Annex VIII to ED Decision 2022/012/R

‘AMC & GM to Annex VIII (Part-SPO) to Commission Regulation (EU) No 965/2012 — Issue 1, Amendment 16’

The text of the amendment is arranged to show deleted, new or amended text as shown below:

(a) deleted text is struck through;
(b) new or amended text is highlighted in blue;
(c) an ellipsis ‘[…]’ indicates that the rest of the text is unchanged.

Note to the reader

In amended, and in particular in existing (that is, unchanged) text, ‘Agency’ is used interchangeably with ‘EASA’. The interchangeable use of these two terms is more apparent in the consolidated versions. Therefore, please note that both terms refer to the ‘European Union Aviation Safety Agency (EASA)’.
The Annex to Decision 2014/018/R of 24 April 2014 of the Executive Director of the Agency is amended as follows:

**AMC1 SPO.GEN.105(a) Crew responsibilities**

**CREW DUTIES — RECORDING OF FLIGHT TIME**

The following should apply for the purpose of recording flight time in accordance with AMC2 SPO.OP.230(i) and meeting experience requirements in specialised operations defined in AMC1 ORO.FC.146(f) and AMC1 SPO.SPEC.HESLO.100:

(a) Flight time should be recorded as flight time in a specialised activity if one of the following applies:

1. The aircraft has external equipment or is in a configuration that requires the use of a specific SOP.
2. A task specialist is on board, or a person indispensable to the mission is being carried in accordance with Article 5(7).
3. The crew applies a specific SOP in the course of a specialised activity.

(b) Irrespective of the scope of Part-SPO, if none of the above applies (e.g. ferry flights), the flight time should not be recorded as a specialised activity.

(c) The list of specialised operations in GM1 SPO.SPEC.005 may be used for the purpose of (a).

**GM1 SPO.OP.101 Altimeter check and settings**

**ALTIMETER-SETTING PROCEDURES**

The following paragraphs of ICAO Doc 8168 (PANS-OPS), Volume I provide recommended guidance on how to develop the altimeter setting procedure:

(a) 3.2 ‘Pre-flight operational test’;
(b) 3.3 ‘Take-off and climb’;
(c) 3.5 ‘Approach and landing’.

**AMC2 SPO.OP.110 Aerodrome operating minima — aeroplanes and helicopters**

**VISUAL APPROACH OPERATIONS**

(...)
AMC2 AMC3 SPO.OP.110 Aerodrome operating minima — aeroplanes and helicopters

GENERAL

(a) The aerodrome operating minima should not be lower than those as specified in SPO.OP.111 AMC5 SPO.OP.110 or AMC4 SPO.OP.110(c).

(b) Whenever practical, approaches should be flown as stabilised approaches (SAPs). Different procedures may be used for a particular approach to a particular runway.

(c) Whenever practical, non-precision approaches should be flown using the continuous descent final approach (CDFA) technique. Different procedures may be used for a particular approach to a particular runway.

(d) For approaches not flown using the CDFA technique: when calculating the minima in accordance with NCC.OP.111 AMC5 SPO.OP.110, the applicable minimum runway visual range (RVR) should be increased by 200 m for Category A and B aeroplanes and by 400 m for Category C and D aeroplanes, provided that the resulting RVR/converted meteorological visibility (CMV) value does not exceed 5 000 m. SAP or CDFA should be used as soon as facilities are improved to allow these techniques.

AMC3 AMC4 SPO.OP.110 Aerodrome operating minima — aeroplanes and helicopters

TAKE-OFF OPERATIONS WITH COMPLEX MOTOR-POWERED AIRCRAFT

(a) General:

(1) Take-off minima should be expressed as visibility (VIS) or RVR limits, taking into account all relevant factors for each aerodrome planned to be used and aircraft characteristics and equipment. Where there is a specific need to see and avoid obstacles on departure and/or for a forced landing, additional conditions, e.g. ceiling, should be specified.

(2) The pilot-in-command should not commence take-off unless the weather conditions at the aerodrome of departure are equal to or better than the applicable minima for landing at that aerodrome, unless a weather-permissible take-off alternate aerodrome is available.

(3) When the reported meteorological visibility VIS is below that required for take-off and the RVR is not reported, a take-off should only be commenced if the pilot-in-command can determine that the visibility along the take-off runway/area is equal to or better than the required minimum.

(4) When no reported meteorological visibility VIS or RVR is available, a take-off should only be commenced if the pilot-in-command can determine that the visibility RVR/VIS along the take-off runway/area is equal to or better than the required minimum.
(b) Visual reference:

(1) The take-off minima should be selected to ensure sufficient guidance to control the aircraft in the event of both a rejected take-off in adverse circumstances and a continued take-off after failure of the critical engine.

(2) For night operations, ground lights should be available to illuminate the runway/final approach and take-off area (FATO) and any obstacles.

**TAKE-OFF OPERATIONS WITH HELICOPTERS AND COMPLEX MOTOR-POWERED AEROPLANES**

(c) Required RVR/ or VIS/visibility:

(1) Complex motor-powered aeroplanes:

(i) For aeroplanes, the take-off minima specified by the operator should be expressed as RVR/VIS values not lower than those specified in Table 1.A.

(ii) When reported RVR or meteorological visibility is not available, the pilot-in-command should not commence take-off unless he/she can determine that the actual conditions satisfy the applicable take-off minima.

(i) For multi-engined aeroplanes with such performance that in the event of a critical engine failure at any point during take-off the aeroplane can either stop or continue the take-off to a height of 1 500 ft above the aerodrome while clearing obstacles by the required margins, the take-off minima specified by the operator should be expressed as RVR or VIS values not lower than those specified in Table 1.

(ii) Multi-engined aeroplanes without the performance to comply with the conditions in (c)(1)(i) in the event of a critical engine failure may need to reland immediately and to see and avoid obstacles in the take-off area. Such aeroplanes may be operated to the following take-off minima provided that they are able to comply with the applicable obstacle clearance criteria, assuming engine failure at the specified height:

(A) The take-off minima specified by the operator should be based upon the height from which the one-engine-inoperative (OEI) net take-off flight path can be constructed.

(B) The RVR minima used should not be lower than either of the values specified in Table 1 or Table 2.

(iii) For single-engined complex aeroplane operations, the take-off minima specified by the operator should be expressed as RVR/CMV values not lower than those specified in Table 1 below.

Unless the operator makes use of a risk period, whenever the surface in front of the runway does not allow for a safe forced landing, the RVR/CMV values should not be lower than 800 m. In this case, the proportion of the flight to be considered starts at the lift-off position and ends when the aeroplane is able to turn back and
land on the runway in the opposite direction or glide to the next landing site in case of power loss.

(iv) When the RVR or the VIS is not available, the pilot-in-command should not commence take-off unless he or she can determine that the actual conditions satisfy the applicable take-off minima.

### Table 11-A

**Take-off — aeroplanes (without low visibility take-off (LVTO) approval)**

<table>
<thead>
<tr>
<th>Facilities</th>
<th>RVR or VIS (m)*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Day only: Nil**</td>
<td>500</td>
</tr>
<tr>
<td>Day: at least runway edge lights or runway centre line markings</td>
<td>400</td>
</tr>
<tr>
<td>Night: at least runway edge lights or runway centre line lights and runway end lights</td>
<td></td>
</tr>
</tbody>
</table>

*: The reported RVR or VIS value representative of the initial part of the take-off run can be replaced by pilot assessment.

**: The pilot is able to continuously identify the take-off surface and maintain directional control.

### Table 2

**Take-off — aeroplanes (without an LVTO approval)**

<table>
<thead>
<tr>
<th>Assumed engine failure height above the take-off runway (ft)</th>
<th>RVR or VIS (m) *</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;50</td>
<td>400</td>
</tr>
<tr>
<td>51–100</td>
<td>400</td>
</tr>
<tr>
<td>101–150</td>
<td>400</td>
</tr>
<tr>
<td>151–200</td>
<td>500</td>
</tr>
<tr>
<td>201–300</td>
<td>1,000</td>
</tr>
<tr>
<td>&gt;300 or if no positive take-off flight path can be constructed</td>
<td>1,500</td>
</tr>
</tbody>
</table>

*: The reported RVR or VIS value representative of the initial part of the take-off run can be replaced by pilot assessment.

(2) Helicopters:

(i) For helicopters having a mass where it is possible to reject the take-off and land on the FATO in case of the critical engine failure being recognised at or before the take-off decision point (TDP), the operator should specify an RVR or VIS as take-off minimum in accordance with Table 31-H.
(ii) For all other cases, the pilot-in-command should operate to take-off minima of 800 m RVR/ or VIS and remain clear of cloud during the take-off manoeuvre until reaching the performance capabilities of (c)(2)(i).

(iii) Table 5 for converting reported meteorological visibility to RVR should not be used for calculating take-off minima.

(iii) For point-in-space (PinS) departures to an initial departure fix (IDF), the take-off minima should be selected to ensure sufficient guidance to see and avoid obstacles and return to the heliport if the flight cannot continue visually to the IDF.

Table 3A.H
Take-off — helicopters (without LVTO approval)

<table>
<thead>
<tr>
<th>RVR/Visibility or VIS</th>
<th>Onshore aerodromes or operating sites with instrument flight rules (IFR) departure procedures</th>
<th>RVR/ or VIS (m) **</th>
</tr>
</thead>
<tbody>
<tr>
<td>No light and no markings (day only)</td>
<td>400 or the rejected take-off distance, whichever is the greater</td>
<td></td>
</tr>
<tr>
<td>No markings (night)</td>
<td>800</td>
<td></td>
</tr>
<tr>
<td>Runway edge/FATO light and centre line marking</td>
<td>400</td>
<td></td>
</tr>
<tr>
<td>Runway edge/FATO light, centre line marking and relevant RVR information</td>
<td>400</td>
<td></td>
</tr>
<tr>
<td>Offshore helideck*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Two-pilot operations</td>
<td>400</td>
<td></td>
</tr>
<tr>
<td>Single-pilot operations</td>
<td>500</td>
<td></td>
</tr>
</tbody>
</table>

*: The take-off flight path to be free of obstacles.

**: On PinS departures to IDF, VIS should not be less than 800 m and ceiling should not be less than 250 ft.

AMC4AMC5 SPO.OP.110 Aerodrome operating minima — aeroplanes and helicopters
Take-off operations with other than complex motor-powered aircraft

(a) General:

(1) Take-off minima should be expressed as VIS or RVR limits, taking into account all relevant factors for each aerodrome planned to be used and aircraft characteristics. Where there is a specific need to see and avoid obstacles on departure and/or for a forced landing, additional conditions, e.g. ceiling, it should be specified.

(2) When the reported meteorological visibility is below that required for take-off and RVR is not reported, a take-off should only be commenced if the pilot-in-command can
determine that the visibility along the take-off runway/area is equal to or better than the required minimum.

(3) When no reported meteorological visibility or RVR is available, a take-off should only be commenced if the pilot-in-command can determine that the RVR/VIS along the take-off runway/area is equal to or better than the required minimum.

(b) Visual reference:

(1) The take-off minima should be selected to ensure sufficient guidance to control the aircraft in the event of both a rejected take-off in adverse circumstances and a continued take-off after failure of the critical engine.

(2) For night operations, ground lights should be available to illuminate the runway/final approach and take-off area (FATO) and any obstacles.

DETERMINATION OF THE DH/MDH FOR INSTRUMENT APPROACH OPERATIONS — AEROPLANES

(a) The DH to be used for a 3D or a 2D approach operation flown using the CDFA technique should not be lower than the highest of:

(1) the obstacle clearance height (OCH) for the category of aircraft;

(2) the published approach procedure DH or minimum descent height (MDH) where applicable;

(3) the system minima specified in Table 4;

(4) the minimum DH permitted for the runway specified in Table 5; or

(5) the minimum DH specified in the AFM or equivalent document, if stated.

(b) The MDH for a 2D approach operation flown not using CDFA technique should not be lower than the highest of:

(1) the OCH for the category of aircraft;

(2) the published approach procedure MDH where applicable;

(3) the system minimum specified in Table 4;

(4) the lowest MDH permitted for the runway specified in Table 5; or

(5) the lowest MDH specified in the AFM, if stated.

DETERMINATION OF THE DH/MDH FOR INSTRUMENT APPROACH OPERATIONS — HELICOPTERS

(c) The DH or MDH should not be lower than the highest of:

(1) the OCH for the category of aircraft;

(2) the published approach procedure DH or MDH where applicable;

(3) the system minima specified in Table 4;

(4) the lowest DH or MDH permitted for the runway/FATO specified in Table 6 if applicable; or
(5) the lowest DH or MDH specified in the AFM, if stated.

**Table 4**

**System minima — all aircraft**

<table>
<thead>
<tr>
<th>Facility</th>
<th>Lowest DH/MDH (ft)</th>
</tr>
</thead>
<tbody>
<tr>
<td>ILS/MLS/GLS</td>
<td>200</td>
</tr>
<tr>
<td>GNSS/SBAS (LPV)</td>
<td>200*</td>
</tr>
<tr>
<td>Precision approach radar (PAR)</td>
<td>200</td>
</tr>
<tr>
<td>GNSS/SBAS (LP)</td>
<td>250</td>
</tr>
<tr>
<td>GNSS (LNAV)</td>
<td>250</td>
</tr>
<tr>
<td>GNSS/Baro VNAV (LNAV/VNAV)</td>
<td>250</td>
</tr>
<tr>
<td>Helicopter PinS approach</td>
<td>250**</td>
</tr>
<tr>
<td>LOC with or without DME</td>
<td>250</td>
</tr>
<tr>
<td>SRA (terminating at ½ NM)</td>
<td>250</td>
</tr>
<tr>
<td>SRA (terminating at 1 NM)</td>
<td>300</td>
</tr>
<tr>
<td>SRA (terminating at 2 NM or more)</td>
<td>350</td>
</tr>
<tr>
<td>VOR</td>
<td>300</td>
</tr>
<tr>
<td>VOR/DME</td>
<td>250</td>
</tr>
<tr>
<td>NDB</td>
<td>350</td>
</tr>
<tr>
<td>NDB/DME</td>
<td>300</td>
</tr>
<tr>
<td>VDF</td>
<td>350</td>
</tr>
</tbody>
</table>

* For localiser performance with vertical guidance (LPV), a DH of 200 ft may be used only if the published final approach segment (FAS) datablock sets a vertical alert limit not exceeding 35 m. Otherwise, the DH should not be lower than 250 ft.

** For PinS approaches with instructions to ‘proceed VFR’ to an undefined or virtual destination, the DH or MDH should be with reference to the ground below the missed approach point (MAPt).

**Table 5**

**Runway type minima — aeroplanes**

<table>
<thead>
<tr>
<th>Runway type</th>
<th>Lowest DH/MDH (ft)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Precision approach (PA) runway, category I</td>
<td>200</td>
</tr>
<tr>
<td>NPA runway</td>
<td>250</td>
</tr>
<tr>
<td>Non-instrument runway</td>
<td>Circling minima as shown in Table 1 in SPO.OP.112</td>
</tr>
</tbody>
</table>

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### Table 6

**Type of runway/FATO versus lowest DH/MDH — helicopters**

<table>
<thead>
<tr>
<th>Type of runway/FATO</th>
<th>Lowest DH/MDH (ft)</th>
</tr>
</thead>
<tbody>
<tr>
<td>PA runway, category I</td>
<td>200</td>
</tr>
<tr>
<td>NPA runway</td>
<td></td>
</tr>
<tr>
<td>Non-instrument runway</td>
<td></td>
</tr>
<tr>
<td>Instrument FATO</td>
<td>200</td>
</tr>
<tr>
<td>FATO</td>
<td>250</td>
</tr>
</tbody>
</table>

Table 6 does not apply to helicopter PinS approaches with instructions to ‘proceed VFR’.

#### AMC6 SPO.OP.110 Aerodrome operating minima — aeroplanes and helicopters

**CRITERIA FOR ESTABLISHING RVR/CMV**

#### AMC7 SPO.OP.110 Aerodrome operating minima — aeroplanes and helicopters

**DETERMINATION OF RVR OR VIS/CMV/VIS MINIMA FOR NPA, APV, CAT I FOR INSTRUMENT APPROACH OPERATIONS — AEROPLANES**

(a) The minimum RVR/CMV/VIS should be the highest of the values specified in Table 3 and Table 4.A but not greater than the maximum values specified in Table 4.A, where applicable.

(b) The values in Table 3 should be derived from the formula below:

\[
\text{required RVR/VIS (m)} = \frac{([\text{DH/MDH (ft)} \times 0.3048])}{\text{length of approach lights (m)}} \cdot \tan \alpha
\]

where \( \alpha \) is the calculation angle, being a default value of 3.00° increasing in steps of 0.10° for each line in Table 3 up to 3.77° and then remaining constant.

(c) If the approach is flown with a level flight segment at or above MDA/H, 200 m should be added for Category A and B aeroplanes and 400 m for Category C and D aeroplanes to the minimum RVR/CMV/VIS value resulting from the application of Table 3 and Table 4.A.

(d) An RVR of less than 750 m as indicated in Table 3 may be used:

1. for CAT I operations to runways with full approach lighting system (FALS), runway touchdown zone lights (RTZL) and runway centreline lights (RCLL);
2. for CAT I operations to runways without RTZL and RCLL when using an approved head-up guidance landing system (HUDLS), or equivalent approved system, or when conducting a coupled approach or flight-director flown approach to a DH. The ILS should not be published as a restricted facility; and
3. for APV operations to runways with FALS, RTZL and RCLL when using an approved head-up display (HUD).
(e) Lower values than those specified in Table 3 may be used for HUDLS and autoland operations if approved in accordance with Annex V (Part SPA), Subpart E.

(f) The visual aids should comprise standard runway day markings and approach and runway lights as specified in Table 2. The competent authority may approve that RVR values relevant to a basic approach lighting system (BALS) are used on runways where the approach lights are restricted in length below 210 m due to terrain or water, but where at least one cross-bar is available.

(g) For night operations or for any operation where credit for runway and approach lights is required, the lights should be on and serviceable, except as provided for in Table 6 of AMC6 SPO.OP.110.

(h) For single-pilot operations, the minimum RVR/VIS should be calculated in accordance with the following additional criteria:

(1) an RVR of less than 800 m as indicated in Table 3 may be used for CAT I approaches provided any of the following is used at least down to the applicable DH:

(i) a suitable autopilot, coupled to an ILS, MLS or GLS that is not published as restricted; or

(ii) an approved HUDLS, including, where appropriate, enhanced vision system (EVS), or equivalent approved system;

(2) where RTZL and/or RCLL are not available, the minimum RVR/CMV should not be less than 600 m; and

(3) an RVR of less than 800 m as indicated in Table 3 may be used for APV operations to runways with FALS, RTZL and RCLL when using an approved HUDLS, or equivalent approved system, or when conducting a coupled approach to a DH equal to or greater than 250 ft.

Table 2: Approach lighting systems

<table>
<thead>
<tr>
<th>Class of lighting facility</th>
<th>Length, configuration and intensity of approach lights</th>
</tr>
</thead>
<tbody>
<tr>
<td>FALS</td>
<td>CAT I lighting system (HIALS ≥ 720 m) distance coded centreline, Barrette centreline</td>
</tr>
<tr>
<td>IALS</td>
<td>Simple approach lighting system (HIALS 420–719 m) single source, Barrette</td>
</tr>
<tr>
<td>BALS</td>
<td>Any other approach lighting system (HIALS, MIALS or ALS 210–419 m)</td>
</tr>
<tr>
<td>NALS</td>
<td>Any other approach lighting system (HIALS, MIALS or ALS &lt; 210 m) or no approach lights</td>
</tr>
</tbody>
</table>

Note: HIALS: high intensity approach lighting system; MIALS: medium intensity approach lighting system; ALS: approach lighting system.

Table 3: RVR/CMV vs. DH/MDH

<table>
<thead>
<tr>
<th>DH or MDH</th>
<th>Class of lighting facility</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>FALS</td>
</tr>
<tr>
<td>Ft</td>
<td></td>
</tr>
<tr>
<td>200</td>
<td>-</td>
</tr>
<tr>
<td>211</td>
<td>-</td>
</tr>
</tbody>
</table>

See (d), (e), (h) above for RVR < 750/800 m.
### Table 4.A: CAT I, ARV, NRA – aeroplanes

<table>
<thead>
<tr>
<th>Facility/conditions</th>
<th>RVR/CMV (m)</th>
<th>Aeroplane-category</th>
</tr>
</thead>
<tbody>
<tr>
<td>ILS, MLS, GLS, PAR, GNSS/SBAS, GNSS/VNAV</td>
<td>Min</td>
<td>According to Table 3</td>
</tr>
<tr>
<td></td>
<td>Max</td>
<td>1 500</td>
</tr>
<tr>
<td></td>
<td>Min</td>
<td>750</td>
</tr>
<tr>
<td></td>
<td>1 201 and above</td>
<td>5 000</td>
</tr>
</tbody>
</table>

### DH or MDH

<table>
<thead>
<tr>
<th>Dh or MDH</th>
<th>Class of lighting facility</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>FALS</td>
</tr>
</tbody>
</table>

See (d), (e), (h) above for RVR < 750/800 m

<table>
<thead>
<tr>
<th>Ft</th>
<th>RVR/CMV (m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>221</td>
<td>-</td>
</tr>
<tr>
<td>231</td>
<td>-</td>
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<tr>
<td>241</td>
<td>-</td>
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<td>1 101</td>
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<tr>
<td>1 201 and above</td>
<td>5 000</td>
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</table>

**Annex VIII to ED Decision 2022/012/R**
<table>
<thead>
<tr>
<th>Facility/conditions</th>
<th>RVR/CMD (m)</th>
<th>Aeroplane-category</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>A</td>
<td>B</td>
</tr>
<tr>
<td>ILS, MLS, GLS, PAR, GNSS/GBAS, GNSS/VNAV</td>
<td>Min</td>
<td>According to Table 3</td>
</tr>
<tr>
<td></td>
<td>Max</td>
<td>1,500</td>
</tr>
<tr>
<td>NDB, NDB/DME, VOR, VOR/DME, LOC, LOC/DME, VDF, SRA, GNSS/LNAV</td>
<td>Min</td>
<td>1,000</td>
</tr>
<tr>
<td></td>
<td>Max</td>
<td>According to Table 3 if flown using the CDFA technique, otherwise an add-on of 200/400 m applies to the values in Table 3 but not to result in a value exceeding 5,000 m.</td>
</tr>
</tbody>
</table>

(a) The RVR or VIS for straight-in instrument approach operations should not be less than the greatest of the following:

1. The minimum RVR or VIS for the type of runway used according to Table 7;
2. The minimum RVR determined according to the MDH or DH and class of lighting facility according to Table 8; or
3. The minimum RVR according to the visual and non-visual aids and on-board equipment used according to Table 9.

If the value determined in (1) is a VIS, then the result is a minimum VIS. In all other cases, the result is a minimum RVR.

(b) For Category A and B aeroplanes, if the RVR or VIS determined in accordance with (a) is greater than 1,500 m, then 1,500 m should be used.

(c) If the approach is flown with a level flight segment at or above the MDA/H, then 200 m should be added to the RVR calculated in accordance with (a) and (b) for Category A and B aeroplanes.

(d) The visual aids should comprise standard runway day markings, runway edge lights, threshold lights, runway end lights and approach lights as defined in Table 8.
### Table 7

**Type of runway versus minimum RVR or VIS — aeroplanes**

<table>
<thead>
<tr>
<th>Type of runway</th>
<th>Minimum RVR or VIS (m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>PA runway, category I</td>
<td>RVR 550</td>
</tr>
<tr>
<td>NPA runway</td>
<td>RVR 750</td>
</tr>
<tr>
<td>Non-instrument runway</td>
<td>VIS according to Table 1 in SPO.OP.112 (Circling minima)</td>
</tr>
</tbody>
</table>

### Table 8

**RVR versus DH/MDH**

<table>
<thead>
<tr>
<th>DH or MDH (ft)</th>
<th>FALS</th>
<th>IALS</th>
<th>BALS</th>
<th>NALS</th>
</tr>
</thead>
<tbody>
<tr>
<td>200</td>
<td>210</td>
<td>550</td>
<td>750</td>
<td>1000</td>
</tr>
<tr>
<td>211</td>
<td>240</td>
<td>550</td>
<td>800</td>
<td>1000</td>
</tr>
<tr>
<td>241</td>
<td>250</td>
<td>550</td>
<td>800</td>
<td>1000</td>
</tr>
<tr>
<td>251</td>
<td>260</td>
<td>600</td>
<td>800</td>
<td>1100</td>
</tr>
<tr>
<td>261</td>
<td>280</td>
<td>600</td>
<td>900</td>
<td>1100</td>
</tr>
<tr>
<td>281</td>
<td>300</td>
<td>650</td>
<td>900</td>
<td>1200</td>
</tr>
<tr>
<td>301</td>
<td>320</td>
<td>700</td>
<td>1000</td>
<td>1200</td>
</tr>
<tr>
<td>321</td>
<td>340</td>
<td>800</td>
<td>1100</td>
<td>1300</td>
</tr>
<tr>
<td>341</td>
<td>360</td>
<td>900</td>
<td>1200</td>
<td>1400</td>
</tr>
<tr>
<td>361</td>
<td>380</td>
<td>1000</td>
<td>1300</td>
<td>1500</td>
</tr>
<tr>
<td>381</td>
<td>400</td>
<td>1100</td>
<td>1400</td>
<td>1600</td>
</tr>
<tr>
<td>401</td>
<td>420</td>
<td>1200</td>
<td>1500</td>
<td>1700</td>
</tr>
<tr>
<td>421</td>
<td>440</td>
<td>1300</td>
<td>1600</td>
<td>1800</td>
</tr>
<tr>
<td>441</td>
<td>460</td>
<td>1400</td>
<td>1700</td>
<td>1900</td>
</tr>
<tr>
<td>461</td>
<td>480</td>
<td>1500</td>
<td>1800</td>
<td>2000</td>
</tr>
<tr>
<td>481</td>
<td>500</td>
<td>1500</td>
<td>1800</td>
<td>2100</td>
</tr>
<tr>
<td>501</td>
<td>520</td>
<td>1600</td>
<td>1900</td>
<td>2100</td>
</tr>
<tr>
<td>521</td>
<td>540</td>
<td>1700</td>
<td>2000</td>
<td>2200</td>
</tr>
<tr>
<td>541</td>
<td>560</td>
<td>1800</td>
<td>2100</td>
<td>2300</td>
</tr>
<tr>
<td>561</td>
<td>580</td>
<td>1900</td>
<td>2200</td>
<td>2400</td>
</tr>
<tr>
<td>581</td>
<td>600</td>
<td>2000</td>
<td>2300</td>
<td>2400</td>
</tr>
<tr>
<td>601</td>
<td>620</td>
<td>2100</td>
<td>2400</td>
<td>2400</td>
</tr>
<tr>
<td>621</td>
<td>640</td>
<td>2200</td>
<td>2400</td>
<td>2400</td>
</tr>
<tr>
<td>641</td>
<td>660</td>
<td>2300</td>
<td>2400</td>
<td>2400</td>
</tr>
<tr>
<td>661 and above</td>
<td>2400</td>
<td>2400</td>
<td>2400</td>
<td>2400</td>
</tr>
</tbody>
</table>
Table 9
Visual and non-visual aids and/or on-board equipment versus minimum RVR — aeroplanes

<table>
<thead>
<tr>
<th>Type of approach</th>
<th>Facilities</th>
<th>Lowest RVR (m)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Multi-pilot operations</td>
</tr>
<tr>
<td>3D operations</td>
<td>RTZL and RCLL</td>
<td>(no limitation)</td>
</tr>
<tr>
<td></td>
<td>Without RTZL and RCLL but using HUDLS or equivalent system; coupled autopilot or flight director to the DH</td>
<td>(no limitation)</td>
</tr>
<tr>
<td></td>
<td>No RTZL and RCLL, not using HUDLS or equivalent system or autopilot to the DH</td>
<td>750</td>
</tr>
<tr>
<td>2D operations</td>
<td>Final approach track offset &lt; 15° for Category A and B aeroplanes or &lt; 5° for Category C and D aeroplanes</td>
<td>750</td>
</tr>
<tr>
<td></td>
<td>Final approach track offset ≥ 15° for Category A and B aeroplanes</td>
<td>1 000</td>
</tr>
<tr>
<td></td>
<td>Final approach track offset ≥ 5° for Category C and D aeroplanes</td>
<td>1 200</td>
</tr>
</tbody>
</table>

Table 10
Approach lighting systems — aeroplanes

<table>
<thead>
<tr>
<th>Class of lighting facility</th>
<th>Length, configuration and intensity of approach lights</th>
</tr>
</thead>
<tbody>
<tr>
<td>FALS</td>
<td>CAT I lighting system (HIALS ≥ 720 m) distance coded centre line, barrette centre line</td>
</tr>
<tr>
<td>IALS</td>
<td>Simple approach lighting system (HIALS 420–719 m) single source, barrette</td>
</tr>
<tr>
<td>BALS</td>
<td>Any other approach lighting system (HIALS, MALS or ALS 210–419 m)</td>
</tr>
<tr>
<td>NALS</td>
<td>Any other approach lighting system (HIALS, MALS or ALS &lt; 210 m) or no approach lights</td>
</tr>
</tbody>
</table>

(e) For night operations or for any operation where credit for visual aids is required, the lights should be on and serviceable except as provided for in Table 15.

(f) Where any visual or non-visual aid specified for the approach and assumed to be available in the determination of operating minima is unavailable, revised operating minima will need to be determined.
AMC6 AMC8 SPO.OP.110 Aerodrome operating minima — aeroplanes and helicopters

DETERMINATION OF RVR/CMV/ OR VIS MINIMA FOR NPA, TYPE A INSTRUMENT APPROACH AND TYPE B CAT I INSTRUMENT APPROACH OPERATIONS — HELICOPTERS

(a) For non-precision approach (NPA) operations, the minima specified in Table 4.1.H should apply:

1. where the missed approach point is within ½ NM of the landing threshold, the approach minima specified for FALS may be used regardless of the length of approach lights available. However, FATO/runway edge lights, threshold lights, end lights and FATO/runway markings are still required;
2. for night operations, ground lights should be available to illuminate the FATO/runway and any obstacles; and
3. for single-pilot operations, the minimum RVR is 800 m or the minima in Table 4.2.H, whichever is higher.

(b) For CAT I operations, the minima specified in Table 4.2.H should apply:

1. for night operations, ground light should be available to illuminate the FATO/runway and any obstacles;
2. for single-pilot operations, the minimum RVR/VIS should be calculated in accordance with the following additional criteria:
   (i) an RVR of less than 800 m should not be used except when using a suitable autopilot coupled to an ILS, MLS or GLS, in which case normal minima apply; and
   (ii) the DH applied should not be less than 1.25 times the minimum use height for the autopilot.

Table 4.1.H: Onshore minima

<table>
<thead>
<tr>
<th>MDH/DH (ft)</th>
<th>FALS</th>
<th>IALS</th>
<th>BALS</th>
<th>NALS</th>
</tr>
</thead>
<tbody>
<tr>
<td>250–299</td>
<td>600</td>
<td>800</td>
<td>1,000</td>
<td>1,000</td>
</tr>
<tr>
<td>300–449</td>
<td>800</td>
<td>1,000</td>
<td>1,000</td>
<td>1,000</td>
</tr>
<tr>
<td>450 and above</td>
<td>1,000</td>
<td>1,000</td>
<td>1,000</td>
<td>1,000</td>
</tr>
</tbody>
</table>

*: ‘MDH/DH’ refers to the initial calculation of MDH/DH. When selecting the associated RVR, there is no need to take account of a rounding up to the nearest 10 ft, which may be done for operational purposes, e.g. conversion to MDA/DA.

**: The tables are only applicable to conventional approaches with a nominal descent slope of not greater than 4°. Greater descent slopes will usually require that visual glideslope guidance (e.g. precision approach path indicator (PAPI)) is also visible at the MDH.

Table 4.2.H: Onshore CAT I minima

<table>
<thead>
<tr>
<th>DH (ft)</th>
<th>FALS</th>
<th>IALS</th>
<th>BALS</th>
<th>NALS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
‘DH’ refers to the initial calculation of DH. When selecting the associated RVR, there is no need to take account of a rounding up to the nearest 10 ft, which may be done for operational purposes, e.g. conversion to DA.

** The table is applicable to standard approaches with a glide slope up to and including 4°.

IALS comprise FATO/runway markings, 420 – 719 m of HI/MI approach lights, FATO/runway edge lights, threshold lights and FATO/runway end lights. Lights to be on.

BALS comprise FATO/runway markings, < 420 m of HI/MI approach lights, any length of LI approach lights, FATO/runway edge lights, threshold lights and FATO/runway end lights. Lights to be on.

NALS comprise FATO/runway markings, FATO/runway edge lights, threshold lights, FATO/runway end lights or no lights at all.

(a) For IFR operations, the RVR or VIS should not be less than the greatest of:

1. the minimum RVR or VIS for the type of runway/FATO used according to Table 11;
2. the minimum RVR determined according to the MDH or DH and class of lighting facility according to Table 12; or
3. for PinS operations with instructions to ‘proceed visually’, the distance between the MAPt of the PinS and the FATO or its approach light system.

If the value determined in (1) is a VIS, then the result is a minimum VIS. In all other cases, the result is a minimum RVR.

(b) For PinS operations with instructions to ‘proceed VFR’, the VIS should be compatible with visual flight rules.

(c) For Type A instrument approaches where the MAPt is within ½ NM of the landing threshold, the approach minima specified for FALS may be used regardless of the length of approach lights available. However, FATO/runway edge lights, threshold lights, end lights and FATO/runway markings are still required.

(d) An RVR of less than 800 m should not be used except when using a suitable autopilot coupled to an ILS, MLS, GLS or LPV, in which case normal minima apply.

(e) For night operations, ground lights should be available to illuminate the FATO/runway and any obstacles.

(f) The visual aids should comprise standard runway day markings, runway edge lights, threshold lights and runway end lights and approach lights as specified in Table 13.

<table>
<thead>
<tr>
<th></th>
<th>200</th>
<th>500</th>
<th>600</th>
<th>700</th>
<th>1000</th>
</tr>
</thead>
<tbody>
<tr>
<td>201-250</td>
<td>550</td>
<td>650</td>
<td>750</td>
<td>1000</td>
<td></td>
</tr>
<tr>
<td>251-300</td>
<td>600</td>
<td>700</td>
<td>800</td>
<td>1000</td>
<td></td>
</tr>
<tr>
<td>301 and above</td>
<td>750</td>
<td>800</td>
<td>900</td>
<td>1000</td>
<td></td>
</tr>
</tbody>
</table>
For night operations or for any operation where credit for runway and approach lights as defined in Table 13 is required, the lights should be on and serviceable except as provided for in Table 15.

**Table 11**
Type of runway/FATO versus minimum RVR — helicopters

<table>
<thead>
<tr>
<th>Type of runway/FATO</th>
<th>Minimum RVR or VIS (m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>PA runway, category I</td>
<td>RVR 550</td>
</tr>
<tr>
<td>NPA runway</td>
<td></td>
</tr>
<tr>
<td>Non-instrument runway</td>
<td></td>
</tr>
<tr>
<td>Instrument FATO</td>
<td>RVR 550</td>
</tr>
<tr>
<td>FATO</td>
<td>RVR or VIS 800</td>
</tr>
</tbody>
</table>

**Table 12**
Onshore helicopter instrument approach minima

<table>
<thead>
<tr>
<th>DH/MDH (ft)</th>
<th>Facilities versus RVR (m)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>FALS</td>
</tr>
<tr>
<td>200</td>
<td>550</td>
</tr>
<tr>
<td>201–249</td>
<td>550</td>
</tr>
<tr>
<td>250–299</td>
<td>600*</td>
</tr>
<tr>
<td>300 and above</td>
<td>750*</td>
</tr>
</tbody>
</table>

* Minima on 2D approach operations should be no lower than 800 m.

**Table 13**
Approach lighting systems — helicopters

<table>
<thead>
<tr>
<th>Class of lighting facility</th>
<th>Length, configuration and intensity of approach lights</th>
</tr>
</thead>
<tbody>
<tr>
<td>FALS</td>
<td>CAT I lighting system (HIALS ≥ 720 m) distance coded centre line, barrette centre line</td>
</tr>
<tr>
<td>IALS</td>
<td>Simple approach lighting system (HIALS 420–719 m) single source, barrette</td>
</tr>
<tr>
<td>BALS</td>
<td>Any other approach lighting system (HIALS, MALS or ALS 210–419 m)</td>
</tr>
<tr>
<td>NALS</td>
<td>Any other approach lighting system (HIALS, MALS or ALS &lt; 210 m) or no approach lights</td>
</tr>
</tbody>
</table>
Aerodrome operating minima — aeroplanes and helicopters

CONVERSION OF REPORTED METEOROLOGICAL VISIBILITY TO RVR/CMV — AEROPLANES

(a) A conversion from meteorological visibility to RVR/CMV should not be used:

(1) when the reported RVR is available;

(2) for calculating take-off minima; and

(3) for other RVR minima less than 800.

(b) If the RVR is reported as being above the maximum value assessed by the aerodrome operator, e.g., ‘RVR more than 1 500 m’, it should not be considered as a reported value for (a)(1).

(c) When converting meteorological visibility to RVR in circumstances other than those in (a), the conversion factors specified in Table 5 should be used.

The following conditions apply to the use of CMV instead of RVR:

(a) If the reported RVR is not available, a CMV may be substituted for the RVR, except:

(1) to satisfy take-off minima; or

(2) for the purpose of continuation of an approach in LVO.

(b) If the minimum RVR for an approach is more than the maximum value assessed by the aerodrome operator, then CMV should be used.

(c) In order to determine CMV from visibility:

(1) for flight planning purposes, a factor of 1.0 should be used;

(2) for purposes other than flight planning, the conversion factors specified in Table 14 should be used.

<table>
<thead>
<tr>
<th>Light elements in operation</th>
<th>RVR/CMV = reported VIS \times \text{meteorological visibility}</th>
<th>Day</th>
<th>Night</th>
</tr>
</thead>
<tbody>
<tr>
<td>HI approach and runway lights</td>
<td></td>
<td>1.5</td>
<td>2.0</td>
</tr>
<tr>
<td>Any type of light installation other than above</td>
<td></td>
<td>1.0</td>
<td>1.5</td>
</tr>
<tr>
<td>No lights</td>
<td></td>
<td>1.0</td>
<td>not applicable</td>
</tr>
</tbody>
</table>
AMC9 AMC10 SPO.OP.110 Aerodrome operating minima — aeroplanes and helicopters

EFFECT ON LANDING MINIMA OF TEMPORARILY FAILED OR DOWNGRADED GROUND EQUIPMENT — COMPLEX MOTOR-POWERED AIRCRAFT

(a) General

These instructions are intended for both pre-flight and in-flight use. It is, however, not expected that the pilot-in-command would consult such instructions after passing 1,000 ft above the aerodrome. If failures of ground aids are announced at such a late stage, the approach could be continued at the pilot-in-command’s discretion. If failures are announced before such a late stage in the approach, their effect on the approach should be considered as described in Table 156 and, if considered necessary, the approach should be abandoned.

(b) Conditions applicable to Table 156:

1. multiple failures of runway/FATO lights other than those indicated in Table 156 should not be acceptable;
2. deficiencies of approach and runway/FATO lights are treated separately; and
3. failures other than ILS or MLS affect the RVR only and not the DH.

Table 156

<table>
<thead>
<tr>
<th>Failed or downgraded equipment</th>
<th>Effect on landing minima</th>
</tr>
</thead>
<tbody>
<tr>
<td>ILS/ALS Navaid standby transmitter</td>
<td>CAT I Type B, No effect APV, NPA Type A APV — not applicable</td>
</tr>
<tr>
<td>Outer marker (ILS only)</td>
<td>No effect if replaced by height check at 1,000 ft; the required height or glide path can be checked using other means, e.g. DME fix</td>
</tr>
<tr>
<td>Middle marker (ILS only)</td>
<td>No effect</td>
</tr>
<tr>
<td>RVR assessment systems</td>
<td>No effect unless used as MAPt</td>
</tr>
<tr>
<td>Approach lights</td>
<td>Minima as for NALS</td>
</tr>
<tr>
<td>Approach lights except the last 210 m</td>
<td>Minima as for BALS</td>
</tr>
<tr>
<td>Approach lights except the last 420 m</td>
<td>Minima as for IALS</td>
</tr>
<tr>
<td>Standby power for approach lights</td>
<td>No effect</td>
</tr>
</tbody>
</table>
### EFFECT ON LANDING MINIMA OF TEMPORARILY FAILED OR DOWNGRADED GROUND EQUIPMENT — OTHER-TAN COMPLEX MOTOR-POWERED AIRCRAFT

#### Table 6

<table>
<thead>
<tr>
<th>Failed or downgraded equipment</th>
<th>Effect on landing minima</th>
</tr>
</thead>
<tbody>
<tr>
<td>Edge lights, threshold lights and runway end lights</td>
<td><strong>CAT I Type B</strong>&lt;br&gt;Day — no effect&lt;br&gt;Night — not allowed&lt;br&gt;<strong>APU, NRA Type A</strong></td>
</tr>
<tr>
<td><strong>Centreline</strong> Centre line lights</td>
<td><strong>Aeroplanes</strong>: No effect if flight director (F/D), HUDLS or autoland; otherwise RVR 750 m. <strong>Helicopters</strong>: No effect on CAT I and SA CAT I approach operations.</td>
</tr>
<tr>
<td><strong>Centreline</strong> Centre line lights spacing increased to 30 m</td>
<td>No effect</td>
</tr>
<tr>
<td><strong>Touchdown-zone</strong> TDZ lights</td>
<td><strong>Aeroplanes</strong>: No effect if F/D, HUDLS or autoland; otherwise RVR 750 m. <strong>Helicopters</strong>: No effect</td>
</tr>
<tr>
<td>Taxiway lighting system</td>
<td>No effect</td>
</tr>
</tbody>
</table>

---

**AMC10** SPO.OP.110 Aerodrome operating minima — aeroplanes and helicopters

**EFFECT ON LANDING MINIMA OF TEMPORARILY FAILED OR DOWNGRADED GROUND EQUIPMENT — OTHER-TAN COMPLEX MOTOR-POWERED AIRCRAFT**

(...)  
(b) A minimum RVR of 750 m should be used for CAT I operations in the absence of centreline lines and/or touchdown zone lights.  
(e) Where approach lighting is partly unavailable, minima should take account of the serviceable length of approach lighting.

**GM1** SPO.OP.110 Aerodrome operating minima — aeroplanes and helicopters

**AIRCRAFT CATEGORIES**

(...)  
**Table T6**

Aircraft categories corresponding to $V_{AT}$ values

(...)
GM5 SPO.OP.110 Aerodrome operating minima — aeroplanes and helicopters

APPROACH LIGHTING SYSTEMS — ICAO, FAA

The following table provides a comparison of the ICAO and FAA specifications.

Table 17

Approach lighting systems — ICAO and FAA specifications

<table>
<thead>
<tr>
<th>Class of lighting facility</th>
<th>Length, configuration and intensity of approach lights</th>
</tr>
</thead>
</table>
| FALS                       | ICAO: CAT I lighting system (HIALS ≥ 720 m) distance coded centre line, barrette centre line  
FAA: ALSF1, ALSF2, SSALR, MALSR, high- or medium-intensity and/or flashing lights, 720 m or more |
| ALS                        | ICAO: simple approach lighting system (HIALS 420–719 m) single source, barrette  
FAA: MALSF, MALS, SALS/SALSF, SSALF, SSALS, high- or medium-intensity and/or flashing lights, 420–719 m |
| BALS                       | Any other approach lighting system (e.g. HIALS, MALS or ALS 210–419 m)  
FAA: ODALS, high- or medium-intensity or flashing lights 210–419 m |
| NALS                       | Any other approach lighting system (e.g. HIALS, MALS or ALS <210 m) or no approach lights |

GM6 SPO.OP.110 Aerodrome operating minima — aeroplanes and helicopters

IAPs — SBAS OPERATIONS

(a) SBAS LPV operations with a DH of 200 ft depend on an SBAS approved for operations down to a DH of 200 ft.

(b) The following systems are in operational use or in a planning phase:

(1) European geostationary navigation overlay service (EGNOS), operational in Europe;
(2) wide area augmentation system (WAAS), operational in the USA;
(3) multi-functional satellite augmentation system (MSAS), operational in Japan;
(4) system of differential correction and monitoring (SDCM), planned by Russia;
(5) GPS-aided geo-augmented navigation (GAGAN) system, planned by India; and
(6) satellite navigation augmentation system (SNAS), planned by China.
GM7 SPO.OP.110 Aerodrome operating minima — aeroplanes and helicopters

MEANS TO DETERMINE THE REQUIRED RVR BASED ON DH AND LIGHTING FACILITIES

The values in Table 8 are derived from the formula below:

\[ \text{RVR (m)} = \left( \frac{\text{DH}/\text{MDH (ft)} \times 0.3048}{\tan \alpha} \right) - \text{length of approach lights (m)}, \]

where \( \alpha \) is the calculation angle, being a default value of 3.00° increasing in steps of 0.10° for each line in Table 8 up to 3.77° and then remaining constant. An upper RVR limit of 2 400 m has been applied to the table.

GM8 SPO.OP.110 Aerodrome operating minima — aeroplanes and helicopters

USE OF DH FOR NPAs FLOWN USING THE CONTINUOUS DESCENT FINAL APPROACH (CDFA) TECHNIQUE

The safety of using the MDH as DH in CDFA operations has been verified by at least two independent analyses concluding that a CDFA using MDH as DH without any add-on is safer than the traditional step-down and level flight NPA operation. A comparison was made between the safety level of using MDH as DH without an add-on with the well-established safety level resulting from the ILS collision risk model (CRM). The NPA used was the most demanding, i.e. most tightly designed NPA, which offers the least additional margins. It should be noted that the design limits of the ILS approach design, e.g. the maximum glide path (GP) angle of 3.5 degrees, must be observed for the CDFA in order to keep the validity of the comparison.

There is a wealth of operational experience in Europe confirming the above-mentioned analytical assessments. It cannot be expected that each operator is able to conduct similar safety assessments, and this is not necessary. The safety assessments already performed take into account the most demanding circumstances at hand, like the most tightly designed NPA procedures and other ‘worst-case scenarios’. The assessments naturally focus on cases where the controlling obstacle is located in the missed approach area.

However, it is necessary for operators to assess whether their cockpit procedures and training are adequate to ensure minimal height loss in case of a go-around manoeuvre. Suitable topics for the safety assessment required by each operator may include:

— understanding of the CDFA concept including use of the MDA/H as DA/H;
— cockpit procedures that ensure flight on speed, on path, and with proper configuration and energy management;
— cockpit procedures that ensure gradual decision-making; and
— identification of cases where an increase of the DA/H may be necessary because of non-standard circumstances, etc.
GM9 SPO.OP.110 Aerodrome operating minima — aeroplanes and helicopters

**INCREMENT SPECIFIED BY THE COMPETENT AUTHORITY**

Additional increments to the published minima may be specified by the competent authority in order to take into account certain operations, such as downwind approaches, single-pilot operations, or approaches flown not using the CDFA technique.

GM10 SPO.OP.110 Aerodrome operating minima — aeroplanes and helicopters

**USE OF COMMERCIALLY AVAILABLE INFORMATION**

When an operator uses commercially available information to establish aerodrome operating minima, the operator remains responsible for ensuring that the information used is accurate and suitable for its operation, and that the aerodrome operating minima are calculated in accordance with the method specified in Part C of its operations manual and approved by the competent authority.

The operator should apply the procedures in ORO.GEN.205 ‘Contracted activities’.

GM1 SPO.OP.110(b)(5) Aerodrome operating minima — Visual and non-visual aids and infrastructure

‘Visual and non-visual aids and infrastructure’ refers to all equipment and facilities required for the procedure to be used for the intended instrument approach operation. This includes but is not limited to lights, markings, ground- or space-based radio aids, etc.

GM1 SPO.OP.112 Aerodrome operating minima — circling operations with aeroplanes

**SUPPLEMENTAL INFORMATION**

(a) The purpose of this Guidance Material is to provide operators with supplemental information regarding the application of aerodrome operating minima in relation to circling approaches.

(b) Conduct of flight — general:

(1) the MDH and obstacle clearance height (OCH) included in the procedure are referenced to aerodrome elevation;

(2) the MDA is referenced to mean sea level;

(3) for these procedures, the applicable visibility is the meteorological visibility VIS; and

(4) operators should provide tabular guidance of the relationship between height above threshold and the in-flight visibility required to obtain and sustain visual contact during the circling manoeuvre.

(c) Instrument approach followed by visual manoeuvring (circling) without prescribed tracks:
(1) When the aeroplane is on the initial instrument approach, before visual reference is stabilised, but not below the MDA/H, the aeroplane should follow the corresponding instrument approach procedure [IAP] until the appropriate instrument MAPt is reached.

(2) At the beginning of the level flight phase at or above the MDA/H, the instrument approach track determined by the radio navigation aids, RNAV, RNP, ILS, MLS or GLS should be maintained until the pilot:

(i) estimates that, in all probability, visual contact with the runway of intended landing or the runway environment will be maintained during the entire circling procedure;

(ii) estimates that the aeroplane is within the circling area before commencing circling; and

(iii) is able to determine the aeroplane’s position in relation to the runway of intended landing with the aid of the appropriate external visual references.

(3) If the pilot cannot comply with the conditions in (c)(2) at the MAPt. When reaching the published instrument MAPt and the conditions stipulated in (c)(2) are unable to be established by the pilot, then a missed approach should be carried out in accordance with that the instrument approach procedure [IAP].

(4) After the aeroplane has left the track of the initial instrument approach, the flight phase outbound from the runway should be limited to an appropriate distance, which is required to align the aeroplane onto the final approach. Such manoeuvres should be conducted to enable the aeroplane to:

(i) to attain a controlled and stable descent path to the intended landing runway; and

(ii) to remain within the circling area and in such a way that visual contact with the runway of intended landing or runway environment is maintained at all times.

(5) Flight manoeuvres should be carried out at an altitude/height that is not less than the circling MDA/H.

(6) Descent below the MDA/H should not be initiated until the threshold of the runway to be used has been appropriately identified. The aeroplane should be in a position to continue with a normal rate of descent and land within the touchdown zone (TDZ).

(d) Instrument approach followed by a visual manoeuvring (circling) with prescribed track.

(1) The aeroplane should remain on the initial instrument approach procedure [IAP] until one of the following is reached:

(i) the prescribed divergence point to commence circling on the prescribed track; or

(ii) the MAPt.

(2) The aeroplane should be established on the instrument approach track determined by the radio navigation aids, RNAV, RNP, ILS, MLS or GLS in level flight at or above the MDA/H at or by the circling manoeuvre divergence point.
(8) Unless otherwise specified in the procedure, final descent should not be commenced from the MDA/H until the threshold of the intended landing runway has been identified and the aeroplane is in a position to continue with a normal rate of descent to land within the touchdown zone (TDZ).

(e) Missed approach

(1) Missed approach during the instrument procedure prior to circling:

(i) if the missed approach procedure is required to be flown when the aeroplane is positioned on the instrument approach track defined by radio navigation aids, RNP, RNAV, ILS, MLS or GLS, and before commencing the circling manoeuvre, the published missed approach for the instrument approach should be followed; or

(ii) if the instrument approach procedure (IAP) is carried out with the aid of an ILS, an MLS or a stabilised approach (SAp), the MAPt associated with an ILS or an MLS procedure without glide path (GP-out procedure) or the SAp, where applicable, should be used.

AMC1 SPO.OP.115 Departure and approach procedures — aeroplanes and helicopters

APPROACH FLIGHT TECHNIQUE — AEROPLANES

(a) All approach operations should be flown as SAp operations.

(b) The CDFA technique should be used for NPA procedures.

AMC1 SPO.OP.152 Destination aerodromes — instrument approach operations

PBN OPERATIONS

The pilot-in-command should only select an aerodrome as a destination alternate aerodrome if an instrument approach procedure that does not rely on GNSS is available either at that aerodrome or at the destination aerodrome.

(a) When the operator intends to use PBN, the operator should either:

(1) demonstrate that the GNSS is robust against loss of capability; or

(2) select an aerodrome as a destination alternate aerodrome only if an IAP that does not rely on a GNSS is available either at that aerodrome or at the destination aerodrome.

GNSS ROBUSTNESS AGAINST LOSS OF CAPABILITY — HELICOPTERS

(b) The operator may demonstrate robustness against the loss of capability of the GNSS if all of the following criteria are met:

(1) SBAS or GBAS are available and used.
(2) The failure of a single receiver or system should not compromise the navigation capability required for the intended instrument approach.

(3) The temporary jamming of all GNSS frequencies should not compromise the navigation capability required for the intended route. The operator should provide a procedure to deal with such cases unless other sensors are available to continue on the intended route.

(4) The duration of a jamming event should be determined as follows:

(i) Considering the average speed and height of a helicopter flight, the duration of a jamming event may be considered to be less than 2 minutes.

(ii) The time needed for the GNSS system to re-start and provide the aircraft position and navigation guidance should also be considered.

(iii) Based on (i) and (ii) above, the operator should establish the duration of the loss of GNSS navigation data due to jamming. This duration should be no less than 3 minutes, and may be no longer than 4 minutes.

(5) The operator should ensure resilience to jamming for the duration determined in (4) above, as follows:

(i) If the altitude of obstacles on both sides of the flight path are higher than the planned altitude for a given segment of the flight, the operator should ensure no excessive drift on either side by relying on navigation sensors such as an inertial system with performance in accordance with the intended function.

(ii) If (i) does not apply and the operator cannot rely on sensors other than GNSS, the operator should develop a procedure to ensure that a drift from the intended route during the jamming event has no adverse consequences on the safety of the flight. This procedure may involve air traffic services.

(6) The operator should ensure that no space weather event is predicted to disrupt the GNSS reliability and integrity at both the destination and the alternate.

(7) The operator should verify the availability of RAIM for all phases of flight based on GNSS, including navigation to the alternate.

(8) The operator’s MEL should reflect the elements in points (b)(1) and (b)(2).

OPERATIONAL CREDITS

c) To comply with point SPO.OP.153, when the operator intends to use ‘operational credits’ (e.g. EFVS, SA CAT I, etc.), the operator should select an aerodrome as destination alternate aerodrome only if an approach procedure that does not rely on the same ‘operational credit’ is available either at that aerodrome or at the destination aerodrome.
GM2 SPO.OP.152 Destination aerodromes — instrument approach operations

GNSS ROBUSTNESS AGAINST LOSS OF CAPABILITY — HELICOPTERS

(a) Redundancy of on-board systems ensures that no single on-board equipment failure (e.g. antenna, GNSS receiver, FMS, or navigation display failure) results in the loss of the GNSS capability.

(b) Any shadowing of the GNSS signal or jamming of all GNSS frequencies from the ground is expected to be of a very short duration and affect a very small area. Additional sensors or functions such as inertial coasting may be used during jamming events. Jamming should be considered on all segments of the intended route, including the approach.

(c) The availability of GNSS signals can be compromised if space weather events cause ‘loss of lock’ conditions and more than one satellite signal may be lost on a given GNSS frequency. Until space weather forecasts are available, the operator may use ‘nowcasts’ as short-term predictions for helicopter flights of short durations.

(d) SBAS also contributes to mitigate space weather effects, both by providing integrity messages and by correcting ionosphere-induced errors.

(e) Even though SBAS should be available and used, RAIM should remain available autonomously. In case of loss of the SBAS, the route and the approach to the destination or alternate should still be flown with an available RAIM function.

(f) When available, GNSS based on more than one constellation and more than one frequency may provide better integrity and redundancy regarding failures in the space segment of the GNSS, jamming, and resilience to space weather events.

AMC1 SPO.OP.215 (a) Commencement and continuation of approach — aeroplanes and helicopters

VISUAL REFERENCES FOR INSTRUMENT APPROACH OPERATIONS

MINIMUM RVR FOR CONTINUATION OF APPROACH — AEROPLANES

(a) The controlling RVR should be the touchdown RVR.

(b) If the touchdown RVR is not reported, then the midpoint RVR should be the controlling RVR.

(c) Where the RVR is not available, CMV should be used, except for the purpose of continuation of an approach in LVO in accordance with AMC8 SPO.OP.110.

(a) NPA, APV and CAT I operations

At DH or MDH, at least one of the visual references specified below should be distinctly visible and identifiable to the pilot:

(1) elements of the approach lighting system;

(2) the threshold;

(3) the threshold markings;
(4) the threshold lights;
(5) the threshold identification lights;
(6) the visual glide-slope indicator;
(7) the touchdown zone or touchdown zone markings;
(8) the touchdown zone lights;
(9) FATO/runway edge lights; or
(10) other visual references specified in the operations manual.

(b) Lower than standard category I (LTS CAT I) operations

At DH, the visual references specified below should be distinctly visible and identifiable to the pilot:

(1) a segment of at least three consecutive lights, being the centreline of the approach lights, or touchdown zone lights, or runway centreline lights, or runway edge lights, or a combination of them; and

(2) this visual reference should include a lateral element of the ground pattern, such as an approach light crossbar or the landing threshold or a barrette of the touchdown zone light unless the operation is conducted utilising an approved HUDLS usable to at least 150 ft.

(c) CAT II or other-than-standard category II (OTS CAT II) operations

At DH, the visual references specified below should be distinctly visible and identifiable to the pilot:

(1) a segment of at least three consecutive lights, being the centreline of the approach lights, or touchdown zone lights, or runway centreline lights, or runway edge lights, or a combination of them; and

(2) this visual reference should include a lateral element of the ground pattern, such as an approach light crossbar or the landing threshold or a barrette of the touchdown zone light unless the operation is conducted utilising an approved HUDLS to touchdown.

(d) CAT III operations

(1) For CAT IIIA operations and for CAT IIIB operations conducted either with fail-passive flight control systems or with the use of an approved HUDLS: at DH, a segment of at least three consecutive lights, being the centreline of the approach lights, or touchdown zone lights, or runway centreline lights, or runway edge lights, or a combination of them is attained and can be maintained by the pilot.

(2) For CAT IIIB operations conducted either with fail-operational flight control systems or with a fail-operational hybrid landing system using a DH: at DH, at least one centreline light is attained and can be maintained by the pilot.
(3) For CAT IIIb operations with no DH there is no requirement for visual reference with the runway prior to touchdown.

(e) Approach operations utilising EVS — CAT I operations

(1) At DH or MDH, the following visual references should be displayed and identifiable to the pilot on the EVS:
   (i) elements of the approach light; or
   (ii) the runway threshold, identified by at least one of the following:
       (A) the beginning of the runway landing surface,
       (B) the threshold lights, the threshold identification lights; or
       (C) the touchdown zone, identified by at least one of the following: the runway touchdown zone landing surface, the touchdown zone lights, the touchdown zone markings or the runway lights.

(2) At 100 ft above runway threshold elevation at least one of the visual references specified below should be distinctly visible and identifiable to the pilot without reliance on the EVS:
   (i) the lights or markings of the threshold; or
   (ii) the lights or markings of the touchdown zone.

(f) Approach operations utilising EVS — APV and NPA operations flown with the CDFA technique

(1) At DH/MDH, visual references should be displayed and identifiable to the pilot on the EVS image as specified under (a).

(2) At 200 ft above runway threshold elevation, at least one of the visual references specified under (a) should be distinctly visible and identifiable to the pilot without reliance on the EVS.

AMC1 SPO.OP.215(b) Commencement and continuation of approach

MINIMUM RVR FOR CONTINUATION OF APPROACH — HELICOPTERS

(a) The controlling RVR should be the touchdown RVR.

(b) If the touchdown RVR is not reported, then the midpoint RVR should be the controlling RVR.

GM1 SPO.OP.215 Commencement and continuation of approach

APPLICATION OF RVR OR VIS REPORTS — AEROPLANES

(a) There is no prohibition on the commencement of an approach based on the reported RVR or VIS. The restriction in SPO.OP.215 applies only if the RVR or VIS is reported and applies to the continuation of the approach past a point where the aircraft is 1 000 ft above the aerodrome elevation or in the FAS, as applicable.
APPLICATION OF RVR OR VIS REPORTS — HELICOPTERS

(b) There is no prohibition on the commencement of an approach based on the reported RVR. The restriction in SPO.OP.215 applies to the continuation of the approach past a point where the aircraft is 1000 ft above the aerodrome elevation or into the FAS, as applicable.

The prohibition to continue the approach applies only if the RVR is reported and is below 550m and is below the operating minima. There is no prohibition based on VIS.

(c) If the reported RVR is 550 m or greater, but it is less than the RVR calculated in accordance with AMCS CAT.OP.MPA.110, a go-around is likely to be necessary since visual reference may not be established at the DH or MDH. Similarly, in the absence of an RVR report, the reported visibility or a digital image may indicate that a go-around is likely. The pilot-in-command should consider available options, based on a thorough assessment of risk, such as diverting to an alternate, before commencing the approach.

APPLICATION OF RVR OR VIS REPORTS — ALL AIRCRAFT

(d) If a deterioration in the RVR or VIS is reported once the aircraft is below 1000 ft or in the FAS, as applicable, then there is no requirement for the approach to be discontinued. In this situation, the normal visual reference requirements would apply at the DA/H.

(e) Where additional RVR information is provided (e.g. midpoint and stop end), this is advisory; such information may be useful to the pilot in order to determine whether there will be sufficient visual reference to control the aircraft during roll-out and taxi. For operations where the aircraft will be controlled manually during roll-out, Table 1 in AMC1 SPA.LVO.100(a) provides an indication of the RVR that may be required to allow manual lateral control of the aircraft on the runway.

AMC1 SPO.OP.215(c) Commencement and continuation of approach

VISUAL REFERENCES FOR INSTRUMENT APPROACH OPERATIONS

For instrument approach operations Type A and CAT I instrument approach operations Type B, at least one of the visual references specified below should be distinctly visible and identifiable to the pilot at the MDA/H or the DA/H:

(a) elements of the approach lighting system;
(b) the threshold;
(c) the threshold markings;
(d) the threshold lights;
(e) the threshold identification lights;
(f) the visual glide path indicator;
(g) the TDZ or TDZ markings;
(h) the TDZ lights;
(i) FATO/runway edge lights;

(j) for helicopter PinS approaches, the identification beacon light and visual ground reference;

(k) for helicopter PinS approaches, the identifiable elements of the environment defined on the instrument chart;

(l) for helicopter PinS approaches with instructions to ‘proceed VFR’, sufficient visual cues to determine that VFR criteria are met; or

(m) other visual references specified in the operations manual.

**GM1 SPO.OP.215(f) Commencement and continuation of approach**

**APPROACHES WITH NO INTENTION TO LAND**

The approach may be continued to the DA/H or the MDA/H regardless of the reported RVR or VIS. Such operations should be coordinated with the air traffic services (ATS).

**AMC2 SPO.OP.230 Standard operating procedures**

**TEMPLATE**

[...]

(c) Crew members:

[...]

(2) In addition, for flight crew members, the following should be specified:

(i) selection criteria (initial qualification, flight experience, experience of the activity);

(ii) initial training (volume and content of the training); and

(iii) recent experience requirement and/or recurrent training (volume and content of the training).

(3) If the operator specifies a crew composition of more than one pilot, the following should apply:

(i) the SOPs should ensure that the pilot flying and pilot monitoring functions are possible from either pilot’s seat throughout the flight; and

(ii) the operator should adapt the SOPs to the specified crew composition.

The criteria listed in (c)(2)(i) to (c)(2)(iii) should take into account the operational environment and the complexity of the activity and should be detailed in the training programmes.

[...]
GM1 SPO.OP.235 EFVS 200 operations

GENERAL

(a) EFVS operations exploit the improved visibility provided by the EFVS to extend the visual segment of an instrument approach. EFVSs cannot be used to extend the instrument segment of an approach and thus the DH for EFVS 200 operations is always the same as for the same approach conducted without EFVS.

(b) Equipment for EFVS 200 operations

(1) In order to conduct EFVS 200 operations, a certified EFVS is used (EFVS-A or EFVS-L). An EFVS is an enhanced vision system (EVS) that also incorporates a flight guidance system and displays the image on a HUD or equivalent display. The flight guidance system will incorporate aircraft flight information and flight symbology.

(2) In multi-pilot operations, a suitable display of EFVS sensory imagery is provided to the pilot monitoring.

(c) Suitable approach procedures

(1) Types of approach operation are specified in AMC1 SPO.OP.235(a)(2).

EFVS 200 operations are used for 3D approach operations. This may include operations based on NPA procedures, approach procedures with vertical guidance and PA procedures including approach operations requiring specific approvals, provided that the operator holds the necessary approvals.

(2) Offset approaches

Refer to AMC1 SPO.OP.235(a)(2).

(3) Circling approaches

EFVSs incorporate a HUD or an equivalent system so that the EFVS image of the scene ahead of the aircraft is visible in the pilot’s forward external FOV. Circling operations require the pilot to maintain visual references that may not be directly ahead of the aircraft and may not be aligned with the current flight path. EFVSs cannot therefore be used in place of natural visual reference for circling approaches.

(d) Aerodrome operating minima for EFVS 200 operations are determined in accordance with AMC1 SPO.OP.235(a)(8).

The performance of EFVSs depends on the technology used and weather conditions encountered. Table 1 ‘Operations utilising EFVS: RVR reduction’ has been developed after an operational evaluation of two different EVSs, both using infrared sensors, along with data and support provided by the FAA. Approaches were flown in a variety of conditions including fog, rain and snow showers, as well as at night to aerodromes located in mountainous terrain. Table 1 contains conservative figures to cater for the expected performance of infrared sensors in the variety of conditions that might be encountered. Some systems may have better capability than those used for the evaluation, but credit cannot be taken for such performance in EFVS 200 operations.
(e) The conditions for commencement and continuation of the approach are in accordance with SPO.OP.215.

Pilots conducting EFVS 200 operations may commence an approach and continue that approach below 1,000 ft above the aerodrome or into the FAS if the reported RVR or CMV is equal to or greater than the lowest RVR minima determined in accordance with AMC1 SPO.OP.235(a)(8) and if all the conditions for the conduct of EFVS 200 operations are met.

Should any equipment required for EFVS 200 operations be unserviceable or unavailable, the conditions to conduct EFVS 200 operations would not be satisfied, and the approach should not be commenced. In the event of failure of the equipment required for EFVS 200 operations after the aircraft descends below 1,000 ft above the aerodrome or into the FAS, the conditions of SPO.OP.230 would no longer be satisfied unless the RVR reported prior to commencement of the approach was sufficient for the approach to be flown without the use of EFVS in lieu of natural vision.

(f) EFVS image requirements at the DA/H are specified in AMC1 SPO.OP.235(a)(4).

The requirements for features to be identifiable on the EFVS image in order to continue approach below the DH are more stringent than the visual reference requirements for the same approach flown without EFVS. The more stringent standard is needed because the EFVS might not display the colour of lights used to identify specific portions of the runway and might not consistently display the runway markings. Any visual approach path indicator using colour-coded lights may be unusable.

(g) Obstacle clearance in the visual segment

The ‘visual segment’ is the portion of the approach between the DH or the MAPt and the runway threshold. In the case of EFVS 200 operations, this part of the approach may be flown using the EFVS image as the primary reference and obstacles may not always be identifiable on an EFVS image. The operational assessment specified in AMC1 SPO.OP.235(a)(2) is therefore required to ensure obstacle clearance during the visual segment.

(h) Visual reference requirements at 200 ft above the threshold

For EFVS 200 operations, natural visual reference is required by a height of 200 ft above the runway threshold. The objective of this requirement is to ensure that the pilot will have sufficient visual reference to land. The visual reference should be the same as that required for the same approach flown without the use of EFVS.

Some EFVSs may have additional requirements that have to be fulfilled at this height to allow the approach to continue, such as a requirement to check that elements of the EFVS display remain correctly aligned and scaled to the external view. Any such requirements will be detailed in the AFM and included in the operator’s procedures.

(i) Specific approval for EFVS

In order to use EFVS without natural visual reference below 200 ft above the threshold, the operator needs to hold a specific approval in accordance with Part-SPA.
(j) Go-around

A go-around will be promptly executed if the required visual references are not maintained on the EFVS image at any time after the aircraft has descended below the DA/H or if the required visual references are not distinctly visible and identifiable using natural vision after the aircraft is below 200 ft. It is considered more likely that an EFVS 200 operation could result in the initiation of a go-around below the DA/H than the equivalent approach flown without EFVS and thus the operational assessment required by AMC1 SPO.OP.235(a)(2) takes into account the possibility of a balked landing.

An obstacle free zone (OFZ) may also be provided for CAT I PA procedures. Where an OFZ is not provided for a CAT I precision approach, this will be indicated on the approach chart. NPA procedures and approach procedures with vertical guidance provide obstacle clearance for the missed approach based on the assumption that a go-around is executed at the MAPt and not below the MDH.

**AMC1 SPO.OP.235(a)(1) EFVS 200 operations**

**EQUIPMENT CERTIFICATION**

For EFVS 200 operations, the aircraft should be equipped with an approach system using EFVS-A or a landing system using EFVS-L.

**AMC1 SPO.OP.235(a)(2) EFVS 200 operations**

**AERODROMES AND INSTRUMENT PROCEDURES SUITABLE FOR EFVS 200 OPERATIONS**

(a) For EFVS 200 operations, the operator should verify the suitability of a runway before authorising EFVS operations to that runway through an operational assessment taking into account the following elements:

(1) the obstacle situation;

(2) the type of aerodrome lighting;

(3) the available IAPs;

(4) the aerodrome operating minima; and

(5) any non-standard conditions that may affect the operations.

(b) EFVS 200 operations should only be conducted as 3D operations, using an IAP in which the final approach track is offset by a maximum of 3 degrees from the extended centre line of the runway.

(c) The IAP should be designed in accordance with PANS-OPS, Volume I (ICAO Doc 8168) or equivalent criteria.
AMC2 SPO.OP.235(a)(2) EFVS 200 operations

VERIFICATION OF THE SUITABILITY OF RUNWAYS FOR EFVS 200 OPERATIONS

The operational assessment before authorising the use of a runway for EFVS 200 operations may be conducted as follows:

(a) Check whether the runway has been promulgated as suitable for EFVS 200 operations or is certified as a PA category II or III runway by the State of the aerodrome. If this is so, then check whether and where LED lights are installed in order to assess the impact on the EFVS equipment used by the operator.

(b) If the check in point (a) above comes out negative, then proceed as follows:

(1) For straight-in IAPs, US Standard for Terminal Instrument Procedures (TERPS) may be considered to be acceptable as an equivalent to PANS-OPS. If other design criteria than PANS-OPS or US TERPS are used, the operations should not be conducted.

(2) If an OFZ is established, this will ensure adequate obstacle protection from 960 m before the threshold. If an OFZ is not established or if the DH for the approach is above 250 ft, then check whether there is a visual segment surface (VSS).

(3) VSSs are required for procedures published after 15 March 2007, but the existence of the VSS has to be verified through an aeronautical information publication (AIP), operations manual Part C, or direct contact with the aerodrome. Where the VSS is established, it may not be penetrated by obstacles. If the VSS is not established or is penetrated by obstacles and an OFZ is not established, then the operations should not be conducted. Note: obstacles of a height of less than 50 ft above the threshold may be disregarded when assessing the VSS.

(4) Runways with obstacles that require visual identification and avoidance should not be accepted.

(5) For the obstacle protection of a balked landing where an OFZ is not established, the operator may specify that pilots follow a departure procedure in the event of a balked landing, in which case it is necessary to verify that the aircraft will be able to comply with the climb gradients published for the instrument departure procedures for the expected landing conditions.

(c) If the AFM stipulates specific requirements for approach procedures, then the operational assessment should verify that these requirements can be met.

AMC1 SPO.OP.235(a)(3) EFVS 200 operations

INITIAL TRAINING FOR EFVS 200 OPERATIONS

Operators should ensure that flight crew members complete the following conversion training before being authorised to conduct EFVS operations unless credits related to training and checking for previous experience on similar aircraft types are defined in the operational suitability data established in accordance with Regulation (EU) No 748/2012:

(a) A course of ground training including at least the following:
characteristics and limitations of head-up displays (HUDs) or equivalent display systems including information presentation and symbology;

(2) EFVS sensor performance in different weather conditions, sensor limitations, scene interpretation, visual anomalies and other visual effects;

(3) EFVS display, control, modes, features, symbology, annunciations and associated systems and components;

(4) the interpretation of EFVS imagery;

(5) the interpretation of approach and runway lighting systems and display characteristics when using EFVS;

(6) pre-flight planning and selection of suitable aerodromes and approach procedures;

(7) principles of obstacle clearance requirements;

(8) the use and limitations of RVR assessment systems;

(9) normal, abnormal and emergency procedures for EFVS 200 operations;

(10) the effect of specific aircraft/system malfunctions;

(11) human factors aspects of EFVS 200 operations; and

(12) qualification requirements for pilots to obtain and retain approval for EFVS 200 operations.

(b) A course of FSTD training and/or flight training in two phases as follows:

(1) Phase one (EFVS 200 operations with aircraft and all equipment serviceable) — objectives:

   (i) understand the operation of equipment required for EFVS 200 operations;

   (ii) understand operating limitations of the installed EFVS;

   (iii) practise the use of HUD or equivalent display systems;

   (iv) practise the set-up and adjustment of EFVS equipment in different conditions (e.g. day and night);

   (v) practise the monitoring of automatic flight control systems, EFVS information and status annunciators;

   (vi) practise the interpretation of EFVS imagery;

   (vii) become familiar with the features needed on the EFVS image to continue approach below the DH;

   (viii) practise the identification of visual references using natural vision while using EFVS equipment;

   (ix) master the manual aircraft handling relevant to EFVS 200 operations including, where appropriate, the use of the flare cue and guidance for landing;
(x) practise coordination with other crew members; and
(xi) become proficient at procedures for EFVS 200 operations.

(2) Phase one of the training should include the following exercises:

(i) the required checks for satisfactory functioning of equipment, both on the ground and in flight;
(ii) the use of HUD or equivalent display systems during all phases of flight;
(iii) approach using the EFVSs installed on the aircraft to the appropriate DH and transition to visual flight and landing;
(iv) approach with all engines operating using the EFVS, down to the appropriate DH followed by a missed approach, all without external visual reference, as appropriate.

(3) Phase two (EFVS 200 operations with aircraft and equipment failures and degradations) — objectives:

(i) understand the effect of known aircraft unserviceabilities including use of the MEL;
(ii) understand the effect of failed or downgraded equipment on aerodrome operating minima;
(iii) understand the actions required in response to failures and changes in the status of the EFVS including HUD or equivalent display systems;
(iv) understand the actions required in response to failures above and below the DH;
(v) practise abnormal operations and incapacitation procedures; and
(vi) become proficient at dealing with failures and abnormal situations during EFVS 200 operations.

(4) Phase two of the training should include the following exercises:

(i) approaches with engine failures at various stages of the approach;
(ii) approaches with failures of the EFVS at various stages of the approach, including failures between the DH and the height below which an approach should not be continued if natural visual reference is not acquired, require either:
(A) reversion to head down displays to control missed approach; or
(B) reversion to flight with downgraded or no guidance to control missed approaches from the DH or below, including those which may result in a touchdown on the runway;
(iii) incapacitation procedures appropriate to EFVS 200 operations;
(iv) failures and procedures applicable to the specific EFVS installation and aircraft type; and
(v) FSTD training, which should include minimum eight approaches.
AMC2 SPO.OP.235(a)(3) EFVS 200 operations

RECURRENT TRAINING AND CHECKING FOR EFVS 200 OPERATIONS

(a) The operator should ensure that the pilots’ competence to perform EFVS 200 operations. To do so, pilots should be trained every 6 months by performing at least two approaches on each type of aircraft operated.

(b) The operator should ensure that the pilots’ competence to perform EFVS 200 operations is checked at each required operator proficiency check by performing at least two approaches on each type of aircraft operated, of which one should be flown without natural vision to 200 ft.

AMC3 SPO.OP.235(a)3) EFVS 200 operations

RECENT EXPERIENCE REQUIREMENTS FOR EFVS 200 OPERATIONS

Pilots should complete a minimum of four approaches using the operator’s procedures for EFVS 200 operations during the validity period of the periodic operator proficiency check unless credits related to currency are defined in the operational suitability data established in accordance with Regulation (EU) No 748/2012.

AMC4 SPO.OP.235(a)(3) EFVS 200 operations

DIFFERENCES TRAINING FOR EFVS 200 OPERATIONS

(a) The operator should ensure that the flight crew members authorised to conduct EFVS 200 operations are provided with differences training or familiarisation whenever there is a change to any of the following:

   (1) the technology used in the flight guidance and flight control system;
   (2) the HUD or equivalent display systems;
   (3) the operating procedures.

(b) The differences training should:

   (1) meet the objectives of the appropriate initial training course;
   (2) take into account the flight crew members’ previous experience; and
   (3) take into account the operational suitability data established in accordance with Regulation (EU) No 748/2012.

AMC5 SPO.OP.235(a)(3) EFVS 200 operations

TRAINING FOR EFVS 200 OPERATIONS

If a flight crew member is to be authorised to operate as pilot flying and pilot monitoring during EFVS 200 operations, then the flight crew member should complete the required FSTD training for each operating capacity.
RECURRENT CHECKING FOR EFVS 200 OPERATIONS

In order to provide the opportunity to practise decision-making in the event of system failures and failure to acquire natural visual reference, the recurrent training and checking for EFVS 200 operations is recommended to periodically include different combinations of equipment failures, go-around due to loss of visual reference, and landings.

OPERATING PROCEDURES FOR EFVS 200 OPERATIONS

(a) For EFVS 200 operations, the following should apply:

1. the pilot flying should use the EFVS throughout the approach;
2. in multi-pilot operations, a suitable display of EFVS sensory imagery should be provided to the pilot monitoring;
3. the approach between the FAF and the DA/H should be flown using vertical flight path guidance;
4. the approach may be continued below the DA/H provided that the pilot can identify on the EFVS image either:
   - the approach light system; or
   - both of the following:
     - the runway threshold identified by the beginning of the runway landing surface, the threshold lights or the runway end identifier lights; and
     - the TDZ identified by the TDZ lights, the TDZ runway markings or the runway lights;
5. a missed approach should be executed promptly if the required visual reference is not distinctly visible and identifiable to the pilot without reliance on the EFVS by 200 ft above the threshold.

(b) Operating procedures for EFVS 200 operations should:

1. be consistent with the AFM;
2. be appropriate to the technology and equipment to be used;
3. specify the duties and responsibilities of each flight crew member in each relevant phase of flight;
4. ensure that flight crew workload is managed to facilitate effective decision-making and monitoring of the aircraft; and
5. deviate to the minimum extent practicable from normal procedures used for routine operations.

(c) Operating procedures should include:
(1) the required checks for the satisfactory functioning of the aircraft equipment, both before departure and in flight;
(2) the correct seating and eye position;
(3) determination of aerodrome operating minima;
(4) the required visual references at the DH;
(5) the action to be taken if natural visual reference is not acquired by 200 ft;
(6) the action to be taken in the event of loss of the required visual reference; and
(7) procedures for balked landing.

d) Operating procedures for EFVS 200 operations should be included in the operations manual.

**AMC1 SPO.OP.235(a)(8) EFVS 200 operations**

**AERODROME OPERATING MINIMA — EFVS 200 OPERATIONS**

When conducting EFVS 200 operations:

(a) the DA/H used should be the same as for operations without EFVS;

(b) the lowest RVR minima to be used should be determined by reducing the RVR presented in:

(1) Table 8 in AMC5 SPO.OP.110 in accordance with Table 1 below for aeroplanes;

(2) Table 12 of AMC6 SPO.OP.110 in accordance with Table 1 below for helicopters;

(c) in case of failed or downgraded equipment, Table 15 in AMC9 SPO.OP.110 should apply.

**Table 1**

<table>
<thead>
<tr>
<th>Operations utilising EFVS: RVR reduction</th>
<th>RVR (m) for EFVS 200 operations</th>
</tr>
</thead>
<tbody>
<tr>
<td>RVR (m) presented in Table 8 in AMC5 SPO.OP.110 or in Table 12 of AMC6 SPO.OP.110</td>
<td></td>
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</table>
AMC1 SPO.OP.235(c) EFVS 200 operations

EVFS 200 WITH LEGACY SYSTEMS UNDER AN APPROVAL

The EVS should be certified before 1 January 2022 as ‘EVS with an operational credit’.

GM1 SPO.OP.235(c) EFVS 200 operations

The competent authority referred to in SPO.OP.235 point (c) is the competent authority for the oversight of the operator, as established in ORO.GEN.105.
AMC1 SPO.IDE.H.120(d) Operations under VFR – flight and navigational instruments and associated equipment

**MULTI-PILOT OPERATIONS**

Two pilots should be considered to be required by the operation if multi-pilot operations are required by one of the following:

(a) the AFM;

(b) at night, the operations manual.

GM1 SPO.IDE.H.120(d) Operations under VFR – flight and navigational instruments and associated equipment

**MULTI-PILOT OPERATIONS ON A VOLUNTARY BASIS — HELICOPTERS OPERATED BY DAY UNDER VFR**

If the AFM permits single-pilot operations, and the operator decides that the crew composition is more than one pilot for day VFR operations only, then point SPO.IDE.H.120(d) does not apply. Additional displays, including those referred to in SPO.IDE.H.120(d), may be required under point SPO.IDE.H.100(e).

AMC1 SPO.IDE.H.125(c) Operations under IFR – flight and navigational instruments and associated equipment

**MULTI-PILOT OPERATIONS**

Two pilots should be considered to be required by the operation if multi-pilot operations are required by one of the following:

(a) the AFM;

(b) the operations manual.