An existing FDS customer had begun operating an aircraft that was unfamiliar to the airline. FDM began flagging up a significant number of ‘low-speed after take-off’ events. Several of these featured significant loss of airspeed and excessive pitch attitudes.

The first stage of the investigation was for FDS to check all the facts; FDS then used their comparative model to check their customer against other operators of similar aircraft to see if this revealed the cause of the problem.

The comparative model identified that the take-off plot from another operator shows the airspeed increasing during the take-off roll to time=20 seconds when the aircraft rotates. The 15 degree nose up attitude in the initial climb ensures the climb out is at about V2+15 knots before the nose is lowered and the aircraft accelerates.

In contrast, the analysis of the customer with the speed loss problem revealed that as the pitch attitude passes 15 deg’, the airspeed is starting to fall, but the nose continues to rise to over 20 deg and the airspeed has fallen to a minimum of V2 – 15 knots.

There was a suggestion that the aircraft was being flown incorrectly. However, the modelling work carried out by FDS discovered that the technique described in the training manual was being strictly followed. It also revealed that the pilots who followed the flight director slavishly and without reference to other instruments were those most likely to experience this problem. FDS passed the results of its investigation to the aircraft manufacturer.
Using the report provided by FDS, the aircraft manufacturer was able to issue a software update, stating “...it has been reported that the take-off crossbar was moving instead of standing still at the desired pitch during rotation and subsequent take-off ... changes have been made to avoid this pitch guidance movement”.

As can be seen from the trend graph below, this change, together with training to reinforce the need to maintain scan of the flight instruments, practically eradicated the frequency of this event.

CONCLUSION

The FDM/FOQA provided by FDS alerted the operator to an unexpected feature of their new aircraft type. Refinement of their training allowed them to continue to operate the type safely.