All weather operations
07.09.2022
BREAK back at 15:10

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easa.europa.eu/connect
1. EASA SESSION ON AWO IMPLEMENTATION (50 minutes) 13:00-13:50
   a. Welcome from Safety Promotion (John Franklin - EASA) and Section Manager Air Operations (Micaela Verissimo - EASA)
   b. EASA presentation on AWO implementation manual (Francisco Arenas Senior Expert Air Operations and Project manager RMT.0379 AWO).
   c. Approval of ongoing operations (Bo Eckerbert – Swedish Transport Agency).
   d. Questions and Answer to the Authorities (LBA, AESA, EASA, etc).

Break 13:50 to 14:00
2. STAKEHOLDER SESSION (1h) 14:00-15:00

a. Explanation about the use of previous operational data (Stefano Prola - IATA)
b. Operator’s view on the implementation of AWO (Valentin Minning - DHL)
c. Implementation of EFVS in SBAS operations (David Mcpherson – European Union Agency for the Space Programme).
d. Service provider’s view on the implementation of AWO (Jeppesen, Navblue and LIDO)

Break 15:00 to 15:10.

PANEL DISCUSSION AND QUESTIONS (50 minutes – 1h).

All-weather operations (AWO)

AWO implementation manual

September 2022
Francisco ARENAS ALVARINO
Senior Expert Air Operations & Air Crew Expert.
OPS community

→ Welcome (europa.eu)
→ Draft All Weather Ops Manual | EASA Community (europa.eu)
→ AWO manual
→ AWO implementation manual V0.10 date 06.09.2022 Version CLEAN.pdf (europa.eu)
→ We want your comments.
Questions

→ Concerning Lido charts, will you change the definition of point 3 in eRM general part 1.8.3.4.6.1.3 since the term CMV is not used anymore in the table 9 RVR versus DH/MDH in AMC5 CAT.OP.MPA.110?

→ What minimum RVR does apply to EFVS-L?

→ As EASA AIR OPS operators fly worldwide, how does Jeppesen support such operators with EASA AIR OPS compliant aerodrome operating minima in countries where aerodrome operating minima are determined in different ways or according to other regulations?
Questions 2

→ do you plan to offer to the customer the capability to request for a customization of the minimum RVR in order to cover their EFVS operations?

→ Is it possible for an operator to continue performing actual aerodrome operational assessment forgetting about desktop assessment? (Operator may not have sufficient staff or time to work on those paper
Questions 3

→ If there is no LVO procedures info provided in AIP AD 2.22 for an aerodrome, is an aircraft operator obliged to check whether Low Visibility Procedures are approved at that aerodrome? Do they inform the aerodrome operator they intend to employ an approach such as SA CAT I in advance? In any MS?

→ The new AMC1 SPA.LVO.105(g) requires the operator, in the item (d)(2), to establish indicators that should include "measures of performance of the airborne equipment for low-visibility approaches". Could you please help us by giving some examples of indicators to comply with this?
Question 4

→ As per Gulfstream AFM 02-09-10/EASA AFM 01-34-70: EFVS operations may be conducted till 100 feet above the touchdown zone elevation. To descend below 100 feet HAT, visual cues must be seen without the aid of EVS. Question may it be considered an EFVS 200 operation?

→ To be able to apply AMC9 CAT.OP.MPA182, is flight monitoring mandatory? It says that the operator should as a minimum have it but not that the operator shall have it.
Thank you for your attention!
Performance based aerodrome operating minima
OVERVIEW OVER THE AWO PROJECT:

Total system approach:

**Affected stakeholders and regulations:**

1. Aircraft Operators - Reg. 965/2012 on Air Operations
2. Pilots - Reg.(EU) 1178/2011 on Flight Crew Licensing:
3. ADR operations and infrastructure - Reg.(EU) 139/2014 on Aerodrome safety
4. Aircraft manufacturers - CS–AWO (ED Decision 2022/007/R )
   Airworthiness
Performance based Regulation

- Safety objective in IR
  - ‘technology neutral’.
- Technical requirements in soft-law
  - CS, AMC and GM detailed the required technology.

Total system approach

- Assess the combination of:
  - Aircraft +
  - ground infrastructure +
  - approach minima.
- Requires a cross-domain approach
  - Certification + OPS + FCL + Aerodromes

Regulations affected:
- Air Operations: Reg. 965/2012
- Flight Crew Licensing: Reg.(EU) 1178/2011
- Aerodromes: Reg.(EU) 139/2014
- Airworthiness: CS–AWO

Stakeholders affected:
- Aeroplanes + helicopters: CAT, NCC, NCO & SPA
- ATO
- Aerodromes
- Aircraft manufacturers
Entry into force

→ Original Equipment Manufacturers (TC/STC)


→ Aerodrome regulations + AMC/GM

- 01 August 2022 – easyaccess rules will be updated soon.

→ Air OPS regulation + FCL (removal section 6 Appendix 9)

- 30 October 2022 – easyaccess rules Feb 2022 only IR.
CS-AWO Issue 2

Carl GARVIE
EASA Regulations Officer
Initial Airworthiness Standards and Specifications
Evolution of CS-AWO Initial Issue

Joint Aviation Requirements

JAR-AWO
All Weather Operations

NPA JAR:
• AWO-08
• AWO-09
• AWO-10
• AWO-12

EASA Certification Specifications for All Weather Operations

CS-AWO
Book 1
Airworthiness code
## Building blocks for CS-AWO Issue 2

<table>
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<th>NPA No.</th>
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<td>JAR AWO-11</td>
<td>High Altitude Landing System Performance</td>
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<td>JAR AWO-13</td>
<td>Introduction of Head-Up Guidance Landing System Requirements</td>
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<td>JAR AWO-14</td>
<td>Structural Limit Loads and Lateral Touchdown Performance</td>
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<td>Autobrake for Category 3B and Anti-Skid Issues</td>
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<td>JAR/FAR 25.1329 harmonization plus other points</td>
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<td>JAR AWO-17</td>
<td>Super Fail-Passive Cat 3 Operations and additional Guidance Material</td>
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Building blocks for CS-AWO Issue 2

The following EASA Certification Review Items were incorporated in the interim document:

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<td>Automatic Landing Distance</td>
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<td>GBAS Landing System for Cat 1 Operations</td>
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<td>CRI K-09</td>
<td>Extrapolation of Wind Limits for Autoland Demonstration</td>
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<td>CRI K-XX</td>
<td>Landing Distances using Head-Up Display</td>
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## Original CS-AWO Issue 1 structure

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<td>Airworthiness certification of aeroplanes for operations with decision heights below 60 m (200 ft) down to 30 m (100 ft) – Category 2 operations</td>
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<td>Subpart 3</td>
<td>Airworthiness certification of aeroplanes for operations with decision heights below 30 m (100 ft) or no decision height – Category 3 operations</td>
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<td>Subpart 4</td>
<td>Directional guidance for take-off in low visibility</td>
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New CS-AWO Issue 2 structure

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### New CS-AWO Issue 2 structure

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<td>Section 3</td>
<td>Airworthiness certification of aeroplanes for operations with decision heights below 60 m (200 ft) and down to 30 m (100 ft) – Category 2 operations (CAT II)</td>
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<td>Section 4</td>
<td>Airworthiness certification of aeroplanes for operations with decision heights below 30 m (100 ft) or no decision height – Category 3 operations (CAT III)</td>
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<td>Section 5</td>
<td>Airworthiness certification of aeroplanes for operational credits for visual segment in reduced Runway Visual Range (RRVR)</td>
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New CS-AWO Issue 2 structure

<table>
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<tr>
<th>Subpart C - Take Off</th>
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<tr>
<td>Section 1</td>
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New elements of CS-AWO Issue 2

→ Head-Up Displays (HUD landing systems):
  → Requirements based on JAA NPAs and JAA HUD papers and EASA CRIs
New elements of CS-AWO Issue 2

→ Enhanced Flight Vision Systems (EFVS)
  → Requirements based on FAA AC 20-167B and DO-315B
→ Both EFVS Approach (100ft) and EFVS Landing System (Touchdown)
→ Visual advantage performance provided in the AFM.
New elements of CS-AWO Issue 2

→ Synthetic Vision Guidance System (SVGS)
→ Requirements based on DO-359
→ Combined Vision Systems also included.
New elements of CS-AWO Issue 2

→ Special Authorisation CAT I (SA CAT I)
  → Requirements based on amended CAT II requirements

→ Any specific limitations are provided in the AFM;

→ Example eligible technologies listed in CS-AWO AMC:
  → HUDs (or equivalent displays) with flight guidance that comply with performance requirements;
  → SVGSs that comply with performance requirements;
  → Automatic approach systems combined with a HUD (or equivalent display) to help with the flight path monitoring and control after the DH;
New elements of CS-AWO Issue 2

→ Special Authorisation CAT I (SA CAT I)
  → Requirements based on amended CAT II requirements

→ Example eligible technologies listed in CS-AWO AMC:
  → Automatic landing systems that comply with performance requirements using a CAT I ILS beam model;
  → Automatic landing systems (as above) with a HUD (or equivalent display) to help with the flight path monitoring before and after the DH;
  → Any other flight guidance system that can demonstrate the required performance.
Regulation (EU) 2022/208
All-weather operations (AWO)

Vasileios STEFANIOROS
EASA – Senior Expert, Aerodromes
AWO Webinar – 19 May 2022
Background information

→ Reasons for change
  → Alignment with ICAO Annex 6 and 14 and ICAO Doc 9365 ‘AWO Manual’
  → Support the implementation of AWO by ensuring:
    → availability of appropriate visual and non-visual aids
    → availability of required information
    → implementation of appropriate procedures
Affected rules

Definitions
- Decision altitude/height
- Instrument runway
- Low visibility operations
- Low visibility procedures
- Low visibility take-off
- Operation with operational credits
- Type B instrument approach operation

Part ADR.OR
ADR.OR.C.005
Aerodrome operator responsibilities

Part ADR.OPS
- Subpart A
  - ADR.OPS.A.070
  - ADR.OPS.A.075
  - ADR.OPS.A.080
  - ADR.OPS.A.085
- Subpart B
  - ADR.OPS.B.030
  - ADR.OPS.B.045
The Basic Principle

- LVP
- CAT II/III runways
- RDALT – PATC
- CAT II/III IAP
- CAT II/III navaid

RVR < 550 m
Special Authorization (SA) CAT I

- LVP
- OFZ
- CAT I IAP – OCH 150 ft
- ILS – Unrestricted/not off-set
- GP – $3^0$
- PATC
- CAT II switch over time
- No additional runway lights

RVR < 550 m
Special Authorization (SA) CAT II

- LVP
- OFZ
- CAT II IAP
- ILS – Unrestricted/not off-set
- ILS class II/D/2
- GP – 3°
- PATC
- CAT II switch over time
- RWY CL for RVR less than 400m
EFVS operations

→ EFVS 200
  → operation in which the approach continues without reliance on the pilot’s natural vision to a height not lower than 200 ft above threshold elevation of not lower than 200 ft above threshold elevation and in visibility conditions equivalent to RVR not lower than 550 m

→ EFVS Approach (EFVS-A)
  → operation in which the approach continues without reliance on the pilot’s natural vision to a height above the threshold elevation of lower than 200 ft but not lower than 100 ft above threshold elevation and in visibility conditions equivalent to RVR less than 550 m

→ EFVD Landing (EFVS-L)
  → operation in which the approach continues without reliance on the pilot’s natural vision and any restriction to a height above the threshold elevation and in visibility conditions equivalent to RVR less than 550 m
**EFVS Operations**

**EFVS 200**
- IAP providing at least lateral guidance in which the final approach track is offset by a maximum of 3° from the extended CL of the runway
- Either an OFZ is established or the VSS is not penetrated by obstacles and an instrument departure procedure is established

**EFVS-A**
- Straight-in IAP
- Either an OFZ is established or the VSS is not penetrated by obstacles and an instrument departure procedure is established
- TDZ RVR is available
- LVP
- CAT II/III switch-over times

**EFVS-L**

**EFVS – A**
- ICAO Type A chart
- ICAO PATC
LVP - SMGCS

→ No significant changes
→ Re-arrangement of existing text between IR/AMC/GM
→ No operational changes
Thank you for your attention!
OPS overview

Your safety is our mission.
AWO - OPS main features

→ Introduction of the ICAO concept of “operational credits”
→ Reduction of the operational demonstration for CATII and CATIII
→ Re-draft of the regulation to improve clarity (e.g. CDFA, app ban...).
→ LVO’s Licence Proficiency Checks requirements are move to OPS

AWO – Helicopters main features

→ Enable helicopter IFR point in space (PinS) approaches and departures to destination with little aerodrome infrastructure.
→ Operational credit for helicopter IFR operating under a approval
AWO - Suitability of runways

What is the issue?
→ Removal of the operational demonstration
  → Today each aircraft type and runway-end requires an operational demonstration
  → There are different standards for Certification and for Aerodromes.

Why did we need to change?
→ To improve aerodrome availability
  → Better use of the infrastructure
  → Reduction of the environmental impact – increase the availability of alternate aerodromes.
  → Economic advantage
    → Charter flights and new routes - more flexibility of the airline network
    → Fuel savings related to alternate aerodromes.
→ To prepare the future of new Autoland technologies.
Suitability of runways – Concept:

→ 90% of runways are within the certification assumptions (both for CS-AWO issue 1 and issue 2)
→ New CS-AWO issue 2 will require more transparency
→ New ADR rules will required more transparency
→ Operator’s assessment of aerodrome subject to authority approval

→ What do we do with the other 10%?
→ Use of previous operational data. If not possible:
  → Use other operator’s operational data
  → Use of other aircraft models operational data, subject to manufacturer’s statement
  → Use manufacturer’s computer simulations or Full flight simulator
→ Operational demonstration.
The operator can choose 3 options (or a combination of them) to demonstrate safe operations into an LVO runway:

1. Grandfathering: previous ACFT Operational data and runway combination.
   - Operator’s self operational data or
   - Another operator data with the same ACFT. – IATA can play a role here.

2. Desktop Assessment: Assessment of airport data against AFM data. NEW
   - Includes CS-AWO Issue 2 and CS-AWO Issue 1 (the majority of aircrafts).
   - Allow other OEM data when AFM is not clear or is missing information.
   - Allow alternative procedure when airport data is not available in the AIP.

Suitability of runways – Summary:

→ Assessment of the runways:
  → Desktop analysis (New)
    → compare AFM data with ADR data
  → Previous operational data
  → Operational demonstration

Suitability of runways – Task Force

→ Authorities: Germany + Sweden + France.
→ Manufacturers: Airbus + Boeing.
→ Industry: IATA (IATA personnel + Iberia + Lufthansa group)
Entry into force:  

→ Publication **Implementing rules:**

→ Air OPS and Air Crew → Published Q4/2021 →

→ Reg. (EU) 2021/2237 and Reg. (EU) 2021/2227

→ Aerodromes → published Q1/2022 → Reg. 2022/208.

→ Applicability

→ Air OPS and Air Crew → 30.10.2022

→ Aerodromes → 01.08.2022

→ Publication **AMC&GM** → Q2/2022.
Implementation support

→ Webinar 19.05.2022 (13:00 – 16:30) on All weather operations
  → It will include an OPS, ADR and CT overview.
  → Explanation of the process of suitability of runways.

→ 2nd Webinar 07.09.2022 (13:00 – 16:30) on AWO - Tentative
  → Administrative actions
Back-up slides
NEXT presentation OPS

aerodromes@easa.europa.eu
Entry into force:

→ Publication:
  → Air OPS and Air Crew → Published in 2021 → Reg. 2021/223
  → Aerodromes → published Q1/2022 → Reg. 2022/208

→ Applicability
  → Air OPS and Air Crew → 30.10.2022
  → Aerodromes → 01.08.2022
Draft ED Decision – AMC & GM:

→ Publication → Q2/2022.
→ Combined Decisions
  → Air OPS + Air Crew + Aerodromes

→ Changes since Opinion 02/2021:
  → Small changes as a consequence of the EASA committee’s comments.
  → One AMC related to Line checkers.
  → Comprehensive change in AMCs SPA.LVO.110 as a consequence of work to address the topic of suitability of runways.

Note: publication of CS-AWO issue 2 was 1Q/2022
Expected aerodrome conditions (e.g. elevation, ambient temperature, touchdown zone slope and ground profile under the approach path) shall be considered and appropriate limitations entered in the AFM. (See AMC AWO.A.ALS.106, paragraph 5)
The aeroplane flight manual (AFM) shall contain the limitations, procedures and other information pertinent to the operation of the automatic landing system and shall include the following appropriate to the use for which the particular system has been certified:

(a) the approved limits established as a result of consideration of the factors listed in CS AWO.A.ALS.106(a) and CS AWO.A.ALS.106(a);  
(b) the approved limits established as a result of consideration of any other factor that the certification has shown to be appropriate;  
(c) the normal and abnormal procedures, including airspeeds;  
(d) the minimum required equipment;  
(e) any additional aeroplane performance limitations (see CS AWO.A.ALS.109);  
(f) the type of xLS navigation means (facilities external to the aircraft) and associated limitations (if any) which have been used as the basis for certification (see AMC AWO.A.ALS.113(f)); and  
(g) runway or airport conditions, including:  
   (1) runway elevation;  
   (2) approach path slope;  
   (3) touchdown zone slope;  
   (4) ground profile under the approach path.
1.3 In accordance with CS AWO.A.ALS.107, the effects of aerodrome conditions (e.g. elevation, ambient temperature, touchdown zone slope and ground profile under the approach path) are to be investigated and, if necessary, appropriate limitations derived for inclusion in the AFM. For the purposes of this assessment, the touchdown zone slope is considered to be the slope of the runway between threshold up to 900 m from the runway threshold. Guidance is given in paragraph 5.
Performance demonstration

5.2 Ground profile

5.2.1 Where use is made of height above ground indicators that depends on the ground profile (such as radio-altimeter signals) in the automatic landing system, any effects of the ground profile before the runway or along the runway on the performance of the system should be examined.

5.2.2 The family of profiles to be investigated should take due account of the way in which the system uses the height above ground indicator (such as radio-altimeter signals) at different heights on the approach. Terrain and runway up slopes, down slopes and other terrain irregularities should be investigated.

Note: Information on the characteristics of aerodromes is contained in ICAO Annex 14. The examination of a number of aerodromes used for automatic landing has shown that the following features may be encountered:

a. sloping runway – slopes of 0.8 %;

b. hilltop runway – 12.5 % slope up to a point 60 m prior to the threshold; or

C. sea-wall – 6 m (20 ft) step up to threshold elevation at a point 60 m prior to the threshold.
5.2.3 Performance demonstration on a particular runway

The acceptable average values for probabilities of exceedance limits of CS-AWO.ALS.106 provided in paragraph 1.4 consider all possible runways where the aircraft can be operated. When considering a particular aerodrome some factors identified in paragraphs 1.2 and 1.4 are known (e.g. altitude, runway length, specific ILS characteristics, touchdown zone and pre-runway threshold longitudinal profile, etc.). In order to assess adequate performance on a particular runway, limit risks can be used as success criteria, having all other parameters varying within their approved limits unless specific restrictions apply to this runway.
The aeroplane flight manual (AFM) should define the categories of xLS ground facilities, or space facilities (if applicable), which have been used as the basis for certification. The AFM may also contain a statement on the possible usage of automatic landing on lower categories of xLS ground facilities, or space facilities (if applicable).