

航空機搭載のウィンドシアア警報システムには、GPWSによりIASや降下率の急激な変化を感知した時点で警報を発出する一般的なものと、気象レーダーシステムにより進行方向前方の気流の乱れを探知して事前に警報を発出する新型のPWS (Predictive Windshear Alert System) の2種類があります。PWSの警報が発出された場合、パイロットは警報が止まるまで回避操作を行い、進入中であればゴーアラウンド、離陸中には上昇を継続することになります。TCASによる回避操作と同じ形態ですが、航空機は多くの警報に対してシステムが優先順位を判断してパイロットに指示を出しています。

PWSによる回避事例が発生しRTミーティングでも検討しましたが、管制間隔設定や責任の所在の問題があり結論は出ていません。管制官の指示やSIDの制限に従えない回避操作を行うケースもあるので、パイロットから回避操作中である旨の通報や管制官による交通情報の発出が重要になるかもしれません。

日本及びICAOには規程がないので、米国の規程をご紹介します。

FAA 7110.65W Air Traffic Control 2016.5

PILOT/CONTROLLER GLOSSARY

PREDICTIVE WIND SHEAR ALERT SYSTEM(PWS)

A self-contained system used onboard some aircraft to alert the flight crew to the presence of a potential wind shear. PWS systems typically monitor 3 miles ahead and 25 degrees left and right of the aircraft's heading at or below 1200' AGL.

Departing flights may receive a wind shear alert after they start the takeoff roll and may elect to abort the takeoff. Aircraft on approach receiving an alert may elect to go around or perform a wind shear escape maneuver.

3-1-8. LOW LEVEL WIND SHEAR/MICROBURST ADVISORIES

a. When low level wind shear/microburst is reported by pilots, Integrated Terminal Weather System (ITWS), or detected on wind shear detection systems such as LLWAS NE++, LLWAS-RS, WSP, or TDWR, controllers must issue the alert to all arriving and departing aircraft. Continue the alert to aircraft until it is broadcast on the ATIS and pilots indicate they have received the appropriate ATIS code. A statement must be included on the ATIS for 20 minutes following the last report or indication of the wind shear/microburst.

PHRASEOLOGY-

LOW LEVEL WIND SHEAR (or MICROBURST, as appropriate) ADVISORIES IN EFFECT.

NOTE-

Some aircraft are equipped with Predictive Wind Shear (PWS) alert systems that warn the flight crew of a potential wind shear up to 3 miles ahead and 25 degrees either side of the aircraft heading at or below 1200' AGL. Pilot reports may include warnings received from PWS systems.

REFERENCE-

FAAO JO 7110.65, Para 2-6-3, PIREP Information.

FAAO JO 7110.65, Para 2-9-3, Content.

FAAO JO 7110.65, Para 3-10-1, Landing Information.

b. At facilities without ATIS, ensure that wind shear/microburst information is broadcast to all arriving and departing aircraft for 20 minutes following the last report or indication of wind shear/microburst.

1. At locations equipped with LLWAS, the local controller must provide wind information as follows:

NOTE-

The LLWAS is designed to detect low level wind shear conditions around the periphery of an airport. It does not detect wind shear beyond that limitation.

REFERENCE-

FAAO JO 7210.3, Para 10-3-3, Low Level Wind Shear/Microburst Detection Systems.

(a) If an alert is received, issue the airport wind and the displayed field boundary wind.

PHRASEOLOGY-

WIND SHEAR ALERT. AIRPORT WIND (direction) AT (velocity). (Location of sensor) BOUNDARY WIND (direction) AT (velocity).

(b) If multiple alerts are received, issue an advisory that there are wind shear alerts in two/several/all quadrants. After issuing the advisory, issue the airport wind in accordance with para 3-9-1, Departure Information, followed by the field boundary wind most appropriate to the aircraft operation.

PHRASEOLOGY-

WIND SHEAR ALERTS TWO/SEVERAL/ALL QUADRANTS. AIRPORT WIND (direction) AT (velocity). (Location of sensor) BOUNDARY WIND (direction) AT (velocity).

(c) If requested by the pilot, issue specific field boundary wind information even though the LLWAS may not be in alert status.

NOTE-

The requirements for issuance of wind information remain valid as appropriate under

this paragraph, para 3-9-1, Departure Information and para 3-10-1, Landing Information.

2. Wind shear detection systems, including TDWR, WSP, LLWAS NE++ and LLWAS-RS provide the capability of displaying microburst alerts, wind shear alerts, and wind information oriented to the threshold or departure end of a runway. When detected, the associated ribbon display allows the controller to read the displayed alert without any need for interpretation.

(a) If a wind shear or microburst alert is received for the runway in use, issue the alert information for that runway to arriving and departing aircraft as it is displayed on the ribbon display.

PHRASEOLOGY-

(Runway) (arrival/departure) WIND SHEAR/ MICROBURST ALERT, (windspeed) KNOT GAIN/LOSS, (location).

EXAMPLE-

17A MBA 40K - 3MF

PHRASEOLOGY-

RUNWAY 17 ARRIVAL MICROBURST ALERT 40 KNOT LOSS 3 MILE FINAL.

EXAMPLE-

17D WSA 25K+ 2MD

PHRASEOLOGY-

RUNWAY 17 DEPARTURE WIND SHEAR ALERT 25 KNOT GAIN 2 MILE DEPARTURE.

(b) If requested by the pilot or deemed appropriate by the controller, issue the displayed wind information oriented to the threshold or departure end of the runway.

PHRASEOLOGY-

(Runway) DEPARTURE/THRESHOLD WIND (direction) AT (velocity).

(c) LLWAS NE++ or LLWAS-RS may detect a possible wind shear/microburst at the edge of the system but may be unable to distinguish between a wind shear and a microburst. A wind shear alert message will be displayed, followed by an asterisk, advising of a possible wind shear outside of the system network.

NOTE-

LLWAS NE++ when associated with TDWR can detect wind shear/microbursts outside the network if the TDWR fails.

PHRASEOLOGY-

(Appropriate wind or alert information) POSSIBLE WIND SHEAR OUTSIDE THE

NETWORK.

(d) If unstable conditions produce multiple alerts, issue an advisory of multiple wind shear/microburst alerts followed by specific alert or wind information most appropriate to the aircraft operation.

PHRASEOLOGY–

MULTIPLE WIND SHEAR/MICROBURST ALERTS (specific alert or wind information).

(e) The LLWAS NE++ and LLWAS–RS are designed to operate with as many as 50 percent of the total sensors inoperative. When all three remote sensors designated for a specific runway arrival or departure wind display line are inoperative then the LLWAS NE++ and LLWAS–RS for that runway arrival/departure must be considered out of service. When a specific runway arrival or departure wind display line is inoperative and wind shear/microburst activity is likely; (for example, frontal activity, convective storms, PIREPs), the following statement must be included on the ATIS, “WIND SHEAR AND MICROBURST INFORMATION FOR RUNWAY (runway number) ARRIVAL/DEPARTURE NOT AVAILABLE.”

NOTE–

The geographic situation display (GSD) is a supervisory planning tool and is not intended to be a primary tool for microburst or wind shear.

c. Wind Shear Escape Procedures.

1. If an aircraft under your control informs you that it is performing a wind shear escape, do not issue control instructions that are contrary to pilot actions. ATC should continue to provide safety alerts regarding terrain or obstacles and traffic advisories for the escape aircraft, as appropriate.

EXAMPLE–

“Denver Tower, United 1154, wind shear escape.”

NOTE–

Aircraft that execute a wind shear escape maneuver will usually conduct a full power climb straight ahead and will not accept any control instructions until onboard systems advise the crew or the pilot in command (PIC) advises ATC that the escape maneuver is no longer required.

REFERENCE–

P/CG Term – Wind Shear Escape

2. Unless advised by additional aircraft that they are also performing an escape procedure, do not presume that other aircraft in the proximity of the escape aircraft are responding to wind shear alerts/events as well. Continue to provide control

instructions, safety alerts, and traffic advisories, as appropriate.

3. Once the responding aircraft has initiated a wind shear escape maneuver, the controller is not responsible for providing approved separation between the aircraft that is responding to an escape and any other aircraft, airspace, terrain, or obstacle. Responsibility for approved separation resumes when one of the following conditions are met:

(a) Departures:

(1) A crew member informs ATC that the wind shear escape maneuver is complete and ATC observes that approved separation has been re-established, or

(2) A crew member informs ATC that the escape maneuver is complete and has resumed a previously assigned departure clearance/routing.

(b) Arrivals:

(1) A crew member informs ATC that the escape maneuver is complete, and

(2) The aircrew has executed an alternate clearance or requested further instructions.

NOTE-

When the escape procedure is complete, the flight crew must advise ATC they are returning to their previously assigned clearance or request further instructions.

EXAMPLE-

“Denver Tower, United 1154, wind shear escape complete, resuming last assigned heading/(name) DP/clearance.”

Or

“Denver Tower, United 1154, wind shear escape complete, request further instructions.”