



EUR 297-21/WG110-21

RTCA Paper No.260-21/SC237-018

Summary of the

EUROCAE Working Group 110/ RTCA SC 237 (Meeting 11)

Helicopter Terrain Awareness Warning Systems (HTAWS) for Onshore Operations

**DATE:** 28<sup>th</sup> - 30<sup>th</sup> September 2021

**PLACE:** Webex

**CONTACT:**

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**ATTENDEES:**

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The following people attended all or part of the webex:

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## 1 Introductions

Mike Deer (MD) welcomed everyone to the meeting. As there were several new members a round of introductions was conducted. Yasuo Ishihara (YI) was unable to attend the meeting due to administrative issues.

## 2 IPR/Membership Callouts and Introductions

Rebecca Morrison (RM) showed the mandatory slides which explain the obligations of members and covered administrative aspects of the meeting. Sebastian Reschenhofer (SR) was not present at the start of the meeting, so RM stated that EUROCAE placed similar obligations on members.

## 3 Previous Meeting Minutes

Actions arising from the previous meetings were discussed. Actions 10.1 and 10.4 were still open and required further work. The Minutes from Meeting 10 were accepted with minor corrections.

Action Reference	Action	By Whom	By Date
10.1	The Group to review DO-309	Group	By next meeting
10.2	Contact HAI and EHA to request operation support/guidance.	Sikorsky (SS) HeliOffshore (SOC)	Closed

10.3	Identify relevant onshore accident and incident data and share with the Group.	UK CAA (MP)	Closed
10.4	Review flight data for Onshore applicability	Sikorsky (RE)	By next meeting

#### 4 Terms of Reference

MD stated that the TORs for Onshore HTAWS MOPS had been accepted by the RTCA PMC and the EUROCAE TAC and Council.

#### 5 Update on HTAWS Rule Making Tasks

Dave Howson (DH) provided an update on how the UK CAA intends to implement Offshore HTAWS in the UKCS as part of their 2022 rulemaking programme. The current UK/EASA operational regulations for Offshore HTAWS mandates Class A HTAWS for aircraft with a CofA after 31 December 2018, but does not define Class A HTAWS. The CAA intends to define a Class A HTAWS as having the functionality shown in CAP 1519 or ED-285/DO-376 compliant equipment, when available. It was clarified that the UK CAA is considering mandating Mode 7 as opposed to optional implementation defined in ED-285/DO-376. Additionally, the UK CAA intends to require the functionality to be retrofitted to all offshore helicopters currently equipped with HTAWS, notwithstanding the date of their initial CofA. He requested feedback from the helicopter and HTAWS equipment OEMs on the proposal, especially regarding feasibility, timescales and costs. He requested responses (directly to DH) by the 15<sup>th</sup> October 2021 in order to feed into the rule-making timetable. He acknowledged that some information would be commercially sensitive and so stated that responses would be treated as commercial in confidence.

OEMs provided an update of implementation of software changes to the Mark XXII HTAWS. OEMs indicated that Mode 7 was not part of the current implementation strategy.

Raffaele Di Caprio (RDC) informed the Group that there has been no recent activity by the Ops RMT working on Prevention of CFIT. EASA had issued an NPA (NPA 2021-07)

covering an ETSO for ED-285 compliant HTAWS (ETSO-2C522). The EASA HTAWS Certification Memo (CM-FT-004) issued in 2019 permits the use of the CAP 1519 alerting envelopes.

Charisse Green (CG) stated that the FAA has no plans to publish a TSO to complement DO-376.

Travis Brooks (TB) stated that there was no HTAWS update from Transport Canada.

#### **Action 11.1**

**UK CAA (DH) to provide a list of questions, with a detailed request for feedback on the UK CAA's proposal for Offshore HTAWS. The Secretary will add the list as an Appendix to the Minutes.**

**Date - Email sent on 29 Sep 2021 and again on 5 October and attached to these Minutes - Closed**

#### **6 Safety Data**

Mark Prior (MP) gave a summary of the safety data previously supplied to the Group in an Excel spreadsheet. Globally there are a large number of accidents characterised as CFIT, but many are the result of loss of control (LOC-I) in IMC by VFR pilots. There are also a number of relevant LOC-I accidents and incidents, where the loss of control occurred on final approach, or shortly after take-off. In many cases, loss of airspeed was the precursor to the LOC-I, and so variants of Modes 3B and 7A might provide appropriate protection.

Bob Endrizzi (BE) gave an update on Sikorsky's analysis of accident and HUMS/FDM data.

Philippe Dugourd (PD) explained that as a HEMS operator his biggest safety issue was the high nuisance alert rate with the FLTA mode. A number of other members supported the comment that the FLTA (DO-309) function was a source of nuisance alerts.

A discussion followed on how the Group's work should be bounded, as not all overland operations could be covered without compromising the effectiveness of the system. It was agreed that initially work should be limited to point-to-point operations, such as corporate and HEMS operations, and then expanded at a later date, if feasible.

The Classic Modes in ED-285/DO-376 will be used as the starting point for the alerting envelopes and adjusted based on onshore operations, accident, and flight data.

Questions were raised over the reliability of the FLTA Mode and how recommendations on improving the DO-309 MOPS would be made. As the Honeywell representatives were absent for most of the meeting, it was agreed to defer detailed discussion on the DO-309 MOPS until the next meeting. Mikaela Lokatt (ML) offered to present at the next meeting on the issues associated with FLTA Modes. It was reiterated that the scope of this WG is only to make recommendations for improvement to DO-309.

#### **Action 11.2**

**Saab (ML) to produce a presentation on the issues associated with implementing a FLTA Mode.**

**Date – at next meeting**

Secretary's Note – Include as an agenda item for Meeting 12.

Other HTAWS manufacturers were also encouraged to share any issues they have experienced with FTLA based on DO-309.

#### **7 Inputs/Data Needed for Onshore Modes**

Firstly, the Group reviewed the EASA presentation from September 2020 developed by RMT.0708, which identified how Classic Modes could be applicable to onshore for VFR/Night VFR/IFR.

A discussion followed on the applicability of the various modes for day and night operations. The need for desensitised envelopes for day or certain operations was also discussed. The individual modes and considerations were then discussed.

### **7.1 Mode 1**

The ED-285/DO-376 Mode 1 Envelopes were reviewed. There was a general concern that the Offshore Mode 1 Caution and Warning might have a high nuisance alert rate for certain types of approach and so airframe OEMs were requested to review the Mode 1 Envelopes against product performance.

#### **Action 11.3**

**All airframe OEMs to review the ED-285/DO-376 Mode 1 Caution and Warning Envelopes against their product performance. In particular:**

- **nuisance alerts due to onshore terrain compared to an offshore surface;**
- **nuisance alerts from higher angle LPV approaches.**

### **7.2 Mode 2**

Mode 2 is designed to warn of rising ground, although some installations inhibit Mode 2 when the FLTA Mode is operational. Mode 2 was not required for Offshore HTAWS as the surface is flat with no rising ground. It was identified that Mode 2 should not be a replacement for DO-309 FLTA.

Again, there were concerns over the nuisance alert rate, although this would be mitigated if the mode was inhibited when the FLTA Mode was active. There was a general desire to integrate Mode 2 with the FLTA (DO-309) Mode. Again, some members expressed a concern over how the Group could improve the DO-309 MOPS in order to provide an effective Onshore HTAWS with a low nuisance alert rate. It was agreed to defer further discussions on the topic until after the Saab FLTA presentation at the next meeting and Honeywell are able to participate.

### **7.3 Mode 3**

It was generally felt that Mode 3A and 3B could be useful for onshore operations, this was supported by the EASA presentation. The airframe OEMs were requested to verify the ED-285/DO-376 Mode 3A and 3B envelopes against their product performance and profiles.

#### **Action 11.4**

**All airframe OEMs to review the ED-285/DO-376 Mode 3 Envelopes against their product performance and certified take-off profiles.**

### **7.4 Mode 4 A/B**

It was agreed that Mode 4A would not be applicable for helicopters with fixed undercarriage. For helicopters with a retractable undercarriage, the Mode 4A alert in ED-285/DO-376 had been raised to take account of typical offshore helideck heights and so provide an effective warning time offshore when a gear-up approach was made. For onshore operations, the Mode 4A/B Envelopes should be set where they are applicable for typical missions, such as HEMS. However, they should not be set at a height where they could conflict with other alerts or standard profile callouts, such as existing gear extension call-out, 200ft for a CAT 1 ILS, or the aircraft fixed Mode 6 callouts between 100 and 160ft.

### **7.5 Mode 5**

As with ED-285/DO-376, Mode 5 could be expanded to include LPV approaches. There was agreement that the text in ED-285/DO-376 could be read-across to the onshore MOPS.

### **7.6 Mode 6**

The fixed height callouts currently included in Mode 6 were required by some ops regulations and so could not be removed at this time, even though evidence indicated that they were of minimal use. DH noted that, for offshore HTAWS, UK CAA would consider modifying the ops rule mandate for the callouts when expanding the HTAWS mandate such that the callouts would not be required where Mode 4 functionality is available; the same approach could be adopted for onshore HTAWS. When modifying other modes, in

particular Mode 4A, it should be confirmed that there is no conflict between the alerting envelopes.

### **7.7 Mode 7**

Modes 7A and 7B are both aircraft specific envelopes. CAP 1538 showed the data for offshore helicopter operations was confined to a limited range of aircraft mass and density altitudes, so fixed envelopes could provide effective warning times whilst keeping the nuisance alert rate to an acceptable level.

Onshore operations will cover a wider range of aircraft mass and density altitudes and so it is probable that the system will have a greater reliance on envelope data to vary the Mode 7A envelope based on operating environment to avoid nuisance alerts. BE showed the S92 Mode 7A data and suggested that if a delta torque margin was used by Onshore Mode 7A to generate an alert, then the MOPS might have to provide increased guidance on developing the protection envelope. In addition, fewer onshore helicopters are equipped with FDM and so similar data to that used in CAP 1538 is unlikely to be available. DH did point out that if the data were available, then CAP 1519 did include a wide range of Mode 7A envelopes which could be installed on a regional basis. BE agreed to review the Mode 7A/B and Mode 1 envelopes and present Sikorsky data at the next meeting.

#### **Action 11.5**

**Sikorsky to review Mode 7A/B and Mode 1 alerting for presenting at the next meeting.**

#### **Date- By next meeting**

It was stated that the accident data should be used to drive the implementation of the different Modes. It was agreed that all Group Members should review the available accident data and assess the benefits of the various alert envelopes.

#### **Action 11.6**

**The Group to review the available accident data and assess the benefits of the alert envelopes.**

## **Date- By next meeting**

### **8 Review of the General MOPS Section**

It was agreed that a lot of the ED-285/DO-376 text can be read-across into the Onshore MOPS. However, when the Onshore Envelopes are refined, it will be necessary to check the imported text to confirm it is still applicable.

The General Section was reviewed briefly.

### **9 Delivery Schedule**

The Group agreed that they were still on track to complete the MOPS by June 2023 for submission to EUROCAE/RTCA. Publication is aimed at September 2023.

### **10 Dates and Location of Future Meeting**

It was decided that the next meeting would take place 1<sup>st</sup>-3<sup>rd</sup> February 2022. Due to the ongoing uncertainty over travel and budgets, it was agreed that a decision would be made in December 2021 whether the meeting would be virtual, in person, or a hybrid configuration. A survey will be provided to members in December.

### **11 Any Other Business**

Nil

### **12 Close**

The meeting closed on the 30<sup>th</sup> September 2021.

### 13 Decisions and Actions

The following actions were raised during the meeting:

Action Reference	Action	By Whom	By Date
11.1	To provide a detailed request for feedback on the UK CAA's proposal for Offshore HTAWS. The Secretary will add the list as an Appendix to the Minutes.	UK CAA (DH)	Closed
11.2	To produce a presentation on the issues associated with implementing a FLTA Mode.	Saab (ML)	At next meeting
11.3	All airframe OEMs to review the ED-285/DO-376 Mode 1 Caution and Warning Envelopes against their product performance.	Airframe OEMs	By next meeting
11.4	All airframe OEMs to review the ED-285/DO-376 Mode 3 Envelopes against their product performance and certified take-off profiles.	Airframe OEMs	By next meeting
11.5	<b>Sikorsky to review Mode 7A/B and Mode 1 alerting for presenting at the next meeting.</b>	Sikorsky (BE)	By next meeting
11.6	The Group to review the available accident data and assess the benefits	All Group Members	By next meeting

	of the alert envelopes.		
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The following actions are still outstanding from Meeting 10

Action Reference	Action	By Whom	By Date
10.1	The Group to review DO-309	Group	By next meeting
10.4	Review flight data for Onshore applicability	Sikorsky (BE)	By next meeting

Mark Prior

Secretary, SC 237/WG-110

## Appendix 1: Request for Feedback from the UK CAA on Their Plans for Implement Offshore HTAWS

Internal UK CAA approval has been granted to amend the mandate in the UK air operating rules for HTAWS for offshore helicopter operations. The air operating rules (SPA.HOFO.160 (c)) currently state:

(c) *Helicopter terrain awareness warning system (HTAWS)*

Helicopters used in CAT operations with a maximum certificated take-off mass of more than 3 175 kg or a MOPSC of more than 9 and first issued with an individual CofA after 31 December 2018 shall be equipped with an HTAWS that meets the requirements for class A equipment as specified in an acceptable standard.

It is proposed that the rule be extended to include “all HTAWS-equipped aircraft”. Most offshore helicopters in operation in the UK are HTAWS equipped – Mode 6 provides the mandatory (CAT.IDE.H.145) height callouts; the rest of the functionality is currently optional for aircraft outside of the current applicability.

There is currently no formal definition for “*class A equipment as specified in an acceptable standard*”; it is proposed that this aspect be covered in a new AMC1 SPA.HOFO.160 (c):

- HTAWS providing the CAP 1519 alert envelope functionality (e.g. Honeywell Mk XXII EGPWS with -036 software) will be considered acceptable for retrofit to existing aircraft and for new aircraft until ED-285/DO-376 HTAWS is available. AMC and/or GM text will be drafted to cover the CAP 1519 functionality which may include Mode 7.
- ETSO-2C522 covering ED-285/DO-376 obviously represents an acceptable standard. In view of the strong objective evidence available, it is likely that the “optional” Mode 7a will be required in the UK version of ETSO-2C522 (UK TSO-2C522).

Timescales are obviously a key issue. In order to set targets that reflect the significant safety benefits expected but are also realistic, UK CAA is seeking industry input as follows:

1. HTAWS OEMs: What are your timescales and costs for providing a modification (Service Bulletin) to upgrade your existing HTAWS to provide the CAP 1519 functionality?
2. HTAWS OEMs: If your current HTAWS can be upgraded to meet ED-285/DO-376, what are your timescales and costs for providing a modification (Service Bulletin)?
3. HTAWS OEMs: If your current HTAWS cannot be upgraded to meet ED-285/DO-376, what are your timescales and costs for providing new HTAWS?
4. Aircraft OEMs: What are your timescales and costs for providing modifications (Service Bulletins) to install CAP 1519 HTAWS both with and without Mode 7 for each of your helicopter types currently engaged in offshore operations in the UK?
5. Aircraft OEMs: What are your timescales and costs for providing modifications (Service Bulletins) to install ED-285/DO-376 HTAWS both with and without Mode 7a for each of your helicopter types currently engaged in offshore operations in the UK?
6. Aircraft OEMs: What is your position on the CAP 1519 Mode 7 and why?
7. Aircraft OEMs: What is your position on the ED-285/DO-376 Mode 7a and why?
8. HTAWS and aircraft OEMs: Any relevant thoughts/comments/ideas?

NB1: Approximate (order of magnitude) costs and timescale estimates are acceptable.

NB2: All responses to be provided directly to the UKCAA and they will be treated as commercial in confidence.

I would be grateful for your responses by end of business on Friday 15 October 2021 please.