely complete instrument approaches and landings. Airborne instruments and equipment and the signals in space radiated by ground-based NAVAIDs must provide pilots adequate guidance to safely control an aircraft by reference solely to instruments until the aircraft arrives at a preestablished minimum height or altitude (DA/DH or MDA) for instrument flight. The total system (airborne and ground-based) does not provide this capability below the minimum height or altitude for instrument flight. Therefore, descent below the specified minimum height or altitude for instrument flight can only be safely accomplished when adequate external visual references are available. If adequate external visual references are not established, a pilot must execute an instrument missed approach at or before passing a preestablished MAP.

> Note: Descent below the specified minimum IFR altitude without adequate visual references to control and maneuver the aircraft to a landing is unsafe and prohibited. The minimum height or altitude for instrument flight for an instrument approach and landing is specified in various ways depending on the type and category of the instrument approach conducted.

A. NPA Procedures. The minimum heights or altitudes for IAPs that do not have vertical guidance can be specified as an MDA, height above touchdown (HAT), height above airport (HAA), minimum descent height (MDH), Obstacle Clearance Altitude (OCA), Obstacle Clearance Height (OCH), or Obstacle Clearance Limit (OCL). MDA and OCA are barometric flight altitudes referenced to mean sea level (MSL). HAT,

HATh, HAA, MDH, OCH, and OCL are radio or radar altitudes referenced to either the elevation of the airport, the elevation of the TDZ, or the elevation of the landing threshold.

- MDA or OCA may be specified for any approach procedure that does not have vertical guidance.
- HAT, MDH, OCH, or OCL may be specified for straight-in approach procedures that do not have vertical guidance.
- HAA, MDH, OCH, or OCL may be specified for circling maneuvers.

B. Precision and Approach Procedures with Vertical Guidance (APV) Approach Procedures. The minimum heights or altitudes for IAP with vertical guidance can be specified as a decision altitude (DA), OCA, DH, OCH, or OCL. DA/DH is specified as a DA referenced to MSL for aircraft equipped with only barometric altimeters and as HAT or HATh (for procedures developed with harmonized visibility minimums) for aircraft equipped with radio altimeter or RAs. DA, DH, OCH, and OCL. A and OCA are referenced to a barometric altitude (MSL). DH (in most countries), OCH, and OCL are referenced to a radio or radar height above either the elevation of the airport, the elevation of the TDZ, or the elevation of the landing threshold.

C. Lowest Permissible Height or Altitude for Instrument Flight. The lowest permissible height or altitude for instrument flight for any approach cannot be lower than any of the following:

- Minimum height specified by the DGCA and/or approved Aircraft Flight Manual (AFM).
- Minimum height or altitude for which the signals from ground-based or space-based navigation equipment can be relied upon for instrument flight.
- Minimum height or altitude that provides adequate obstacle clearance.
- Minimum height or altitude authorized for the flightcrew.
- Minimum height or altitude authorized for the operator for that aircraft and equipment combination.
- Minimum height or altitude permitted by the operative airborne and ground-based or space-based equipment.
- Minimum height or altitude published or otherwise established for the instrument approach.
- Minimum height or altitude authorized in ACLs for the operation being conducted.

1.11 OPERATING MINIMUMS

The lowest operating minimums for operations conducted under CASR 121, , and 135 are specified in standard ACLs, as appropriate. In general, an air carrier is authorized to use operating minimums specified by the following groups of IAP, provided the minimums are not lower than the lowest minimums specified in the air carrier's ACL for any particular type of approach procedure.

- CASR Part 97, IAP.

- Any IAPs approved and incorporated into the ACLs.
- ICAO contracting State IAPs at foreign airports.
- IAPs established by an air carrier at foreign airports, provided the procedure is accepted in accordance with the ACLs.

A. Straight-In Minimums for Approaches with a DA/DH. The lowest permissible DA/DH and visibility minimums for all airplanes conducting standard straight-in IAPs other than CAT II or CAT III that have a DA/DH are HAT 200 and RVR 1800. The lowest permissible DA/DH and visibility minimums for helicopters is ¼ statute mile visibility or RVR 1200 (350 meters). These basic DA/DH and visibility minimums are normally restricted to runways that are equipped with a lighting system consisting of TDZ and RCL lights and medium intensity approach lighting system with runway alignment indicator lights (MALSR), simplified short approach lighting system with runway alignment indicator lights (SSALR), and ALSF-1 or ALSF-2 approach lighting systems. RVR 1800 is authorized when FD, AP, or HUD is used in lieu of TDZ and RCL lights. Additionally, SA CAT I operations are discussed in Chapter 6.

B. Straight-In Minimums for Approaches with an MDA. The lowest permissible MDA and visibility minimums for Categories A, B, C, and D aircraft during the conduct of straight-in IAPs that have an MDA are HAT 250 and ½ statute mile visibility or RVR 2400 (700 meters). The lowest permissible MDA and visibility minimums for helicopters operated at 90 knots or less are HAT 250 and ¼ statute mile visibility or RVR 1600 (450 meters). The lowest MDA and visibility minimums for helicopters operated at more than 90 knots are HAT 250 and ½ statute mile visibility or RVR 2400 (700 meters). These minimums are the lowest authorized for approaches that have an MDA and are restricted to runways that are equipped with MALSR, SSALR, ALSF-1, or ALSF-2 approach lighting systems, or foreign equivalents.

C. Controlling Minimum Concept. The concept of a controlling minimum is based on reported weather conditions at the destination airport. The controlling minimum concept includes considerations for the reported weather conditions, the capabilities of the flightcrew, and the capabilities of the airborne and ground- or space-based equipment. This concept prohibits a pilot from continuing past the FAF or beginning the FAS of an IAP unless the reported visibility (RVV or RVR, if applicable) is equal to or greater than the authorized visibility (RVV or RVR) minimum for that IAP.

1) Objective. The basic objective of the controlling minimum concept is to provide reasonable assurance that once the aircraft begins the FAS, the pilot will be able to safely complete the landing. The controlling minimum concept, however, permits a pilot to continue a CAT I approach to DA/DH if the visibility/RVV/RVR was reported to be at or above the controlling minimum when the pilot began the FAS, even though a later visibility/RVV/RVR report indicates a below-minimum condition. RVR reports, when available for a particular runway, are the reports (controlling reports) that must be used for controlling whether an approach to, and landing on, that runway is authorized or prohibited.

2) CASR Parts 91 Controlling Minimum. The controlling minimums concept as described above is not applicable to CASR part 91 operators when determining if the pilot can continue past the FAF or begin the Final Approach Segment (FAS). CASR Parts 91 operations can begin an approach and continue to the DA/DH or the MDA and the MAP, even when the weather conditions are reported to be below the authorized

IFR landing minimums. Upon arrival at the MDA and before passing the MAP, or upon arrival at the DA/DH, the approach may be continued below DA/DH or MDA to the runway if the seeing-conditions required by CASR 91.175(c)(d) or CASR 91.175(l) are met.

3) CASR Part 121 Controlling Minimum. The controlling minimum concept for operations conducted under CASR part 121 is implemented by CASR 121.651(b). For these operations, the controlling minimum must be used at civilian airports within the Republic of Indonesia unless the provisions of CASR 121.651(d) are met. CASR 121.651(d) permits a pilot to begin the FAS, even though the reported visibility/RVV/RVR is below the controlling minimum, if the approach procedure is an ILS and the flight is actively monitored by a Precision Approaches Radar (PAR).

a) Therefore, pilots are not constrained by the controlling minimum on runways with ILS and active PAR facilities, provided the provisions of CASR 121.651(d) are met. The controlling minimum concept allows for a pilot to continue a CAT I approach to DA/DH or MDA if the visibility/RVV/RVR was reported to be at or above the controlling minimum when the pilot began the FAS, even though a later visibility RVV/RVR report indicates a below-minimum condition.

b) Upon reaching DA/DH or MDA and before passing the MAP, the approach may be continued below DA/DH or MDA to touchdown if the requirements of CASR 121.651(c) are met, even though the visibility/RVV/RVR is reported to be below the controlling minimum. The controlling minimum concept does not apply to CASR part 121 operations conducted at civilian airports in many foreign countries. In foreign countries, CASR part 121 operators may conduct look-see approaches unless the rules of a foreign country prohibit look-see approaches. If the rules of the foreign country prohibit look-see approaches, the controlling minimum concept applies in that country.

4) CASR Parts 135 Controlling Minimum. The controlling minimum concept for CASR 135 differs in application from CASR part 121. CASR Part 91 applies to all CASR 135 operations whether they are conducted in foreign countries or the Republic of Indonesia. For CASR 135 operations, the controlling minimum concept must be used at all airports

1.12 MAXIMUM SINK RATES

A. Perceptual Limitations. Restricted seeing-conditions significantly affect a pilot's ability to visually detect or perceive vertical height, sink rate (vertical velocity), and vertical acceleration. As seeing-conditions decrease, the pilot's ability to perceive vertical height, sink rate, and vertical acceleration degrades faster than the ability to perceive lateral errors and lateral accelerations. Personnel establishing operating minimums must consider these human perceptual limitations.

B. Aircraft Structural Limitations. According to structural design criteria, the aircraft structure must tolerate touchdown sink rates (vertical velocity) of at least 10 feet per second (600 feet per minute). Touchdown sink rates higher than the maximum rates evaluated during the certification of an aircraft can cause serious structural damage, including catastrophic failure. Therefore, instrument procedure design must provide for sink rates that give a pilot the capability of detecting unacceptable situations and adjusting the flightpath to achieve a safe landing, considering available visual aids and

operating minimums. Visual aids and operating minimums must provide a high probability that a pilot will be able to control the aircraft adequately and adjust the vertical flightpath to achieve acceptable sink rates at touchdown and touchdown within the TDZ.

C. Maximum Acceptable Sink Rates. Operational experience and research have shown that a sink rate of greater than approximately 1,000 feet per minute (16.67 feet per second) is unacceptable during the final stages of an approach (below 1,000 feet above ground level (AGL)). This is due to a human perceptual limitation that is independent of the type of airplane operated and is equally applicable to helicopters. Therefore, the IAPs and the operational practices and techniques must ensure that sink rates greater than 1,000 feet per minute are not required or permitted in either the instrument or visual portions of an approach and landing operation. Operating minimums and available visual aids must provide reasonable assurance that a pilot will have adequate external visual references in the visual portions of all IFP (certain CAT III operations excepted). To be considered adequate, these external visual references must permit a pilot to adequately perceive sink rates and manually maneuver the aircraft (or evaluate AP performance) to achieve an acceptable touchdown sink rate and touchdown point, considering the operating minimums and the available visual aids.

1.13 EFFECTS OF AIRCRAFT/COCKPIT DESIGN ON SEEING-CONDITIONS

A. Design of an Aircraft. The overall design of an aircraft and the design of a cockpit significantly affect seeing-conditions during the latter stage of an approach and landing and during the initial stage of a takeoff. Cockpit design has a direct affect on a pilot's ability to determine the three-dimensional position of an aircraft in relation to a landing or takeoff surface and, consequently, on the ability to safely control the flightpath of the aircraft. Therefore, cockpit design is a significant factor in establishing operating minimums of a particular aircraft. Generally, aircraft with larger cockpit cutoff angles (better downward viewing angles over the nose) and shallower landing pitch attitudes provide for better seeing-conditions. Improved seeing-conditions derived from improved cockpit design can be used to justify lower operating minimums. Seeing-conditions are affected by geometric factors related to the design of an aircraft's structure and by aerodynamic factors related to an aircraft's pitch axis. When considering aircraft/cockpit design, it is important to note the following:

- The radio (radar) altimeter is calibrated to read the height of the landing gear above the terrain (when in the landing configuration).
- The glidepath antenna tracks down the centerline of the glideslope when the instruments in the cockpit indicate the aircraft is on glidepath.
- The pilot's eyes are always higher than what is indicated on the radio (radar) altimeter.
- The pilot's eyes are above the electronic glideslope in most aircraft.

B. Aircraft and Cockpit Physical Design. The significant factors related to the physical design of an aircraft and cockpit combination that affect seeing-conditions most are as follows:

- Distance along the longitudinal axis from directly above the main landing gear to directly beneath the pilot's eyes.

- Vertical distance from the pilot's eyes to a position abeam the main landing gear.
- Distance along the longitudinal axis from directly beneath the glideslope antenna to directly beneath the pilot's eyes.
- Vertical distance from the glideslope antenna to abeam the pilot's eyes.
- Cockpit cutoff (CCO) angle.

C. The CCO Angle. The CCO angle is the angle, measured downward, from the longitudinal axis of the aircraft (zero pitch reference) to the lowest (most depressed) angle that can be seen over the aircraft's nose from the proper sitting position (eye reference position). The CCO angle in most transport category aircraft is between 15 and 25 degrees. Although many VFR helicopters have an excellent CCO angle, most IFR helicopters have CCO angles equivalent to transport category aircraft.

D. Aircraft Aerodynamic Design. The significant factors associated with the aerodynamic design of an aircraft that affect seeing-conditions are related to pitch attitudes. The pitch attitudes necessary for final approach, flare (deceleration for rotorcraft), and landing (air taxiing for rotorcraft) have a major affect on seeing-conditions. This is because a nose-up attitude reduces the downward viewing angle relative to the horizon, which reduces seeing-conditions.

1) For example, an aircraft with an excellent CCO angle of 21 degrees and a high final approach pitch attitude of 8 degrees would have a seeing condition comparable to a similar size aircraft having a poor CCO angle of 13 degrees and a 0 degree pitch attitude. Since the pitch attitude on final approach varies with approach speed, aircraft configuration, and gross weight, the seeing-conditions change as these operational factors change.

2) The aircraft's flare characteristics (deceleration for rotorcraft) can also have a significant effect on the seeing-conditions during landing. The seeing-conditions during flare decrease if any positive pitch change is required. In helicopters, the most severe degradation to the seeing-conditions occurs during deceleration to air taxi or hover. Often, the deceleration rate in a helicopter must be limited to maintain adequate seeing-conditions.

3) For example, when a typical IFR helicopter with an 18 degree CCO angle and a 0 degree final approach attitude approaches an 18 degree pitch attitude during a maximum effort deceleration, the pilot will lose sight of the landing surface. At an 18 degree pitch attitude with an 18 degree CCO angle, the lowest downward viewing angle would be parallel with the horizon.

4) Therefore, a deceleration pitch attitude must be maintained significantly below 18 degrees to maintain adequate visual references with the landing surface. A similar situation is encountered in turbojet airplanes during takeoff rotation and initial climb when external visual references can be lost.

E. Eye Reference Position. Eye reference position is a critical factor in achieving optimum seeing-conditions. A pilot's seat must be individually adjusted so that the pilot's eyes are located at an optimum eye reference position. When seated in this position, a pilot should be able to take advantage of the full CCO angle, maintain reference with the necessary flight instruments, and operate all necessary controls. Many aircraft have special devices that indicate proper seat adjustment. Improper seat adjustment,

especially in CAT II and III operations, can prevent the pilot from acquiring adequate external visual reference upon arrival at DA/DH or MDA/MAP.

1) The seating position commonly used for en route operations in many aircraft is too low and too far aft for the pilot to achieve optimum seeing-conditions during approach and landing operations. This lower and further aft seating position results in a reduction of the CCO angle, which degrades the seeing-conditions by reducing the segment of the approach and landing surface visible over the aircraft's nose.

2) A pilot maintaining this undesirable seating position during approach and landing may tend to compensate for the reduced CCO angle, and its effects, by leaning forward in an attempt to acquire the necessary external visual references. A consequence of this practice is a tendency to unintentionally reduce the pitch attitude. Since seeing-conditions improve as the nose is lowered, this tendency to reduce pitch attitude can contribute to the tendency to duck under, which has resulted in landings short of the runway.

1.14 SAFETY DURING MISSED APPROACHES AND GO-AROUNDS

A. Executing a Go-Around. Most aircraft used in air transportation have the capability, in a normal approach and landing configuration, of safely executing a go-around from any point before touchdown, even when significant failures occur, such as engine, hydraulic, or AP failures. This aircraft performance capability for safety in go-arounds should be provided for, particularly for go-arounds caused by operational factors, such as airborne and ground-based equipment failures, ATC contingencies, loss of external visual references, and misalignment with the landing surface. This capability is required in all CAT II and CAT III operations. When establishing operating minimums for aircraft that do not have this capability, the consequences of the failures that would preclude a safe go-around must be considered. Operating minimums for aircraft without the performance capability to safely go around following engine failure must provide adequate seeing-conditions to successfully accomplish a forced landing in a preestablished location. The following factors must be considered when evaluating the safety of go-arounds from any point in the approach before touchdown.

B. Go-Around Capability. The go-around capability is based on normal operating conditions at the lowest authorized operating minimum. Factors related to geometric limitations of the aircraft during the transition to a go-around (such as tail strike, or rotor strike) must be considered. Other factors such as the available visual cues, AP or FD mode switching, altitude loss in transition to go-around, and altitude loss due to AP malfunction must also be considered.

C. Inadvertent Touchdown. If a go-around could result in an inadvertent touchdown, the safety of such an event must be considered. The aircraft design and/or procedures used must accommodate for relevant factors. Examples of relevant factors that must be considered include operation of engines, the operation of autothrottle, autobrakes, autospoilers, AP mode switching, and other systems that could be adversely affected by an inadvertent touchdown.

D. Failure Condition in the Aircraft. If the occurrence of any failure condition in the aircraft or its associated equipment could preclude a safe go-around from low altitude, then these failure conditions must be clearly identified. In these cases, a

minimum height must be specified from which a safe go-around can be initiated if the failure occurs. If the failure occurs below the specified height, pilots must be made aware of the effects or consequences of any attempt to go around.

E. Appropriate Procedures for Low-Altitude Go-Arounds. Information must be provided to the flightcrew concerning appropriate procedures for low altitude go-arounds and the height loss expected. If the conduct of certain approach and landing operations is authorized with an engine-out, height loss information for engine-out operations must also be provided to the flightcrew.

1.15 FUNCTION OF EXTERNAL VISUAL REFERENCES

Except for certain CAT III operations, external visual information is essential for a pilot to safely take off or to complete an instrument approach and landing. This external visual information (visual cues) is necessary for a pilot when assessing the three-dimensional position of the aircraft, its velocity, and its acceleration or deceleration in relation to the intended landing or takeoff surface. This information is essential for a pilot when manually maneuvering (or when evaluating the AP's performance in maneuvering) the aircraft into alignment with the centerline of a landing or takeoff surface. External visual references are essential for a pilot to safely touchdown (decelerate to air taxi/hover for rotorcraft) within the TDZ and for maintaining directional control to stop on the runway (maintain directional control and avoid obstacles while air taxiing for rotorcraft). In degraded seeing-conditions, the quality of external visual information can be significantly improved by use of visual aids, such as runway markings and lighting. Such visual aids are necessary to increase the conspicuousness of the landing or takeoff surface. These aids provide pilots with the necessary visual references during takeoff, the final stages of approach and landing, and ground movement. The importance of visual aids increases as seeing-conditions decrease.

A. Lateral Position and Crosstrack Velocity or Acceleration. Approach lighting, TDZ lighting, RCL lighting, runway edge lighting, and runway markings provide visual references to pilots for assessing lateral position and crosstrack velocity or acceleration.

B. Visual Roll References During Landing, Takeoff, Rotation, and Initial Climb. Approach lighting, threshold lighting, in-runway lighting, and runway markings provide visual roll references during landing, takeoff, rotation, and initial climb.

C. Visual Information for a Pilot. TDZ lighting and runway markings indicate the plane of a landing surface and identify the touchdown area, thereby providing a vertical and longitudinal reference. These visual aids provide necessary visual information for a pilot to determine vertical position, sink rate, and vertical acceleration or deceleration.

D. Adequate Alignment and Directional Control Information. The visual guidance information from in-runway lights and/or markings must be sufficient to ensure adequate alignment and directional control information during takeoff or during final stages of landing and deceleration.

E. External Visual Aids. Reference to external visual aids is a primary requirement for controlling the aircraft's flightpath when operating below the minimum altitude (height) published for instrument flight.

1.16 MINIMUM VISIBILITY, RVV, AND/OR RVR

Upon arrival at the minimum height or altitude for instrument flight and before passing a preestablished decision point, a pilot must establish adequate seeing-conditions to safely complete the approach and landing.

A. Establishing Operating Minimums. Operating minimums are expressed as visibility, RVV or RVR. Criteria for establishing operating minimums must provide a reasonable assurance that a pilot can establish the required seeing-conditions before passing the decision point. This criterion provides this assurance if the weather conditions are reported to be at or above the landing minimum when the approach is initiated. To achieve this objective, the operating minimums specified for the procedure (visibility, RVV, RVR) must be compatible with the minimum height or altitude for instrument flight and the decision point specified for the procedure.

B. Establishing Visual Reference. Therefore, when the reported weather conditions are at the authorized minimums, a pilot should be able to establish external visual references upon arrival at the minimum height or altitude (DA/DH or MDA), and before passing the decision point (DA/DH, MAP, or visual descent point (VDP)). At this point a pilot must be able, by external visual reference, to maneuver to a landing without exceeding a descent rate of 1,000 feet per minute or exceeding aircraft limitations on touchdown. For example, it would not be practical to specify a DA/DH of 200 feet (HAT 200) with an operating minimum of RVR 700 (200 meters) since the first visual contact in a typical aircraft would not occur until approximately 130 feet above the elevation of the TDZ.

C. Adequate External Visual References. The specified operating minimum must also permit adequate external visual references to be established early enough for a normal descent to landing (less than 1,000 feet per minute). For example, it would not be reasonable to specify an MDA equivalent to a HAT of 400 feet and an operating minimum of RVR 1600 (450 meters) for typical turbojet airplanes. In this situation, the pilot would not establish first visual contact until the airplane is within 4,000 feet of the landing threshold and would require a descent rate much higher than 1,000 feet per minute to land within the TDZ.

1.17 CONCEPT OF RVR

A. Operating Minimums. Operating minimums are specified in terms of ground visibility, tower visibility, and RVR. The RVR concept has evolved over a long period, and its use in the United States began in 1955. As operating minimums were reduced due to improvements in airborne and ground-based equipment, it became more likely that pilots would not see the full length of the runway upon arrival at the specified decision point. Positions established for taking visibility observations were often several miles from the approach end of many runways. This resulted in reported visibility values that frequently did not represent the seeing-conditions encountered during the final stages of approach and landing. This deficiency was particularly critical when rapidly changing weather conditions within the terminal area occurred. These factors generated a need for systems such as RVR, which could rapidly and reliably provide reports of the seeing-conditions that a pilot could expect to encounter in the TDZ and along the runway.

B. RVR Measurements. RVR measurements are taken by a system of calibrated transmissometers and account for the effects of ambient background light and the runway light intensity. Transmissometer systems are strategically located to provide RVR measurement associated with one or more of the three basic portions of a runway: the TDZ, the runway midpoint (Mid), and the rollout end of the runway (rollout).

C. Instrumentally Derived Value. RVR is an instrumentally derived value that reflects an artificially created seeing-condition on or near the portion of the runway associated with the RVR report. This artificially created seeing-condition is achieved by using HIRLs, as well as TDZ and RCL lights if they are installed. These lights increase the conspicuousness of the landing surface and reach out to the pilot, thereby creating a seeing-condition that is significantly better than the reported ground visibility or tower visibility. Since RVR is based on high intensity lights, an RVR report only has meaning when associated with the seeing-conditions on or near the portion of the runway where the report was obtained (TDZ, Mid, or rollout). An RVR report has no meaning unless a pilot is also seeing the high intensity lights on which the report is based.

1) To properly apply operating minimums, it is important to understand RVR. The following is a list of statements that describe what RVR is.

- RVR is an instrumentally derived value.
- RVR is currently measured by transmissometers located approximately 400 feet from RCL.
- RVR is related to the transmissivity (degree of opaqueness) of the atmosphere.
- RVR is an approximation of the distance a pilot should see when an aircraft is on, or slightly above, the portion of the runway associated with the report.
- RVR is calibrated by reference to runway lights and/or the contrast of objects.
- RVR is a value that varies with runway light setting.
- RVR is a value that only has meaning for the portions of the runway associated with the RVR report (TDZ, Mid, or rollout).

2) The following is a list of statements that describe what RVR is not.

- RVR is not a measure of meteorological visibility.
- RVR is not a measure of surface visibility or tower visibility.
- RVR is not a measure of seeing-conditions on taxiways, ramps, or aprons.
- RVR is not a measure of seeing-conditions at or near MDA or DA/DH.
- In the United States, RVR is not measured or reported by a human observer.
- RVR is not “visibility.”

D. Concept of Controlling RVR. Controlling RVR means that RVR reports are used to determine operating minimums whenever operating minimums are specified in terms of RVR, and RVR reports are available for the runway being used. All CAT I operating minimums below one-half statute mile and all CAT II and III operating minimums are based on RVR. The use of visibility is prohibited because the reported visibility may not represent the seeing-conditions on the runway. All takeoff minimums below ¼ statute mile visibility (RVR 1600 (450 meters) for airplanes and RVR 1200 (350

meters) for rotorcraft) are predicated on RVR and use of visibility is prohibited. For example, if the takeoff minimum for a particular operation is TDZ RVR 1200 (350 meters)/rollout RVR 1000 (300 meters), RVR reports are controlling and a takeoff is prohibited unless the TDZ RVR report is at or above RVR 1200 (350 meters) and the rollout RVR report is at or above RVR 1000 (300 meters). In this example, a takeoff cannot be based on visibility if the RVR system is operative, even if the reported visibility is greater than 1 statute mile.

1.18 VISUAL AIDS AND RUNWAY ENVIRONMENT

A. Identifying Contrast Levels. A primary factor in the identification of objects, such as landing surfaces, depends on a pilot's ability to see contrasts between the object and the surrounding background. The ability to see and recognize contrasts in the brightness or color of an object is much greater than the ability to determine the actual level of illumination of an object. For example, a 100-watt light bulb seems to be much brighter at night than during daylight conditions, even though the actual level of illumination is the same.

B. Increasing Contrast Levels. The contrast between a 100-watt light and a dark night background is much greater than it is in a daylight background. The presence of airborne particles or water droplets causes the available light to diffuse or scatter. This scattering effect raises the overall illumination of the background that, in turn, reduces the level of contrast between an object and its background. This is the primary reason why seeing-conditions decrease when landing into the sun on a hazy or foggy day or when the landing lights of an aircraft are turned on in snow or fog conditions. Reduced levels of contrast increase the difficulty of identifying objects such as snow-covered runways or runways located in heavily lighted urban areas. As a result, contrast levels must be increased to provide the seeing-conditions necessary for the safe conduct of operations with reduced operating minimums.

1) Seeing-conditions can be improved by using visual aids and by enhancing the level of contrast within the runway environment. For example, the difference in the level of contrast between a landing or takeoff surface and the surrounding area can be improved through good airport maintenance practices. Such practices as planting and maintaining grass around a runway and between a runway and a taxiway, and plowing snow-covered runways, improve levels of contrast. The most effective way to improve the contrast of a landing or takeoff surface, however, is to use visual aids because they are effective in a variety of weather conditions.

2) Visual aids such as approach lights, runway lights, and runway markings significantly improve the contrast between a landing or takeoff surface and the immediate surrounding area. The improved contrast provided by approach and runway lighting significantly improves seeing-conditions in both night and daylight operations. Approach lighting and runway lighting are essential elements of all landing operations conducted in weather conditions below RVR 4000 (1200 meters) and all takeoff operations below RVR 1600 (450 meters).

1.19 THRESHOLD CROSSING HEIGHT (TCH) CONCEPT

Many complex technical factors must be considered during the installation of ILS and MLS equipment to support approach and landing operations at any particular runway. The signals in space radiated by the facility must meet required flight inspection requirements (accuracy and course structure) for the particular category of operation to be supported. Design of ground support systems must be such that there is an extremely small probability of losing electronic guidance during actual operations (continuity of service). The design must also provide for an extremely high probability of providing continuously reliable electronic guidance (integrity). The ILS or MLS accuracy and course structure, continuity of service, and integrity must meet established standards for the category of operation authorized at that facility. Another critical factor in installing and siting these systems is the TCH. The following discussion addresses significant factors that must be considered when establishing acceptable TCHs.

A. Aircraft Glideslope/Elevation Antenna Location. The glideslope/elevation receiver of the aircraft detects vertical movement (displacement) of the glideslope/elevation antenna in relation to the centerline of an electronic glideslope/elevation radiated from a ground facility. As a result, the location of the glideslope/elevation antenna on the aircraft directly relates to terrain and obstacle clearance during the final stages of an approach and landing.

1) The physical dimensions and aerodynamic characteristics of the aircraft (especially pitch attitude) are important factors in the determination of the proper location of a glideslope reception antenna. In conventional aircraft, the glideslope/elevation antenna is located above the height of the main landing gear. Since an aircraft is maneuvered so that its antenna tracks the centerline of the electronic glidepath, the main landing gear will track below the glidepath.

2) For example, if the antenna of an aircraft is located 40 feet above the landing gear and the electronic glidepath crosses 30 feet above the runway threshold, the main landing gear will touch down short of the runway since the antenna, not the landing gear, flies the glidepath. This example illustrates the important relationship between the aircraft antenna location and the electronic glidepath TCH.

3) This situation can be resolved by siting the ILS or MLS to achieve a specified TCH and by requiring proper location of the glideslope/elevation antenna on the aircraft. Similar problems are encountered when using visual vertical guidance systems such as Visual Approach Slope Indicator (VASI) or precision approach path indicator (PAPI), since the pilot's eyes track the visual glidepath and the gear follows a lower path. The need to maintain certain landing gear crossing heights at the threshold establishes the minimum safe TCH for a particular aircraft. The current minimum TCH requirements are based on the DC-10 that has, in landing configuration, the greatest vertical displacement between the antenna location and the landing gear.

B. Barometric VNAV (baro-VNAV) TCHs. The most significant factor in determining the threshold wheel crossing height for aircraft using baro-VNAV for vertical guidance during the FAS is the vertical distance between the static ports and the bottom of the main landing gear, when the aircraft is in its normal approach attitude. The minimum and maximum acceptable TCHs for these aircraft are determined in a manner similar to ILS/MLS-equipped aircraft using the static ports and the main landing gear height, instead of the glideslope/elevation antenna to landing gear height.

C. Acceptable TCHs. Siting ILS or MLS equipment to achieve a particular TCH can be a complex task. Operational experience with citing these systems has shown a need to establish a range of acceptable TCHs. The types of aircraft likely to use a particular facility must be considered. Another consideration in establishing the range of acceptable TCHs is the pilot's ability to detect (by external visual references) deviations from the proper glidepath and to make the necessary flightpath adjustments for adequate landing gear clearance at the threshold. Proper TCHs in CAT II and especially CAT III operations are more critical because of the limited visual cues available and the use of automatic landing systems.

D. Minimum and Maximum Acceptable TCHs in the United States. The minimum acceptable TCH at a particular runway is determined by the most TCH-critical aircraft likely to be used at that facility. The maximum acceptable TCH also depends upon the types of aircraft likely to be used at the facility. The instrument approach and landing system must be sited so that all aircraft have a high probability of a safe touchdown (deceleration to air taxi or hover for rotorcraft) in the TDZ. Landing performance is based on the assumption that touchdown will occur in the TDZ. Very high TCHs will not permit some aircraft to safely touchdown within the TDZ, therefore maximum acceptable TCHs must also be established.

E. TCHs at Foreign Airports. Glideslope TCHs at foreign airports may not be equivalent to U.S. criteria. It is important for pilots and operators using foreign airports to understand the significance of TCH and to know the minimum TCHs that can be safely used by their aircraft. Operations should not be conducted to runways with TCHs below minimum acceptable TCHs for any particular aircraft, unless special limitations are placed on the conduct of the operation. These special limitations must be such that a pilot can safely and consistently touchdown within the TDZ and safely complete the rollout on the available runway length.

1.20 AIRPORT FACILITIES AND SERVICES

The varied seeing-conditions encountered in AWOs require pilots to rely heavily on visual aids, electronic guidance from ground-based facilities, and other facilities and services provided by the airport. Therefore, basic VFR airport facilities and services must be enhanced before safe operations can be conducted in instrument flight conditions. Runways and taxiways must meet more stringent criteria with respect to width, length, marking, and lighting. Instrument approach aids and IAPs are required. Visual aids are needed to assist a flightcrew during transition from instrument to visual flight and during ground movement. Meteorological observation and measurement equipment must be available to provide real-time information on weather conditions. Equipment and procedures must be established to provide aeronautical information on runway surface conditions and the status of airport facilities and services.

A. VFR Airport Facilities and Services. Enhancements to basic VFR airport facilities and services necessary to support instrument flight operations include the following general factors:

- Physical characteristics of the runway environment, including approach, departure, and pre-threshold terrain characteristics.
- Obstacles and the obstacle limitation assessment surfaces.

- Visual aids.
- Electronic aids.
- Secondary (standby) power supplies.

B. Physical Characteristics. Physical characteristics of a runway environment become increasingly important as seeing-conditions deteriorate. Excessive runway or approach light gradients can create undesirable visual illusions and can cause hard or long landings. Longer runway lengths are necessary for reasons such as the tendency to land further down the runway because of visual illusions and the increased difficulty in controlling the aircraft's flightpath. The topography in the approach and pre-threshold areas should be regular and preferably level to ensure proper operation of radio (radar) altimeters, FD systems, and automatic landing systems.

1) The operation of automatic landing systems and other systems that provide flight guidance during flare and landing (such as HUD) is dependent on input from radio altimeters. As a result, the flare profile, touchdown sink rate, and touchdown point can be adversely affected by the profile of the pre-threshold terrain. Where the pre-threshold terrain for a particular runway could affect safe operations (examples include SEA 16R, CVG 36C, MSP 30L, and PIT 10L), an in-flight demonstration must be made to determine that the flight control system of a particular aircraft is not adversely affected by the pre-threshold terrain profile.

2) Additionally, the pre-threshold terrain at certain runways (examples include MSP 30L and PIT 10L) may not permit a radio altimeter to be used to define DH for CAT II or AH/DH for CAT III operations for certain aircraft. In certain situations, an inner marker (IM) can be used to define the CAT II DH or the CAT III AH.

C. Obstacles and Obstacle Limitation Assessment Surfaces. Degraded seeing-conditions decrease a pilot's ability to see and avoid obstacles. Therefore, it is essential that obstacle protection is provided along the approach paths, missed approach and departure flightpaths, and in areas on or near runways used for takeoffs and landings.

1) In certain situations, obstacles may prevent the conduct of CAT II or III operations. In other situations, a higher-than-normal DH for CAT I or II operations may be required to guarantee obstacle clearance upon the execution of a missed approach. During operations using approaches with vertical guidance, it is essential to provide obstacle protection in runway safety areas and obstacle-free zones. A runway safety area is an area adjacent to the runway that must be free from fixed or mobile "nonbreakable" obstructions. Runway safety areas reduce the potential for catastrophic accidents if portions of the aircraft structure (such as a wingtip) extend beyond the runway edge, or if an aircraft departs the runway during a landing or takeoff roll.

2) An obstacle-free zone is a three-dimensional area including portions of the landing surface that provides obstacle clearance during landings or during rejected landings, including missed approaches after touchdown. The only fixed obstructions permitted in runway safety areas or obstacle-free zones are frangible objects or obstructions that are fixed by their functional purpose. "Fixed by their functional purpose" means that the installation of the object in those areas is essential to the safe conduct of operations on the runway; there are no alternative locations (examples include such objects as runway lights, glideslope/elevation antennas, and RVR

reporting systems). Mobile obstructions (such as aircraft and/or vehicles) are not permitted within runway safety areas or obstacle-free zones while aircraft are using the runway. Aircraft, vehicles, and other objects that could disturb ILS or MLS electronic guidance are not permitted in ILS- or MLS-critical areas when other aircraft are critically dependent on this type of guidance.

3) Since protection of these areas or zones is critical to safe operations (particularly during degraded seeing-conditions), visual aids (such as signs, markings, or lighting) must be provided for identifying the boundaries of these areas to pilots and operators of other vehicular traffic. ATC procedures and ground movement restrictions must be provided to ensure that these areas are protected.

D. Visual Aids. Visual aids are essential for most AWOs. Visual aids are also important for the safe and expeditious guidance and control of taxiing aircraft. These aids include signs, markings, and lights that identify holding points or indicate directions, and the marking or lighting of the taxiway centerline and edges. The conspicuousness of runway and taxiway markings deteriorates rapidly, especially at busy airports. These markings must be frequently inspected and maintained, particularly for CAT II or III operations.

1) All lighting systems should be monitored by ATC so that timely information on system failures or malfunctions can be provided to pilots. Regular visual inspections of all sections of the lighting systems are normally used to determine the status of individual lights.

2) Therefore, it is usually only necessary for ATC to remotely monitor lighting circuits to determine whether the proper amount of power is being demanded by, and delivered to, the lighting systems. Remote monitoring of approach, runway edge, and in-runway lighting is essential during CAT II and CAT III operations, unless frequent visual inspections (every 2 hours) or timely pilot reports indicate that the lights are serviceable for the operations in progress.

E. Nonvisual (Electronic) Aids. Ground- or space-based systems that provide electronic guidance must provide the quality of guidance (flight-inspected course structure), integrity (degree of trust that can be placed on the accuracy of the guidance), and continuity of service (protection against loss of signal) appropriate to the category of the operation being conducted (CAT I/CAT II/CAT II). Systems used operations using approaches with vertical guidance must provide acceptable flightpath angles and acceptable TCHs. A classification system has been established through ICAO for ground-based electronic systems used for approaches with vertical guidance.

1) This classification system reflects the ground-based system configuration, course quality, integrity, and continuity of service capabilities. Since the electronic aids provide such a critical function, pilots conducting takeoff or landing operations must be notified immediately of any changes in system status or of any malfunctions or failures. To meet this requirement, all facilities associated with ILS or MLS ground equipment must be constantly monitored by ATC or other appropriate personnel.

2) The required levels of reliability, integrity, and continuity of service for these facilities are usually provided by automatic electronic monitoring systems, online standby equipment (backup transmitters), duplication of key functions, and secondary power supplies.

F. Secondary Power Supplies. Secondary power sources (standby power supplies) are essential for ensuring that visual aids, electronic aids, meteorological reporting systems, and communication facilities continue to function, even if the main source of power is interrupted. Loss of power to these systems becomes more critical as seeing-conditions deteriorate. Therefore, as conditions change from CAT I to CAT II or CAT III, the levels of required redundancy increase, and standby power switchover times decrease.

CHAPTER 2 APPROVAL OF R.O.I. OPERATORS FOR SPECIAL AUTHORIZATION CATEGORY I AND ALL CATEGORY II/III OPERATIONS—CASR PARTS 91 (LARGE AIRCRAFT), 121, AND 135

2.1 OVERVIEW

The general process of approval or acceptance of certain operations, programs, documents, procedures, methods, or systems is an orderly method used by Directorate of Airworthiness and Aircraft Operations (DAAO) inspectors to ensure that such items meet regulatory standards and provide for safe operating practices. It is a modular, generic process that is ideally suited for the approval of Special Authorization (SA) Category (CAT) I and CAT II/III (including SA CAT II) programs that are solicited by operators from the Directorate General of Civil Aviation (DGCA). The process consists of five distinct yet related phases and can result in approving or not approving an operator's CAT II and/or CAT III application. It is important for an inspector to understand that the process described in this chapter is not all inclusive, but is rather a tool to be used with good judgment in conducting day-to-day duties and responsibilities. A flow diagram of the process is found in Figure 2.1, Category II/III Evaluation and Approval Process Flow Diagram. Civil Aviation Safety Regulation (CASR) parts 121 and 135 operators have traditionally been the industry leaders of low visibility innovations and equipage. As such, these operators have been the focus of the DGCA's low visibility approval process. In recent years, the business jet community has gained parity with the airlines in terms of equipage, and their fleet size rivals that of major airlines. The DGCA applies the same approval process for CASR and large CASR part 91 aircraft operators as for CASR parts 121 and 135.

2.2 APPLICABILITY

The purpose of this task is to provide operational system safety oversight, analysis, and guidance to principal inspectors (PI) and All Weather Operations Specialists (AWOS) on the authorization of operators to conduct instrument landing system (ILS) approach operations. The principal operations inspector (POI) authorizes the SA CAT I and all CAT II/III operations via the issuance of an Authorization, Conditions, and Limitations (ACL) The process in this chapter applies to R.O.I operators conducting operations under CASR part 91 (large aircraft), 121, or 135 who pursue DGCA SA CAT I and CAT II/III operational approval. For rotorcraft, CAT II authorization in accordance with this chapter also permits Helicopter ILS operations to a decision height (DH) of less than 200 feet.

2.3 PREREQUISITES AND COORDINATION REQUIREMENTS

A. Prerequisites. This task requires knowledge of operational requirements; knowledge of DGCA certification rules, policies, and operational system requirements; knowledge of reduced visibility flight operations, aircraft systems, and certification requirements; skill in applying system safety principles; and the ability to link local issues with the broader regional, national, and international concerns.

B. Coordination. This task requires coordination between the Principle Inspector (PI), and may also require coordination with the operator, training vendors, and aircraft/avionics manufacturers.

2.4 OPERATOR AUTHORIZATION—SA CAT I, SA CAT II, CAT II RVR 1000 (300 METERS)

A. Inspector Procedures. The purpose of this task is for the POI to authorize issuance of the appropriate ACL (or a letter disapproving the request for the ACL) for operators to conduct ILS SA CAT I, SA CAT II, and CAT II RVR 1000 (300 meters) operations.

B. SA CAT I. To conduct SA CAT I operations, the operator must be authorized for either CAT II or III operations using an approved CAT II or III HUD to DH. The SA CAT I authorization is contained in selectable text in ACL C052 for 121, 129, and 135 operators, and in ACL C059 for part 91 operators.

1) If the operator is not approved for CAT II or CAT III operations using an approved CAT II or III HUD, then the operator must first complete the CAT II/III approval process, which begins in subchapter 2.5. The operator is eligible for SA CAT I when RVR 1200 (350 meters) minimums using an approved HUD to DH or touchdown are authorized through the CAT II/III approval process.

2) If the operator is already approved for CAT II or III operations using an approved CAT II or III HUD, completion of the CAT II/III approval process is not required for SA CAT I.

C. SA CAT II. To conduct SA CAT II operations, the operator must be authorized for either CAT II or III operations using autoland or an approved HUD that provides guidance to touchdown. SA CAT II authorization is contained in selectable text in ACL C059 for CASR parts 91, 121, 129, and 135 operators.

1) If the operator is not approved for CAT II or III operations using autoland or an approved HUD that provides guidance to touchdown, then the operator must first complete the CAT II/III approval process, which begins in subchapter 2.5. The operator is eligible for SA CAT II when RVR 1200 (350 meters) minimums using autoland or an approved HUD that provides guidance to touchdown are authorized through the CAT II/III approval process.

2) If the operator is approved for CAT II or III operations using autoland or an approved HUD that provides guidance to touchdown, completion of the CAT II/III approval process is not required for SA CAT II.

D. CAT II—RVR 1000 (300 meters). To conduct CAT II RVR 1000 (300 meters) operations, the operator must be authorized for either CAT II or III operations using autoland or an approved HUD that provides guidance to touchdown. CAT II RVR 1000 (300 meters) authorization is contained in selectable text in ACL C059 for CASR parts 91, 121, 129, and 135 operators.

1) If the operator is not approved for CAT II or III operations using autoland or an approved HUD that provides guidance to touchdown, then the operator must first complete the CAT II/III approval process, which begins in subchapter 2.5. The operator

is eligible for CAT II RVR 1000 (300 meters) when RVR 1200 (350 meters) minimums using autoland or an approved HUD that provides guidance to touchdown are authorized through the CAT II/III approval process.

2) If the operator is approved for CAT II or III operations using autoland or an approved HUD that provides guidance to touchdown, completion of the CAT II/III approval process is not required for CAT II RVR 1000.

2.5 CAT II/III ILS OPERATOR AUTHORIZATION PROCESS

A. Inspector Procedures. The purpose of this task is for the POI to authorize issuance of the appropriate ACL (or a letter disapproving the application for the ACL) for operators to conduct CAT II and/or CAT III operations (after concurrence from the RFSD).

1) The principal points of contacts (POCs) for the operator are the POI, PMI, or PI. Any errors or corrections discovered during the evaluation must be channeled through those PIs back to the applicant. This process will ensure consistency and continuity.

2) This task requires timely issuance of CAT II/III ACL, as applicable, or disapproval of the operator's application.

Note: For rotorcraft, CAT II authorization in accordance with this chapter also permits Copter ILS operations to a DH of less than 200 feet.

B. Five Phase Process. The CAT II/III operator authorization process consists of five distinct phases and is initiated by an operator's initial inquiry. Figure 2.1 shows a flow chart with a summary of the five-phase process.

C. Initial Inquiry (Phase One).

1) Upon initial inquiry, determine the type of operation proposed by the applicant in accordance with Figure 2.1.

2) See Chapter 2, subchapter 2.4 and Table 4-5, Special Authorization Category I, Special Authorization Category II, and Category II RVR 1000 (300 meters) Authorization, if the operator wants to add SA CAT I, SA CAT II, and/or CAT II RVR 1000 (300 meters) authorizations as part of the CAT II/III approval process.

3) Advise the applicant to submit a letter of intent (LOI). The LOI should be submitted before the formal application so that the DGCA can dedicate appropriate resources for the evaluation of the application.

4) Inform the applicant about AC 120-29 (for CAT II applicants) and AC 120-28 (for CAT III applicants).

5) Advise the applicant that there is only one acceptable means for demonstrating that the airborne equipment is Airworthy for CAT II or III operations. This means of approval is CAT II or III type design approval, which is normally reflected in the approved Aircraft Flight Manual (AFM). Inspectors shall not approve CAT II or III operations with any aircraft for any operator unless the operator presents written evidence of CAT II or III type design approval for the particular aircraft.

6) Advise the applicant of the importance of committing resources in developing the application package and that, even if a perfect package is submitted, the minimum timeline requirement (after package approval) will be in accordance with Figure 2.8, Summary of CAT II/III Approval Requirements, which includes the relevant timeframes for each required Operator Use Suitability Demonstration (OUSD) stage, based on the operator's experience and the level of authorization sought.

Note: The timeline may be significantly compressed for operators with CAT II/III authorization in the same model but different series of aircraft with minimal differences between flight guidance systems, landing systems, and avionics systems.

7) Advices the applicant to name the company's central POC, and provide telephone and fax contact numbers as early as possible.

8) Review with the applicant the requirements for preparing a compliance statement, as identified in subchapter 2.5, (D) (3).

D. Receipt of Application (Phase Two).

1) Upon receipt of the formal application and compliance statement, the first task is to inventory the contents of the package by referencing the respective operations and airworthiness job aids sections titled "Operator's Document Application Package." If any of the documentation is missing or appears incomplete, the evaluation process may begin on the remaining documents.

2) Timely notification to the operator on the documents that are missing or that are incomplete should be made as soon as practical.

3) A compliance statement shall be prepared by every operator, regardless of previous experience, when introducing low visibility operations with a new make, model, and series (M/M/S) to their fleet. A compliance statement is not required when an operator is authorized CAT II/III in the same model but different series of aircraft with minimal differences between flight guidance systems, landing systems, and avionics systems. In these situations, the operator should complete the job aid to facilitate the PI's review.

a) Preparation of the compliance statement benefits the applicant by systematically ensuring that all applicable areas are appropriately addressed during the evaluation process. The compliance statement shall be in the form of a complete listing of all AC (AC 120-29 and/or AC 120-28) sections.

b) Next to each listing, the applicant must provide a specific reference to a manual or other document in the application package and may provide a brief narrative description that describes how the applicant will comply with each section. Those sections that do not apply to the type of operation being requested should be annotated in the compliance statement as "N/A." The compliance statement also serves as a master index to the applicant's manual system to expedite the DGCA review and approval of the operation and manual system. The compliance statement is an important source document during the evaluation process.

c) After the evaluation process is completed, the compliance statement should be kept current as changes are incorporated in the applicant's system. Compliance statements should be prepared as a two-volume application. Volume I

should contain the AC reference by section (e.g., AC 120-29, paragraph 6.1.8) and provide the location in the operator's source document. Volume II should contain all the relevant operator documents pertaining to the operator's application package.

d) Examples of the compliance statement format are provided in Figure 2.6, Compliance Statement Examples.

E. Evaluating the Formal Application Package (Phase Three).

1) Begin the evaluation of the applicant's package by entering the operator's name and applicable CASR type of operation on the job aid.

2) Then, following the job aid line by line, enter the appropriate page or section from the operator's documents into the "Operator's Reference Document" column. Note that the job aid has linked references to ACs, regulations, and orders that will provide additional guidance during the conduct of the evaluation. Figure 2.2 is a representative section of the Flight Operations Job Aid illustrating how entries are made by the reviewing inspector.

3) While the job aids provide a systematic, standardized approach to conducting the evaluation, they do not provide sufficient depth and scope to capture areas that are identified as needing additional work. These areas may be complex and need further clarification or may be as simple as typographical errors that require correction.

4) The inspector should initiate and maintain a separate comment document list of findings while conducting the evaluation. Figure 2.7, Comment Document List: Example, is an example of what such a list may look like and illustrates the depth and scope of what the evaluation should include.

5) During the evaluation, if any documents or other relevant parts of the application require correction, are missing, or are incomplete, the applicant should be notified immediately. Normally, documents should not be returned to the applicant unless so requested. This facilitates the ability to compare newly revised material with its earlier version. A log should be kept by the reviewing inspector to maintain a historical record of telephone conversations, e-mails, or other forms of correspondence that occur during the evaluation period. However, if the majority of the application package is deemed to be unacceptable to the inspector, it should be returned with a letter of disapproval.

6) The operator's approved training and qualification program (CAT II/III pilot training program) must provide the flightcrews with the CAT II/III skills, knowledge, proficiency, and qualification necessary to safely conduct CAT II/III operations. The use of the stabilized approach concept is mandatory for all CAT II/III operations. It is national policy and direction that all operators should be encouraged to use the Standard Instrument Approach Procedures (SIAP) for all CAT II/III operations. The training and qualification curriculum changes necessary for CAT II/III operations are directly related to the need for increased precision in flightpath control due to the reduced seeing-conditions encountered in these operations.

a) The CAT II/III ground training curriculum segments must include the following:

- Required ground-based visual aids,
- Required ground-based electronic aids,

- Required airborne equipment,
- Authorized minimums,
- Controlling RVR requirements,
- Limitations and use of RVR information,
- CAT III critical areas and the critical need to protect these areas,
- Required crew duties and responsibilities,
- Seeing-conditions associated with the transition from instrument to visual flight,
- Essential nature of maintaining a full-time instrument reference by one pilot throughout the approach and landing,
- Critical nature of proper eye reference position (proper sitting height),
- Required pilot training and qualifications,
- Methods for determining that the aircraft is Airworthy for CAT II/III operations, and
- Dispatch/flight release requirements.

b) The flight training requirements depend on the equipment installed (autopilot (AP), autoland, or HUD), the operating procedures used, and the kinds of CAT II/III operation authorized (such as FP or FO). The primary objective of the flight training is to ensure that the flightcrew has the skills, knowledge, proficiency, and qualifications necessary to meet the operational concepts and criteria for CAT II/III operations. The flightcrews must also be able to demonstrate in flight, or through an acceptable simulation, the competence necessary to safely conduct these operations. To satisfactorily demonstrate competence, the pilot must successfully accomplish the required maneuvers in accordance with the policies, criteria, procedures, and crew duties specified in this order, AC 120-28, AC 120-29, and the specific operator's operating manuals and approved qualification program. The CAT II/III flight training curriculum segment must include sufficient flight training to permit pilots to acquire the knowledge and develop the skills and abilities necessary to demonstrate competence in the following areas (see AC 120-28 and AC 120-29 for additional guidance):

- Determination of DH and/or AH, including the use of RAs and, if appropriate, the inner markers;
- Recognition of, and proper reaction to, significant CAT II/III system failures before passing the DH or AH, as appropriate;
- Proper missed approach techniques and the expected height loss as it relates to manual or automatic go-around and the go-around initiation altitude;
- The use and limitations of RVR information, including determination of controlling RVR and the number and locations of the RVR reporting systems required;
- The availability and limitations of external visual cues during the latter stages of the approach, flare, and landing;
- Proper procedures to be used for unexpected visibility deterioration (to less than the authorized RVR) during approach, flare, and rollout;
- Achieving the proper eye reference position (proper sitting height) and the expected external visual references with the weather at authorized minimums;

- The appearance and expected sequence of visual cues during approaches and landings at the authorized minimums;
- The effects of wind shear (in CAT II/III weather conditions) on system performance, the proper procedures to be used in these wind shear encounters, and the wind limitations for these operations;
- The proper procedures for transitioning from instrument to visual flight;
- Recognition of the limits of acceptable aircraft position and flightpath tracking in the approach, flare, and landing with special emphasis on tracking performance in the decision region; and
- Recognition of, and reaction to, significant airborne or ground system faults or abnormalities during the approach, flare, and landing.

c) Each pilot in command (PIC) and second in command (SIC) used in CAT II/III operations must satisfactorily demonstrate the ability to safely conduct CAT II/III operations to either a company check pilot or an FAA inspector during initial and recurrent CAT II/III qualification. The events and/or maneuvers that must be demonstrated depend on the airborne equipment installed, the kinds of CAT II/III operations authorized, and the crew duties and responsibilities used by that operator. See AC 120-28 and AC 120-29 for a more detailed description of these requirements.

7) The operator's manuals must contain clear and concise policy, criteria, guidance, and direction to its flightcrews and other persons involved in its CAT II/III operations. To be acceptable, these manuals must meet the criteria of the CASRs , this SI , and the appropriate CAT II/III ACs. These manuals must adequately address the following:

- Airport and runway requirements, including the additional runway field length required;
- Airborne and ground-based equipment required for the various minimums;
- Methods for determining that the aircraft is Airworthy for the intended operation, including minimum equipment list (MEL)/Configuration Deviation List (CDL) requirements;
- Flightcrew procedures, crew duties, and crew responsibilities;
- Instrument approach procedures (IAP) and minimums authorized;
- Pilot training and qualifications; and
- Any operating restrictions or limitations necessary to safely conduct these operations.

8) Before approving the operator's proposal, the inspector must ensure that the operator's CAT II/III Continuous Airworthiness Program (CAP) includes the special airborne equipment and procedures required for CAT II/III operations. Coordination with the PMI or the PI is essential before granting operational approval. The inspector shall not issue ACL that authorize CAT II/III operations until all requirements are met. This includes approval of the operator's CAT II/III maintenance program for the particular aircraft involved.

9) When the application package is deemed to be acceptable to the inspector, a letter of approval should be sent to the operator.

F. The Demonstration Phase (Phase Four). Phase Four is referred to as the OUSD. This phase begins after the POI has received concurrence from the PI that the

operator's application package is in order and has been approved. The OUSD plan submitted with the application is the primary vehicle used for conducting this phase. Guidance for the OUSD and an example of an acceptable OUSD plan are contained in this section.

1) **Special Considerations.** Special design requirements and special maintenance programs are necessary to achieve the airborne system reliability required for the conduct of CAT II/III operations. The special maintenance programs necessary for CAT II/III operations are extensive and expensive and are usually the largest factors affecting an operator's decision of whether or not to conduct these operations.

2) **Purpose.** The purpose of the OUSD is to demonstrate and validate the reliability and performance of lower minimum programs (LMP) in line operations consistent with the operational concepts specified in AC 120-28 and AC 120-29, as applicable. An OUSD is required for CAT II and III approvals. Demonstration requirements are established considering any applicable criteria, applicability of previous operator service experience, experience with a specific aircraft type by other operators, experience of crews of that operator, and other such factors. The demonstration period is typically 6 months long for each phase (CAT II and III) of a progression to CAT III landing minimums. This permits the DGCA to evaluate the ability of the operator to maintain and operate its proposed LMP system. During the demonstration period, at least 10 percent of the required number of landings should be observed by an appropriately qualified DGCA operations inspector. For this purpose, an appropriately qualified operations inspector is:

- For small piston and turboprop airplanes, or helicopters, qualified in the appropriate category and class;
- For large helicopters, qualified in a helicopter over 12,500 pounds;
- For large piston or turboprop airplanes, qualified in an airplane over 12,500 pounds;
- For small turbojets, qualified in the appropriate category and class; and
- For large turbojets, qualified in a turbojet airplane over 12,500 pounds.

3) **Subphases.** The OUSD phase consists of two subphases:

a) The first subphase is referred to as the OUSD landing phase. During this period, the operator conducts the required number of landings using the CAT II or III systems approved in the submitted OUSD plan. The weather minimums used by the operator is prescribed based on the operators current authorization for that aircraft. A success rate of 90 percent is required.

1. Parts 121, and 135 operators seeking CAT III approval, or seeking to conduct CAT II using autoland or HUD to touchdown, must be issued ACL C061 (autoland) or ACL C062 (HUD to touchdown) prior to the landing demonstrations. CASR Part 121, 121.579(c), , and CASR part 135, 135.579(c) specify that these types of operations must be authorized by ACL .

2. Demonstrations may be conducted in line operations, during training flights, or during aircraft type or route proving runs. The demonstration period should run for 6 months. Therefore, if an operator seeks CAT II initially and then CAT III subsequently, the total demonstration period will be 12 months.

3. The POI issues the appropriate ACL (ACL C059 or C060 (ACL H108 or ACL H109 for helicopter operations), as applicable) with any appropriate restricted lower minimums and any other restrictions required for the OUSD demonstration phase. If an excessive number of failures (e.g., unsatisfactory landings, system disconnects) occur during the landing demonstration program, a determination should be made for the need for additional demonstration landings, or for consideration of other remedial action (e.g., procedures adjustment, wind constraints, or system modifications).

b) The second phase, the OUSD demonstration phase, begins after completion of the OUSD landing phase. The OUSD demonstration phase is typically 6 months, unless otherwise indicated in Table 4-5A and subchapter 2.5, (F) (4) (d). The purpose of the OUSD demonstration phase is to verify that the operator's proposed maintenance and operational procedures are suitable for CAT II/III operations. To reach the lowest CAT III minimums, a second OUSD demonstration phase may be required, as specified in Table 4-5A and subchapter 2.5, (F) (4) (d). After successful completion of all required OUSD demonstration subphases, unrestricted minimums are issued by the POI.

4) **OUSD Landing and Minimums Requirements.**

a) CAT III Authorization Basis.

AC 120-28 Authorized Aircraft. Aircraft authorized under AC 120-28 contain a statement authorizing FP or FO landing and/or rollout control systems.

a. FP Landing System without Rollout System. Aircraft with an FP landing system without a rollout system may be authorized minimums as low as RVR 600 (175 meters) for TDZ, RVR 600 (175 meters) for MID, and RVR 300 (85 meters) for rollout after successful completion of the first 6-month OUSD.

b. FP Landing System with Any Rollout System. Aircraft with an FP landing and any rollout system may be authorized minimums as low as RVR 600 (175 meters) for TDZ, RVR 400 (100 meters) for MID, and RVR 300 (85 meters) for rollout after successful completion of the first 6-month OUSD.

c. FO Landing System with a FP Rollout System. Aircraft with an FO landing system and FP rollout systems may be authorized minimums as low as RVR 600 (175 meters) for TDZ, RVR 400 (100 meters) for MID, and RVR 300 (85 meters) for rollout after successful completion of the first 6-month OUSD. The operator may then be authorized for minimums as low as RVR 400 (100 meters) for TDZ, RVR 400 (100 meters) for MID, and RVR 300 (85 meters) for rollout RVR after successful completion of the second 6-month OUSD.

d. FO Landing System with a FO Rollout System. Aircraft with FO landing and rollout systems may be authorized minimums as low as RVR 600 (175 meters) for TDZ, RVR 400 (100 meters) for MID, and RVR 300 (85 meters) for rollout after successful completion of the first 6-month OUSD. The operator may then be authorized for minimums as low as RVR 300 (85 meters) for TDZ and RVR 300 (85 meters) for MID and RVR 300 (85 meters) for rollout RVR after successful completion of the second 6-month OUSD.

b) CAT II/III Experienced Operators. To meet the definition of "CAT II experienced" as used in this chapter, the operator must have a current ACL C059 (H108 for helicopter operations) that has been authorized for at least 1 year for unrestricted CAT II operations to an RVR 1200 (350 meters) minimum. To meet the definition of "CAT III experienced" as used in this chapter, the operator must have a current ACL C060 (H109 for helicopter operations) that has been authorized for at least 1 year for CAT III operations to no more than an RVR 700 (200 meters) minimum. Operators that have foreign authority approval from an International Civil Aviation Organization (ICAO) member State authorizing use of lowest applicable or intended CAT II or III minimums are also considered experienced operators.

1. Experienced CAT III operators seeking a lower CAT III authorization, such as an approved RVR 600 (175 meters) CAT III operator seeking a RVR 300 (85 meters) CAT III authorization, are not required to complete an additional OUSD.

2. The inspector should ensure that the aircraft are suitable for the authorization sought, and review the operator's training, maintenance, and operational procedures to ensure that each reflect the new authorization.

c) Table 4-5A contains a summary of OUSD landing and demonstration phase requirements for multiple scenarios. These scenarios are described further in subchapter 2.5, (F)(4)(d-h).

d) Operator with No CAT II/III Experience Seeking CAT II. For a new operator (defined as one without prior CAT II/III experience) seeking CAT II for the first time, the aircraft is considered to be "new" regardless of how long the aircraft has been in the operator's fleet. The operator must conduct 100 landings at CAT I weather minimums or greater. Upon successful completion of 90 percent of the landings, the POI may issue ACL C059 (H108 for helicopter operations) authorizing CAT II operations to RVR 1600 (450 meters) for the duration of the 6-month maintenance OUSD. Upon successful completion of the OUSD, the POI may authorize CAT II operations to RVR 1200 (350 meters).

1. In standard CAT II operations, the objective of the requirement for an operator to validate the CAT II maintenance program for at least 6 months with minimums restricted to DH 100 and RVR 1600 (450 meters) is to ensure that the required level of airborne equipment reliability is achieved. This is to ensure that frequent malfunctions will not occur in standard CAT II operations (DH 100 and RVR 1200 (350 meters)). The design features of CAT III airborne equipment significantly reduce the potential for failures that could adversely affect standard CAT II operations. As a result, validation of the CAT II maintenance program before conducting operations to DH 100/RVR 1200 (350 meters) is not necessary if these operations are conducted under a restriction that requires the airborne equipment to operate to CAT III standards (e.g., FP or FO automatic landing).

2. If the operator requests to eliminate the 6-month restriction (DH 100 and RVR 1600 (450 meters)) based on operational credit for the use of CAT III systems to conduct CAT II operations, the operator ACL C059 (H108 for helicopter operations) must specify that all CAT II operations using DH 100 and RVR 1200 (350 meters) must be conducted with the airborne equipment operating to CAT III standards. This limitation should read FP autoland only or FP/FO autoland only, as appropriate, for aircraft equipped with CAT III automatic landing systems, or FP HUD only for aircraft equipped

with CAT III HUD. For DH 100 and RVR 1200 (350 meters) operations, these restrictions must remain in the operator's ACL s until the CAT II maintenance program for that aircraft is successfully validated.

e) Operator with No CAT II/III Experience Seeking CAT III. For a new operator (defined as one without prior CAT II/III experience) seeking CAT III for the first time, the aircraft is considered to be "new" regardless of how long the aircraft has been in the operator's fleet. The operator must conduct 100 landings at CAT I weather minimums or greater. Upon successful completion of 90 percent of the landings, the POI may issue ACL C059 (H108 for helicopter operations) authorizing CAT II operations to RVR 1200 (350 meters) for the first 6-month maintenance OUSD. This RVR 1200 (350 meters) minimum is based on the use of CAT III landing systems (autoland or HUD). Upon successful completion of this OUSD, the POI may issue ACL C060 authorizing CAT III operations to RVR 700 (200 meters) or 600 (175 meters) for the duration of the second 6-month maintenance OUSD. If the operator is requesting minimums below RVR 600 (175 meters), a second 6-month OUSD is required. Upon successful completion of the second OUSD, the POI may authorize CAT III operations to RVR 400 (100 meters) or 300 (85 meters).

f) Operator with CAT II Experience Seeking CAT II for a New Aircraft. For an experienced CAT II operator seeking CAT II for a new aircraft (defined as an aircraft new to the operator's fleet), the operator must conduct 50 landings at CAT I weather minimums or greater. Upon successful completion of 90 percent of the landings, the POI may issue ACL C059 authorizing CAT II operations to RVR 1600 (450 meters) for the duration of the 6-month maintenance OUSD. Upon successful completion of the OUSD, the POI may authorize CAT II operations to RVR 1200 (350 meters).

> Note: An operator may be approved to eliminate the 6-month restriction (DH 100 and RVR 1600 (450 meters)) based on operational credit for the use of CAT III systems to conduct CAT II operations, in accordance with subchapter 2.5, (F)(3)(d)(2).

g) Operator with CAT II Experience Seeking CAT II with New Flight Control Equipment. For an experienced CAT II operator seeking CAT II for the same aircraft with new equipment, such as the addition of a CAT II or III HUD, the operator must conduct 25 landings at CAT I weather minimums or greater. The first 3-month maintenance OUSD may run concurrently with the landing phase. Upon successful completion of 90 percent of the landings and the first 3-month maintenance OUSD, the POI may issue ACL C059 (H108 for helicopter operations) authorizing CAT II operations to RVR 1600 (450 meters) for the duration of the 3-month maintenance OUSD. Upon successful completion of the second OUSD, the POI may authorize CAT II operations to RVR 1200 (350 meters).

1. Although all demonstrations landings using the new flight control equipment must be conducted at CAT I weather minimums or greater, at the POI's discretion the operator may continue to use CAT II minimums, provided the requirements of the current authorization continue to be met. The operator should submit a plan to state how they will transition to the new equipment and conduct the landing OUSD. This plan should address the differences between CAT II operations using the current authorization, proposed CAT II operations using new equipment, and the plan for conducting the landing OUSD in CAT I or better conditions using the new

equipment, and it should address operational control in CAT II conditions, training, procedures, and profiles. the POI may authorize continued CAT II operations in the transition using the previously authorized equipment if those operations can be conducted safely.

2. If CAT II operations cannot be conducted safely using the current authorization due to differences in crew procedures, training, etc., the operator's CAT II authorization should be deauthorized until it can be reauthorized after the OUSD landing phase in accordance with subchapter 2.5, (F)(4) (g).

> Note: An operator may be approved to eliminate the 6-month restriction (DH 100 and RVR 1600 (450 meters)) based on operational credit for the use of CAT III systems to conduct CAT II operations, in accordance with subchapter 2.5, (F)(4)(d)(2).

h) Operator with CAT II Experience Seeking CAT III with New Flight Control Equipment. For an experienced CAT II operator seeking CAT II for a new aircraft (defined as an aircraft new to the operator's fleet), the operator must conduct 50 landings at CAT I weather minimums or greater. Upon successful completion of 90 percent of the landings, the POI may issue ACL C059 (H108 for helicopter operations) authorizing CAT II operations to RVR 1200 (350 meters) for the first 6-month maintenance OUSD. This RVR 1200 (350 meters) minimum is based on the use of CAT III landing systems (autoland or HUD). Upon successful completion of this OUSD, the POI may issue ACL C060 authorizing CAT III operations to RVR 700 (200 meters) or 600 (175 meters) for the duration of the second 6-month maintenance OUSD. If the operator is requesting minimums below RVR 600 (175 meters), a second 6-month OUSD is required. Upon successful completion of the second OUSD, the POI may authorize CAT III operations to RVR 400 (100 meters) or 300 (85 meters).

1. Although all demonstrations landings using the new flight control equipment must be conducted at CAT I weather minimums or greater at the POI's discretion, the operator may continue to use CAT II minimums, provided the requirements of the current authorization continue to be met. The operator should submit a plan to state how they will transition to the new equipment and conduct the landing OUSD. This plan should address the differences between CAT II operations using the current authorization, proposed CAT II operations using new equipment, and the plan for conducting the landing OUSD in CAT I or better conditions using the new equipment, and it should address operational control in CAT II conditions, training, procedures, and profiles. With the concurrence of the AWOS, the POI may authorize continued CAT II operations in the transition using the previously authorized equipment if those operations can be conducted safely.

2. If CAT II operations cannot be conducted safely using the current authorization due to differences in crew procedures, training, etc., then the operator's CAT II authorization should be deauthorized until it can be reauthorized after the OUSD landing phase in accordance with subchapter 2.5, (F)(4)(g).

i) Operator with CAT II Experience Seeking CAT III for the Same Aircraft. For an experienced CAT II operator seeking CAT III for the same aircraft with the same equipment, the operator must conduct 50 landings at CAT II weather minimums or greater. Upon successful completion of 90 percent of the landings, the POI may issue ACL C060 authorizing CAT III operations to RVR 700 (200 meters) or 600 (175 meters)

for the 6-month maintenance OUSD. This OUSD is required even if the operator is not seeking minimums below RVR 600 (175 meters). Upon successful completion of the OUSD, the POI may authorize CAT III operations to RVR 400 (100 meters) or 300 (85 meters).

j) Operator with CAT II Experience Seeking CAT III for a New Aircraft. For an experienced CAT II operator seeking CAT III for an aircraft new to the operator's fleet, the operator must conduct 50 landings at CAT II weather minimums or greater. With successful completion of 90 percent of the landings, the POI may issue ACL C059 (H108 for helicopter operations) authorizing CAT II operations for the duration of the 6-month maintenance OUSD. Upon successful completion of this OUSD, the POI may issue ACL C060 authorizing CAT III operations to RVR 700 (200 meters) or 600 (175 meters) for the duration of the second 6-month maintenance OUSD. If the operator is requesting minimums below RVR 600 (175 meters), a second 6-month OUSD is required. Upon successful completion of the second OUSD, the POI may authorize CAT III operations to RVR 400 (100 meters) or 300 (85 meters).

k) Operator with CAT III Experience Seeking CAT II for a New Aircraft. For an experienced CAT III operator seeking CAT II for an aircraft new to the operator's fleet, the operator will conduct 50 landings at CAT I weather minimums or better. Upon successful completion of 90 percent of the landings, the POI may issue ACL C059 (H108 for helicopter operations) to conduct CAT II operations to RVR 1600 (450 meters) for the duration of the 6-month maintenance OUSD. Upon successful completion of the OUSD, the POI may authorize CAT II operations to RVR 1200 (350 meters).

> Note: An operator may be approved to eliminate the 6-month restriction (DH 100 and RVR 1600 (450 meters)) based on operational credit for the use of CAT III systems to conduct CAT II operations, in accordance with subchapter 2.5, (F)(4)(d)(2).

l) Operator with CAT III Experience Seeking CAT III for a New Aircraft. For an experienced CAT III operator seeking CAT III for an aircraft new to the operator's fleet, the operator must conduct 50 landings at CAT I weather minimums or greater. With successful completion of 90 percent of the landings, the POI may issue ACL C059 (H108 for helicopter operations) authorizing CAT II operations to RVR 1200 (350 meters) for the first 6-month maintenance OUSD. Upon successful completion of this OUSD, the POI may issue ACL C060 authorizing CAT III operations to RVR 700 (200 meters) or 600 (175 meters) for the duration of the second 6-month maintenance OUSD. If the operator is requesting minimums below RVR 600 (175 meters), a second 6-month OUSD is required. Upon successful completion of the second OUSD, the POI may authorize CAT III operations to RVR 400 (100 meters) or 300 (85 meters).

m) Operator with CAT III Experience Seeking CAT III with New Flight Control Equipment. For an experienced CAT III operator seeking CAT III for the same aircraft with new equipment (previous CAT III with autoland now adding a HUD), the operator must conduct 25 landings at CAT II weather minimums or better. The first 3-month maintenance OUSD may run concurrently with the landing phase. With successful completion of 90 percent of the landings and the 3-month OUSD, the POI may issue ACL C060 authorizing CAT III operations to RVR 700 (200 meters) or 600 (175 meters) for the duration of the second 3-month maintenance OUSD. If the operator is requesting minimums below RVR 600 (175 meters), a second 6-month OUSD is required. Upon

successful completion of this OUSD, the POI may authorize CAT II operations to RVR 400 (100 meters) or 300 (85 meters).

5) **Operators with Small Fleets.** The DGCA recognizes that it may be impractical to require operators with limited fleet size and limited access to SA CAT I and CAT II/III runways to accumulate 100 demonstration approaches and landings. The number of required landings is dependent on the operator's prior experience with SA CAT I or CAT II/III, the number of aircraft in the operator's fleet, and the FAA's experience in SA CAT I or CAT II/III operations with the operator's aircraft. The POI, will determine what is manageable for the operator, while still meeting the intent of AC 120-28 and AC 120-29. Past practice has allowed a combination of approach and landings in a level C or better flight simulator and in the actual aircraft.

G. Sample OUSD PLAN. Figure 2.9, Sample OUSD Plan, contains an example of an OUSD plan that is acceptable to the DGCA.

H. The Approval Phase (Phase Five). ACL authorizations are issued in accordance with appropriate guidance, direction, and procedures.

1) **Approval of Landing Minimums.** When the data from the operational demonstration has been analyzed and found acceptable, an applicant may be authorized the lowest requested minimums consistent with the requirements in subchapter 2.5, (F)(4) (phase four).

2) **Qualification and Currency—Operational Requirements.** The number or percentage of flightcrew members who are current and qualified prior to authorizing the operator for either restricted or unrestricted CAT II or III operations are at the discretion of the POI. Because the OUSD landing phase has no required timeline (just a required number of successful landings), the operator should have an approved plan and policy to ensure that each flightcrew member required for a specific aircraft/flight is current and qualified for CAT II or III operations prior to commencing any CAT II or III approach and landing operations, including required OUSD landings and either restricted or unrestricted CAT II/III authorizations. Typically, the operator will receive approval for flightcrew training (procedures, profiles, simulator requirements, etc.) and should begin training their pilots before the required OUSD landing and maintenance phases. This will ensure that a large percentage of pilots are current and qualified for CAT II or III operations upon issuance of unrestricted CAT II/III landing minimums.

3) **ACL .**

a) All standard CAT II/III operations are restricted to airports and runways that meet the special safety requirements necessary for CAT II/III operations. Within the Republic of Indonesia , all approved CAT II/III airport and runway operations are conducted in accordance with approved CAT II/III IAPs published in CASR part 97. R.O.I. CAT II/III operations shall only be conducted in accordance with an approved CASR part 97 CAT II/III IAP.

b) For operations in foreign countries, DAAO maintains a list of approved CAT II/III airports/runways. Each runway must be authorized in the Foreign Airports/Runways table of ACL C059 (CAT II) and/or C060 (CAT III), as appropriate. Even though a particular runway is approved for CAT II/III operations, an operator cannot be authorized to conduct CAT II/III operations at that location until that particular CAT II/III operation is authorized in the operator's ACL

Figure 2.1 Category II/III Evaluation and Approval Process Flow Diagram

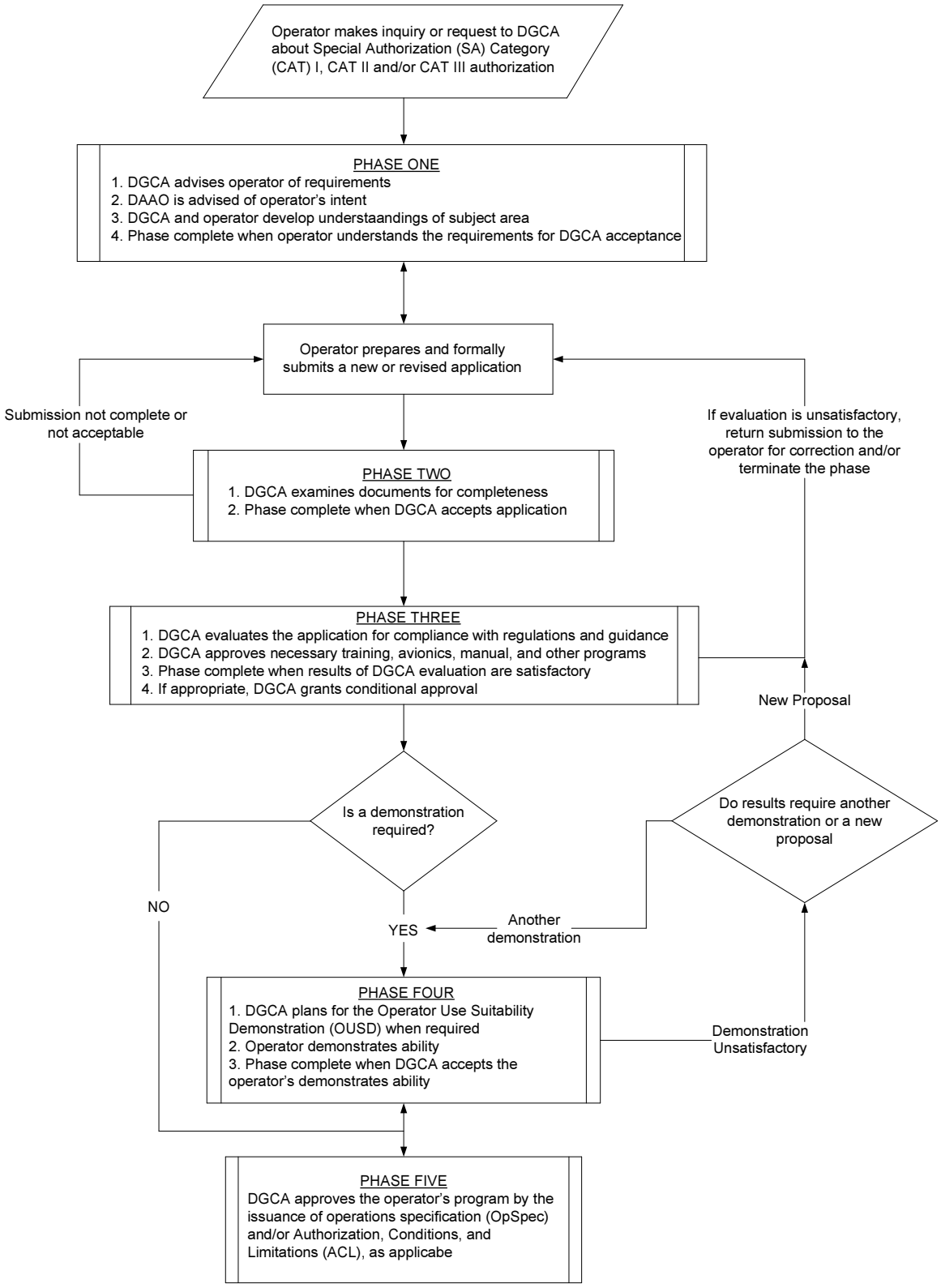


Figure 2.2 Category II/III Approval Job Aid (Operations)

		CAT II/III APPROVAL JOB AID	
		Operator Name:	
		CASR Part: 91 ☐ 121 ☐ 135☐	Date:
		Application for: CAT II ☐ CAT III ☐ Authorization	
		Previous CAT II: Yes ☐ No ☐ CAT III: Yes ☐ No ☐	
		New Aircraft to Operator: Yes ☐ No ☐	
		Upgraded Equipment on Existing Aircraft: Yes ☐ No ☐	
✓		**FLIGHT OPERATIONS**	**Operator's Reference Document**
	1	**OPERATOR PROCEDURES**	
	1.A	Type of Operation	
	1.B	CAT II and CAT III Instrument Approach Procedures	
	1.C	Aircraft Flight Manual (AFM)/Flight Operations Manual (FOM)/Pilot's Operating Handbook (POH)/Quick Reference Handbook (QRH) Provisions (as applicable)	
	1.D	Crew Coordination and Monitoring Procedures	
	1.E	Callouts	
	1.F	Use of Decision Altitude (DA)(H) (Fail Passive(FP))	
	1.G	Use of Alert Height (AH) (Fail Operational (FO))	
	1.H	Crew Briefings	
	1.I	Configurations	
	1.J	Non-Normal Operations and Procedures	
	1.K	Special Environmental Considerations (as applicable)	
	1.L	Continuing CAT II/ III Approaches in Deteriorating Weather	
	1.M	Dispatch Planning and Minimum Equipment List (MEL)/Configuration Deviation List (CDL) Requirements	
	1.N	Aircraft System Suitability Demonstration (as required)	
	1.O	Operator Use Suitability Demonstration (OUSD)	
	1.P	Data Collection/Analysis for Airborne System Demonstrations	
	1.Q	Operational Procedure for Return to Service (RTS)	
	2	**TRAINING AND CREW QUALIFICATION**	
	2.A	Initial Training	

	2.B	Recurrent Training/Qualification	
	2.C	Upgrade Training	
	2.D	Requalification Training	
	2.E	Recency of Experience	
	2.F	Differences Training	
	2.G	Simultaneous Training and Qualification for Cat II and III	
	2.H	Ground Training Curriculum Segment	
	2.I	Surface Movement Guidance and Control System (SMGCS) Training	
	2.J	Flight Training Curriculum Segment	
	2.K	Maneuvers and Procedures Document	
	2.L	Initial Qualification	
	2.M	Multiple Aircraft Type or Variant Qualification (as applicable)	
	2.N	Special Terrain Airports (as applicable)	
	2.O	High Minimums Captain Procedures	
	2.P	Line Checks	
	2.Q	Crew Records and Notification System	
	2.R	Advanced Qualification Program (AQP) and Single Visit Training (SVT) Program Exemptions	
	3	**AIRPLANE AND EQUIPMENT**	
	3.A	Airborne Systems for Cat II	
	3.B	Airborne Systems for Cat III	
	3.C	Automatic Flight control system (AFCS) and Landing Systems	
	3.D	Flight Director (FD) Systems	
	3.E	Head-up Display (HUD) Systems	
	3.F	Enhanced/Synthetic Vision Systems (EVS/SVS)	
	3.G	Hybrid Displays	
	3.H	Required Navigation Performance (RNP) (as required)	
	4	**ACL AND/OR OPERATIONS SPECIFICATIONS**	
	4.A	Issuance of CAT II/III Minimums in Authorizations, Conditions, and Limitations (ACL) for operators under CASR part 91 and subsequently issuance OpSpec for operators under CASR part 121 and 135	
	4.B	ACL Amendments (as required)	

	5	**OPERATOR'S DOCUMENT APPLICATION PACKAGE**	
	5.A	Aircraft Operations Manual (pertinent parts)	
	5.B	Flight Operations Manual (pertinent parts)	
	5.C	Compliance Documents	
	5.D	Flight Operations Training Manual	
	5.E	Requested ACL	
	5.F	Implementation Timetable	
	5.G	Minimum Equipment List (MEL)	
	5.H	Operator Use Suitability Demonstration (OUSD) Plan	
	5.I	Application Letter	

Figure 2.3 Category II/III Approval Job Aid (Avionics/Airworthiness)

		CAT II/III APPROVAL JOB AID	
		Operator Name:	
		CASR Part: 91 ☐ 121 ☐ 135☐	Date:
		Application for: CAT II ☐ CAT III ☐ Authorization	
		Previous CAT II: Yes ☐ No ☐ CAT III: Yes ☐ No ☐	
		New Aircraft to Operator: Yes ☐ No ☐	
		Upgraded Equipment on Existing Aircraft: Yes ☐ No ☐	
✓	**Doc Ref**	**AVIONICS/AIRWORTHINESS**	**Operator's Reference Document**
	1	**OPERATOR CAMP**	
	1.A	Type of Operation:	
	1.B	Integrated Program ☐ Specific Program ☐	
	1.C	Lower Landing Minimums (LLM) Specific Procedures in Company Maintenance Manual (CMM)	
	1.D	Revision and Update LLM CMM Procedures	
	1.E	LLM Personnel Records System	
	1.F	LLM System and Configuration Status/Compliance for Each Aircraft	
	1.G	LLM Mods, Additions, and Changes	
	1.H	Mx Requirements/Log Entries Necessary to Change LLM Status	
	1.I	Specific LLM Discrepancy Reporting Procedures Minimum Equipment List (MEL)	
	1.J	LLM Quality Control (QC) and Quality Analysis (QA) Program	
	1.K	Procedures to Ensure Non-LLM Qual Aircraft Remain Off Status	
	1.L	Placarding/Logbook Procedures	
	1.M	LLM Downgrade Procedures if Mx Performed by Unqualified Personnel	
	1.N	Return to Service (RTS) Procedures	
	1.O	LLM Continued Status Procedures	
	1.P	Periodic Performance Sampling Procedures	
	1.Q	LLM Parts Identification Procedures	

	1.R		
	1.S		
	1.T		
	1.U		
	1.V		
	1.W		
	2	**INITIAL AND RECURRENT MAINTENANCE TRAINING**	
	2.A	LLM Initial Training Curriculum Document	
	2.B	LLM Certification/Qualification Requirements	
	2.C	Training Records System for LLM Personnel	
	2.D	Training Equipment Description	
	2.E	Curriculum Subject Areas	
	2.F	Vendor or Vendor's Outside Parts Procedures and LLM Program Compatibility	
	2.G	Component Tracking and Control Procedures	
	2.H	Component Mods and Changes (Airworthiness Directives (AD), Engineering Orders (EO), etc.) Tracking Procedures	
	2.I	LLM Recording and Reporting Procedures for System Malfunctions	
	2.J	LLM Software Install, Test, Update, Evaluate, Control Procedures	
	2.K	MEL Procedures (Remarks Section, Limitations, Upgrade/Downgrade)	
	2.L	LMM Required Inspection Items (RII) Components, Systems, and Software	
	2.M		
	2.N		
	2.O		
	2.P		
	2.Q		
	3	T**EST EQUIPMENT/CALIBRATION STANDARDS**	
	3.A	Required Accuracy and Reliability Primary/Secondary Standards	
	3.B	Contract Maintenance or Vendor Test Equipment Reliability Procedures	

	3.C	Dedicated LMM Test Equipment Listing	
	3.H		
	4	**RETURN TO SERVICE (RTS) PROCEDURES**	
	4.A	LMM Upgrade/Downgrade Procedures	
	4.B	Interdepartmental LLM Aircraft Status Notification Procedure	
	4.C	Component/System Testing Level Requirements	
	4.D	Built-In Test Equipment (BITE) Procedures	
	4.E	Contractor/Vendor Training and Authorization for RTS	
	4.F		
	4.G		
	4.H		
	5	**PERIODIC AIRCRAFT SYSTEM EVALUATIONS**	
	5.A	Logbook Entry Procedures	
	5.B	Recordkeeping Procedures	
	5.C	Avionics/Airframe Manufacturers Procedures	
	5.D	Engineering Analysis Procedures	
	6	**RELIABILITY REPORTING AND QUALITY CONTROL**	
	6.A	Operator Use Suitability Demonstration (OUSD) Report	
	6.B	Monthly Summary Report (following OUSD to certificate-holding district office (CHDO)) Format	
	6.C	Reliability and Reporting Requirements After 1-Year Period (6.B)	
		OPERATOR'S DOCUMENT APPLICATION PACKAGE	
	7	CMM-Pertinent Parts	
	7.A	LLM Initial/Recurrent Training Program	
	7.B	LLM Personnel Records System	
	7.C	MEL Procedures	
	7.D	LLM QC and QA Program	
	7.E	RTS Procedures	

Figure 2.4 Special Authorization Category I, Special Authorization Category II, and Category II RVR 1000 (300 meters) Authorization

Requested	**Current Authorization**	**Action**
Special Authorization (SA) CAT I	CAT II or III authorized using head-up display (HUD)	Review operator procedures and authorize authorizations, conditions, and Limitations (ACL)
SA CAT I	CAT II or III not authorized using HUD	CAT II or III approval process required.
SA CAT II	CAT II or III authorized using autoland or HUD to touchdown	Review operator procedures and authorize ACL .
SA CAT II	CAT II or III not authorized using autoland or HUD to touchdown	CAT II or III approval process required. SA CAT II may be authorized concurrent with Runway Visual Range (RVR) 1200 CAT II minimums when using autoland or HUD to touchdown.
CAT II RVR 1000 (300 meters)	CAT II or III authorized using autoland or HUD to touchdown	Review operator procedures and authorize ACL .
CAT II RVR 1000 (300 meters)	CAT II or III not authorized using autoland or HUD to touchdown	CAT II or III approval process required. SA CAT II may be authorized concurrent with RVR 1200 (350 meters) CAT II minimums when using autoland or HUD to touchdown.

Figure 2.5 Example of Completed Flight Operations Job Aid

✓		FLIGHT OPERATIONS	Operator's Reference Document
	1	**OPERATOR PROCEDURES**	OM = Operations Manual
✓	1.A	Type of Operation	OM, 1.1.0 and 1.2.0
✓	1.B	CAT II and CAT III Instrument Approach Procedures	OM, 1.4, 1.5, and 1.6
?	1.C	Aircraft Flight Manual (AFM)/Flight Operations Manual (FOM)/Pilot's Operating Handbook (POH)/Quick Reference Handbook (QRH) Provisions (as applicable)	**Need pertinent portions**
✓	1.D	Crew Coordination and Monitoring Procedures	OM Chapter 1
✓	1.E	Callouts	OM Chapter 1
✓	1.F	Use of Decision Altitude (DA)/Decision Height(DH) (Fail Passive (FP))	OM Chapter 1
✓	1.G	Use of Alert Height (AH)(Fail Operational (FO))	Not applicable
✓	1.H	Crew Briefings	OM Chapter 1
✓	1.I	Configurations	OM Chapter 1
✓	1.J	Non-Normal Operations and Procedures	OM Chapter 1
✓	1.K	Special Environmental Considerations (as applicable)	Not Covered
✓	1.L	Continuing CAT II/ III Approaches in Deteriorating Weather	OM Chapter 1
?	1.M	Dispatch Planning and Minimum Equipment List (MEL)/Configuration Deviation List (CDL) Requirements	No CAT II List (OM 3.1.3)
✓	1.N	Aircraft System Suitability Demonstration (as required)	Not Applicable
?	1.O	Operator Use Suitability Demonstration (OUSD)	Need OUSD Plan
?	1.P	Data Collection/Analysis for Airborne System Demonstrations	Need OUSD Plan
?	1.Q	Operational Procedure for Return-to-Service (RTS)	No Clear Procedure found

Figure 2.6 Compliance Statement Examples

Example 1. Compliance Statement. Table of Contents

NOTE: The table of contents in the operator's application package should mirror the table of contents contained in Advisory Circular (AC) 120-29 and AC 120-28, as follows.

Lower Minimum Program (LMP) Application

CAT II and CAT III Automatic Landing Operations

TABLE OF CONTENTS

Volume I

1. General
2. Related References and Definitions
3. Background
4. Operational Concepts
5. Airborne System Requirements
6. Procedures
7. Training and Crew Qualifications
8. Airports, Navigation Facilities and Meteorological Criteria
9. Continuing Airworthiness/Maintenance
10. Approval of R.O.I. Operators
11. Operator Reporting, and Taking Corrective Actions

Example 2. Compliance Statement Section 1, General

ABC Airlines, Inc. Lower Minimum Program (LMP) Application
CAT II and CAT III Automatic Landing Operations

SECTION 1 GENERAL

1. The ABC Airlines, Inc. Lower Minimum Program (LMP) Application, Volumes I and II are prepared and hereby submitted to demonstrate compliance with the DGCA directives pertaining to CAT II, III, and Autoland operations for the purposes of receiving DGCA approval via ACL and/or operations specifications (OpSpecs).

2. Per the requirements contained in AC 120-29 and AC 120-28, ABC Airlines, Inc. requests the issuance of ACL and/or operations specifications (OpSpecs) C059, C060, and C061 for the B-737-700. Samples of these ACL are included at the end of this section. These ACL are necessary to authorize automatic landings and CAT II operations to a decision height (DH) of 100 feet and a corresponding Runway Visual Range (RVR) of 1200. CAT III operations to a DH of 50 feet and RVR of 700 feet are simultaneously applied for and here incorporated. AC 120-28-, Initiating New Combined CAT II and CAT III programs, sets forth the acceptable

provisions for the ABC Airlines, Inc. combined LMP application methodology.

3. The Compliance Table (Section 1, Page 2, Table 1) sets forth each prerequisite on the following pages. Moreover, AC 120-28 and AC 120-29are referenced throughout.

4. This application is constructed in a manner that demonstrates compliance with each applicable paragraph of AC 120-29 and each applicable section of AC 120-28. ABC Airlines, Inc. compliance statements begin in Volume 1, Section 2, and page 1 of this application. Paragraphs/sections listed under the reference column describe how ABC Airlines, Inc. has achieved compliance with AC 120-29 and AC 120-28. A source document column lists the reference document title, section/chapter, and page numbers.

WEATHER MINIMUMS OBJECTIVES

1. ABC Airlines, Inc. seeks an initial automatic landing authorization with CAT I landing weather minimums or better and DH. After the satisfactory completion of 100 autolands with a 90% success rate has been demonstrated, CAT II minimums (100 DH/RVR 1200 (350 meters)) can be authorized, as set forth in applicable DGCA SI

2. After successful completion of the 6-month Operator Use Suitability Demonstration (OUSD) period, ABC Airlines, Inc. seeks CAT III landing weather minimums of not less than 50 feet above the touchdown zone (TDZ) and not less than RVR 700 (200 meters).

Example 3. Compliance Statement: Compliance Statement Format (Operations)

SECTION 3. BACKGROUND (OPERATIONS)

Advisory Circular Reference	Source Document	DGCA Comments
Major changes addressed in this revision (AC 120-29 and AC 120-28). ABC Airlines, Inc. does not seek approval for low visibility approaches using head-up displays (HUD), use of Required Navigation Performance (RNP), satellite-based navigation, engine inoperative CAT II or III approaches.	AC 120-29 AC 120-28 B-737-700 FOTM, page 4.19	
Relationships of operational authorizations for CAT I, II, or IIIa and airborne system demonstrations (AC 120-29 and	AFM, Section 1, page 15 AFM, Section 3,	

AC 120-28). The B-737-700 is type certificated (TC) by the Original Equipment Manufacturer (OEM) as a CAT IIIa aircraft. No initial airworthiness demonstration of airborne equipment and systems is required.	pages 4A, 5, 5A, and 6	
Applicable criteria (AC 120-29 and AC 120-28). AC 120-29 and AC 120-28 have been used to establish CAT II/III operations. ABC Airlines, Inc. will comply with AC 120-29 and AC 120-28 criteria.	AC 120-29 AC 120-28	
CAT I, II, and III terminology (current edition, AC 120-29). ABC Airlines, Inc. CAT I, II, and III definitions are consistent with U.S. standard OpSpecs, current editions of AC 120-29 and AC 120-28.	AC 120-29	

SECTION 4. OPERATIONAL CONCEPTS (OPERATIONS)

Advisory Circular Reference	**Source Document**	**DGCA Comments**
Classification and applicability of minimums (AC 120-29 and AC 120-28). ABC Airlines, Inc. is seeking CAT III operations. ABC Airlines, Inc. will be conducting operations using approved autoland systems and procedures. There is no proof of concept required. The airplane and its associated systems have demonstrated the necessary level of accuracy, integrity, and availability. This was shown initially during the OEM type certificate (TC) airworthiness	AFM, Section 1, page 18 AFM, Section 4, pages 4A, 5, 5A, 6, 7	

demonstrations. Compliance will be confirmed during the OUSD and will be monitored by ABC Airlines, Inc. on a continuing basis.		
Landing (AC 120-29 and AC 120-28). Approach and Landing Concepts and Objectives (AC 120-29). ABC Airlines, Inc. is currently a CAT I operator. By this application and approval process, ABC Airlines, Inc. is seeking authorization for CAT II approaches to a DH of not less than 100 feet with a RVR of not less than 1,200 feet, and CAT III approaches to a DH of not less than 50 feet with a RVR of not less than 700 feet.	AC 120-29 AC 120-28 AC 120-28	

Example 4. Compliance Statement: Format (Maintenance)

SECTION 9. CONTINUING AIRWORTHINESS/MAINTENANCE (AVIONICS)

Advisory Circular Reference	Source Document	DGCA Comments
(15) Land verify test is required every 30 days to remain in CAT IIIa operational status.	Lower Landing Minimums (LLM) Configuration Maintenance Procedures (CMP, page 5, subparagraph E.1.b.3 LLMCMP, pages 10–11, subparagraph F.1.b	
9.3 Initial and recurrent maintenance training (AC 120-29).		
(a) ABC's CAT II/III personnel maintenance training program defines the LLMCMP policies and procedures for low visibility and	LLMCMP, page 9-10, subparagraph E.1.j TSAA Maintenance Training Manual,	

lower landing minimums operations. Personnel qualifications, syllabi, and recurrent training are outlined in the Maintenance Training Manual.	Section 6-02, page 22 TSAA Maintenance Training Manual, Section 7-02, page 37	

Figure 2.7 Comment Document List: Example

A. ABC Air Transport has submitted a CAT II/III operations manual (OM) containing nine tabbed sections, named as follows:

1) Table of Contents
2) Preface
3) Log of Revisions
4) List of Effective Pages
5) Chapter 1
6) Chapter 2
7) Chapter 3
8) Chapter 4
9) Appendix

B. It is noted that the List of Effective Pages (LEP), pages 1 and 2, have been marked DGCA-approved with an effective date of 6/28/09; however, the DGCA has not yet approved this OM.

C. The following is a list of concerns after review by Principle Inspector (PI):

1) The table of contents for Chapter 1 does not list or refer in any way to CAT II procedures and instructions, while in fact the OM purports to apply to CAT II/III procedures and instructions.

2) Section 1.2.0, line 1, refers to “this CAT III manual” when in fact the OM is labeled “CAT II/III Operating Manual.”

3) The second full paragraph in Section 1.2.0 states “The airplane to which this Manual applies may be used to conduct CAT III operations provided the instruments and items of equipment listed herein that are required for a particular CAT III operation are” but does not state that it can be used to conduct CAT II operations.

4) Throughout the OM CAT II and CAT III procedures and instructions are not clearly separated resulting in some confusion to the reader. Paragraph 6.1.7 in the current edition of AC 120-28 states, “The operator should assure that to the greatest extent possible, procedures for Category III are consistent with the procedures for that operator for Category II and Category I to minimize confusion about which procedure should be used or to preclude procedural errors.”

5) In the section Pitch Modes in the ALT ACQ item, there is a typo in the word “V?S.”

Figure 2.8 Summary of Category II/III Approval Requirements (meters)

Operator Experience	Level Sought	New Aircraft	Initial Mins	Number of Landings	Mins #2	OUSD	Mins #3	OUSD	Mins #4
New	CAT II	Yes	CAT I	100	RVR[1] 1600 (450)	6 months	RVR[1] 1200 (350)	N/A	N/A
New	CAT III	Yes	CAT I	100	RVR[1] 1200 (350)	6 months	RVR[2] 700 (200) or 600 (175)	6 months	RVR[2] 400 (100) or 300 (85)
CAT II	CAT II	Yes	CAT I	50	RVR[1] 1600 (450)	6 months	RVR[1] 1200 (350)	N/A	N/A
CAT II	CAT II	Same A/C and new equipment	CAT I	25, 3-month OUSD concurrent	RVR[1] 1600 (450)	3 months	RVR[1] 1200 (350)	N/A	N/A
CAT II	CAT III	Same A/C and new equipment	CAT I	50	RVR 1200 (350)	6 months	RVR[2] 700 (200) or 600 (175)	6 months	RVR[2] 400 (100) or 300 (85)
CAT II	CAT III	Same A/C and equipment	CAT II	25, 3-month OUSD concurrent	RVR 700 (200) or 600 (175)	3 months[3]	RVR 400 (100) or 300 (85)	N/A	N/A
CAT II	CAT III	Yes	CAT I	50	RVR[1] 1200 (350)	6 months	RVR[2] 700 (200) or 600 (175)	6 months	RVR[2] 400 (100) or 300 (85)
CAT III	CAT II	Yes	CAT I	50	RVR[1] 1600 (450)	6 months	RVR[1] 1200 (350)	N/A	N/A
CAT III	CAT III	Yes	CAT I	50	RVR[1] 1200 (350)	6 months	RVR[2] 700 (200) or 600 (175)	6 months	RVR[2] 400 (100) or 300 (85)
CAT III	CAT III	Same A/C and new equipment	CAT II	25, 3-month OUSD concurrent	RVR 700 (200) or 600 (175)	3 months[3]	RVR 400 (100) or 300 (85)	N/A	N/A

[1] RVR 1600 (450 meters) and RVR 1200 (350 meters) are issued via ACL C059 (H108 for helicopter operations). See , Chapter 2, Subchapter 2.4 for approval of SA CAT I, SA CAT II, or CAT II RVR 1000 (300 meters).

[2] RVR 700 (200 meters), RVR 600 (175 meters), RVR 400 (100 meters), and RVR 300 (85 meters) minimums are issued via ACL C060 (H109 for helicopter operations). Aircraft certified for CAT IIIa operations are limited to RVR 700 (200 meters). Certified fail-passive landing systems are eligible for minimums as low as RVR 600 (175 meters) TDZ, RVR 400 (100 meters) MID. Fail-operational landing systems are eligible for minimums as low as RVR 300 (85 meters), based on the type of rollout system.

[3] A second OUSD and all reporting requirements are required even if the operator is not seeking RVR 400 (100 meters) or 300 (85 meters) minimums.

Figure 2.9 Sample Operator Use Suitability Demonstration Plan

1) This Operator Use Suitability Demonstration (OUSD) plan contains direction and guidance to be utilized by ABC Airlines, Inc. personnel responsible for conducting and managing demonstration instrument landing system (ILS)-coupled approach and automatic landings required for FAA issuance of operations specification (OpSpec) C059. It shall also provide applicable guidance and direction for required follow-on demonstration landings to be required for FAA issuance of OpSpec C060.

a) The Director of Operations (DO) is responsible for implementation of all operational procedures required by this OUSD plan. The Director of Maintenance (DOM) is responsible for implementation of all maintenance procedures required by this OUSD plan. They are jointly responsible for providing routine and regular updates and feedback to ABC Inc.'s principal operations inspector (POI), principal maintenance inspector (PMI), and principal avionics inspector (PAI). Operational/airworthiness demonstrations, aircraft system suitability, and operational use suitability demonstrations must be completed as described in AC 120-29, Criteria for Approval of Category I and Category II Weather Minima for Approach, paragraphs 10.5.1 and 10.5.2, unless otherwise specified by the certificate-holding district office (CHDO). AC 120-28, Criteria for Approval of Category III Weather Minima for Takeoff, Landing and Rollout, specifies similar OUSD requirements for CAT III approval. Once ABC is approved for CAT II operations, this plan will be updated with the appropriate CAT III OUSD requirements. The purpose of these operational demonstrations is to determine or validate the use and effectiveness of the applicable aircraft flight guidance systems, training, flightcrew procedures, maintenance program, and manuals applicable to the program being approved. ABC's B-737-700 FAA approved Aircraft Flight Manual (AFM) references both advisory circulars (AC) as the criteria used as the basis for both CAT II and CAT III airworthiness demonstrations; therefore our B-737-700 fleet is already considered to meet the provisions of 10.5.1. This OUSD plan is designed to address provisions of 10.5.2., requiring verification of OUSD for initial CAT II approval.

b) For CAT II authorization, at least 100 landings will be accomplished in line operations using the autoland system, with a success rate of at least 90 percent.

NOTE: It is a good practice to conduct at least one approach using the autoland system to each runway intended for CAT II operations in weather better than that requiring use of CAT II minimums. Such demonstrations may be conducted in line operations, or during training or ferry flights. In any case, every demonstration autoland must be conducted in weather equal to or greater than ABC Inc.'s current CAT I operating minimums; 200 feet Decision Altitude (DA), RVR 1800 (550 meters).

1. If an excessive number of failures (e.g., unsatisfactory landings, system disconnects) occur during the landing demonstration program, a determination will be made for the need for additional demonstration landings, or for consideration of other remedial action (e.g., procedures adjustment, wind constraints, system modifications).

2. The system must demonstrate reliability and performance in line operations consistent with the operational concepts specified in and required by OpSpec paragraph C059, Category II Instrument Approach and Landing Operations (Optional: 14 CFR parts 91, 121, 125, 125 Letter of Deviation Authority (LODA) holder, 135, and 91K Operators) and Special Authorization Category I Instrument Approach and Landing Operations (Optional: Part 91 Operators).

3. Landing demonstrations will generally be accomplished on U.S. facilities or international facilities acceptable to the FAA. International facilities acceptable to the FAA are published at the Flight Operations Branch (AFS-410) Web site: http://www.faa.gov/about/office_org/headquarters_offices/avs/offices/afs/afs400/afs410/status_lists/.

4. At ABC Inc.'s discretion, demonstrations may be made on other runways and facilities if sufficient information is collected to determine the cause of any unsatisfactory performance (e.g., critical area was not protected). No more than 50 percent of the demonstrations may be made on such facilities.

5. U.S. Facilities Approved for CAT II and CAT III Demonstrations. U.S. ILS facilities that have published Title 14 of the Code of Federal Regulations (14 CFR) part 97 CAT II or CAT III instrument approach procedures (IAP) are acceptable for CAT II and CAT III demonstrations.

6. Foreign Facilities Approved for CAT II and CAT III Demonstrations. Only those approved foreign ILS facilities listed on the Flight Technologies and Procedures Division (AFS-400) Web site (http://www.faa.gov/about/office_org/headquarters_offices/avs/offices/afs/afs400/afs410) are *approved* for U.S. air carriers to conduct CAT II and/or CAT III demonstrations.

NOTE 1: Every demonstration autoland must be conducted in weather equal to or greater than ABC Inc.'s current CAT I operating minimums: 200 feet DH, RVR 1800 (550 meters).

NOTE 2: For takeoff or landing operations less than RVR 1200 (350 meters), air carriers must have low visibility training in accordance with FAA AC 120-57, Surface Movement Guidance and Control System, current edition.

2) Documentation.

a) ABC monitors aircraft maintenance performance trends through the Continuous Analysis and Surveillance Program (CASP). CASP is designed to assist in detection and correction of recurring problems in the B-737-700 fleet. CASP action is predicated on the inbound Boeing Air Transport Association of America (ATA) codes entered in the logbook. Should any ATA code be entered in the logbook three times or more in any 20-day period, the item will be flagged and analyzed for systemic corrective action by the engineering department. Therefore it is extremely important for crewmembers to enter the correct ATA code when making logbook entries, particularly when related to the aircraft autoflight system and autoland performance. Flightcrews will use form ABC OUSD-1 (sample below) to record all unsatisfactory autoland approaches. A logbook entry is also required for any unsatisfactory Autoland. Forms ABC OUSD-1 will be left with the aircraft logbook for scanning into the maintenance tracking system (retained for 1 year). This information will also be retrieved by the CASP and published monthly in the Fleet Maintenance CASP Report. All autoflight system history is also available in the maintenance tracking system by the applicable ATA chapter.

NOTE: The crew is responsible to notify dispatch of all autolands by Aircraft Communications Addressing and Reporting System (ACARS) message at the end of each flight. Dispatch will ensure that maintenance control is notified of all autolands in a timely manner so that appropriate recordkeeping and maintenance action can be taken. In the event of an unsuccessful autoland, the crew shall submit an Autoland Discrepancy Form in addition to the ACARS report. If ACARS is inoperative or not installed, the flightcrew must submit an Autoland Discrepancy Form to the chief pilot.

b) Autoland messages are accessed through ACARS, page 2 of the FLT Summary page, Automatic Approach, as in the following example:

Example: Autoland Messages on ACARS Page 2 of Flight Summary

FLIGHT SUMMARY PAGE 2: AUTOMATIC APPROACH

(1) Enter required information as follows:

1. Select YES;
2. Enter RUNWAY used;
3. Enter reported RVR visibility in feet
4. Enter SAT or UNSAT, as appropriate for the autoland;
5. Enter DISC ALT disconnect altitude in feet or enter 0 (zero) for full autoland; and
6. SEND when all required fields are filled.

(2) Reporting Requirements. Upon receipt of an ACARS, FLIGHT SUMMARY, AUTOMATIC APPROACH message in dispatch, maintenance control will enter all data on a CAT II OUSD tracking spreadsheet and forward the message to the following management personnel:

1. Director of Operations (DO), Captain Boe Sharp.
2. Director of Maintenance (DOM), Ken Johnson.

c) During each morning meeting for the duration of this OUSD, maintenance control will brief all attendees as to the current status of OUSD landings, including the following statistics:

- Autolands attempted: previous 24 hours;
- Satisfactory autolands: previous 24 hours;
- Unsatisfactory autolands with preliminary reasons;
- Total satisfactory autolands to date;
- Total unsatisfactory autolands to date; and
- FAA feedback if any.

1. Should there be any unsatisfactory autolands reported, the DOM and the DO are jointly responsible to determine whether maintenance factors, operational factors, or some combination thereof are responsible for the unsatisfactory autoland and to develop appropriate remedial procedures.

2. Additionally, maintenance control is responsible for maintaining a current and inspectable OUSD file of all relevant e-mail messages and B-737-700 Autoland Discrepancy Forms. This file may be maintained in electronic format or by the maintenance tracking system with scanned B-737-700 Autoland Discrepancy Forms.

d) Form ABC OUSD-1, B-737-700 Autoland Discrepancy Form. Flightcrews will use Form ABC OUSD-1 to record all unsatisfactory autoland approaches. An unsuccessful autoland is defined as follows:

- Aircraft fails to maintain runway track within + or – 22 feet of centerline;

- Drift rate exceeds 2 feet per second;
- Aircraft does not touch down within the touchdown zone (TDZ);
- Autoflight system does not maintain the aircraft within required performance parameters when within the decision region; and
- Any other performance abnormality; e.g., early autoflight disconnect, failure to ALIGN, failure to FLARE, failure to RETARD autothrottles, or failure to rollout properly.

1. A logbook entry is required for any unsatisfactory autoland. Forms ABC OUSD-1–B-737-700 will be left with the aircraft logbook for scanning into the maintenance tracking system (retained for 1 year). This information will also be retrieved by the CASP and published monthly in the Fleet Maintenance CASP Report.

2. All autoflight system history is also available in the maintenance tracking system by the applicable ATA chapter.

Sample Autoland Discrepancy Form
ABC OUSD-1–B-737-700, Autoland Discrepancy Form (Front)

This form will be completed whenever an approach is attempted using the airborne low approach
system, regardless of whether the approach is abandoned or concluded successfully.

CAT II/IIIa APPROACH EVALUATION

CAT II ☐ CAT IIIa ☐ Autoland Yes ☐ No ☐

Pilot in Command (PIC) _____

Second in Command (SIC) _____

Date _____ Registration No. _____ Airport ID _

Rwy _____ Wx _____ Wind _____

APPROACH EVALUATION:

Was the approach successful? Yes ___ No _____

Flight control guidance system used:

Auto-coupler _____

Flight director _____

Airspeed at middle marker ± at _____ 100' ± _ from programmed speed?

If unable to complete the approach, indicate the cause:
Airborne equipment ☐ Ground equipment ☐ ATC (Air Traffic Control) ☐ Other ☐
Identify and describe nature of deficiency.

_____
_____
_____
_____

See criteria on rear of this form

ABC OUSD 1–B 737 700, Autoland Discrepancy Form (Back)

AUTOLAND CRITERIA

An unsuccessful autoland is defined as follows:

1. Aircraft fails to maintain runway track within +/- 22 feet of centerline;

2. Drift rate exceeds 2 feet per second;

3. Aircraft does not touch down within the touchdown zone (TDZ);

4. Autoflight system does not maintain the aircraft within required performance parameters when within the decision region; and

5. Any other performance abnormality; e.g., early autoflight system disconnect, failure to ALIGN,
failure to FLARE, failure to RETARD autothrottles, or failure to rollout properly.

A logbook entry is required for any unsatisfactory autoland.

e) Data Collection Requirements and Miscellaneous Considerations.

Form ABC OUSD-1–B-737-700 was developed to allow the flightcrew to record unsatisfactory approach and landing performance. The resulting data and a summary of the demonstration data will be made available to the principal inspectors (PI) and regional Flight Standards division (RFSD) NextGen Branch (AXX-220) for evaluation. The data provided by FORM ABC OUSD-1–B-737-700 include the following information:

1. Information regarding the inability to initiate an approach or identify deficiencies related to airborne equipment.

2. Information regarding abandoned approaches, stating the reasons the approach was abandoned and the altitude above the runway at which the approach was discontinued or at which the automatic landing system was disengaged.

3. Information regarding any system abnormalities that required manual intervention by the pilot to ensure a safe touchdown or touchdown and rollout, as appropriate.

4. Data Analysis. Unsatisfactory approaches using facilities approved for CAT II or CAT III where landing system signal protection was provided should be fully documented. The following factors should be considered:

a. Air Traffic Control (ATC) Factors. ATC factors that result in unsuccessful approaches should be reported. Examples include situations in which a flight is vectored too close to the final approach fix (FAF)/final approach point (FAP) for adequate localizer and glide slope capture, lack of protection of ILS critical areas, or ATC requests for the flight to discontinue the approach.

b. Faulty Navigational Aid (NAVAID) Signals. NAVAID (e.g., ILS localizer (LOC)) irregularities, such as those caused by other aircraft taxiing, over-flying the NAVAID (antenna), or where a pattern of such faulty performance can be established should be reported.

c. Other Factors. Any other specific factors affecting the success of CAT II operations that are clearly discernible to the flightcrew should be reported. An evaluation of reports discussed above will be made to determine system suitability for authorization for CAT II operations.

5. The following precautions must be observed when conducting autolands:

a. The runway and associated instrument procedure should have no outstanding Notices to Airmen (NOTAM) or other applicable notes concerning the procedure precluding the use of the autoland system (e.g., it should not have notes such as “LOC unusable inside the threshold,” or “Glideslope unusable below xxx feet.”).

b. Suitable ILS critical area protection (or equivalent) should be requested from ATC, if applicable. Similar to precautions for a CAT II or III procedure, the crew should remain alert to detect any evidence of unsuitable system performance, whether or not critical protection is being provided.

c. Airports/runways on the CAT II/III special terrain list may not be used for initial CAT II or CAT III autoland demonstrations. The characteristics of the prethreshold terrain or TDZ slope at these facilities may cause abnormal performance in flight control systems. Additional analysis or flight demonstrations are required for each aircraft type prior to approval of CAT II or CAT III minimums. Should ABC Inc. intend to use autoland procedures at these specified runways, prior coordination and approval is required.

NOTE: Every demonstration autoland must be conducted in weather equal to or greater than ABC Inc.’s current CAT I operating minimums: 200 feet DA, RVR 1800 (550 meters).

CHAPTER 3 APPROVAL OF SMALL CATEGORY A AIRCRAFT FOR CATEGORY II OPERATIONS—PART 91

3.1 OVERVIEW

The general process of approval or acceptance of certain operations, programs, documents, procedures, methods, or systems is an orderly method used by DAAO) inspectors to ensure that such items meet regulatory standards and provide for safe operating practices. It is a modular, generic process that is ideally suited for the approval of Category (CAT) II programs that are solicited by operators from the Directorate General of Civil Aviation (DGCA) . It is important for an inspector to understand that the process described in this chapter is not all inclusive, but it is rather a tool to be used with good judgment in conducting day-to-day duties and responsibilities.

3.2 APPLICABILITY

The purpose of this chapter is to provide operational system safety oversight, analysis, and guidance to principal inspectors (PI) on the authorization of operators of small Category A aircraft (including airplanes and rotorcraft) to conduct CAT II instrument landing system (ILS) and/or Copter ILS with a decision height (DH) below 200 feet approach and landing operations. The principal operations inspector (POI) authorizes these operations via the issuance of ACL C059. The process in this chapter applies only to R.O.I operators of small Category A aircraft under CASR part 91. See Chapter 2 for the process to authorize operators for CAT II/III operations under CASR part 91 , 121, or 135, and to authorize other helicopter operators for Copter ILS operations with a DH less than 200 feet.

3.3 PREREQUISITES AND COORDINATION REQUIREMENTS

A. Prerequisites. This task requires knowledge of regulatory requirements of CASR part 91 and DGCA policies and qualification as flight operations inspector (FOI)

B. Coordination. This task requires coordination with airworthiness units.

3.4 OBJECTIVE

The objective of this task is to determine if an operator of a small Category A civil aircraft (airplane or rotorcraft) has developed acceptable procedures to conduct safe instrument approaches to CAT II minimums and/or Copter ILS minimums with a DH below 200 feet. Successful completion of this task results in acceptance or rejection of the operator’s proposed CAT II procedures manual (if required) and issuance or denial of ACL C059 to CASR part 91 small Category A aircraft operators.

3.5 APPROVAL METHOD

A CASR part 91 small Category A aircraft operator is issued ACL C059 for CAT II operations and/or Copter ILS operations with a DH below 200 feet.

3.6 SMALL Category A AIRCRAFT CAT II AND COPTER ILS OPERATIONS

The DH and RVR for an aircraft on an ILS approach is specified on the part 97 Standard Instrument Approach Procedure (SIAP) chart. The DH for a CAT I ILS approach is 200 feet or more above the touchdown zone (TDZ) or threshold and the RVR minimums is 1,800 feet or greater. The DGCA determined that altitude and visibility values could be lowered based upon the demonstrated skill of the flightcrew and the performance of the aircraft and ground-based navigation equipment. The DGCA has authorized certain operators to use lower-than-normal CAT I ILS minimums at specified airports after demonstrating the ability to conduct safe instrument approaches.

A. Copter ILS and Helicopter CAT II Approval. Copter ILS and Helicopter CAT II approval will permit operators to fly to minimums no lower than 100 feet height above touchdown (HAT) and/or to visibilities no lower than RVR 1200 (350 meters) on published CASR part 97 Copter ILS and CAT II ILS procedures. An unpublished DH reduction is not authorized; e.g., the authorized DH is no lower than the relevant minimum on the instrument approach procedure (IAP). The visibility minimum may be reduced in accordance with CASR part 97, 97.3. For operations with DH below 150 feet, either a marker beacon receiver providing aural and visual indications of the inner marker (IM) or a functioning radio altimeter (RA) is required.

B. Small Category A Airplane CAT II Approval. Small Category A airplane CAT II approval permits operators to fly to minimums no lower than 100 feet height above threshold (HATh) and to visibilities no lower than RVR 1200 (350 meters) on published CASR part 97 CAT II ILS procedures. Reductions to CAT I ILS procedures are not authorized. For operations with DH below 150 feet, either a marker beacon receiver providing aural and visual indications of the IM or a functioning RA is required.

C. Approaches Authorized. Operators approved for CAT II approaches conducted under CASR part 91 may conduct any CASR part 97 public CAT II approaches (i.e., published approaches). The specific approaches do not have to be listed in the ACL . Small Category A aircraft, CAT II, and Copter ILS operations to a DH below 200 feet are not authorized when operating for compensation or hire.

3.7 APPLICATION FOR DEVIATION

Section 91.193 provides for deviations to the requirements of 91.189, 91.191, and 91.205(f). This authority applies to the operation of small Category A aircraft that meet the requirements listed in 97.3. Initial contact can occur in any of several forms (telephone conversation, in-person visit, letter, submission of an application, etc.). Before approval of a CAT II authorization, an operator must accomplish the following:

A. Letter of Intent (LOI). The applicant should submit LOI (Letter of Intent to Conduct Category II and/or Copter Instrument Landing System Operations) containing specific information about the proposed operation (e.g., the types of aircraft, Schedule

of Events (SOE), aircraft and avionics configurations, and a description of the maintenance and inspection program). Operators should state the extent of relief requested from the requirements of 91.189, 91.191, and/or 91.205(f). This LOI must be submitted to the DAAO

B. DAAO Receipt. Upon receipt of an LOI requesting a small Category A aircraft CAT II and/or Copter ILS deviation, the inspector shall provide the applicant a copy of the small Category A aircraft approval job aid (Figure 3.1) and inform the applicant of the requirements for approval. Provide a copy of the LOI to the airworthiness and avionics units for timely coordination and review.

C. Application Package. When the applicant submits a completed job aid and application package, the inspector should review the application package for completeness, verify that the aircraft/avionics are equipped as required in subchapter 3.10, and forward that data to the DAAO. DAAO concurrence is required for all small Category A aircraft, CAT II ILS, and Copter ILS authorizations.

Figure 3.1 Small Category A Category II Job Aid

CASR Part 91 Small Category A Aircraft, CAT II ILS, or Copter ILS Below 200 Feet DH—Job Aid

This job aid lists the critical items necessary to evaluate a request for CAT II authorization for a CASR part 91 small Category A aircraft. List the authorization(s) sought below:

Small Category A CAT II: ☐Yes ☐No Copter ILS below 200 feet DH: ☐Yes ☐No

Pilot: Phone Number: E-mail Address:

License Held: License Number:

Ratings Held: CAT II Rating Date:

Aircraft Make and Model: Aircraft Registration:

Aircraft Location: Proposed Demonstration Date:

Proposed Demonstration Location:

1. Aircraft Equipment. Is the aircraft equipped with the following instruments and equipment?

The instruments and equipment specified in 91.205(d): ☐Yes ☐No

A communication system that does not affect the operation of the ILS systems: ☐Yes ☐No

A marker beacon receiver that provides distinctive aural and visual indications of the outer and middle marker: ☐Yes ☐No

One sensitive altimeter adjustable for barometric pressure having a placarded correction for altimeter scale error, in the absence of a radio altimeter: ☐Yes ☐No

One vertical speed indicator: ☐Yes ☐No

For operations with DH below 150 feet, either a marker beacon receiver providing aural and visual indications of the inner marker or a functioning radio altimeter: ☐Yes ☐No

Warning systems for immediate detection by the pilot of system faults in the ILS and the radio altimeter (if required): ☐Yes ☐No

An externally vented static pressure system with an alternate static pressure source: ☐Yes ☐No

A heat source for the airspeed system pilot tube installed or an equivalent means of preventing malfunctioning because of icing of the pilot system: ☐Yes ☐No

Remarks:

2. CAT II Manual (See CASR Part 91 Appendix A, 91.191). Does your CAT II manual contain all of the following information:

The registration number, make, and model of the aircraft to which it applies:	☐Yes ☐No
A maintenance program as specified in CASR part 91 appendix A, section 4:	☐Yes ☐No
The procedures and instructions related to:	
Recognition of DH:	☐Yes ☐No
Use of RVR information:	☐Yes ☐No
Approach monitoring:	☐Yes ☐No
The decision region (the region between the middle marker/final approach fix (FAF) and the DH):	☐Yes ☐No
Maximum permissible deviations of the basic ILS indicator within the decision region:	☐Yes ☐No
Missed approach:	☐Yes ☐No
Use of airborne low approach equipment:	☐Yes ☐No
Minimum altitude for the use of the autopilot (if applicable):	☐Yes ☐No
Instrument and equipment failure warning systems:	☐Yes ☐No
Procedures in the event of instrument failure:	☐Yes ☐No

Remarks:

Name (Print)	**Signature**	**Date**

3.8 REVIEW OF APPLICATION PACKAGE

A. Pilot Certification and Recency. The applicant must be authorized for CAT II operations and meet all CAT II recency requirements in accordance with CASR part 61, 61.57 and 61.67. ACL C059 cannot be issued to a pilot who does not meet the CAT II certification and recency requirements at the time of issuance. The pilot may elect to concurrently seek CAT II authorization under CASR part 61 and conduct the aircraft evaluation required in this approval process.

B. Manual Requirements. Coordinate review of the manual with the airworthiness and avionics units as necessary. The following information and procedures should be included in the CAT II manual (see CASR part 91 appendix A, section 1(b)):

1) **Aircraft Identification.** Registration number, serial number, make, and model of the aircraft to which it applies.

2) **Maintenance Program.** A maintenance program as specified in CASR part 91 appendix A, section 4.

3) **Procedures.** The procedures and instructions related to:

a) DH.

b) Use of RVR information.

c) The decision region (the region between the middle marker (MM)/final approach fix (FAF) and DH).

d) The maximum permissible deviations of the basic ILS indicator within the decision region.

e) A missed approach.

f) Use of equipment minimum altitude for use of autopilot (AP).

g) Instrument and equipment failure warning systems.

h) Instrument failure.

i) Other procedures, instructions, and limitations that may be found necessary by the Administrator.

4) **Unsatisfactory CAT II Operations Manual.** If the manual is unsatisfactory:

a) Contact the applicant and explain areas of the CAT II operations manual that need to be corrected.

b) Prepare a letter of disapproval, with a suspense date for submission of the corrected CAT II operations manual.

c) Retain a copy of the CAT II operations manual for future comparison.

d) Return the application, the CAT II operations manual, and the letter of disapproval to the applicant.

5) **Satisfactory CAT II Operations Manual.** If the manual is satisfactory:

a) Approve the manual in accordance with the criteria in CASR 91.191 and part 91 appendix A, coordinating with avionics and airworthiness as necessary.

b) Prepare a letter of approval.

C. Maintenance Program Requirements. Each maintenance program must contain the following:

1) A list of each instrument and item of equipment specified in CASR part 91 appendix A, section 2 that is installed in the aircraft and approved for CAT II operations, including the make and model of those specified in CASR part 91 appendix A, section 2(a).

2) A schedule that provides for the performance of the procedures under subchapter 3.8, (C)(5) within 3 calendar-months after the date of the previous inspection. The inspection must be performed by a person authorized by CASR part 43, except that each alternate inspection may be replaced by a functional flight check. This functional flight check must be performed by a pilot holding a CAT II pilot authorization for the type aircraft checked.

3) A schedule that provides for the performance of bench checks for each listed instrument and item of equipment that is specified in CASR part 91 appendix A, section 2(a) within 12 calendar-months after the date of the previous bench check.

4) A schedule that provides for the performance of a test and inspection of each static pressure system in accordance with CASR part 43 appendix E within 12 calendar-months after the date of the previous test and inspection.

5) 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 CASR part 91 appendix A, section 2(a) to perform as approved for CAT II operations, including a procedure for recording functional flight checks.

6) A procedure for assuring that the pilot is informed of all defects in listed instruments and items of equipment.

7) 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 approval condition before it is returned to service for CAT II operations.

8) A procedure for an entry in the maintenance records required by CASR part 43, 43.9 that shows the date, airport, and reasons for each discontinued CAT II operation because of a malfunction of a listed instrument or item of equipment.

D. Bench Check Requirements. Any required bench check must:

1) Be performed by a certificated repair station holding one of the following ratings as appropriate to the equipment checked:

a) An instrument rating.

b) A radio rating.

2) Consist of removal of an instrument or item of equipment, and performance of the following:

a) A visual inspection for cleanliness, impending failure, and the need for lubrication, repair, or replacement of parts;

b) Correction of items found by that visual inspection; and

c) Calibration to at least the manufacturer's specifications unless otherwise specified in the approved CAT II manual for the aircraft in which the instrument or item of equipment is installed.

3) After the completion of one maintenance cycle of 12 calendar-months, a request to extend the period for checks, tests, and inspections is approved if it is shown that the performance of particular equipment justifies the requested extension.

4) The airborne ILS avionics must be operationally checked within the preceding 15 flight hours and 15 days before conducting a Copter ILS or CAT II ILS and found to perform satisfactorily. The check may be performed using ramp or bench test equipment; by a functional flight check conducted by a pilot holding a Copter ILS authorization while flying an unrestricted ILS approach (an ILS approach with a DH no higher than 200 feet HAT and no autocoupler limitations); or by an actual Copter ILS or CAT II ILS approach. Such checks should be recorded in the aircraft logbook or aircraft maintenance records by the person performing the check as provided in 91.407(b).

3.9 EVALUATION PROGRAM

An evaluation program will be conducted by the operator when the aircraft flight control guidance system required for CAT II operations is not approved under an appropriate type certificate (TC) or Supplemental Type Certificate (STC) (CASR part 91 appendix A). Information derived from the evaluation program should be used to update appropriate operational procedures and techniques in the operator's CAT II manual. Request for deviation of the evaluation program must be coordinated with the DAAO.

A. Evaluation Program Requirements. An evaluation program is not required if an applicant has an aircraft in which the instruments and equipment have been TC'd or STC'd for CAT II operations. The applicant must present the rest of the application package for approval. This manual may have been developed by a manufacturer and adapted for a specific operator's use.

B. Demonstration of Flight Control Guidance System. The equipment to be evaluated for approval will be the flight control guidance system. This program provides a method of approval for those airplane owners or operators having airplanes equipped with a flight control guidance system that is not approved for CAT II operations under an appropriate TC or STC. Satisfactory demonstration will show that the equipment performs to the standards with the reliability necessary for CAT II operations.

C. Requirements for Conducting the Evaluation Program. The procedures and requirements for conducting an evaluation program are prescribed in CASR part 91 appendix A, section 3(e). The following should be considered:

1) When IM receiving equipment is to be used as the primary means of identifying the 100-foot DH, its use will be permitted when the ground equipment is operable. However, in the absence of operable IM ground equipment, the lowest authorized DH is 150 feet using only a barometric altimeter. It will be necessary to rely on barometric altimeters required by CASR part 91 appendix A, section 2(a)(7). These altimeters will be acceptable under that section if:

a) The altimeters and their static systems meet the requirements of 91.411 within the past 12 months; and

b) Altimeter correction data, which considers both scale error and main landing gear wheel height of the airplane, is available to the pilot in command (PIC). Scale error is determined by an altimeter test and inspection under CASR part 43 appendix E.

2) If the first five approaches are successful, the demonstration is complete. Otherwise, a success rate of 90 percent must be achieved for 10 approaches. If this cannot be demonstrated, the application is disapproved. All demonstration approaches must be observed by an DGCA inspector and recorded on a suitable form developed by the operator in order to facilitate evaluation. See Figure 3.2, Category II Approach Evaluation, for an example. A successful approach is one in which:

a) At the 100-foot DH, the indicated airspeed and heading are satisfactory for a normal flare and landing (speed must be plus or minus 5 knots of programmed airspeed, but may not be less than the computed threshold speed if autothrottles are used);

b) The aircraft at the 100-foot DH is positioned so that the cockpit is within, and tracking so as to remain within, the lateral confines of the runway extended;

c) Deviation from glideslope after leaving the outer marker (OM) does not exceed 50 percent of full-scale deflection as displayed on the ILS indicator;

d) No unusual roughness or excessive attitude changes occur after leaving the MM; and

e) In the case of an aircraft equipped with an approach coupler, the aircraft is sufficiently in trim when the approach coupler is disconnected at the DH to allow for the continuation of a normal approach and landing.

3) All evaluation approaches must be conducted under simulated instrument conditions after prior arrangement with the controlling air traffic control (ATC) facility. When conducting approaches, the operator should ask ATC to ensure that vehicles or other aircraft on the surface will not move into the ILS critical area. An aircraft or vehicle in the ILS critical area could cause momentary deviations to ILS course or glideslope signals, which may result in an unsatisfactory approach. If the DGCA inspector identifies an external condition and is reasonably sure this external condition caused an unsatisfactory approach, that approach may be disregarded at the inspector's discretion.

4) Although the evaluation approaches are not required to be performed on a CAT II ILS, it is important to note that an unsatisfactory evaluation approach is extremely difficult to attribute to small errors in ILS ground equipment. Many CAT I ILS facilities are capable of meeting CAT II signal standards, but are not monitored to the same tolerances as CAT II/III facilities. An unsatisfactory approach due to a critical error incursion is something that may be identified, but an unsatisfactory approach due to a signal or monitor error outside CAT II limits but within CAT I limits cannot be detected by the PIC or DGCA inspector.

5) Flags, lights, aural warnings, and other displays associated with normal and abnormal functioning of the flight control guidance system should be evaluated to determine if they provide the crew with information suitable for a CAT II operation.

6) The PIC conducting an evaluation program is not required to meet the CAT II pilot requirements of 61.67.

Figure 3.2 Category II Approach Evaluation

CATEGORY II APPROACH EVALUATION

Pilot in Command (PIC) _____ Second in Command (SIC) _____

Date _____ Registration No. _____ Airport _____

Runway _____ Weather _____ Wind _____ DGCA Inspector _____

This form will be completed whenever an approach is attempted using the airborne low approach system, regardless of whether the approach is abandoned or concluded successfully.

APPROACH EVALUATION:

Was the approach successful? Yes ____ No _____

Flight control guidance system used:

a. Auto-coupler _____

b. Flight Director ____

If equipped and used, did a and b agree? Yes _____ No _____

Second in Command? Yes _____ No _____

DGCA Inspector? Yes ___ No _____

Airspeed at middle marker ± at _____ 100' ± _____ from programmed speed?

If unable to initiate _____ or complete _____ approach (indicate which), indicate the cause:

Airborne equipment _____ Identify and describe nature of deficiency.

Ground equipment _____ Identify and describe nature of deficiency.

Approach control or tower request _____ .

Other _____ State reason:

Was airplane in trim at 100' for continuation of flare and landings?

If approach and landing abandoned, state altitude above runway: feet, (state reasons)

_____

Quality of overall performance: Acceptable _____ Unacceptable _____

_____

PIC Signature

3.10 SMALL CATEGORY A AIRCRAFT SPECIAL PROVISIONS

The following text must be entered into ACL C059, Table 1 when authorizing any operator of small CAT A aircraft.

A. Exceptions to 91.189. The provisions of 91.189 apply to all operations conducted in accordance with this authorization. However, when a second in command (SIC) is not required by the aircraft type design, the SIC requirements of 91.189(a)(1) are not applicable.

B. Exceptions to 91.205(f). The provisions of 91.205(f) do not apply with the following exceptions:

1) For operations under the terms of this authorization, the instruments and equipment specified in 91.205(d) are required together with the following instruments and equipment:

a) A communication system that does not affect the operation of the ILS systems;

b) A marker beacon receiver that provides distinctive aural and visual indications of the OM and MM;

c) One sensitive altimeter adjustable for barometric pressure having a placarded correction for altimeter scale error, in the absence of a RA;

d) One vertical speed indicator;

e) For operations with DH below 150 feet, either a marker beacon receiver providing aural and visual indications of the IM or a functioning RA;

f) Warning systems for immediate detection by the pilot of system faults in the ILS and the RA (if required);

g) An externally vented static pressure system with an alternate static pressure source; and

h) A heat source for the installed airspeed system pilot tube or an equivalent means of preventing malfunctioning because of icing of the pilot system.

2) No passengers or property may be carried for compensation or hire.

3) The following minimum applies for ILS approaches to CAT II runways: DH RVR.

4) This authorization applies only to the following: *(insert the aircraft make, model, registration, and serial number)*.

5) Operations under the terms of this authorization will not be conducted unless the required ILS equipment has been operationally checked within the preceding 15 hours of flight time and within 15 days before flight, and has been found to perform satisfactorily for the type of operation authorized. The check may be performed using ramp test equipment, a functional flight check conducted by a pilot holding a CAT II authorization, or by an actual approach. Such checks should be recorded in the aircraft logbook or aircraft maintenance records by the person performing the check as provided in 91.407(b).

3.11 TASK OUTCOMES

Completion of this task results in one or more of the following:

- An approved CAT II operations manual.
- A certificate of waiver or authorization.
- ACL and/or Operations specifications (OpSpecs) for the aircraft.
- An approved evaluation program.
- A disapproved application.
- A letter indicating disapproval of a CAT II operations manual.
- A letter indicating approval of a CAT II operations manual.

3.12 FUTURE ACTIVITIES

- Renewal of aircraft authorization.
- Review revisions to the operator’s CAT II operations manual.
- Possible enforcement investigation.

CHAPTER 4 LOW VISIBILITY SURFACE MOVEMENT AND TAKEOFF OPERATIONS

4.1 OVERVIEW

This chapter contains a summary of takeoff operations based on published Surface Movement Guidance and Control System (SMGCS) on any airports where scheduled air carriers are authorized to conduct operations (taxi, takeoff, and/or landing) when the visibility is less than Runway Visual Range (RVR) 1200 (350 meters).

4.2 APPLICABILITY

DGCA must ensure that each air carrier initial and/or recurrent pilot ground training programs include information about airport surface movement during night and low visibility environments and familiarization with airport markings, signs, and lighting. This is critical for Category (CAT) II/III operations, as well as lower-than-standard takeoff operations.

4.3 OPERATOR REQUIREMENT—LOW VISIBILITY TAXI AND TAKEOFF OPERATIONS

A. General. Current ground operation systems have not always provided an adequate level of safety during night operations and low visibility conditions.

1) These criteria outline the pilot crewmember training requirements under CASR part 121, 121.415(g) and CASR part 135, 135.403 (b) in all weather, day, and night surface movement operations.

2) Inspectors must ensure that each air carrier initial and/or recurrent pilot ground training programs include information about airport surface movement during night and low visibility environments and familiarization with airport markings, signs, and lighting.

3) Additional information can be found in ICAO Doc 9476-AN/927.

B. Flightcrew Training and Qualification Requirements. If an operator requests authorization to conduct lower-than-standard takeoffs, the flightcrew must be trained and qualified in their respective crew positions for the applicable takeoff minimums requested. The pilot in command (PIC) is ultimately responsible for ensuring that the flightcrew members are appropriately qualified before conducting an authorized lower-than-standard takeoff.

1) Individual pilots must be trained in their respective crew positions (parts , 121, and 135) and checked (parts , 121, and 135) in takeoffs using the appropriate requested minimums, before being approved for conducting such takeoffs.

2) Pilot qualification must consist of an initial check that includes one takeoff at the lowest requested takeoff minimums. It is also required during each pilot’s recurrent qualification cycle. This qualification must be completed in a flight simulator capable of replicating the applicable takeoff visibility, and the simulator must be set at (or lower than) the applicable takeoff visibility during such takeoffs.

3) Additional crew qualification for a check airman or a qualified DGCA inspector, beyond that shown herein for regular flightcrews is not required.

4) DAAO ASIs must ensure that operators requesting lower-than-standard takeoff minimums provide appropriate training for flightcrews, including the procedures listed below, as appropriate:

- Confirming the takeoff runway alignment (Confirming the Takeoff Runway, includes guidance and/or advisory information about acceptable techniques);
- Rejected takeoffs in a low visibility environment;
- Low visibility instrument takeoff cross-check priorities;
- Engine failure during critical phases of takeoff in low visibility;
- Acceleration and climb disorientation factors and illusions;
- Use of head-up display (HUD) takeoff guidance systems (when installed in aircraft for RVR 300 (85 meters) authorization only);
- Taxiing in a low visibility environment with emphasis on preventing runway incursion and SMGCS training (includes guidance and/or advisory information about acceptable techniques);
- Taxiway critical areas;
- Crew coordination and planning;
- Required ground-based visual aids (such as stop bars and taxi holding position lights);
- Required ground-based electronic aids (such as ILS/microwave landing system (MLS) and transmissometers); and
- Determination of takeoff alternate airports.

C. Authorizations, Conditions, and Limitations (ACL) . When appropriate, DAAO ASIs will issue ACL C056 and/or C078 to parts 121 , and ACL C057 and/or C079 to part 135 operators, . These OpSpecs contain specific flightcrew, aircraft, and airport requirements when lower-than-standard takeoff minimums are used.

CHAPTER 5 NON-PRECISION, APPROACH PROCEDURES WITH VERTICAL GUIDANCE, AND CATEGORY I PRECISION APPROACH AND LANDING OPERATIONS

5.1 OVERVIEW

This chapter includes guidance for operations other than Category (CAT) II/III approaches for CASR parts 91, 121, 129, and 135 operators. Approach and landing operations other than CAT II/III include visual approaches, contact approaches, circling approaches, Non‑precision Approaches (NPA), approach procedures with vertical guidance (APV), and CAT I instrument landing system (ILS) approaches. This chapter includes guidance for both approach procedures using ground-based and/or satellite-based Navigational Aids (NAVAID).

5.2 APPLICABILITY

The information detailed in this chapter applies to the operators of all civil aircraft operating under parts 91, 121, 129, and 135. This chapter addresses concepts and national policy guidance to be used by a DGCA inspector when evaluating, approving, or denying requests for an authorization to conduct any terminal area approach operation other than CAT II/III operations. Requests for CAT I operations other than those based on ILS, such as Ground Based Augmentation System (GBAS) Landing System (GLS) or microwave landing system (MLS), are to be directed to the DGCA . This chapter does not apply to Special Authorization (SA) CAT I instrument procedures. See Chapter 6 for SA CAT I approvals.

5.3 APPROVAL METHOD

A. CASR Part 91. Part 91 operators do not need a Authorizations, Conditions, and Limitations (ACL) for any other than CAT II/III (which includes SA CAT I) authorizations described in this chapter. Precision runway monitor (PRM) approaches do not require a specific ACL , but the operator must adhere to the criteria prescribed on the “Attention All Users” that accompanies each PRM approach.

B. CASR Part 121, 129, and 135. ; Parts 121, and 135 operators are issued ACL and operations specifications (OpSpecs). Part 129 operators are issued operations specifications (OpSpecs).

1) **C051.** C051 is issued to all operators conducting airplane operations under , part 121, , and 135 who conduct any terminal flight operations under IFR.

2) **C052.** C052 is applicable to all operators conducting airplane operations under parts, 121, and 135. Paragraph C052 specifies the types of instrument approaches the operator is authorized to conduct under IFR and prohibits the use of other types of instrument approaches, and authorizes the lowest straight-in non-precision, APV, and CAT I precision approach and landing minimums.

3) **C054.** C054 is issued to all operators conducting operations under parts 121, . It is also issued to operators who conduct turbine-powered airplane operations under part 135. It is not issued to part 135 operators who do not operate turbine-powered

airplanes unless that operator also conducts operations under part 121. C054 specifies the RVR landing minimum equivalent to the published RVR landing minimum that must be used by high-minimum pilots (less than 100 hours in aircraft type). It also specifies that before a pilot in command (PIC) of a turbojet can conduct an instrument approach with visibility conditions reported to be below three-quarters of a mile or RVR 4000 (1200 meters) (basic turbojet landing minimums), the pilot must be specifically qualified and authorized to use standard landing minimums.

4) **C061.** C061 authorizes an operator to use a flight control guidance system with automatic landing capabilities to touchdown in conditions other than CAT II/III. Part 121, 121.579(c) and part 135, 135.93(d) specify that this type of operation must be authorized by ACL and OpSpecs. C061 is optional for parts , 121, and 135.

5) **C062.** ACL and OpSpec C062 is optional for part , 121, , and 135 operations to authorize operators to use manually flown flight control guidance systems to conduct approach and landing operations to fly a CAT I ILS using a Head-Up-Guidance System (HGS).

6) **C064.** C064 authorizes an operator to conduct nonscheduled passenger and all-cargo (scheduled and nonscheduled) terminal area IFR operations in Class G airspace or into airports without an operating control tower.

7) **C073.** C073 authorizes operators to use decision altitude (DA) in lieu of MDA on certain NPA procedures. These procedures must meet specific criteria to verify that the visual approach area is clear of obstacles and will safely permit a brief descent below DA.

8) **C075.** ACL and OpSpec C075 is issued to operators who conduct parts , 121, and 135 operations with fixed-wing airplanes. ACL and OpSpec C075 specifies the lowest minimums that can be used for CAT I circling approach maneuvers. It also provides special limitations and provisions for instrument approach procedures (IAP) at foreign airports.

9) **C077.** C077 is an optional authorization that is applicable to all operators conducting operations under the provisions for part 135 on-demand turbojet and all parts 121 . ACL and OpSpec B051 is applicable for parts 121 visual flight rules (VFR) en route operations for propeller-driven aircraft and may be issued in conjunction with C077.

10) **C080.** C080 is used to authorize terminal area IFR operations for scheduled passenger operations in Class G airspace or at airports without an operating control tower.

Figure 5.1 Available ACL and OpSpec.

Paragraph	**121**	**121/135**	**135**
C051	✓	✓	✓
C052	✓	✓	✓

C054	✓	✓	✓
C061	✓	✓	✓
C062	✓	✓	✓
C064	✓	✓	✓
C073	✓	✓	✓
C075	✓	✓	✓
C076	✓	✓	✓
C077	✓	✓	✓
C080	✓	✓	✓

5.4 GENERAL

A. Areas of Operation. Non-precision, APV, and CAT I precision approaches can be conducted at controlled and uncontrolled airports. All of these approaches can be conducted under IFR in visual or instrument flying conditions. Visual approaches are conducted with reference to the airport and/or the proceeding aircraft. Contact approaches are conducted with visual reference to the terrain. The circling maneuver of an NPA is conducted with visual reference to the airport. Straight-in NPAs, circling approaches down to the MDA, and CAT I ILS approaches may be conducted in instrument flying conditions.

B. Landing Minimums. Landing minimums for other than CAT II/III approaches are generally addressed by CASR part 91, 91.175, and 121.651, , 135.617, , and ACL and/or standard or special OpSpecs Part C. The published minimums on a part 97 instrument approach reflect these requirements.

C. CAT I Terminology. The CAT I terminology used in this chapter is based on and consistent with R.O.I. ACL and/or OpSpecs for parts 121, 129, and 135 operators. . While there are slight variations with International Civil Aviation Organization (ICAO), the broad objectives and practical operational applications are similar. For R.O.I. . applications to parts 121, , 129, and 135 operators, CAT I is considered to include any ILS, MLS, GLS, or precision approach radar (PAR) IAP having minimums not less than 200 feet height above touchdown (HAT) and RVR not less than 1,800 feet. SA CAT I procedures have approach minimums as low as 150 feet. DA/DH and RVR 1400 (400 meters). Approval for these procedures requires special equipage and training, which is discussed in Chapter 6. In certain circumstances, usually related to training, the DGCA and industry commonly refer to CAT I procedures as precision approaches and the other-than-CAT I procedures as NPAs. These terms are used below when describing CAT I operations.

D. DA/DH. For APV and CAT I precision approaches, a DA/DH is typically specified. The DA/DH presents the minimum altitude in an approach to which descent may continue, or by which a missed approach must be initiated, if the required visual reference to continue the approach has not been established. The DA/DH altitude value is typically measured by a barometric altimeter and is the determining factor for an ILS approach procedure. The height value specified in parentheses is typically a radio or radar altitude equivalent height above the TDZ (HAT) used only for advisory reference, and it does not necessarily reflect actual height about the underlying terrain.

E. Minimum Descent Altitude/Height (MDA/H). The minimum heights or altitudes for IAPs that do not have vertical guidance are specified as an MDA/H. For straight-in minimums, the MDA is a barometric altitude (above mean sea level (MSL)) with a specific HAT zone. . For circling minimums, the MDA is a barometric altitude with a specific height above airport (HAA). The height value specified in parentheses is the minimum descent height (MDH), which is typically a radio or radar altitude height equivalent to the HAT for straight-in minimums or HAA for circling minimums. The MDH is used only for advisory reference, and it does not reflect actual height above the underlying terrain.

F. Straight-In Minimums for Approaches with a DA. The lowest permissible minimums for Categories A, B, C, and D aircraft during the conduct of straight-in IAPs that have a DA are HAT 200 and one-half statute mile visibility or RVR 1800 (550 meters). The lowest permissible minimums for helicopters operated at 90 knots or less are HAT 200 and one-fourth statute mile visibility or RVR 1200 (350 meters). These minimums for helicopters operated at more than 90 knots are HAT 200 and one-half statute mile visibility or RVR 1800 (550 meters). These minimums are the lowest authorized for approaches that have a DA and are restricted to runways that are equipped with a runway TDZ and RCL lighting and either a medium intensity approach lighting system with runway alignment indicator lights (MALSR), simplified short approach lighting system with runway alignment indicator lights (SSALR), Approach Lighting System with Sequenced Flashing Lights (ALSF)-1, or ALSF-2 approach lighting systems, or foreign equivalents.

G. Straight-In Minimums for Approaches with a MDA. The lowest permissible minimums for Categories A, B, C, and D aircraft during the conduct of straight-in IAPs that have a MDA are HAT 250 and one-half statute mile visibility or RVR 2400 (700 meters). The lowest permissible minimums for helicopters operated at 90 knots or less are HAT 250 and one-fourth statute mile visibility or RVR 1600 (450 meters). These minimums for helicopters operated at more than 90 knots are HAT 250 and one-half statute mile visibility or RVR 2400 (700 meters). These minimums are the lowest authorized for approaches that have a MDA and are restricted to runways that are equipped with an MALSR, SSALR, ALSF-1, or ALSF-2 approach lighting systems, or foreign equivalents.

5.5 OPERATIONAL AUTHORIZATION

A. Straight-In Approach and Landing Operations. Before an operation can be authorized for the use of straight-in IAPs that have either an MDA or a DA/DH, inspectors must evaluate the proposed operation and determine that the operator is competent to safely conduct those procedures. Inspectors must ensure that the

operator's program specifies the conditions necessary for the safe conduct of proposed operations. The operator's program should incorporate systems, methods, and procedures that meet the following criteria:

- Program restricts operations to aircraft that are properly equipped and Airworthy for the straight-in approaches to be conducted.
- Complies with regulatory requirements specified for the operations.
- Meets the requirements of Parts B, C, and H of the ACL and the criteria of this order.
- Provides for accepted safe operating practices, such as altitude awareness and sterile cockpit procedures.
- Meets the criteria of AC 120-29, when applicable.
- Requires the use of the stabilized approaches when turbojet, turbofan, or propfan airplanes are used.
- Program restricts operations to pilots who are properly trained, experienced, qualified, and proficient for the particular operation being conducted (including use of basic air carrier minimums as well as standard minimums).
- Program restricts operations to airports and runways that meet the requirements applicable to straight-in instrument approaches.

B. Approaches Requiring Circling Maneuvers. When an operator is authorized to conduct instrument approaches, the ACL automatically authorize the conduct of circling maneuvers in VFR weather conditions (1,000-foot ceiling and 3-statute mile visibility). A circling maneuver conducted under this authorization may be performed at the published HAA appropriate for the highest speed in the circling maneuver. However, before circling maneuvers can be conducted with ceilings below 1,000 feet and/or visibilities below 3 statute miles, the operator's approved training program must provide for training in the circling maneuver. If an operator intends to conduct circling maneuvers with ceilings below 1,000 feet and/or visibilities below 3 statute miles, inspectors must evaluate the operator's training program and determine that it provides adequate instruction and checking of pilots on the circling maneuver. When an operator does not provide training on circling maneuvers, the operator's operating policies and procedures must prohibit circling maneuvers when ceilings and/or visibilities are below 1,000 feet and 3 statute miles. Inspectors must also ensure that the certificate holder's overall program specifies the necessary conditions (over and above those required for straight-in approaches) to safely conduct circling maneuvers. The operator's program should incorporate methods, procedures, and training that meet the following criteria:

- Meets the circling maneuver criteria in the ACL .
- Requires the circling maneuver to be performed in visual flight conditions.
- Provides for safe missed approaches throughout the circling maneuver.
- Requires the use of circling maneuver minimums appropriate to the highest speed used in a particular circling maneuver.
- Program restricts operations to those airports and runways where circling maneuvers can be safely completed.
- Program restricts circling maneuvers with ceilings below 1,000 feet and/or visibilities below 3 statute miles to those pilots who are properly trained and checked for the circling maneuver in those weather conditions.

1) No part 135 certificate holder authorized to conduct operations under IFR shall use, nor may any PIC execute, a circling approach maneuver to minimums published in the IAP for the circling approach maneuver or the minimums specified in the chart in ACL C075, whichever is higher, unless that PIC has (within the last 6 months,) satisfactorily demonstrated the circling approach maneuver to published minimums to an approved check airman or the DGCA .

2) For part 121, if the operator does not provide flight training and flight checking on the circling approach maneuver in accordance with part 121 appendices E and F, respectively, then the operator's Company Operations Manual (COM) and the manuals used by the flightcrews must specifically prohibit conducting circling approach maneuvers when reported weather conditions are below 1000-3 (ceiling and visibility).

3) Ground training must include instruction on procedures to be used to ensure that missed approaches executed during a circling approach maneuver will be conducted safely.

4) See ACL C075 for details on the training and checking requirements for the circling approach maneuver authorization for all certificate holders.

C. Operator Manuals. Before granting approval by issuing ACL , inspectors must evaluate the ability of the operator's overall program to provide the policy guidance, methods, and procedures necessary for ensuring the safe conduct of instrument approach operations using basic air carrier operating minimums. In conducting this evaluation, inspectors must consider certain factors related to the manuals. After completing this evaluation, the inspector must make a judgment concerning whether the operator's program as described in its manuals is able to meet the CASR and ACL requirements. Inspectors must also make a judgment concerning the operator's ability to provide for safe, accepted operating practices and procedures. When conducting this evaluation and making an appropriate judgment, the inspector should consider the following factors:

- Criteria and procedures for determining the suitability of runways, airport facilities, services, and ground-based equipment necessary for the types of aircraft used and the CAT I operation to be conducted.
- Criteria and procedures for determining the airborne equipment required to be serviceable at departure.
- Criteria and procedures for determining the airborne and ground-based equipment that must be serviceable before conducting CAT I operations at the destination and alternate airports.
- Criteria and procedures for determining the airworthiness status of the aircraft for the operation to be conducted.
- Criteria and procedures to ensure that the minimum equipment list (MEL) requirements are met for the operation being conducted.
- Criteria and procedures that ensure that CAT I dispatch or flight release requirements are met.
- Criteria and procedures for determining the instrument procedures and operating minimums authorized, including the equipment, training, and qualification requirements necessary for conducting the operations.
- Specific and detailed operating procedures and crew duty assignments for the types of aircraft used and the IAPs authorized. (These policies and

procedures must require all turbojet operations to be conducted in accordance with the “stabilized approach” concept.)

- Specific requirements and instructions concerning the operating restrictions and limitations associated with the types of aircraft and the IAPs to be used.

D. The Operator’s Training Program. Inspectors must evaluate training programs to determine that flightcrews receive both ground and flight training on the instrument approaches the operator is authorized to conduct. Because of procedural and design similarities, flight training on one type of IAP often provides the necessary training for other types of IAPs. Inspectors observing training in progress should verify that the approved training and qualification curriculum segments ensure flightcrew competency in the conduct of authorized IAPs.

E. Maintenance Program. Before approving an operator’s proposal to use turbojet, turbofan, and/or propfan airplanes in All Weather Terminal Area Operation (AWTA) operations that use standard operating minimums, inspectors must ensure that the operator’s approved airworthiness program includes the special airborne equipment required for the standard minimums. Close coordination with the principal maintenance inspector (PMI) is essential before granting operational approval.

F. Authorizing Part 97 ILS CAT I. Principal operations inspectors (POI) authorize issuance of part 97 ILS CAT I operations via issuance of an ACL , as appropriate. The purpose of this task is for a principal inspector (PI) to authorize ILS CAT I operations.

1) For CAT I, unless DGCA otherwise specifies that approach demonstrations are necessary due to unusual circumstances or special situations for special systems such as autoland, operators may conduct CAT I operations without need for special demonstrations if the aircraft type Aircraft flight Manual (AFM) does not preclude the intended operation.

2) The acceptable task performance is that applicants are issued the ACL and/or OpSpec (or a letter of disapproval of application for the ACL and/or OpSpec) in a timely manner, as appropriate to the content of the application and the qualifications of the applicant.

G. Proving and Validation Tests. Validation testing is not required if CAT I operations are evaluated during the aircraft proving tests required by part 121 or 135. Validation tests are required, however, if an operator has previously conducted VFR only operations and is proposing to conduct AWTA operations for the first time with existing aircraft. Validation tests may also be required when a part 135 operator or an applicant for a certificate proposes to conduct AWTA operations with an aircraft in which part 135 does not require that a proving test be conducted.

5.6 CONTINUOUS DESCENT FINAL APPROACH (CDFA)

CDFA is a specific technique for flying the Final Approach Segment (FAS) of a non-precision IAP as a continuous descent, without level-off, from an altitude/height at or above the final approach fix (FAF) altitude/height to a point approximately 50 feet (15 meters) above the landing runway threshold or the point where the flare maneuver should begin for the type of aircraft flown.

A. CDFA Operating Concept. The CDFA operating concept is to fly non-precision IAPs as a continuous descent maintaining the published nominal vertical profile using VNAV guidance, altitude versus range (or DME) cross-checks, or altitude versus time cross-checks. The most critical aspect of CDFA is that the pilot executes a missed approach at the MDA plus an additive buffer altitude (to prevent descent below MDA) instead of leveling off at the MDA.

B. Near-Term Safety Benefits. Based on near-term safety benefits (controlled flight into terrain (CFIT)-reduction) of using stabilized-approach criteria on a continuous descent with a constant, pre-determined Vertical Path (VPATH) to the runway, and the desire to move to three-dimensional operations where possible, users have indicated their intent to apply the CDFA technique to non-precision IAPs. Use of the CDFA technique will enhance landing safety by eliminating the potential vulnerability of two-dimensional approach operations and the use of stepdown fixes by providing a continuous descent to the runway. This both reduces exposure to unstabilized approaches that lead to inappropriate landing performance and reduces vulnerability to CFIT accidents.

5.7 VISUAL APPROACH

ACL C077 authorizes an operator to conduct visual approaches, provided the conditions specified in the C077 are met. The ICAO definition of a visual approach includes a contact approach and does not include requirements to have VFR weather conditions, to be under the control of an ATC facility, or to be within 35 nautical miles (NM) of the destination airport. In both domestic and foreign operations, the operator must comply with the conditions specified in the OpSpecs when conducting visual approaches. When authorized to operate in foreign countries, the operator's policies, procedures, and approved training program must ensure that the requirements for visual approaches in foreign countries are adequately addressed.

5.8 OTHER APPROACH OPERATIONS

A. Airborne Radar and Offshore Approaches. An operator can be authorized to conduct Airborne Radar Approaches (ARA) and/or offshore standard approach procedures (OSAP). The operator's approved training program, equipment installations, and operational policies and procedures must meet the criteria specified in the current edition of AC 90-80, Approval of Offshore Standard Approach Procedures, Airborne Radar Approaches, and Helicopter En Route Descent Areas, before the operator can be authorized to conduct ARAs and OSAPs. ARAs and OSAPs are authorized by listing the procedure in ACL H113.

B. Helicopter En Route Descent Areas (HEDA). HEDAs permit a single instrument procedure to serve many offshore heliports, and significantly reduce the burden of developing numerous Standard Instrument Approach Procedures (SIAP) for this dynamic situation. This is particularly useful in offshore operations where heliports frequently exist for short periods of time and where the location of the heliport is frequently moved because of operational needs. Once the criteria specified in AC 90-80 have been met, HEDAs are authorized by being listed in ACL H104.

5.9 OPERATING MINIMUMS

The lowest operating minimums for operations conducted under parts , 121, 129, and 135 are specified in standard ACL and/or OpSpecs, . In general, an operator is authorized to use operating minimums specified by the following groups of IAPs, provided the minimums are not lower than the lowest minimums specified in the air carrier's ACL and/or OpSpecs for any particular type of approach procedure.

- Part 97 IAP.
- Any IAPs approved and incorporated in the ACL and/or OpSpecs.
- ICAO contracting state IAPs at foreign airports.
- IAPs established by an air carrier at foreign airports, provided the procedure is accepted in accordance with the ACL and/or OpSpecs.

5.10 CONTROLLING MINIMUM CONCEPT

The concept of a controlling minimum is based on reported weather conditions at the destination airport. The controlling minimum concept includes considerations for the reported weather conditions, the capabilities of the flightcrew, and the capabilities of the airborne and ground- or space-based equipment. This concept prohibits a pilot from continuing past the FAF, or beginning the FAS of an IAP unless the reported visibility (RVR, if applicable) is equal to or greater than the authorized visibility (RVR) minimum for that IAP. The basic objective of the controlling minimum concept is to provide reasonable assurance that once the aircraft begins the FAS, the pilot will be able to safely complete the landing. The controlling minimum concept, however, permits a pilot to continue a CAT I approach to DA/DH if the visibility/RVR was reported to be at or above the controlling minimum when the pilot began the FAS even though a later visibility/RVR report indicates a below-minimum condition. RVR reports, when available for a particular runway, are the reports (controlling reports) that must be used to determine whether an approach to, and landing on, that runway are authorized or prohibited.

A. Parts 91 Controlling Minimum. The controlling minimums concept as described above is not applicable to part 91 operators when determining if the pilot can continue past the FAF or begin the FAS. Parts 91 operations can begin an approach and continue to the DA/DH or the MDA and the MAP, even when the weather conditions are reported to be below the authorized IFR landing minimums. Upon arrival at the MDA and before passing the MAP, or upon arrival at the DA/DH, the approach may be continued below DA/DH or MDA to the runway if the seeing conditions required by 91.175(c)(d) or 91.175(l) are met.

B. Part 121 Controlling Minimum. The controlling minimum concept for operations conducted under part 121 is implemented by 121.651(b). For these operations, the controlling minimum must be used at civilian airports within the Republic of Indonesia , unless the provisions of 121.651(d) are met. Section 121.651(d) permits a pilot to begin the FAS even though the reported visibility/RVR is below the controlling minimum if the approach procedure is an ILS and the flight is actively monitored by a PAR. Therefore, pilots are not constrained by the controlling minimum on runways with ILS and active

PAR facilities, provided the provisions of 121.651(d) are met. The controlling minimum concept allows for a pilot to continue a CAT I approach to DA/DH or MDA NPA if the visibility/RVR was reported to be at or above the controlling minimum when the pilot began the FAS, even though a later visibility/RVR report indicates a below-minimum condition. Upon reaching DA/DH or MDA and before passing the MAP, the approach may be continued below DA/DH or MDA to touchdown if the requirements of 121.651(c) are met even though the visibility/RVR is reported to be below the controlling minimum.

5.11 AIR CARRIER OPERATING MINIMUMS

Although part 97 establishes standard minimums for the various types of approaches and lighting system combinations, these standard minimums cannot automatically be used by parts 121 and 135 certificate holders. The air carrier minimums must consider the high-minimum PIC requirements and basic turbojet requirements contained in ACL C054, or any other limitations imposed on the carrier by the DGCA where appropriate, as described below.

A. Air Carrier Minimums Limitations. Any limitations to air carrier minimums must be used by all parts 121 and 135 operators until the requirements for special airborne equipment, pilot qualification, pilot training, and/or experience requirements for standard operating minimums are met. The POI may then authorize the certificate holder to use the standard operating minimums (i.e., the minimums defined by the part 97 SIAP).

B. High-Minimum PIC. The increased difficulty in piloting tasks encountered during low visibility approach and landing operations make it necessary for PICs to acquire a certain amount of flight experience before operating to the lowest authorized CAT I minimums. The objective of this flight experience requirement is to ensure that the pilot is fully aware of the aircraft's equipment capabilities and limitations, the available external visual cues, and the aircraft's handling characteristics.

1) The flight experience necessary to meet this objective is specified in 121.652 or 135.617, as applicable. High-minimum PIC requirements for part 135 operations are applicable only to turbine-powered airplanes (turbojet or turbopropeller). These rules require those PICs who do not meet these experience requirements (high-minimum PICs) to increase the published MDA/DA/DH by 100 feet and the published visibility by one-half statute mile or the RVR equivalent. The RVR that must be used when an RVR is published and available is the applicable high-minimum-PIC RVR value specified in ACL and/or OpSpec C054, shown in Table 4-7A, ACL and/or OpSpec C054 RVR Landing Minimum—High-Minimums Pilot in Command.

2) The increased operating minimums for high-minimum PICs always result in operating minimums that are higher than standard minimums. For example, if the minimums published for an ILS approach to a certain runway are HAT 200/RVR 1800 (550 meters), the operating minimums that must be used by a high-minimum PIC for an approach to that runway must not be lower than HAT 300 and RVR 4500 (1350 meters) (HAT 200 + 100 feet and the high-minimum PIC equivalent of RVR 1800 (550 meters), which is RVR 4500 (1350 meters), as specified in ACL and/or OpSpec C054). If the minimums published for an approach that has a DA/DH were HAT 200 and a visibility of three-fourths statute mile, the high-minimum PIC would have to use a HAT of 300 and a visibility of 1¼ statute miles. Therefore, when dispatching or releasing a flight, the

increased operating minimums for high-minimum PICs and the reported and/or forecasted weather conditions at the destination airport must be considered.

3) The specific operating rule provisions, 121.652 and 135.617 , are similar; however, significant differences exist in the specific details of these rules.

a) Section 121.652 raises high-minimum PIC operating minimums by HAT 100 feet and visibility by one-half statute mile or by the RVR equivalent. The high-minimum PIC RVR equivalents are specified in the ACL . Section 121.652 specifies that the MDA or DA/DH and visibility minimum required for a high-minimum PIC do not have to be raised above the conditions required to designate the airport as an alternate airport.

1. The method for determining alternate minimums, however, is to add a buffer to the HAT/HAA and visibility or RVR authorized for landing. The lowest buffer when determining alternate minimums is to add 200 to the ceiling and one-half mile to the visibility, which is greater than the requirement to add 100 and one-half to determine the high time PIC minimum. Therefore, alternate minimums will always be higher than the high-minimum PIC's landing minimums.

2. This rule establishes HAT 300 feet and one statute mile (or the RVR equivalent as low as RVR 4500 (1350 meters)) as the lowest straight-in operating minimums for high-minimum PICs when conducting approaches that have a DA/DH or MDA. This rule also permits the 100-hour flight experience requirement to be reduced by up to 50 percent by substituting one landing for 1 required hour of flight experience, provided the PIC has at least 100 hours of PIC time in another type airplane in part 121 operations.

3. Section 135.617 establishes the same requirements for part 135 operators, with two exceptions.

a. Section 135.617 applies only to turbine-powered (turbojet and turbopropeller) airplanes.

b. Section 135.617 does not permit a reduction to the 100-hour flight experience requirement.

C. Basic Turbojet Minimum. A basic turbojet visibility/RVR operating minimum has been established for all turbojet airplanes operated under parts 121 and 135. The basic turbojet minimum for straight-in approaches is three-fourths statute mile visibility or RVR 4000 (1200 meters). Any minimum less than the basic turbojet minimum is not authorized in turbojet aircraft until the specific requirements of ACL C054 are met. When the airplane equipment, the runway lighting/marking systems, and the pilots are in compliance and qualified, then the lowest minimums that have been established for various approved approach and runway lighting/marking configurations may be authorized.

Figure 5.2 ACL C054 RVR Landing Minimum—High-Minimums Pilot in Command

RVR Landing Minimum as Published	RVR Landing Minimum Equivalent Required for High Minimum Pilots
RVR 1800 (550 meters)	RVR 4500 (1350 meters)
RVR 2000 (600 meters)	RVR 4500 (1350 meters)
RVR 2400 (700 meters)	RVR 5000 (1500 meters)
RVR 3000 (900 meters)	RVR 5000 (1500 meters)
RVR 4000 (1200 meters)	RVR 6000 (1800 meters)
RVR 5000 (1500 meters)	RVR 6000 (1800 meters)

5.12 AUTOLAND OR HUD TO TOUCHDOWN OPERATIONS

Autoland or HUD to touchdown operations are required for all CAT III operations, and many operators use autoland or HUD for CAT II, CAT I, and VFR operations as well. Sections 121.579(c), 125.329(d), and 135.93(d) prohibit the use of autoland or HUD to touchdown in any operation unless the operator is specifically authorized via ACL . ACL C059 and C060 authorize autoland or HUD to touchdown in CAT II and III operations, respectively. ACL C061 or H110 authorizes autoland operations in other than CAT II/III operations and ACL C062 or H111 authorizes HUD to touchdown in other than CAT II/III operations.

A. ILS Category Classification. The ILS category classification system provides a more comprehensive method of describing ILS performance than the simple CAT I/II/III classification. A facility's classification is defined by using two characters (I/C, II/D, III/E, etc.).

1) The first character indicates conformance to the facility performance category standards. This character indicates if the ground equipment is classified as a CAT I, CAT II, or CAT III ILS.

2) The second character defines the ILS point (Figure 5.3, Localizer Course and Glidepath Bend Amplitude limits) to which the localizer conforms to the Facility Performance CAT III course structure tolerances. These classifications indicate ILS conformance to a physical location on the approach or runway as follows:

- A: 4 NM before the threshold.
- B: 3,500 feet before the threshold (CAT I decision point).
- C: Glidepath altitude of 100 feet HAT (CAT II decision point).
- T: Threshold.
- D: 3,000 feet beyond the threshold (CAT III requirement only).
- E: 2,000 feet before the runway end (CAT III requirement only).

B. Use of Autoland at R.O.I CAT I Facilities or Equivalent. For CAT I, autoland may be used at runways with facilities other than those with published CAT II or III IAPs if the precautions discussed in subchapter 5.12, (C) are followed. This is to aid pilots in achieving stabilized approaches and reliable touchdown performance to improve

landing safety in adverse weather; for CAT II or III training; to exercise the airborne system to ensure suitable performance; for maintenance checks; or for other such reasons. Use of this capability may be particularly important for pilot workload relief in stressful conditions of fatigue after long international flights; night approaches; crosswinds or turbulence; when there may be other aircraft non-normal conditions being addressed; or to aid safe landing performance in otherwise adverse weather, restricted visibility, or with cluttered runways. This is true even though reported visibility may be well above minimums (e.g., heavy rain distorting view out the windshield, snow-covered runways where markings are not easily visible).

C. ILS Classification and CAT I Autoland Operations. ILS classification is being added to the Airport/Facility Directory (A/FD), but not all ILS runways are included as of February 2012. To support autoland or HUD to touchdown operations, CAT III course structure tolerances to at least point D are highly encouraged (e.g., I/D, II/D, III/D). . CAT II approaches that do not support autoland operations will note this limitation via chart note or Notices to Airmen (NOTAM). When conducting autoland operations on a CAT I runway/ILS, runways with a I/D or I/E classification are the most suitable and are preferred. Practice autoland or HUD to touchdown operations may be conducted at CAT I runways in VFR conditions where the facility classification is unknown, because the flightcrew is monitoring system performance, visually verifying the position of the aircraft, and can determine whether to continue to a landing or execute a missed approach in VFR conditions. Though it is not recommended, flightcrew monitoring and increased visibility also permits practice autoland or HUD to touchdown operations using an ILS classified as I/A, I/B, I/C, or I/T, provided the operation is performed in VFR conditions. The flightcrew must be ready at all times to execute a missed approach when conducting CAT I autolands.

D. Pre-Threshold Terrain. The DGCA maintains a list of CAT II/III runways with special terrain that may affect autoland or HUD to touchdown operations, such as irregular pre-threshold terrain or TDZ slope. Each operator and aircraft must be approved for each special terrain runway to conduct any CAT II or III operations using autoland or HUD to touchdown. Chapter 2 contains more information about how to authorize CAT II/III operations at special terrain runways.

E. Maintenance Return to Service and Required Practice Autolands. An aircraft manufacturer and certification requirements may require that a practice autoland or HUD to touchdown be performed on a published CAT II or III approach. If so, the operator should adhere to these requirements. If autoland is not required to be performed on a CAT II ILS, it is important to note that an unsatisfactory approach is extremely difficult to attribute to small errors in ILS ground equipment. Even CAT I ILS facilities that meet CAT III signal standards are not monitored to the same tolerances as CAT II/III facilities. An unsatisfactory approach due to a critical area incursion is something that may be identified, but an unsatisfactory approach due to a signal or monitor error cannot be detected by the flightcrew or maintenance.

F. Flightcrew Training. In addition to other training requirements, flightcrew training should emphasize the importance of:

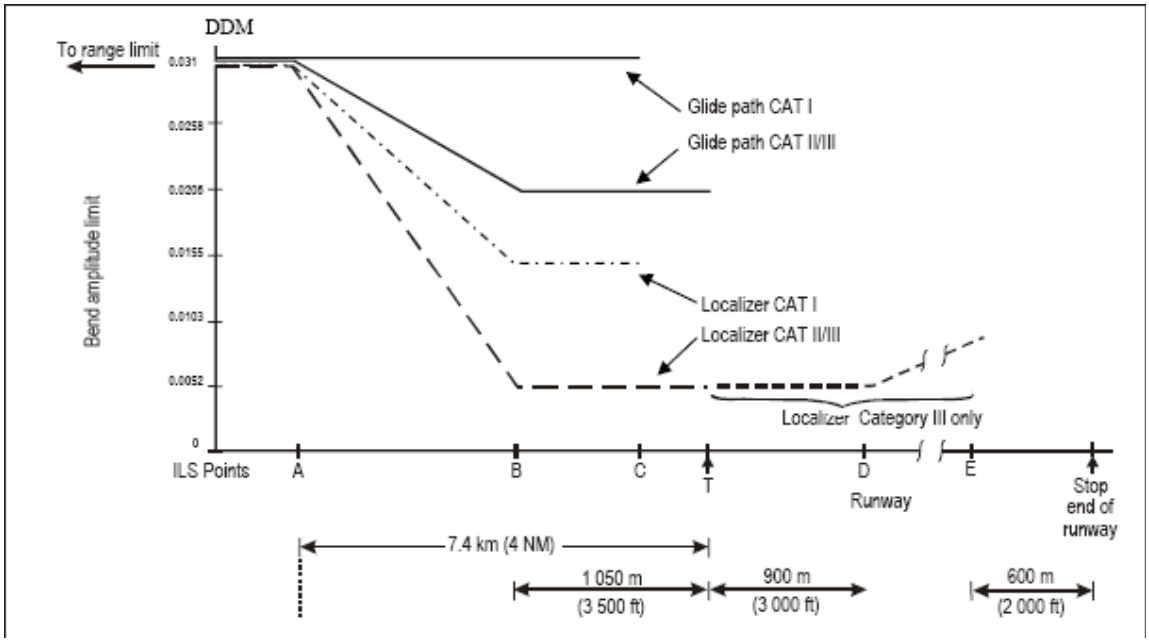
1) Monitoring equipment performance and visual verification of aircraft position on all practice autolands.

2) Verifying that the CAT I approach does not have any charted restrictions that would prohibit autoland or HUD to touchdown operations (“ILS unusable within 0.5 DME,” “autopilot coupled approach not authorized below XXX feet”).

3) Requesting that ATC protect the critical area for all practice autolands. ATC will protect the ILS critical areas if the ceiling is less than 800 feet and/or the visibility is less than 2 miles. Note that ATC is not required and may not be able to protect the critical areas if the weather is better than 800/2.

4) Performing maintenance return to service as required by either manufacturer, certification, or the operator, as described in subchapter 5.12, (E).

Figure 5.3 Localizer Course and Glidepath Bend Amplitude Limits



CHAPTER 6 CATEGORY II OPERATIONS

6.1 OVERVIEW

This chapter contains concepts, direction, and guidance to be used by principal inspectors (PI) for evaluating and approving or denying requests for authorization to conduct Special Authorization (SA) Category (CAT) I, CAT II, CAT II (Runway Visual Range (RVR) 1000), and SA CAT II operations. This includes all SA CAT I, CAT II, CAT II (RVR 1000 (300 meters)), and SA CAT II operations at airports and runways new to an operator/program manager, even though previously approved aircraft, airborne equipment, ground-based equipment, concepts, and procedures are being used in these operations. Although SA CAT I is not a CAT II operation, it is included in this chapter because it requires CAT II authorization using an approved CAT II or III head-up display (HUD) to decision height (DH).

6.2 APPLICABILITY

The intent is that the PI will use the general information provided in this chapter, along with the specific information provided in Chapter 2 for domestic operators and Chapter 8 for CASR part 129 foreign air carriers, when evaluating requests for SA CAT I, CAT II, and SA CAT II operations. This process is only applicable for operator requests for instrument landing system (ILS)-based CAT II operations.

6.3 APPROVAL METHOD

A. Part 91. A part 91 (including part 91 subpart F (part 91F)) large aircraft operator is issued an authorizations, conditions, and limitations (ACL) for SA CAT I.

B. Part 121, 129, and 135. Part 121, 129, or 135 operators are issued authorizations, conditions, and limitations (ACL) and/or operations specification (OpSpec) C052 for SA CAT I and ACL and/or OpSpec C059 for CAT II (RVR 1200 (350 meters)), CAT II (RVR 1000 (300 meters)), and SA CAT II (RVR 1200 (350 meters)). . Issue ACL H108 and OpSpec for CAT II helicopter operations.

6.4 GENERAL

A. Objective. The essential difference between CAT I and II operations is that a CAT II operation places greater reliance on the guidance provided by the airborne and ground-based equipment. This equipment must be capable of delivering the aircraft to a position from which the flightcrew can accomplish a transition from instrument to visual flight at a height above touchdown (HAT) of 100 feet and complete the landing in the reduced (CAT II) seeing-conditions. The primary objective of CAT II operations is to provide a level of safety equivalent to CAT I precision instrument approach operations, even though the seeing-conditions in CAT II operations can be much worse than those encountered in CAT I operations. This objective (the equivalent level of safety) is achieved by the following:

- Enhanced reliability and precision in the airborne and ground-based equipment to increase the precision of flightpath control;
- Enhanced flightcrew training and qualifications to increase the precision of flightpath control;
- Additional airport visual aids to enhance seeing-conditions;
- Additional criteria to ensure obstacle and terrain clearance;
- Additional criteria to ensure ILS/microwave landing system (MLS) signal protection;
- Special operational procedures; and
- Special air traffic control (ATC) procedures, limitations, or both.

B. Operational Approval Basis. CAT II operations are approved for an operator by the issuance of an ACL and/or OpSpecthat authorizes the conduct of CAT II instrument approach procedures (IAP) at specified airports. The basis for this approval depends on the operating rules applicable to the operation (, 121, , or 135), the complexity of aircraft (turbine-powered, reciprocating, or helicopter), the passenger capacity of the aircraft, and/or the size of the aircraft (large or small). The operator evaluation and approval process for reduced visibility flight operations, including CAT II/III operations, is covered in depth in Chapter 2.

6.5 CAT II OPERATIONAL CONCEPTS

The weather conditions in a CAT II operation restrict seeing-conditions so that the external visual references necessary to manually control the aircraft are not acquired until the aircraft reaches a very low altitude (typically 100 to 200 feet above ground level (AGL)). Therefore, the flightcrew must operate and control the aircraft by referring to instruments throughout most of the approach and to a combination of instrument and external visual information during the final stages of the approach, flare (deceleration for helicopters), and landing. Because of the reduced maneuvering capability resulting from CAT II seeing-conditions, the precision of the flight guidance system and the overall precision of flightpath control must ensure that the aircraft can be flown to a position that is closely aligned with the RCL and the desired glidepath. The increased reliability and precision required of the airborne and ground-based equipment is necessary to ensure that when the aircraft arrives at DH, it is on a flightpath that permits the pilot to complete the landing without any significant runway alignment maneuvers. All CAT II operations are conducted in accordance with the DH and RVR concepts used in CAT I operations. However, because of the limited seeing-conditions available in CAT II weather conditions, the additional requirements outlined under the objective of CAT II operations are necessary to ensure that an adequate level of safety is maintained when an aircraft is being operated in these conditions. Technologies such as HUD and automatic landing systems have resulted in additional operational capability of airborne avionics systems and the potential for additional landing minimums credit. These airborne systems, coupled with modern reliable ILS and more restrictive performance requirements associated with procedures developed for low visibility operations, CAT II or lower-than-standard CAT I operations can now be authorized to approved runways that were originally programmed to just support basic CAT I operations.

A. Function of Visual Reference. Because of the limitations in the airborne equipment used in CAT II operations and the available instrument guidance, the pilot

must have sufficient visual references to manually control and maneuver the aircraft from the DH to a full stop on the runway. These external visual references are required below DH for the pilot to control and maneuver the aircraft, align the aircraft with the RCL, touch down within the TDZ, and then roll out on the runway.

B. Purpose of CAT II Operating Minimums. CAT II operating procedures and minimums have been established to ensure that the desired level of safety is achieved when CAT II seeing-conditions exist. These operating minimums are based on the DH and RVR concepts. The established operating minimums (DH and RVR) determine the minimum safe heights for instrument flight and the minimum RVR at which the landing can be safely completed by external visual reference in a particular aircraft. These operating minimums are based on established CAT II operational concepts and on the required CAT II airborne equipment, ground-based visual and electronic equipment, operating procedures, and pilot training and qualification. These operating minimums, when combined with other CAT II requirements, ensure that the combination of information available from external visual sources and the aircraft instruments and equipment are sufficient to enable properly qualified pilots to safely operate the aircraft along the desired flightpath.

C. Establishing Operating Minimums. Several sets of operating minimums are established for CAT II operations. For standard CAT II operations, minimums are DH 150/RVR 1600 (450 meters), DH 100/RVR 1600 (450 meters), and DH 100/RVR 1200 (350 meters). For operations based on autoland or Head-Up-Guidance System (HGS), minimums can be as low as DH 100/RVR 1000 (300 meters) (at foreign airports and domestic ILS Type III facilities), and an SA for CAT II operations can be approved for RVR 1200 (350 meters) at specially approved ILS facilities that do not meet International Civil Aviation Organization (ICAO) standards for ALSF/TDZ/RCL lighting systems. Most runways that support CAT II operations permit the use of DH 100/RVR 1200 (350 meters) operating minimums. Operating minimums at some runways, however, are restricted to DH 150/RVR 1600 (450 meters) because of limitations in the ground equipment (such as a single RVR reporting system), localizer signal reliability, limitations imposed by the prethreshold terrain (RA not authorized), and/or obstacle clearance limitations in the final approach surface, the approach light surface, the touchdown area, and the missed approach area.

D. CAT II Flight Guidance and Control Systems. Standard CAT II operations are based on the use of special airborne and ground-based equipment that have capability, reliability, and redundancy superior to the equipment required for CAT I operations (see AC 120-29). Although CAT II airborne equipment provides increased capability, reliability, and redundancy, the flight control guidance systems used in these operations are not necessarily capable of automatically detecting all potential failures that could significantly disturb the aircraft's flightpath (e.g., single-channel flight control systems). If such failures occur, the flightcrew must be able to quickly detect the failure and to intervene manually to continue safely to the approach and landing or execute a missed approach. In other words, CAT II operations without autoland are based on the use of single-channel flight directors (FD), single-channel autopilots (AP), or combinations of both. Even though some CAT II operations are based on dual independent FDs, each of these systems is usually a single-channel system that is not capable of detecting all potential failures. Therefore, even with dual independent FDs, the flightcrew must be able to detect failures and manually intervene in certain cases. CAT II operations are

also based on the use of redundant ILS ground equipment; dual ILS airborne equipment; RAs (to identify DH); instrument failure detection and warning systems; special missed approach guidance equipment; and rain removal equipment.

E. Autoland or HUD to Touchdown at CAT I Runways. Chapter 5, Subchapter 5.5 of this SI contains guidance about the use of autoland or HUD to touchdown at CAT I runways.

F. Airworthiness of CAT II Airborne Equipment.

1) Throughout the history of CAT II operations, two processes have existed for showing that the airborne equipment of the aircraft is Airworthy for CAT II operations. One process is the type design approval process in which approval is obtained during aircraft certification testing. The other is the operational demonstration and approval process in which approval is obtained after the operator/program manager demonstrates satisfactory airworthiness of the equipment in actual flight operations. Currently, the most prevalent process is the type design approval process in which approval is contained in the approved Aircraft Flight Manual (AFM). Aircraft that have CAT II type design approval are not required to undergo an operational airworthiness demonstration.

2) For aircraft that do not have CAT II type design approval, an operational demonstration of CAT II airworthiness in accordance with AC 120-29 is required. Generally, this operational demonstration program includes a requirement that the operator conduct at least 300 approaches to 100 feet in CAT I or better weather conditions using the proposed CAT II system.

3) Special design requirements and special maintenance programs are necessary to achieve the airborne system reliability required for the conduct of CAT II operations. The special maintenance programs necessary for CAT II operations are extensive and expensive and are usually the largest factors affecting an operator's decision of whether to conduct these operations.

G. Airports and Runways. R.O.I. operators with the CAT II ACL and/or OpSpecare approved to conduct CAT II operations for any airport/runway (excluding special terrain CAT II/III airports/runways) for which a CAT II IAP has been published.

H. Foreign CAT II IAP.

1) **Operations.** All CAT II operations by R.O.I operators at foreign airports must be authorized in accordance with the guidance and direction in this SI . All foreign runways approved for CAT II operations by R.O.I operators must also meet the requirements of this SI and International Civil Aviation Organization (ICAO) standards (ICAO Annex 10, ICAO Manual of AWO and Doc. 9365/AN910) which are promulgated for use for CAT II by the state of aerodrome.

2) **Authorizing Foreign CAT II Runways.** All CAT II operations conducted in foreign countries must be conducted in accordance with the operator's CAT II ACL and/or OpSpecs. The only means of approving these operations is through the issuance of ACL and/or OpSpecs, which specify the foreign runways and minimums authorized for each aircraft used by the operator. ACL C059 and H108 specify the CAT II IAPs, runways, operating minimums, limitations, and aircraft authorized for CAT II operations for a particular operator. These paragraphs also specify the CAT II airborne equipment,

RVR equipment, pilot qualification, and missed approach requirements that apply to the operator's CAT II operation. If the flightcrew is properly qualified and the aircraft is properly equipped and maintained, an operator can, in general, be authorized to conduct CAT II All Weather Terminal Area Operations (AWTA) to any foreign runway approved for CAT II operations. The exception to this are those runways specified as restricted CAT II runways. The criteria in AC 120-29 and this order establish the lowest approach and landing minimums that can be authorized, under any circumstances, for CAT II operations. The lowest minimums for each kind of CAT II operation for a particular operator are specified in ACL C059 and H108, as appropriate. DGCA inspectors shall not authorize an operator to use minimums lower than these values. Additionally, inspectors shall not authorize the use of CAT II minimums for any foreign runway unless the provision of this SI.

I. CAT II Operations to Airports/Runways with Special (Irregular) Terrain. (Reserved).

J. Directorate of Airworthiness and Aircraft Operations (DAAO) Review and Concurrence. All initial approvals for CAT II operations that are based on ILS facilities for each type of aircraft operated by an operator/program manager require review and concurrence by the DAAO – before an ACL and/or OpSpec may be issued for that operation. Unless specified otherwise in the DAAO review and concurrence, subsequent reductions in CAT II operating minimums for each aircraft type do not require further DAAO concurrence before the revised ACL and/or OpSpecauthorizing the lower minimums can be issued to the operator.

6.6 STANDARD CAT II OPERATIONS

Standard CAT II operating minimums (DH 100/RVR 1200 (350 meters)) are based on the building block approach. The building-block approach is based on CAT I operations, including standard CAT I requirements, and includes the special aeronautical knowledge, experience, skill, training, and qualifications as well as the special airborne and ground-based equipment specified in AC 120-29. The assumptions and criteria used in aircraft certification and CAT II IAP design must be compatible with the operational concepts in this SI . These assumptions and criteria ensure that flightcrews and aircraft that meet the requirements of this SI and AC 120-29 can be used to safely conduct CAT II operations using standard CAT II minimums. Any special equipment or procedures necessary for the safe conduct of CAT II operations must be specified in the airworthiness certification basis of the aircraft (type certificate (TC) or Supplemental Type Certificate (STC)) or in the approved AFM. Any aircraft that cannot be safely operated to standard CAT II operating minimums using flightcrews that meet the minimum requirements of this SI and AC 120-29 shall not be certificated or otherwise approved for CAT II operations. The ACL and/or OpSpec establishes the lowest operating minimums that can be used in any CAT II operation, even if the established IAP specifies minimums lower than those values. Special airborne equipment, special ground-based equipment and special flightcrew training required for CAT II operations are specified in this SI , AC 120-29, and the approved AFM.

A. ACL for Standard CAT II. ACL C059 authorizes standard CAT II for parts 91, , 121, , and 135 operators.

B. Standard CAT II Operating Minimums. The standard CAT II operating minimums for all aircraft are DH 100 and RVR 1200 (350 meters). The DH is typically based on the use of radio (radar) altimetry. Procedures that have “Radio Altitude Not Authorized (RA NA)” (for example, due to irregular underlying terrain) typically use the first indication of arrival at the inner marker (IM) as a means to establish decision altitude (DA)/decision height (DH). However, an operator may elect to use first indication of arrival at either the IM or the barometric altitude decision altitude (DA), which ever comes first, as the means for minimums determination.

C. Higher-Than-Standard CAT II Operating Minimums. The higher-than-standard CAT II minimums for all aircraft are DH 100 and RVR 1600 (450 meters). These minimums are usually applied as interim minimums (restricted to higher-than-standard CAT II minimums) for a 6-month demonstration period for operators/program managers new to CAT II operations. The first 6 months are used to validate the effectiveness of the operator’s/program manager’s maintenance program and operational procedures in order to support issuance of the standard CAT II minimums. These minimums are also applied when there are RVR sensor limitations (only one installed), irregular underlying terrain, obstacle clearance requirements, or pre-threshold terrain limitations (RA not authorized—RA NA), which preclude the use of standard CAT II minimums.

6.7 SA CAT I OPERATIONS

SA CAT I operations are based on the use of a CAT II or III HUD to maintain a more precise lateral and vertical track, reduce Flight Technical Error (FTE), and avoid division of attention between flight instruments and visual identification of the landing area. SA CAT I procedures allow increased capacity in reduced visibility conditions using existing airport infrastructure.

A. Operator Requirements for SA CAT I. To conduct SA CAT I operations, the operator must be authorized for either CAT II or III operations using an approved CAT II or CAT III HUD to DH.

1) If the operator is not approved for CAT II or III operations using an approved HUD, then the operator must first complete the CAT II/III approval process in Chapter 2.

2) If the operator is approved for CAT II or III operations using an approved HUD, completion of the CAT II/III approval process is not required for SA CAT I.

B. ACL for SA CAT I. SA CAT I authorization is contained in selectable text in ACL C052 for parts , 121, , and 135 operators, and in ACL C059 for part 91 operators.

C. SA CAT I Operating Minimums. SA CAT I approaches have an RA DH as low as 150 feet and a visibility minimum as low as RVR 1400 (400 meters) to runways that do not have TDZ or RCL lighting and require that the approach is flown using an aircraft with a HUD to DH.

6.8 CAT II RVR 1000 (300 METERS) OPERATIONS

DGCA authorizes CAT II approaches with a DH as low as 100 feet and visibility minimums of RVR 1000 (300 meters) to runways that meet all CAT II equipment,

performance, and lighting requirements. When the R.O.I. operator asks specials CAT II RVR 1000 (300 meters), the operator must meet:

A. Operator Requirements for CAT II RVR 1000 (300 meters). To conduct CAT II RVR 1000 (300 meters) operations, the operator must be authorized for either CAT II or III operations using autoland or an approved HUD that provides guidance to touchdown.

1) If the operator is not approved for CAT II or III operations using autoland or an approved HUD that provides guidance to touchdown, then the operator must first complete the CAT II/III approval process in Chapter 2. The operator is eligible for CAT II RVR 1000 (300 meters) when RVR 1200 (350 meters) minimums using autoland or an approved HUD that provides guidance to touchdown are authorized through the CAT II/III approval process.

2) If the operator is approved for CAT II or CAT III operations using autoland or an approved HUD that provides guidance to touchdown, completion of the CAT II/III approval process is not required for CAT II RVR 1000 (300 meters).

B. ACL for CAT II to RVR 1000 (300 meters). CAT II RVR 1000 (300 meters) authorization is contained in selectable text in ACL C059 for parts 91, , 121, , and 135 operators.

C. CAT II RVR 1000 (300 meters) Operating Minimums. The CAT II RVR 1000 (300 meters) operating minimums for all aircraft are DH 100 and RVR 1000 (300 meters). The RVR 1000 (300 meters) minimum is indicated in a chart note, referenced to the standard CAT II line of minimums, which states, “Requires specific ACL approval and use of autoland or HUD to touchdown.” The use of autoland or HUD to touchdown is required. The DH is typically based on the use of radio (radar) altimetry. Another acceptable method at runways where an IM (Inner Marker) is available is to use both the IM and barometric altimeter. In these situations, the decision to continue for landing or execute a missed approach takes place at the first indication of the IM or at the published barometric DA, whichever occurs first.

6.9 SA CAT II OPERATIONS

SA CAT II operating minimums for all aircraft are not less than DH 100 and visibility of not less than RVR 1200 (350 meters) using autoland or HUD approved to touchdown. The intent of SA CAT I is to achieve lower landing minimums on runways that have the ILS facilities capable of supporting CAT II or CAT III approaches, but lack the instrument approach and/or runway lighting for CAT II or CAT III. Autoland or HUD approved to touchdown provides the equivalent level of safety as a standard CAT II approach.

A. Operator Requirements for SA CAT II. To conduct SA CAT II operations, the operator must be authorized for either CAT II or III operations using autoland or an approved HUD that provides guidance to touchdown.

1) If the operator is not approved for CAT II or III operations using autoland or an approved HUD that provides guidance to touchdown, then the operator must first complete the CAT II/III approval process in , Chapter 2. The operator is eligible for SA CAT II when RVR 1200 (350 meters) minimums are authorized through the CAT II/III approval process.

2) If the operator is approved for CAT II or III operations using autoland or an approved HUD that provides guidance to touchdown, completion of the CAT II/III approval process is not required for SA CAT II.

B. ACL for SA CAT II. SA CAT II authorization is contained in selectable text in ACL C059 for parts 91, 121, , and 135 operators.

C. SA CAT II Operating Minimums. The SA CAT II operating minimums for all aircraft are DH 100 and RVR 1200 (350 meters). The DH is based on the use of radio (radar) altimetry. Barometric altimetry is not an acceptable means of establishing the DH for SA CAT II operations.

6.10 OPERATIONAL CREDIT FOR CAT III EQUIPMENT

A. Purpose of Program Validation. In standard CAT II operations, the objective of the requirement for an operator to validate the CAT II maintenance program for at least 6 months with minimums restricted to DH 100 and RVR 1600 (450 meters) is to ensure that the required level of airborne equipment reliability is achieved. This is to ensure that frequent malfunctions will not occur in standard CAT II operations (DH 100 and RVR 1200 (350 meters)). The design features of CAT III airborne equipment significantly reduce the potential for failures that could adversely affect standard CAT II operations. As a result, validation of the CAT II maintenance program before conducting operations to DH 100/RVR 1200 (350 meters) is not necessary if these operations are conducted under a restriction that requires the airborne equipment to operate to CAT III standards (e.g., fail passive (FP) or fail operational (FO) automatic landing).

B. Opting Out of Program Validation. If the operator requests to eliminate the 6-month restriction (DH 100 and RVR 1600 (450 meters)) based on operational credit for the use of CAT III systems to conduct CAT II operations, the operator ACL must include a limitation that specifies all CAT II operations using DH 100 and RVR 1200 (350 meters) must be conducted with the airborne equipment operating to CAT III standards. This limitation should read FP autoland only, or FP/FO autoland only, as appropriate, for aircraft equipped with CAT III automatic landing systems, or FP HUD only for aircraft equipped with CAT III HUD. For DH 100 and RVR 1200 (350 meters) operations, these restrictions must remain in the operator ACL until the CAT II maintenance program for that aircraft is successfully validated.

CHAPTER 7 CATEGORY III OPERATIONS

7.1 OVERVIEW

This chapter contains concepts, direction, and guidance to be used by principal inspectors (PI) for evaluating and approving or denying requests for authorization to conduct all Category (CAT) III operations. This includes all CAT III operations at airports and runways new to an operator/program manager, even though previously approved aircraft, airborne equipment, ground-based equipment, concepts, and procedures are being used in these operations. Additional information may be found in Chapter 1.

7.2 APPLICABILITY

The intent is that the PI will use the general information provided in this chapter, along with the specific information provided in Chapter 2 for domestic operators when evaluating requests for CAT III operations. This process is only applicable for operator requests for instrument landing system (ILS)-based CAT III operations.

7.3 Approval Method

A. Part 91 Holder. A part 91 (including part 91 subpart F) holder operator is issued an ACL for all CAT III operations using the C060.

B. Parts 121, and 135. Part 121, or 135 operators are issued ACL C060 for all CAT III operations (or H109 for helicopter operations).

7.4 GENERAL

A. Concepts, Direction, and Guidance. This chapter contains concepts, direction, and guidance to be used by inspectors for evaluating and approving or denying requests for authorization to conduct CAT III All Weather Operations (AWO). All CAT III operations using aircraft, airborne equipment, ground-based equipment, or concepts/procedures, which are new to a particular operator, require approval. In addition, all CAT III operations at airports and runways new to a particular operator require approval even though previously approved aircraft, airborne equipment, ground-based equipment, concepts, and procedures are used in those operations. This chapter contains an amplification of the general concepts, policies, direction, and guidance covered in previous chapters of this chapter. Specific standards are provided for inspectors evaluating CAT III AWOs with airborne and ground-based equipment, which have well understood operational characteristics and limitations.

B. Types of CAT III Operations. The types of CAT III operations that can be authorized for use by R.O.I operators are ILS based. There is currently one microwave landing system (MLS)-based CAT III operation at London-Heathrow, and other CAT III MLS operations may be conducted at a few locations in the future, provided these operations are restricted to an ILS-like operation that has at least a 4-nautical mile (NM) to 5-NM straight-in Final Approach Segment (FAS). CAT III operations using Global Positioning System (GPS) Landing Systems (GLS), which requires the use of a Ground

Based Augmentation System (GBAS) or Local Area Augmentation System (LAAS), may also be approved in the near future.

C. Objective of CAT III Operations. The essential difference between CAT III AWOs and CAT I and II operations is that a CAT III operation places a greater reliance on the guidance provided by the airborne and ground-based guidance equipment. The guidance provided by the equipment must continue through touchdown in CAT IIIa operations and through touchdown and rollout to a safe taxi speed in CAT IIIb operations. In contrast to other types of operations, CAT III operations do not ensure sufficient external visual cues for the pilot to manually control the aircraft during flare and landing. The primary objective of CAT III operations is to provide a level of safety equivalent to CAT I and CAT II operations without the use of these visual cues. The desired level of safety for CAT III operations is achieved by the following enhancements:

1) The airborne equipment and ground-based equipment must ensure increased precision in flightpath control. The increased reliability and precision of flightpath control (as compared to CAT I systems) is achieved through highly reliable and precise ground-based equipment and airborne systems. These systems are capable of guiding the aircraft with significantly increased precision to touchdown or through rollout, as appropriate.

2) The aircraft performance and equipment requirements associated with a missed approach from very low altitudes are enhanced to ensure that these operations can be safely conducted even if a momentary touchdown occurs on the runway after the go-around is initiated. Special criteria assures obstacle and terrain clearance to accommodate missed approaches from very low altitudes.

3) More stringent criteria are specified for the profile of the pre-threshold terrain to ensure that the flight guidance and control systems function properly during the final stages of approach, flare, and landing.

4) Surface Movement Guidance and Control Systems (SMGCS) are established to ensure the landing runway is protected from potential incursions and ensure the overall safety of the operation.

7.5 CAT III OPERATIONAL CONCEPTS

The weather and environmental conditions encountered in CAT III AWOs severely restrict seeing-conditions. External visual reference is not acquired until the aircraft reaches a very low altitude. Typically, external visual references begin to become available below 100 feet. Even though external visual references are usually available before touchdown, the seeing-conditions are not sufficient for the pilot to consistently perform a safe, manual landing. Therefore, the aircraft must be controlled by instruments and special equipment throughout the approach, flare, and touchdown (deceleration for rotorcraft) in weather conditions as low as RVR 700 (200 meters) and through rollout to a safe taxi speed (air taxi or hover for rotorcraft) in weather conditions below RVR 700 (200 meters). Due to the reduced seeing-conditions and the hazards associated with a pilot’s attempts to manually maneuver the aircraft to landing in those seeing-conditions, the precision of the flight guidance and control system and the overall precision of flightpath control must provide these capabilities.

A. DH and AH. There are substantial differences between the DH and AH concepts. All FP operations are conducted in accordance with the DH and RVR concepts. All FO operations are normally conducted in accordance with the AH and RVR concepts. DHs are only used with FO systems in very unique situations (see AC 120-28). DH and AH are never used together in any operation since the DH requires that external visual reference be established before passing a specified point and AH does not. The very limited seeing-conditions available in CAT III operations require additional criteria to ensure that an adequate level of safety is achieved and maintained when operating in this environment.

1) **DH Operations.** For FP operations using a DH, the pilot must arrive at a decision before passing the DH to either permit the flight guidance and control system to be used to touchdown or to execute a missed approach. For a DH operation, the external visual information, the instrument information, and the airborne system information must be integrated so the flightcrew can make a definitive decision no later than arrival at the DH. The decision to permit the flight guidance and control system to continue to direct the aircraft to touchdown must be based on an assessment that the airborne systems have not degraded in a way that affects FP capabilities, and the external visual cues (touchdown zone (TDZ) lighting) confirm that the aircraft will touchdown within the TDZ. Since all DHs used in CAT III operations must be 50 feet or less, the inner marker (IM) cannot be used to define the CAT III DH. Since DH 50 is located very near the runway threshold, the terrain profile within these areas is adequate for CAT III radio altimeter (RA)-based DHs. CAT III operations are normally conducted using a DH of 50 feet; however, a different DH may be operationally approved in special circumstances, such as the use of a hybrid CAT III landing system.

2) **AH (Alert Height) Operations.** For operations with an AH, the pilot must also arrive at a decision, before passing the AH, to either permit the flight guidance and control system to be used to touchdown or to execute a missed approach. In direct contrast to operations with a DH, however, this decision must be based on an assessment that the airborne systems have not degraded in a way that affects FO capabilities. FO systems permit certain system failures below AH without requiring a missed approach, because the aircraft is still capable of continuing to a safe landing and rollout. External visual references are not required before touchdown in operations based on the AH concept.

B. Kinds of CAT III Operations. There are two different and distinct kinds of CAT III operations: FP operations and FO operations.

1) FP operations use a DH of 50 feet (15 meters) and a TDZ RVR no lower than RVR 600 (175 meters). In the event of a failure when using a FP CAT III system, the flight guidance and control system will not disturb the aircraft's flightpath when it fails, and the flightcrew immediately receives an aural and visual warning of system failure. Therefore, a DH must be used to ensure that, before passing 50 feet above ground level (AGL), the flightcrew establishes external visual reference with the TDZ to determine that the flight guidance and control system is functioning properly and to ensure that the aircraft will land within the TDZ. A go-around is mandatory if the flight guidance and control system fails before touchdown during FP operations in CAT III weather conditions.

2) FO operations usually use an AH instead of a DH (see AC 120-28). As the name implies, critical CAT III systems remain operational even if some failures occur. FO systems are designed so that the system remains fully operational following any failure or combination of failures that are likely to occur after the aircraft passes AH. Therefore, there is no requirement to establish external visual reference before touchdown to confirm that the aircraft will land safely.

C. CAT III Operating Minimums. CAT III operating minimums are based on two criteria and are always the higher of the following minimums:

1) **Published ILS Minimums.** The part 97 Standard Instrument Approach Procedure (SIAP) criteria is based on the integrity and reliability of the ILS ground system. When the ILS supports operation to touchdown but not rollout, RVR 700 (200 meters) is the lowest authorized minimum. When the ILS supports both touchdown and rollout operations, RVR 600 (175 meters) minimums are typically published. If the ILS supports both touchdown and rollout operations and the localizer is monitored to an even higher standard of reliability, RVR 300 (85 meters) minimums may also be published.

2) **CAT III ACL C060 Minimums.** CAT III minimums in C060 are based on the certification statement in the Aircraft Flight Manual (AFM), and based on the airworthiness requirements contained in the AC 120-28.

AC 120-28 Authorized Aircraft. Aircraft authorized under AC 120-28~~D~~ or subsequent revisions contain a statement authorizing FP or FO landing and/or rollout control systems.

1. FP Landing System without Rollout System. Aircraft with an FP landing system without a rollout system may be authorized minimums as low as RVR 600 (175 meters) for TDZ, RVR 600 (175 meters) for MID, and RVR 300 (85 meters) for rollout.

2. FP Landing System with Any Rollout System. Aircraft with a FP landing and rollout system may be authorized minimums as low as RVR 600 (175 meters) for TDZ, RVR 400 (100 meters) for MID, and RVR 300 (85 meters) for rollout.

3. FO Landing System with a FP Rollout System. Aircraft with an FO landing system and FP rollout systems may be authorized minimums as low as RVR 400 (100 meters) for TDZ, RVR 400 (100 meters) for MID, and RVR 300 (85 meters) for rollout RVR.

4. FO Landing System with a FO Rollout System. Aircraft with FO landing and rollout systems may be authorized minimums as low as RVR 300 (85 meters) for TDZ and RVR 300 (85 meters) for MID and RVR 300 (85 meters) for rollout RVR.

7.6 RA AND PRETHRESHOLD TERRAIN

A. **Operation.** The operation of almost all CAT III landing systems is dependent on RA information during the latter stages of the landing. The flare profile, the rate of descent at touchdown, and the distance of the touchdown point from the threshold can be adversely affected by the profile of the terrain immediately before the landing

threshold. The terrain, which is most critical, lies in an area approximately 200 feet on either side of the runway centerline (RCL) extended from the threshold into the approach area to a distance of approximately 1,000 feet before the landing threshold.

B. **Prethreshold Terrain.** At runways where the terrain beneath the approach flightpath is not approximately level, abnormal autopilot (AP) and/or flight director (FD) behavior may result from erroneous RA signals. Irregularities in the pre-threshold terrain can have a major effect on the performance of the landing systems required for CAT III operations (autoland or head-up display (HUD) to touchdown). A special operational test and evaluation program is required before approving any CAT III operations for any aircraft on these runways. This test program is essential to ensure that CAT III operations can be safely conducted on these runways with a particular CAT III aircraft type (aircraft with similar flight characteristics and similar flight guidance and control systems). This special test and evaluation must be accomplished in nonrevenue service.

C. **Requests for Evaluation.** All requests to conduct this evaluation must be sent to the DGCA for approval. Inspectors shall not, under any circumstances, authorize any CAT III operations with any aircraft to these runways unless that particular CAT III type aircraft has been specifically evaluated in accordance with AC 120-28 and specifically approved for that operation by the DGCA. The DAAO maintains a list of these special terrain runways which must be authorized in ACL C059 and/or C060 to utilize any CAT II/III minimums that require the use of autoland or HUD to touchdown. This document lists all CAT II/III special terrain runways, as well as all approved aircraft make, model, and series (M/M/S) for each runway.

D. **Runways.** A few CAT II runways currently have restrictions (that is, Radio Altitude Not Authorized (RA NA)) due to the pre-threshold terrain profile, which prohibits the use of RA information to determine the CAT II DH. Standard CAT II operations (DH 100 and RVR 1200 (350 meters)) can still be conducted by using the IM to determine arrival at the DH. Although the RA cannot be used to accurately and reliably determine arrival at the CAT II DH (height above touchdown (HAT) 100), it may still be possible to safely conduct CAT III operations to these runways if the pre-threshold terrain does not adversely affect the performance of the CAT III landing system. For example, Pittsburgh International Airport (KPIT) runway 10L has a CAT II approach with “RA NA” minimums (RA DH not authorized), but certain aircraft have been approved for CAT III autoland operations.

7.7 FOREIGN CAT III INSTRUMENT APPROACH PROCEDURES (IAP)

A. **Operations.** All CAT III operations by R.O.I operators at foreign airports must be authorized in accordance with the guidance and direction in this SI. All foreign runways approved for CAT III operations by R.O.I operators must also meet the requirements of this SI and International Civil Aviation Organization (ICAO) standards (ICAO Annex 10, ICAO Manual of AWO and Doc. 9365/AN910) which are promulgated for use for CAT III by the state of aerodrome.

B. **Authorizing Foreign CAT III Runways.** All CAT III operations conducted in foreign countries must be conducted in accordance with the operator’s CAT III OpSpecs and/or ACLs. The only means of approving these operations is through the issuance of

OpSpecs and/or ACLs, which specify the foreign runways and minimums authorized for each aircraft used by the operator. OpSpecs and/or ACL C060 and H109 specify the CAT III IAPs, runways, operating minimums, limitations, and aircraft authorized for CAT III operations for a particular operator. These paragraphs also specify the CAT III airborne equipment, RVR equipment, pilot qualification, and missed approach requirements that apply to the operator's CAT III operation. If the flightcrew is properly qualified and the aircraft is properly equipped and maintained, an operator can, in general, be authorized to conduct CAT III AWOs to any foreign runway approved for CAT III operations. The exception to this are those runways specified as restricted CAT III runways. The criteria in AC 120-28 and this order establish the lowest approach and landing minimums that can be authorized, under any circumstances, for CAT III operations. The lowest minimums for each kind of CAT III operation for a particular operator are specified in OpSpecs and/or ACL C060 and H109, as appropriate. DGCA inspectors shall not authorize an operator to use minimums lower than these values.

7.8 CAT I Autoland or HUD to Touchdown Operations

Autoland or HUD to touchdown operations are required for all CAT III operations, and many operators use autoland or HUD for CAT II, CAT I, and visual flight rules (VFR) operations as well. Part 121, 121.579(c); and part 135, 135.93(d) prohibit the use of autoland or HUD to touchdown in any operation unless the operator is specifically authorized via ACLs ACL C059 and C060 authorize autoland or HUD to touchdown in CAT II and CAT III operations, respectively. ACL C061 or H110 authorizes autoland operations in other than CAT II/III operations and ACL C062 or H111 authorizes HUD to touchdown in other than CAT II/III operations.

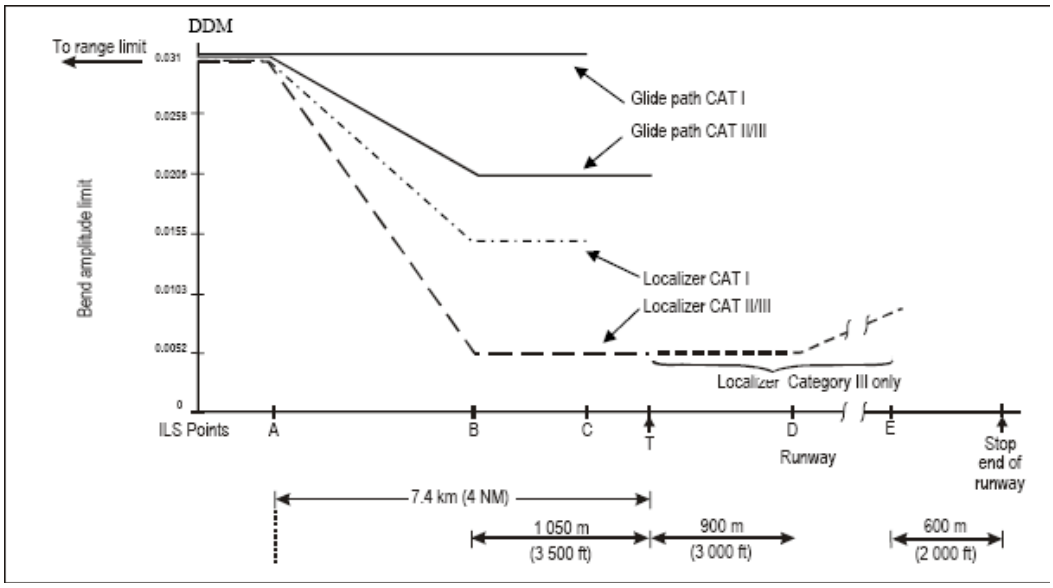
A. **ILS Category Classification.** The ILS category classification system provides a more comprehensive method of describing ILS performance than the simple CAT I/II/III classification. A facility's classification is defined by using two characters (I/C, II/D, III/E, etc.).

1) The first character indicates conformance to the facility performance category standards. This character indicates if the ground equipment is classified as a CAT I, CAT II, or CAT III ILS.

2) The second character defines the ILS point (Figure 7.1, Localizer Course and Glidepath Bend Amplitude Limits) to which the localizer conforms to the Facility Performance CAT III course structure tolerances. These classifications indicate ILS conformance to a physical location on the approach or runway as follows:

- A: 4 NM before the threshold.
- B: 3,500 feet before the threshold (CAT I decision point).
- C: Glidepath altitude of 100 feet height above threshold (HATh) (CAT II decision point).
- T: Threshold.
- D: 3,000 feet beyond the threshold (CAT III requirement only).
- E: 2,000 feet before the runway end (CAT III requirement only).

Figure 7.1 Localizer Course and Glidepath Bend Amplitude Limits



B. **Use of Autoland at R.O.I CAT I Facilities or Equivalent.** For CAT I, autoland may typically be used at runways with facilities other than those with published CAT II or III IAPs. This is to aid pilots in achieving stabilized approaches and reliable touchdown performance to improve landing safety in adverse weather; for CAT II or III training; to exercise the airborne system to ensure suitable performance; for maintenance checks; or for other such reasons. Use of this capability may be particularly important for pilot workload relief in stressful conditions of fatigue after long international flights; night approaches; crosswinds or turbulence; when there may be other aircraft non-normal conditions being addressed; or to aid safe landing performance in otherwise adverse weather, in restricted visibility, or with cluttered runways. This is true even though reported visibility may be well above minimums (e.g., heavy rain distorting view out the windshield, snow covered runways where markings are not easily visible, etc.).

C. **ILS Classification and CAT I Autoland Operations.** When conducting autoland operations on a CAT I runway/ILS, runways with a I/D or I/E classification are the most suitable and are preferred. Practice autoland or HUD to touchdown operations may be conducted at CAT I runways in CAT I or better weather conditions where the facility classification is unknown, because the flightcrew is monitoring system performance, visually verifying the position of the aircraft, and can determine whether to continue to a landing or execute a missed approach in CAT I or better weather conditions. Though it is not recommended, flightcrew monitoring and increased visibility also permits practice autoland or HUD to touchdown operations using an ILS classified as I/A, I/B, I/C, or I/T, provided the operation is performed in VFR conditions.

D. **Pre-Threshold Terrain.**

1) DAAO maintains a list of CAT II/III runways with special terrain which may affect autoland or HUD to touchdown operations, such as irregular pre-threshold terrain or TDZ slope. Each operator and aircraft must be approved for each special terrain runway to conduct any CAT II or III operations using autoland or HUD to touchdown. Chapter 2 contains more information about how to authorize CAT II/III operations at special terrain runways.

2) The DGCA does not analyze CAT I runways to determine if any irregular pre-threshold terrain will impact autoland or HUD to touchdown operations. Practice autoland or HUD to touchdown operations may be conducted at CAT I runways where the pre-threshold terrain has not been analyzed because the flightcrew is monitoring system performance, visually verifying the position of the aircraft, and can determine whether to continue to a landing or execute a missed approach in VFR conditions. All operators approved to use autoland- or HUD-equipped aircraft should be encouraged to routinely use these systems at suitably equipped runways during operations in VFR and in CAT I IFR conditions. Flightcrew training should emphasize the importance of monitoring equipment performance on all practice autolands.

E. **Maintenance Return to Service and Required Practice Autolands.** An aircraft manufacturer and certification requirements may require that a practice autoland or HUD to touchdown be performed on a published CAT II or III approach. If so, the operator should adhere to these requirements. If autoland is not required to be performed on a CAT II ILS, it is important to note that an unsatisfactory approach is extremely difficult to attribute to small errors in ILS ground equipment. Even CAT I ILS facilities that meet CAT III signal standards are not monitored to the same tolerances as CAT II/III facilities. An unsatisfactory approach due to a critical error incursion is something that may be identified, but an unsatisfactory approach due to a signal or monitor error cannot be detected by the flightcrew or maintenance.

F. **Flightcrew Training.** In addition to other training requirements, flightcrew training should emphasize the importance of:

1) Monitoring equipment performance and visual verification of aircraft position on all practice autolands.

2) Verifying that the CAT I approach does not have any charted restrictions, which would prohibit autoland or HUD to touchdown operations (“ILS unusable within 0.5 DME,” “autopilot coupled approach not authorized below XXX feet”).

3) Requesting that ATC protect the critical area for all practice autolands. ATC will protect the ILS critical areas if the ceiling is less than 800 feet and/or the visibility is less than 2 miles.

4) Performing maintenance return to service as required by either the manufacturer, certification, or the operator, as described in subchapter 7.8, (E).

CHAPTER 8 MAINTENANCE/INSPECTION PROGRAMS FOR LOW APPROACH AND LANDING MINIMUMS

8.1 OBJECTIVE

This chapter provides guidance for evaluating applications for lower approach and landing minimums in respect to the appropriate support program.

8.2 GENERAL

A. **Responsibilities.**

1) The avionics specialist aviation safety inspector's (ASI) primary responsibility is to provide technical support to the Operations ASI and the applicant. The responsibility for monitoring all applicants during the evaluation period should be coordinated between the avionics specialist and Operations ASIs, to include:

- Approvals,
- In-flight evaluation observations, and
- Surveillance.

2) The applicant is responsible for obtaining and submitting all documents that establish the eligibility of its aircraft, such as:

- The required maintenance/inspection program necessary for continued eligibility;
- The applicant's minimum equipment list (MEL), with the limitations for Category (CAT) I operations, if applicable; and
- An acceptable means for maintaining the reliability of the flight guidance control and associated systems.

B. **Qualifications for Low Approach and Landing Minimums.** Low approach and landing minimums are issued to qualified operators operating under CASR part 91, 121, 129, or 135. While the operating rules for each of these authorizations may vary significantly, the approval guidelines do not. Approval for low or minimum approaches in all categories will require regulatory compliance in the following three major areas:

- Airborne equipment and systems,
- Flightcrew and maintenance personnel qualifications, and
- Lowered minimum procedures, including a maintenance/inspection program.

C. **Deviations.** Deviations will not be made without coordination between the avionics specialists and Operations ASIs. All requests for deviations must be forwarded to the DGCA The applicant will be advised not to proceed in operating under its lower minimum proposal until the deviation request is resolved.

8.3 PREREQUISITES AND COORDINATION REQUIREMENTS

A. **Prerequisites.**

- Knowledge of the regulatory requirements of parts 91, 121, 129, and 135, as applicable.
- Successful completion of the Airworthiness Inspector Indoctrination course(s), or previous equivalent.

B. **Coordination.** This task requires coordination with the avionics specialist and Operations ASIs, and the applicant, if necessary.

8.4 CAT I OPERATIONS

The avionics specialist ASI's responsibilities for CAT I authorizations are to evaluate the flight director (FD) and/or autopilot (AP) systems. The principal operations inspector (POI) is responsible for determining the overall suitability of an operator's CAT I capabilities.

8.5 CAT II EQUIPMENT APPROVAL UNDER PARTS 91 AND/OR 135 (9 OR FEWER)

A. **Lower Approach Minimum Approval.** An application for lower approach minimum authority will specify the basis for the aircraft approval to conduct lower minimum approaches. This authority will be based on:

- Type certification and the Airplane Flight Manual (AFM)/Rotorcraft Flight Manual (RFM),
- Supplemental Type Certification,
- Operational evaluation, or
- Any acceptable combination of the above.

B. **Requirements for CAT II Approval.**

1) Requirements for CAT II approval for General Aviation (GA) operators have been established in part 91, 91.189, 91.191, and 91.205, and part 91 appendix A (see the note below). These chapters specify:

- Required instruments and items of equipment,
- Methods of approval,
- Evaluation program conduct,
- Calibration standards, and
- Maintenance/inspection programs.

2) The instruments and equipment listed in the manual that are required for a particular category II operation have been inspected and maintained in accordance with the maintenance program contained in that manual.

C. **Operational Evaluation Programs.** Engineering coordination should be requested when necessary, particularly for those aircraft in which the functions and limitations of the automated systems are significant factors for safe operation.

D. **FD Systems.** Avionics specialist ASIs will be aware that single FD systems with dual displays in which the second display repeats only the instrument landing system (ILS) information on the pilot's display will not meet the requirements for two ILS receiving systems.

E. **Optional Avionics Equipment.** Optional avionics equipment installed by the operator will either be approved in the field or referred to the DAAO for an engineering evaluation. The evaluation can assist in determining if flight testing is required, what limitations may apply, and whether or not the installation may require a Supplemental Type Certificate (STC). If an STC is required, avionics specialist ASIs will assist in the accomplishment of a compliance and conformity inspection, as necessary, when requested by the DAAO. Optional equipment that may be installed and require approval includes the following:

- FD systems,
- Automatic throttle control systems,
- AP and approach coupler systems,
- Speed control command systems,
- System fault detection and warning systems, and
- Radio altimeters (RA).

F. **Alterations.** ASIs should carefully review proposals to alter installed avionics equipment required for a particular category of operation and handle them in accordance with established procedures. Each proposal should be evaluated for its effect on system performance, compatibility with the original standard, and compliance with CAT II criteria.

1) When manufacturer-proposed alterations to existing avionics equipment appear to be major, the ASI will verify the approval status before sanctioning incorporation of the change by the operator. If DGCA approval of the alteration is not clearly indicated in the manufacturer's instructions, the operator will obtain such approval before performing the alteration.

2) An avionics specialist ASI will exercise a cautious approach to field approval of alterations. Pressure from any source must not discourage the avionics specialist ASI from verifying that the alteration is being made in accordance with approved technical data and that the technical evaluation is clearly within the scope of the avionics specialist ASI's training, experience, and approval authority.

3) ASIs will also carefully examine alterations originating in an operator's engineering department and, when necessary, refer them to the appropriate DAAO

8.6 CAT II/III EQUIPMENT APPROVAL UNDER PART 121/135

A. **Large Aircraft Criteria.** Operators using large aircraft operating under part 121 will meet the requirements in this chapter.

> Note: AC 120-28 or AC 120-29 is available to assist operators in developing and obtaining approval of CAT II/III equipment installations and maintenance/inspections programs.

B. **Turbojet Criteria.** All operators using turbojet aircraft must comply with the aircraft systems evaluation criteria that applies to part 121 operators. Applicants certificated under part 135 using turbojet aircraft will also use the aircraft equipment evaluation standards.

C. **Systems Evaluation Approval.** Systems evaluation approval should be accomplished in accordance with AC 120-28, or AC 120-29, as applicable.

D. **CAT II/III.**

1) The aircraft requirements for Lower Landing Minimums (LLM) include requirements for the total aircraft performance and associated systems. The acceptance of an aircraft in either category must be completely based on performance and approved DGCA data.

2) Upon receiving an operator's request for LLM authorization, the assigned avionics specialist ASI should immediately contact the type certificating office. This action is to determine whether the aircraft has been approved for such operation and what equipment and systems have been approved. If the aircraft has not been LLM certified, the ASI should request assistance from the appropriate DAAO so that an application for an STC can be properly consolidated.

8.7 CONTINUOUS AIRWORTHINESS PROGRAM (CAP) FOR LLM

A. **Requirements.** This chapter outlines the requirements for the CAP. This type of operation will need a detailed evaluation supported by well-defined maintenance, training, and reliability programs. All maintenance and reliability supporting documents become part of the accepted program. A monthly utilization/reliability summary will be established for the applicable aircraft and is given to the DGCA for the initial data collection/demonstration period of 1 year. Quarterly reporting after the initial period will be accomplished in accordance with the certificate holder's reliability.

B. **Initial Program.** The initial program should also include appropriate programs identified in the Maintenance Review Board (MRB) document. The frequency of maintenance actions may be revised when sufficient experience has been gained to justify a change and when there is no conflict with the certification requirements. MRB-specified tasks and/or other approved maintenance procedures may be revised to ensure the required airborne equipment will continue to meet total system performance, accuracy, availability, reliability, and integrity for the operation.

C. **Reliability.** The reliability of systems and/or components set forth as substantiation for the LLM certification becomes the performance criteria for the program.

1) Controlled monitoring of the LLM system reliability will require that the operator, after initial evaluation, incorporate the pertinent systems and components into the approved reliability program. If the LLM system reliability does not meet the approved program, the operator will be allowed a reasonable time period in which to improve the reliability.

2) The DAAO responsible for the type certification should be advised when the monthly removal rate is exceeded and informed of the probable cause. The reliability reporting is necessary when operational approval was based on probability analysis.

D. **Maintenance Manual.** The maintenance manual will identify all special techniques, maintenance/inspection frequencies, and test equipment requirements to support the program. It will also specify the method of controlling the operational status of the aircraft. Those technicians qualified to release an aircraft for LLM must be identified.

E. **Procedures.** The operator's procedures must include a method for manual distribution to assure availability to the appropriate maintenance facility.

F. **Method of Approval.** Operators will show the method of approval of required equipment as listed in the maintenance portion of the manual.

G. **Approved Training.** The operator must provide an approved training and recurrent training program. The list of personnel must be current. All maintenance personnel authorized to carry out this approved maintenance program must have training on the applicable aircraft systems and the approved policy and procedures of the certificate holder's approved LLM aircraft maintenance program authorization. Only those persons trained and qualified should be permitted to perform LLM maintenance/inspections.

H. **Airborne Systems.** The operational demand for LLM airborne systems with exposure to numerous hidden functions requires that the aircraft be either periodically exercised or functionally checked. This is to ensure that all systems are operational and that no dormant failure has occurred. The initial program will provide either a periodic LLM approach or periodic system functional check.

I. **Experience.** Until sufficient experience and data is available (excluding the 6-month demonstration), it is recommended the aircraft status period not exceed 35 days. Failure to exercise the system by simulated LLM approach or functionally checking the system within 35 days should automatically place the aircraft in a non-LLM status. The aircraft must maintain this status until the required functional check is made.

8.8 PROGRAM DEVELOPMENT

A. **Initial Development.** At the time of formal application, the avionics specialist ASI will begin to monitor development activity. Participation in all meetings with an applicant will usually require coordination with the Operations ASI. It is important for the operator to include all key personnel in any meetings.

B. **The Operator's Lower Minimums Program.** The operator's lower minimums program must be developed and the procedures used during the evaluation period. Part D ACL must reflect all special LLM maintenance requirements that were developed to support repetitive evaluation of LLM systems and equipment.

8.9 MAINTENANCE/INSPECTION PROGRAMS

The proposed maintenance/inspection programs must be tailored to the applicant's operations and maintenance organization. All maintenance and reliability supporting documents become part of the accepted program.

A. **Requirements for Maintenance/Inspection Programs.** Maintenance/inspection programs will provide for the proper maintenance and inspection of equipment and aircraft systems.

B. **Control and Accountability.** Emphasis will be placed on control and accountability of all areas associated with LLM approvals. These areas primarily encompass the following:

- Initial and recurrent training on flight guidance control systems,
- The use of test equipment,
- The differences in aircraft systems between aircraft in an operator's fleet,
- Special procedures for airworthiness release and control of the aircraft approach status,
- Initial and recurrent training in all areas of the lower minimums program, and
- Training for new personnel and equipment types.

C. **Operational Status of the Aircraft.** The method for controlling the operational status of the aircraft lower minimum required equipment must ensure that flight, dispatch, and maintenance personnel are kept aware of the current status.

D. **Purchase of Avionics Equipment Package Installations.** Some manufacturers and repair stations may develop GA maintenance/inspection programs in conjunction with their CAT II avionics equipment installation "package." The contents of such programs should be thoroughly evaluated for compliance and maintainability with LLM regulations.

E. **Requalification Procedures.** The program must include procedures for requalification of an aircraft for lower minimums following maintenance on any required system. This must include tests after replacements, resetting in rack, and interchange of components.

F. **Approval.** The Principle Maintenance Inspector (PMI) will indicate approval of the maintenance program portion of the operator's CAT II/III manual by signing and dating each page of the program.

8.10 MAINTENANCE TRAINING PROGRAMS

A. **Develop Programs.** Programs can be developed to be compatible with the existing maintenance/inspection program, as long as there is a clear distinction between normal and lower minimum requirements.

B. **Proposal.** When an operator's proposal is based on an existing maintenance/inspection program, the ASI must ensure that all procedures will provide for the lower minimums program requirements. Caution will be exercised when an applicant has used a program approved for use by another operator for developing its own.

C. **Proposal/Existing Program Areas for Close Review.** The following areas of the proposal and or existing programs will be closely reviewed:

- The existing maintenance or inspection program;
- The existing reliability program;
- The training program;
- The initial evaluation checks for existing aircraft and for new aircraft;
- The existing parts pool, borrowed parts procedure, and control of spare parts; and
- An operator's existing reliability program may be accepted when shown to be adequate for its lower minimum operations.

8.11 TEST EQUIPMENT AND STANDARDS

A. **Performance Standards, Tolerances, and Calibration Procedures.**

1) Performance standards, tolerances, and calibration procedures applicable to ILS equipment have been adequately covered by:

- Technical Standard Orders (TSO),
- Manufacturers' instruction manuals.

2) These standards or their equivalent are generally considered acceptable for inclusion in maintenance/inspection programs for equipment operated to the landing minimums of CAT I. Such standards may not be adequate for CAT II/III. Those that will not provide CAT system performance will be revised to provide the required level of performance.

B. **LLM Tolerances.** In many cases, the tolerances for CAT II/III airborne equipment are more rigid than those for CAT I. Therefore, the equipment used to inspect, test, and bench check CAT II/III equipment may require more frequent test and calibration.

C. **Established Standards and Tolerances.** Standards and tolerance established in the maintenance/inspection program for testing and calibrating airborne equipment and systems that are required for CAT II/III operations will not be relaxed following program approval without adequate substantiation that system performance will not be degraded.

D. **Built-In Test Equipment (BITE) Test and Return to Service.**

1) The BITE test is a maintenance tool that can be used for return to service if certified by the aircraft manufacturer. The proper procedure for return to service is to perform an operational ground or functional flight check. The procedures in the manufacturer's maintenance manual, including the provisions of BITE, the fault isolation manual, the aircraft maintenance manual, and the operator's approved MEL are all essential portions in the process for an aircraft to be returned to service.

2) For those aircraft for which BITE is minimal or non-existent or that have a mix of digital and analog equipment, then a more comprehensive functional test using test procedures and equipment prescribed in the manufacturer's maintenance manual must be accomplished before approval to return to service. On repeat discrepancies, the

functional test must consist of the most comprehensive test in the maintenance manual for aircraft that have different levels of test complexities.

3) The CAT II/III maintenance manual will address the procedures for return to service.

8.12 MAINTENANCE PERIOD EXTENSIONS—GENERAL AVIATION

A. **Applications for Extensions.**

1) The DAAO will consider applications for extensions of maintenance periods for GA operators at the completion of one maintenance cycle of at least 12 calendar-months. Operators should apply to the DAAO having jurisdiction of the area in which the operator is located.

2) The DAAO will consider the following factors in granting an extension:

- Records of CAT II approaches due to malfunctioning equipment,
- Number of CAT II approaches (actual and simulated),
- Maintenance records of CAT II equipment failures,
- Service history of known trends toward malfunctioning,
- Unit mean time between failures (MTBF), and
- Records of functional flight checks.

B. **Check, Test, and Inspection Extensions.** Extensions to the check, test, and inspection periods may be granted if factors indicate that the performance and reliability of the CAT II/III instruments and equipment will not be adversely affected. GA extension periods, in most cases, would be 1 calendar-month for tests, inspections, and functional flight checks, and 4 calendar-months for bench checks. The operator's program should include procedures for obtaining the extensions.

C. **Increased Extension Periods.** The extension periods suggested in subchapter 8.12, (B) may be increased at the discretion of the avionics specialist ASI.

8.13 FUNCTIONAL FLIGHT CHECKS

Some operators have submitted programs that provide for functional flight checks. This procedure must not be approved unless all airworthiness requirements have been satisfied before dispatch. In no instance can a functional flight check be substituted for the certification of complete systems or equipment operation.

8.14 REPORTS AND RECORDS

A. **Responsibilities of Recordkeeping.** The owner's/operator's organization will provide training to persons responsible for these reports in appropriate parts of the proposed LLM program.

B. **CAT III or Any Autoland Category.** Operators authorized for any autoland category will provide reports of airborne equipment malfunctions during actual approaches. They will submit the reports on a yearly basis to the DGCA or at any time the malfunctions significantly affect the autoland capability.

8.15 PROCEDURES

A. **Review the Maintenance/Inspection Program.** Review the applicant's maintenance/inspection program to ensure that it contains control and accountability over the following:

- All maintenance accomplished on lower minimum required systems and equipment;
- All alterations to systems and equipment;
- Approach status of each aircraft at all times;
- Return to service procedures to upgrade aircraft to CAT II/III status;
- Spare equipment;
- Maintenance calibration, use of test equipment, and records/reporting requirements;
- Repetitive and chronic discrepancies to ensure the affected aircraft remains out of lower minimums approach status until positive corrective actions is made; and
- All aircraft in the fleet that have not been evaluated for lower minimums approaches.

B. **Review the Existing Maintenance/Inspection Programs.** Ensure that the existing maintenance/inspection program has procedures for the following:

- Identifying chronic discrepancies and corrective action followup;
- Keeping aircraft with chronic and/or repetitive discrepancies out of a lower minimum status until positive corrective action is taken;
- Training maintenance personnel assigned to reliability analysis;
- Conducting initial evaluation checks for existing aircraft and for new aircraft to the fleet before inclusion in the operator's lower minimum operations;
- A means for identifying all CAT II/III components used in the applicable aircraft systems in the existing parts pool, parts borrowing procedure, and control of spare parts;
- Ensuring that calibration standards for all test equipment used for maintaining lower minimum systems and equipment are met;
- Ensuring that each flightcrew and persons with operational dispatch authority are aware of any equipment malfunction that may restrict lower minimum operations; and
- Submitting any changes to the LLM maintenance program to the DGCA FAA for acceptance and approval by the avionics specialist inspector before any changes are adopted.

C. **Review the Functional Flight Checks.** If a functional flight check has been submitted, ensure that the following information is included:

- Maintenance clearance and/or concurrence before an aircraft is returned to a lower minimum status, even if the functional flight check was found to be satisfactory;
- Request for a flight check by maintenance in the aircraft log; and

- Maintenance entry acknowledging the results and the action taken.

D. **Evaluate the Supporting Data.** Unless the applicant provides supporting approval data, the avionics specialist ASI will coordinate with the Operations ASI responsible for the type certificate (TC) to determine the acceptability of each aircraft for the authorizations requested.

E. **Review the MEL.** Appropriate sections of the MEL must be revised to identify CAT II/III required systems and special procedures, if applicable.

F. **Review the Personnel Training Requirements.** Ensure that there are procedures for the following:

1) All maintenance personnel involved and authorized to carry out this approved maintenance program must have initial and recurrent specialized training on the applicable aircraft systems and the approved policy and procedures of the certificate holder's approved LLM aircraft maintenance program authorization.

2) Ensuring personnel contracted to perform CAT II/III related maintenance are qualified and the program requirements are made available to these persons.

3) Personnel not qualified to perform maintenance on CAT II systems and equipment, including flightcrew and dispatch, will be trained in the airworthiness release requirements of the lower minimums program.

8.16 TASK OUTCOMES

Complete the Task. The Director DAAO has the primary responsibility to grant the operator approval for lower minimums. It is the avionics specialist ASI's primary responsibility to evaluate and approve the CAT II/III maintenance requirements and associated support programs after concurrence of the DAAO. Successful completion of this task will therefore consist of coordination with the Operations ASI for sending all original CAT II and III documentation to the DAAO for review and concurrence.