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AERODROME OPERATING MINIMA

1. PURPOSE

1.1 The purpose of this AIC is to provide methods to be adopted by operators in determining aerodrome operating minima for the safe conduct of the operations in adverse weather conditions.

References :

MCAR 1996	-	Regulations 52, 53 and 54
Doc 9365-AN/910	-	Manual of All Weather Operations
Doc 8168	-	Procedures for Air Navigation Services Aircraft Operations (PANS-OPS)
Annex 6	-	Operations of Aircraft, Part I International Commercial Air Transport
AIC 16/2000 dated 14 JUL 2002	-	Precision Approach and Landing Operations Para. 2 – Aerodrome Operating Minima
AIC 17/2000 dated 14 JUL 2002	-	Content of an Operations Manual Para. 3.9 – Aerodrome Operating Minima
FOSI Vol.2	-	Air Operator Administration Figure 2.1.3 Operations Specifications Part C, Para. 2

2. TAKE-OFF

2.1 Take-off minima are usually stated as visibility or RVR limits. Where there is a specific need to see and avoid obstacles on departure, take-off minima may, in cases, include cloud base limits. Where avoidance of such obstacles may be accomplished by alternate procedural means, such as use of climb gradients or specific departure paths, cloud base restrictions need not be applied. Take-off minima typically account for factors such as terrain and obstacle avoidance, aircraft controllability and performance, visual aids available, runway characteristics, navigation and guidance available, non-normal conditions such as engine failure, and adverse weather, such as runway contamination or winds.

2.2 Take-off minima concern the take-off manoeuvre itself. For flight initiation, departure weather minima at an aerodrome should not be less than the applicable minima for landing at that aerodrome unless a suitable take-off alternate aerodrome is available. The take-off alternate aerodrome should have weather conditions and facilities suitable for landing the aeroplane in normal and non-normal configurations pertinent to the operation. In addition, in the non-normal configuration the aeroplane must be capable of climbing to and maintaining altitudes which provide suitable obstacle clearance and navigation signals en route to a take-off alternate aerodrome which should be located within the following distance from the aerodrome of departure:

a. aeroplanes having two power-units not more than a distance equivalent to a flight time of one hour at single-engine cruise speed;

b. aeroplanes having three or more power-units not more than a distance equivalent to a flight time of two hours at the one-engine inoperative cruise speed.

Take-off Minima

Commercial transport aeroplanes (multi-engine aeroplanes)

Facilities	RVR/VIS
Runway edge lights, runway center line lights, center line markings, and touchdown, mid-point and stop-end	175 m
Runway edge lights and either center line lights or center line markings	500 m

3. APPROACH AND LANDING

3.1 Non-precision Approach Minima
Commercial transport aeroplanes (multi-engine aeroplanes)

Relationship between MDH and visibility minima
for MDH of 100 m (320 ft) and higher

MDH		Visibility or RVR (metres)			
		Aeroplane Category			
metres	feet	A	B	C	D
100-120	320-390	1600	1600	1600	2000
121-140	391-460	1600	1600	2000	2400
141-160	461-530	1600	1600	2000	2800
161-180	531-600	1600	1600	2400	2800
181-205	601-670	1600	1600	2800	3200
206-225	671-740	1600	1600	3200	3600
226-250	741-810	1600	2000	3600	4000
251-270	811-880	1600	2000	4000	4400

Relationship between visual aids and visibility minima
for MDH between 75 m and 100 m (250 ft – 320 ft)

	Visibility or RVR (m)			
Aeroplane Category	A	B	C	D
Full Facilities	800*	800*	800*	1600**
Intermediate Facilities	1200	1200	1200	1600
Basic Facilities	1600	1600	1600	1600

* 1200 m visibility/RVR for NDB.

** 1200 m visibility/RVR for localizer with final approach fix (FAF) and middle marker (MM).

Full facilities	Cat I lighting system (precision approach), runway edge lights, threshold lights, end lights and runway markings.
Intermediate Facilities	High intensity simple approach lighting system, runway edge lights, threshold lights, end lights and runway markings.
Basic Facilities	Low intensity simple approach lighting system, runway edge lights, threshold lights, end lights and runway markings.

3.2 Circling Minima
Commercial transport aeroplanes (multi-engine aeroplanes)

Aeroplane Category	A	B	C	D
MDH	120 m (400 ft)	150 m (500 ft)	180 m (600 ft)	210 m (700 ft)
Visibility	1600 m	1600 m	2400 m	3600 m

3.3 Precision Approach Category I Minima
Commercial transport aeroplanes (multi-engine aeroplanes)

	Full Facilities	Intermediate Facilities	Basic Facilities
DH*	60 m (200 ft)	60 m (200 ft)	60 m (200 ft)
RVR	550 m	800 m	1200 m
Visibility	800 m	800 m	1200 m

* DH is 60 m (200 ft) or OCH whichever is higher
DH may be increased for approaches made with one engine inoperative

** Increases in DH will require an appropriate increase in RVR/visibility

3.4 Precision Approach Category II Minima
Commercial transport aeroplanes (multi-engine aeroplanes)

	Basic Cat II minima	Restricted Cat II*
Decision Height (DH)	30 m (100 ft)	45 m (150 ft)
RVR**	350 m	500 m

* Restricted Category II minima are generally used for operational evaluation phases prior to authorization of Basic Category II minima.

** Increases in DH may require an appropriate increase in RVR
Certain facility outages may require increases of RVR for a specific decision height.

3.5 Precision Approach Category III Minima
Commercial transport aeroplanes (multi-engine aeroplanes)

	Category IIIA		Category IIIB
	Fail Passive	Fail Operational	
Decision Height (DH)	Not less than 15 m (50 ft)	Less than 15 m (50 ft) or no DH	Less than 15 m (50 ft) or no DH required
RVR	300 m*	300 m**	100 m**

* Minima for fail-passive operations lower than 300 m but not less than 200 m RVR are restricted to operations conducted in accordance with specific criteria for these operations such as those specified in ECAC Doc 17

** For airborne equipment combinations acceptable for Category III operations

4. AIRBORNE EQUIPMENT

4.1 Minimum equipment combinations acceptable for Category I operations
Commercial transport aeroplanes (multi-engine aeroplanes)

- Equipment type/specification
- ILS or MLS receiver
- ILS or MLS raw data display
- 75 MHz marker beacon receiver and indicator (certain MLS operations require DME)
- Flight director – single with single display
  Or
  Automatic flight control system with ILS/MLS couples approach mode

4.2 Minimum equipment combinations for Category II operations
Commercial transport aeroplanes (multi-engine aeroplanes)

Equipment Type/Specifications	Cat II Operations	
	Manual	Automatic
	Mode	Mode
Raw data display	x	x
ILS receiver		
- Dual with displays	x	x
- Excess deviation warning	x	x
Radio altimeters		
- Single self monitored with dual displays	x	x
Flight director systems (FDS)		
- Single self monitored with dual displays	-	x*
- Dual with dual displays	x*	-
- Go-around mode	x	x
Automatic flight control system with ILS coupled approach mode	-	x
Auto throttle	x	x

* A head-up display approach and landing guidance system may be substituted for one of the two FDS for manual operation or for the single FDS acceptable for automatic operations.

4.3 Minimum equipment combinations for Category III operations
Commercial transport aeroplanes (multi-engine aeroplanes)

Equipment Type/Specifications Cat IIIB	Cat IIIA Operations		
	DH 15 m (50 ft) Or more	DH less than 15 m (50 ft) or no DH	Operations
Raw data display	x	x	x
ILS receiver			
- Dual with dual display	x	x	x
- Excess deviation warning	x	x	x
Radio altimeters			
- Dual with dual displays	x	x	x
Flight director systems (FDS)			
- Dual with dual displays	x	x	x
- Go-around mode	x	x	x
Automatic landing system			
- Fail passive	x	-	-
- Fail operational	-	x*	-
- Fail operational with automatic roll out mode	-	-	x**
Automatic go-around mode	-	x	x***
Auto-throttle mode	x	x	x

* A fail operational hybrid system with head-up display as a secondary independent guidance system may be substituted for a fail operational automatic landing system.

** A fail operational hybrid system with head-up display as the secondary independent guidance system with roll-out guidance from either head-up display or automatic system may be substituted for a fail operational automatic landing system with automatic roll-out mode.

*** A fail-passive automatic system supplemented by dual FDS with computed go-around mode acceptable.

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