



# Terms of Reference

for rulemaking task RMT.0708

## Prevention of controlled flight into terrain with helicopters and helicopter terrain awareness and warning systems

ISSUE 1

### Issue/rationale

Terrain and obstacle conflict is the second priority key risk area for helicopter offshore operations (HOFO), although equipment that is now fitted to helicopters that conduct these operations will significantly mitigate the risk of this outcome. Obstacle collisions is the second most common accident outcome in the helicopter commercial air transport (CAT) domain. This highlights the challenges of helicopter emergency medical service (HEMS) operations and their limited selection and planning for landing sites. Terrain and obstacle conflict is the most common risk for specialised operations (SPO).

This RMT intends to mitigate these risks by establishing the conditions to install and use helicopter terrain awareness and warning systems (HTAWSs) and other CFIT prevention means.

<b>Action area:</b>	Rotorcraft operations		
<b>Affected rules:</b>	Commission Regulation (EU) No 965/2012; Related AMC and GM material to Annex I (Definitions), Annex II (Part-ARO), Annex III (Part-ORO), Annex IV (Part-CAT), Annex V (Part-SPA), Annex VI (Part-NCC), Annex VII (Part-NCO) and Annex VIII (Part-SPO); CS-27, CS-29, CS-MMEL, and CS-GEN-MMEL.		
<b>Affected stakeholders:</b>	Helicopter operators; helicopter manufacturers; manufacturers of avionics and electronic components; software and database providers; national aviation authorities (NAAs)		
<b>Driver:</b>	Safety	<b>Rulemaking group:</b>	Yes
<b>Impact assessment:</b>	Light	<b>Rulemaking Procedure:</b>	Standard

• EASA rulemaking process milestones



## 1. Why we need to change the rules — issue/rationale

Having helicopters fitted with helicopter terrain awareness and warning systems (HTAWS) is expected to prevent between 8.5 and 11.5 controlled flight into terrain (CFIT) accidents with fatalities or severe injuries within 10 years (medium safety improvement). This rulemaking task (RMT) will consider mandating the installation of HTAWSs on board helicopters for certain operations.

This RMT may consider mandating HTAWSs to be forward-fitted on helicopters operated onshore, as currently mandated for offshore. This RMT should only mandate HTAWSs to be retrofitted on the current fleet if HTAWS standards are improved. An appropriate impact assessment for retrofitting will need to be further developed.

Based on the preliminary cost-effectiveness analysis, HTAWSs are not to be considered for the following operations: non-commercial operations with other than complex motor-powered aircraft (NCO), specialised operations (SPO), and commercial air transport (CAT) with small helicopters in visual flight rules (VFR) operations (night and day).

This RMT will also consider other CFIT prevention measures.

This RMT will also consider an update of the night-vision imaging systems (NVIS) regulations and their extension to helicopter operators not involved in CAT.

### Related safety issues

The following safety recommendations (SRs) from aircraft accident investigation reports published by the designated safety investigation authority<sup>1</sup> will be considered during the development of this RMT. New SRs related to this task may be considered after the publication of this ToR, where appropriate.

#### **UK AAIB recommendation 2014-034**

‘It is recommended that the European Aviation Safety Agency assess whether mandating the use of Helicopter Terrain Awareness and Warning Systems compliant with Technical Standard Order C194 or European Technical Standard Order C194 would provide safety benefits for helicopter operations within Europe.’

Related to the accident that occurred on 16 January 2013 in central London involving the A109E helicopter registered G-CRST

#### **UK AAIB recommendation 2016-013**

‘It is recommended that the European Aviation Safety Agency requires the installation of Helicopter Terrain Awareness Warning Systems to all helicopters, used in offshore Commercial Air Transport operations, with a Maximum Certificated Take-off Mass (MCTOM) of more than

<sup>1</sup> Regulation (EU) No 996/2010 of the European Parliament and of the Council of 20 October 2010 on the investigation and prevention of accidents and incidents in civil aviation and repealing Directive 94/56/EC (OJ L 295, 12.11.2010, p. 35) (<http://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1479716039678&uri=CELEX:32010R0996>).

3,175 kg, or a Maximum Operational Passenger Seating Configuration (MOPSC) of more than nine, manufactured before 31 December 2018.'

Related to the accident that occurred on 23 August 2013 on approach to Sumburgh airport involving the AS332 helicopter registered G-WNSB.

#### **NTSB A06-19 addressed to the FAA**

'Require all existing and new U.S.-registered turbine-powered rotorcraft certificated for six or more passenger seats to be equipped with a terrain awareness and warning system.'

Related to the accident that occurred on 23 March 2004 in the Gulf of Mexico involving the S-76A++ helicopter registered N579E.

Other SRs are related to the improvement of HTAWS standards, such as UK AAIB 2011-058, -059, -061 and -062.

'It is recommended that the European Aviation Safety Agency requires that crews of helicopters, fitted with a Terrain Awareness and Warning System, be provided with an immediate indication when the system becomes inoperative, fails, is inhibited or selected off.

It is recommended that the European Aviation Safety Agency reviews the acceptability of crew-operated on/off controls which can disable mandatory helicopter audio voice warnings.

It is recommended that the European Aviation Safety Agency ensures that helicopter performance is taken into consideration when determining the timeliness of warnings generated by Helicopter Terrain Awareness and Warning Systems.

It is recommended that the European Aviation Safety Agency reviews the frequency of nuisance warnings generated by Terrain Awareness and Warning System equipment in offshore helicopter operations and takes appropriate action to improve the integrity of the system.'

The above are related to the accident that occurred on 18 February 2009 in the North Sea involving the EC225LP helicopter registered G-REDU.

There are no exemptions pertinent to the scope of this RMT.

There are no alternative means of compliance (AltMoC) pertinent to the scope of this RMT.

This RMT will consider the UK CAA CAP 1519 guidance document and UK CAA CAP 1538 research report, as well as any other related research document.

This RMT will consider any relevant industry standard, including the one under development by EUROCAE Working Group 110.

#### **ICAO and third-country references relevant to the content of this RMT**

ICAO Annex 6 part III 3 Section II recommendation 4.4.4, applicable to commercial air transport, shall be taken into consideration.



'A helicopter when operating in accordance with IFR and which has a maximum certificated take-off mass in excess of 3 175 kg or a maximum passenger seating configuration of more than 9 should be equipped with a ground proximity warning system which has a forward-looking terrain avoidance function.'

## 2. What we want to achieve — objective

The overall objectives of the EASA system are defined in Article 1 of Regulation (EU) 2018/1139<sup>2</sup> (Basic Regulation). This project will contribute to the achievement of the overall objectives by addressing the issues outlined in Chapter 1.

The specific objective of this proposal is to consider mandating equipment and functions that will increase the situational awareness of the pilot, prevent CFIT accidents, and improve safety.

The following aspects will be considered:

- HTAWS and any related functions derived from aeroplane TAWS, including any helicopter terrain awareness warning (H-TAW) and helicopter flight envelope warning (H-FEW) functions.
- Other technologies focusing on increasing the situational awareness of the pilot, including moving maps with obstacle databases.
- Improve situational awareness by enabling the use of NVIS by non-CAT operators.
- Training elements, related to the adoption of such technologies, or as a substitute to their adoption, may also be considered.

## 3. How we want to achieve it

### 3a. Certification issues

EASA, with the support of any required consultative workshops, will conduct the following activities:

- Consider the work conducted by EUROCAE Working Group 110.
- Draft amendments to CS-27 and CS-29 to incorporate any particular certification provisions for H-TAW and H-FEW functions or to establish any acceptable means of compliance (AMC) in order to assist applicants in the integration of HTAWS within their designs, as necessary.
- Draft new or amend existing European Technical Standard Orders (ETSOs) for H-TAW and H-FEW functions, as necessary

### 3b. Operational issues

A rulemaking group will be established and will be tasked with the following activities:

- Review the current helicopter operating rules.
- Review the reference documents listed in Section 8.3.

---

<sup>2</sup> Regulation (EU) 2018/1139 of the European Parliament and of the Council of 4 July 2018 on common rules in the field of civil aviation and establishing a European Union Aviation Safety Agency, and amending Regulations (EC) No 2111/2005, (EC) No 1008/2008, (EU) No 996/2010, (EU) No 376/2014 and Directives 2014/30/EU and 2014/53/EU of the European Parliament and of the Council, and repealing Regulations (EC) No 552/2004 and (EC) No 216/2008 of the European Parliament and of the Council and Council Regulation (EEC) No 3922/91 (OJ L 212, 22.8.2018, p. 1) (<https://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1536149403076&uri=CELEX:32018R1139>).

- Consider the work conducted by EUROCAE Working Group 110.
- Draft new requirements as necessary to improve the situational awareness of the pilot.
- Draft new operational requirements as necessary to provide cost-effective helicopter terrain awareness, including the use of NVIS, H-TAW and H-FEW functions.
- Draft amendments to CS-MMEL and CS-GEN-MMEL addressing any equipment or function introduced in the new operational requirements.
- Consider pilot training as an alternative to additional equipment and functions.
- Develop an impact assessment (IA), using the helicopter preliminary impact assessment (PIA) as a starting point.
- Develop a notice of proposed amendment (NPA) including, as appropriate, amendments to Commission Regulation (EU) No 965/2012, CS-MMEL and CS-GEN-MMEL and related AMC and GM.

#### 4. What are the deliverables

Following certifications activities and the work of the rulemaking group, the following deliverables will be produced:

- an NPA containing amendments to Commission Regulation (EU) No 965/2012 and related AMC and GM, and amendments to CS-MMEL, CS-GEN-MMEL, CS-ETSO, CS-27 and CS-29 and related AMC and GM, as necessary;
- an Opinion containing the draft new/amended implementing rules; and
- a Decision containing the new/amended CSs, AMC and GM.

#### 5. How we consult

A public consultation on the published NPA will take place in accordance with Article 7 of the Rulemaking Procedure<sup>3</sup>.

During the drafting of the certification aspects of the NPA, EASA may, as required, organise stakeholder engagement events/workshops to receive feedback on any proposed amendments to the CSs and associated AMC.

#### 6. Interface issues

This RMT will be linked with RMT.0325 (OPS.057(a)) & RMT.0326 (OPS.057(b)) 'Helicopter emergency medical services performance and public interest site'<sup>4</sup>. The draft new/amended implementing rules will be included in the Opinion that will be produced for RMT.0325 (OPS.057(a)) & RMT.0326 (OPS.057(b)) 'Helicopter emergency medical services performance and public interest site'.

<sup>3</sup> EASA is bound to follow a structured rulemaking process as required by Article 115(1) of Regulation (EU) 2018/1139. Such a process has been adopted by the EASA Management Board (MB) and is referred to as the 'Rulemaking Procedure'. See MB Decision No 18-2015 of 15 December 2015 replacing Decision 01/2012 concerning the procedure to be applied by EASA for the issuing of opinions, certification specifications and guidance material (<http://www.easa.europa.eu/the-agency/management-board/decisions/easa-mb-decision-18-2015-rulemaking-procedure>).

<sup>4</sup> <https://www.easa.europa.eu/document-library/terms-of-reference-and-group-compositions/rmt0325-ops057a-rmt0326-ops057b>



## 7. Profile and contribution of the rulemaking group

A rulemaking group will be established for operational issues. The tasks of the rulemaking group are defined in Section 3b.

Profile of the rulemaking group and its members:

- pilot experience in CAT, NCC or SPO operations;
- helicopter flight operations management experience;
- performance-based risk management experience;
- experience in the oversight of helicopter operators;
- competent authority (CA) oversight experience;
- extensive knowledge of helicopter avionics systems, equipment or software, including any system or function in charge of increasing the situational awareness of the pilot;
- extensive knowledge of the ICAO Standards and Recommended Practices (SARPs) and EU regulatory framework;
- experience in the performance-based regulatory framework;
- experience in risk assessment and knowledge of the related methodology.

The rulemaking group should have a balanced representation of NAAs, air operators, pilot associations, and manufacturers representing different types of operations relevant to the topic.

## 8. Reference documents

### 8.1. Affected regulations

- Commission Regulation (EU) No 965/2012 of 5 October 2012 laying down technical requirements and administrative procedures related to air operations pursuant to Commission Regulation (EU) No 216/2008 of the European Parliament and of the Council (OJ L 296, 25.10.2012, p. 1)

### 8.2. Affected decisions

- Decision N°2012/015/Directorate R of the Executive Director of the Agency of 24th October 2012 on Acceptable Means of Compliance and Guidance Material to Commission Regulation (EU) No 965/2012 of 5 October 2012 laying down technical requirements and administrative procedures related to air operations pursuant to Regulation (EC) No 216/2008 of the European Parliament and of the Council ‘Guidance Material to Annex I — Definitions’
- Decision 2014/025/R of the Executive Director of the Agency of 28 July 2014 adopting Acceptable Means of Compliance and Guidance Material to Part-ARO of Regulation (EU) No 965/2012 and repealing Decision 2014/014/R of the Executive Director of the Agency of 24 April 2014 ‘AMC and GM to Part-ARO — Issue 3’
- Decision 2014/017/R of the Executive Director of the Agency of 24 April 2014 adopting Acceptable Means of Compliance and Guidance Material to Part-ORO of Regulation (EU) No 965/2012 and repealing Decision 2012/017/R of the Executive Director of the Agency of 24 October 2012 ‘AMC and GM to Part-ORO — Issue 2’



- 
- Decision 2014/015/R of the Executive Director of the Agency of 24 April 2014 adopting Acceptable Means of Compliance and Guidance Material to Part-CAT of Regulation (EU) No 965/2012 and repealing Decision 2012/018/R of the Executive Director of the Agency of 24 October 2012 ‘AMC and GM to Part-CAT — Issue 2’
  - Decision N°2012/019/Directorate R of the Executive Director of the Agency of 24th October 2012 on Acceptable Means of Compliance and Guidance Material to Commission Regulation (EU) No 965/2012 of 5 October 2012 laying down technical requirements and administrative procedures related to air operations pursuant to Regulation (EC) No 216/2008 of the European Parliament and of the council ‘Acceptable Means of Compliance and Guidance Material to Part-SPA’
  - Decision N° 2013/021/R of the Executive Director of the European Aviation Safety Agency of 23 August 2013 adopting Acceptable Means of Compliance and Guidance Material for Non-commercial operations with complex motor-powered aircraft (Part-NCC)
  - Decision N° 2014/016/R of the Executive Director of the agency of 24 April 2014 adopting Acceptable Means of Compliance and Guidance Material to Part-NCO of Regulation (EU) No 965/2012 and repealing Decision 2013/022/R of the Executive Director of the Agency of 23 August 2013 ‘AMC and GM to Part-NCO — Issue 2’
  - Decision 2014/018/R of the Executive Director of the agency of 24 April 2014 adopting Acceptable Means of Compliance and Guidance Material to Part-SPO of Regulation (EU) No 965/2012 ‘AMC and GM to Part-SPO’
  - Decision N°2014/019/R of the Executive Director of the Agency of 24 April 2014 adopting Guidance Material to Regulation (EU) No 965/2012 ‘GM to Regulation (EU) No 965/2012’
  - Decision 2014/004 of the executive director of the Agency of 31 January 2014 adopting Certification Specifications and Guidance Material for Master Minimum Equipment List ‘CS-MMEL - Initial issue’
  - Decision 2014/005 of the executive director of the Agency of 31 January 2014 adopting Certification Specifications and Guidance Material for Generic Master Minimum Equipment List ‘CS-GEN-MMEL — Initial issue’
  - Executive Director Decision 2003/15/RM of 14 November 2003 amending Certification Specifications and Acceptable Means of Compliance for Small Rotorcraft (« CS-27 »)
  - Executive Director Decision 2003/16/RM of 14 November 2003 amending Certification Specifications and Acceptable Means of Compliance for Large Rotorcraft (« CS-29 »)
  - Decision 2003/010/RM of the Executive Director of the European Aviation Safety Agency of 24 October 2003 on certification specifications, including airworthiness codes and acceptable means of compliance, for European Technical Standard Orders (« CS-ETSO »)



### 8.3. Reference documents

HTAWS-related documents:

- ICAO Annex 6 Part III - International Operations — Helicopters
- TSO C-194 and ETSO C-194 — Helicopter Terrain Awareness and Warning System (HTAWS)
- RTCA DO 309 — Minimum Operational Performance Standards (MOPS) for Helicopter Terrain Awareness and Warning System (HTAWS) Airborne Equipment
- RTCA DO 367— Minimum Operational Performance Standards (MOPS) for Terrain Awareness and Warning System (HTAWS) Airborne Equipment
- CAP 1519 — Offshore Helicopter Terrain Awareness Warning System Alert Envelopes
- CAP 1538 — Class A Terrain Awareness Warning System (TAWS) for Offshore Helicopter Operations
- any MOPS or ED document resulting from the work of the EUROCAE Working Group 110

Safety promotion material related to avoiding and escaping IMC conditions in VFR:

- EHEST Flight Instructor Guide, 2015
- EHEST HE4 Single Pilot Decision Making, 2012
- EHEST HE3 Helicopter Off Airfield Landing Site Operations, 2012
- EHEST HE2 Helicopter Airmanship, 2011
- EHEST HE1 Safety Considerations, 2011

Safety publications related to wire strikes:

- EHEST Flight Instructor Guide, 2015
- EHEST HE 7 Techniques for Helicopter Operations in Hilly and Mountainous Terrain, 2014
- EHEST HE4 Single Pilot Decision Making, 2012
- EHEST HE3 Helicopter Off Airfield Landing Site Operations, 2012
- Helicopter Association International (HAI) 'Surviving the Wires Environment' video

Safety publications related to the management of automation and flight path monitoring:

- HE9 Automation and Flight Path Management, 2015

