

RECOMMENDATIONS

In March 2018 the Dutch Safety Board published the report *Insufficient thrust setting for takeoff* in which it recommended to EASA to start, in cooperation with other regulatory authorities, standardisation bodies, the aviation industry and airline operators, the development of specifications and the establishment of requirements for Takeoff Performance Monitoring Systems (TOPMS) without further delay. Such a system has to provide a timely alert to flight crew when the achieved takeoff performance is inadequate for the given aeroplane configuration and aerodrome conditions, including the runway length available in case of intersection takeoffs.

At the time of writing this report the overall feasibility of TOPMS has still not been demonstrated because of the complexity of such a system. As a result, no technical specifications or guidance materials to define the operational performance of such a system have been drafted. At the same time, takeoff performance occurrences continue to occur, and therefore the development of technological solutions is still urgent. Systems detecting gross input errors and deviations in parameter settings or comparing predicted and actual aeroplane acceleration during the takeoff run are systems that are considered feasible as a first step towards a more complex TOPMS.

Reduced thrust takeoffs¹ are commonly used as a cost reduction measure. However, performing reduced thrust takeoffs introduces safety risks, such as the risk of input of erroneous takeoff parameters into the Electronic Flight Bag and/or Flight Management System as well as a reduction of the takeoff performance safety margins. The erroneous data input may lead to calculated takeoff speeds and thrust settings being lower than required, causing a flight safety hazard, because the required takeoff roll increases. In case of only minimal changes in takeoff parameters, the resulting additional cost reduction will probably also be marginal. However, changing the input data introduces the risk of erroneous entries, especially when a change is introduced last minute. Currently, there is insufficient insight in the relation between the actual cost reduction on one hand and the increase in safety risk with respect to erroneous data entry on the other hand. Also, there is no common airline policy or procedure regarding reduced thrust takeoffs and the entry of takeoff performance data. The Dutch Safety Board is of the opinion that operators need to consider the benefits of reduced thrust takeoffs against the possible safety risks, like reduced safety margins in case of an engine failure after the decision speed V_1 .

¹ In this report the term 'reduced thrust takeoff' is used for all takeoffs with less than maximum available thrust.

The Dutch Safety Board therefore issues the following recommendations:

To European Union Aviation Safety Agency and the Federal Aviation Administration:

To take the initiative in the development of specifications and, subsequently, develop requirements for an independent onboard system that detects gross input errors in the process of takeoff performance calculations and/or alerts the flight crew during takeoff of abnormal low accelerations for the actual aeroplane configuration as well as insufficient runway length available in case of intersection takeoffs. Take this initiative in close consult with the aviation industry, including manufacturers of commercial jetliners amongst which in any case The Boeing Company.

To International Air Transport Association:

To develop a standard policy for airlines with regard to procedures for reduced thrust takeoffs, including a risk analysis addressing cost reductions versus introduced safety risks.

To The Boeing Company:

For the existing and future commercial aeroplanes, to research on and develop an independent onboard system that detects gross input errors in the process of takeoff performance calculations and/or alerts the flight crew during takeoff of abnormal low accelerations for the actual aeroplane configuration as well as insufficient runway length available in case of intersection takeoffs.

To International Civil Aviation Organization:

To note the conclusions of this report and introduce provisions addressing an independent onboard system that detects gross input errors in the process of takeoff performance calculations and/or alerts the flight crew during takeoff of abnormal low accelerations for the actual aeroplane configuration as well as insufficient runway length available in case of intersection takeoffs.