



# Explanatory Note to Decision 2017/019/R

## Prediction of wind shear for aeroplanes performing commercial air transport operations

RELATED NPA/CRD 2016-18 — RMT.0369 & RMT.0370 (OPS.077 (a) & (b))

### EXECUTIVE SUMMARY

The objective of this rulemaking task was to analyse the risks linked to the effect of wind shear during a take-off from, approach to and landing at an airport, and identify the appropriate mitigations.

The European Aviation Safety Agency (EASA) concluded that no regulatory action is needed to mandate the installation of predictive wind shear systems (PWSs). Instead, EASA will develop a safety promotion initiative providing recommendations on wind-shear-related training in the context of evidence-based training (EBT) and the oversight thereof. In this framework, recommendations and guidance to voluntarily install PWSs will be further considered.

The proposed way forward is expected to maintain the current level of safety.

<b>Action area:</b>	Runway safety	<b>Rulemaking group:</b>	No
<b>Affected rules:</b>	Commission Regulation (EU) No 965/2012; ED Decision No 2012/018/R (AMC & GM to Part-CAT)	<b>Rulemaking Procedure:</b>	Standard
<b>Affected stakeholders:</b>	Commercial air transport (CAT) aeroplane operators		
<b>Driver:</b>	Safety		
<b>Impact assessment:</b>	Full		

### EASA rulemaking process milestones



## Table of contents

<b>1. About this Decision .....</b>	<b>3</b>
<b>2. In summary — why and what .....</b>	<b>4</b>
2.1. Background information .....	4
2.2. Objectives.....	4
2.3. Conclusions .....	4
<b>3. References .....</b>	<b>6</b>
3.1. Related regulations .....	6
3.2. Affected decisions.....	6
3.3. Other reference documents .....	6



## 1. About this Decision

EASA has developed ED Decision 2017/019/R in line with Regulation (EC) No 216/2008<sup>1</sup> (hereinafter referred to as the ‘Basic Regulation’) and the Rulemaking Procedure<sup>2</sup>.

This rulemaking activity is included in the EASA 5-year Rulemaking Programme<sup>3</sup> under rulemaking task RMT.0369 & RMT.0370 (OPS.077 (a) & (b)). The scope and timescales of the task were defined in the related Terms of Reference<sup>4</sup>.

The draft text of this Decision has been developed by EASA. All interested parties were consulted<sup>5</sup> through NPA 2016-18 ‘Prediction of wind shear for aeroplanes performing commercial air transport operations’<sup>6</sup>. 9 comments were received and duly reviewed. 7 of these comments were supporting the NPA. The other 2, however, stated their preference towards mandating the installation of the equipment in new aeroplanes, including turboprop-powered aeroplanes, and in all existing fleet respectively. This is based on the assumption of increased wind shear occurrences due to climate changes. However, the cost-effectiveness analysis performed in the impact assessment would not be affected and ‘do nothing’ continues to be the preferred option for the following reasons:

- lack of data on accidents involving turboprop-powered aeroplanes;
- turboprop-powered aeroplanes are more impacted by the cost of the installation due to their average size; and
- climate change does not necessarily result in an increase in the number of wind-shear-related accidents.

<sup>1</sup> Regulation (EC) No 216/2008 of the European Parliament and of the Council of 20 February 2008 on common rules in the field of civil aviation and establishing a European Aviation Safety Agency, and repealing Council Directive 91/670/EEC, Regulation (EC) No 1592/2002 and Directive 2004/36/EC (OJ L 79, 19.3.2008, p. 1) <http://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1467719701894&uri=CELEX:32008R0216>).

<sup>2</sup> EASA is bound to follow a structured rulemaking process as required by Article 52(1) of Regulation (EC) No 216/2008. 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>3</sup> <http://easa.europa.eu/rulemaking/annual-programme-and-planning.php>

<sup>4</sup> <https://www.easa.europa.eu/document-library/rulemaking-subjects/prediction-wind-shear-aeroplane-cat-operations>

<sup>5</sup> In accordance with Article 52 of Regulation (EC) No 216/2008, and 6(3) and 7) of the Rulemaking Procedure.

<sup>6</sup> <https://www.easa.europa.eu/document-library/notices-of-proposed-amendment/npa-2016-18>



## 2. In summary — why and what

This rulemaking task assesses the pros and cons of mandating the installation of PWSs to reduce the risk of accidents caused by wind shear.

The introduction of PWSs enhances the ability of the flight crew to be aware of wind shear ahead of the aircraft. This allows them to take preventive action, such as aborting the approach, thus ensuring the safety of both passengers and aeroplanes.

In this rulemaking task, EASA analysed the feasibility of mandating PWSs in order to reduce the exposure to risk associated to wind shear phenomena.

### 2.1. Background information

Wind shear represents a serious hazard for the operation of CAT aeroplanes. Accidents and serious incidents have occurred due to the presence of wind shear during the take-off, approach and landing phases of a flight.

The French Safety Investigation Authority (BEA) addressed to EASA its Safety Recommendation (SR) FRAN-2009-012 in order to establish the regulatory conditions for installing PWSs in accordance with the recommendations of paragraph 6.21 of ICAO Annex 6 Part I: 'All turbo-jet aeroplanes of a maximum certificated take-off mass in excess of 5 700 kg or authorized to carry more than nine passengers should be equipped with a forward-looking wind shear warning system.'

Following this SR, EASA assessed the possibility to introduce a requirement to install equipment capable of detecting wind shear.

### 2.2. Objectives

The specific objective of this proposal is to assess whether the number of accidents and serious incidents caused by wind shear in CAT operations can be reduced in a cost-effective manner.

The Decision also provides an answer to (SR) FRAN-2009-012 addressed to EASA as regards equipping CAT aeroplanes with PWSs and RWSs.

### 2.3. Conclusions

After an assessment of the current fleet, differences between turbojet- and turboprop-powered aeroplanes were identified in terms of the effects of a wind shear event and the impact of the cost of installing the system. Additionally, the data available indicated that there were no accidents involving turboprop-powered aeroplanes where wind shear was identified as a causal factor. Therefore, the option of mandating PWSs in turboprop-powered aeroplanes was dismissed.

The options were thus reduced to three, namely:

- do nothing;
- implement PWSs and RWSs for all turbojet-powered aeroplanes with a CofA issued after 2023; and
- implement PWSs and RWSs for all turbojet-powered aeroplanes.

EASA performed an assessment of wind shear occurrences. All the aeroplanes involved in the accidents or serious incidents considered were turbojet-powered and most of them already had PWS installed.



The number of accidents where the installation of a PWS might have had an impact was thus reduced to one, which did not result in any injuries or fatalities.

It was established that a significant number of larger aeroplanes currently being operated by European operators already have the PWS function available as part of their avionics equipment.

A cost-effectiveness analysis, based on the data referred to above, determined that the cost of installing the equipment in the aeroplanes not already equipped with it would not justify the safety benefit gained from mandating the installation of reactive wind shear systems (RWSs) and/or PWSs. Moreover, PWSs were found to be inefficient in dry weather conditions, which further justifies this conclusion.

Consequently, EASA concluded that no regulatory changes are necessary. The proposed way forward is expected to maintain the current level of safety.

As a complementary measure, EASA will develop a safety promotion initiative providing recommendations on wind-shear-related training in the context of evidence-based training (EBT) and the oversight thereof. In this framework, recommendations to voluntarily install PWSs will be further considered.



### 3. References

#### 3.1. Related regulations

- 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 (OJ L 296, 25.10.2012, p. 1)

#### 3.2. Affected decisions

- Decision N° 2012/018/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-CAT')

#### 3.3. Other reference documents

- FAA:** AC 25-12 — Airworthiness Criteria for the Approval of Airborne Windshear Warning Systems in Transport Category  
AC 00-54 — Pilots Windshear Guide  
AC 120-41 — Criteria for Operational Approval of Airborne Wind Shear Alerting and Flight Guidance  
FAR Part 121.358 — Low-altitude windshear system equipment requirements  
FAA Paper — Airborne Short and Long Range Windshear Predictive Systems, Revision 10.2 (dated January 1995)  
FAA TSO C63e — Airborne Radar Equipment
- RTCA:** DO-220 Minimum Operational Performance Standards (MOPS) for Airborne Weather Radar with Forward-Looking Windshear Capability  
DO 220A Minimum Operational Performance Standards (MOPS) for Airborne Weather Radar with Forward-Looking Windshear Capability (available now)
- ICAO:** Annex 6, Part 1 — Recommendation of forward looking wind shear system (predictive)
- BEA:** FRAN-2009-012 Safety recommendation to establish regulation for installation of PWS in accordance with ICAO recommendations
- Lincoln Laboratory:** Wind-Shear System Cost Benefit Analysis Update, by R.G. Hallowell, J. Y. N. Cho, S. Huang, M. E. Weber, G. Paull, T. Murphy, dated 13 May 2009

