

SAFETY RECOMMENDATIONS

Note: in accordance with the provisions of Article 17.3 of Regulation 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, a safety recommendation in no case creates a presumption of fault or liability in an accident, serious incident or incident. The recipients of safety recommendations shall report to the safety investigation authority which issued them, on the measures taken or being studied for their implementation, as provided for in Article 18 of the aforementioned regulation.

In this serious incident, during the first RNP approach with LNAV/VNAV minima, an incorrect QNH was provided by a controller:

- Twice to the flight crew, and each time the crew read back the incorrect QNH provided,
- Once to another flight crew, who did not read back the QNH given but read back the valid QNH at the time, without this being noticed by the controller.

The QNH given to the flight crew differed by 10 hPa from the valid QNH at the time and included in the ATIS information, leading to an approach carried out around 280 ft below the descent profile. When the crew was transferred to the tower frequency, as per standard procedure, the controller gave the landing clearance without giving them the QNH value. The approach resulted in a near Controlled Flight Into Terrain (CFIT), without visual references, at a minimum height of 6 ft. Not having acquired visual references, the crew performed a go-around.

Before the second RNP approach with LNAV/VNAV minima, the flight crew only received the QNH during the go-around phase. This time the QNH given to the crew was correct but the read-back by the crew was incorrect and the error was not noticed by the controller. Therefore, the crew continued to fly with an incorrect QNH setting which resulted in the aircraft remaining at an altitude around 280 ft below the expected flight path.

During the second approach, the flight crew acquired visual references before reaching the minima and were able to correct the flight path and to land without further incident.

The Air Traffic Control operational procedures require the controller to give the QNH to the flight crew at the first altitude clearance, but there is no obligation to repeat the QNH before landing. Initial interviews conducted as part of the investigation suggest that the importance of the QNH for approaches using the baro-VNAV function, with respect to the risk of CFIT, may be underestimated and not clearly understood by controllers.

The flight crew operational documentation regarding a RNP approach with LNAV/VNAV minima mentions the risks of the cockpit altimeters having different settings, but it does not specifically mention the risk of having the same incorrect QNH setting on both altimeters.

In the case of a RNP approach with LNAV/VNAV minima, vertical guidance uses the baro-VNAV function. Therefore, in this case, QNH setting errors are critical. These errors cannot be detected by altitude-distance cross-checks against values provided on the approach chart. In addition, there is no dedicated item requiring a specific cross-check of the QNH with another source of information such as the ATIS, METAR or confirmation of the QNH with ATC.

This type of issue is common to all approaches using the baro-VNAV function.

A Minimum Safe Altitude Warning (MSAW) system could be considered as one of the last barriers to avoid a CFIT event when available.

At Paris-Charles de Gaulle airport, the standard procedure for a controller in case of a MSAW when the aircraft is not being vectored is to:

- immediately advise the flight crew that a terrain alert has been generated,
- instruct the flight crew to immediately check their flight level or altitude,
- and give them the QNH.

During this serious incident, the MSAW was triggered on both approaches and the standard MSAW phraseology was not applied by the controllers. In particular, the crew were not instructed to check their altitude nor were they given the QNH.

Initial interviews conducted as part of the investigation suggest that the emergency phraseology associated with a MSAW is not perfectly known nor understood by controllers.

Air Traffic Control risk awareness and operational procedures

The BEA recommends:

- *Whereas in the short time span of this event, an incorrect QNH was provided to two flight crews by one controller,*
- *Whereas in the short time span of this event, two controllers did not notice the read-back of an incorrect QNH,*
- *Whereas the MSAW system, when available, can be considered as one of the last barriers to avoid CFIT,*
- *Whereas the MSAW phraseology was not used, and the QNH information was not repeated,*

That Paris-Charles de Gaulle Air Traffic Services:

Ensure without delay, that controllers are aware of the importance of the QNH for approaches using the baro-VNAV function, with respect to the risk CFIT

[Recommendation FRAN-2022-005]

Ensure without delay, that controllers are aware of the importance of checking that the information read back by flight crews is correct

[Recommendation FRAN-2022-006]

Ensure without delay, that controllers strictly use the standard phraseology in case of a MSAW, and provide the QNH information

[Recommendation FRAN-2022-007]

Implement without delay a procedure for controllers to mitigate the risk of an incorrect QNH being used by flight crews during approaches using the baro-VNAV function, possibly by repeating the QNH at an appropriate time during the approach.

[Recommendation FRAN-2022-008]

Flight crew risk awareness and operational procedures

The BEA recommends:

- *Whereas there was a difference of 10 hPa between the QNH provided by the ATIS and the controller during the approach, which is higher than what might be expected from atmospheric pressure fluctuations, and was not noticed by the crew,*
- *Whereas the operational documentation of the airline does not highlight the importance of the QNH for approaches using the baro-VNAV function, with respect to the risk of CFIT,*

- *Whereas the airline operational procedures regarding approaches using the baro-VNAV function are not robust against altimeter QNH setting errors affecting both altimeters,*

that Airhub Airlines:

Ensure without delay, that the flight crews are made aware of the importance of the QNH setting for approaches using the baro-VNAV function, with respect to the risk of CFIT

[Recommendation FRAN-2022-009]

Implement without delay, a procedure to mitigate the risks of an incorrect QNH setting affecting both altimeters during approaches using the baro-VNAV function, possibly by crosschecking the QNH with another source of information, in particular with the ATIS information when available or by asking the controller for confirmation of the QNH

[Recommendation FRAN-2022-010]