Proposed Special Condition on "Cancellation of AFM Engine Management Tables"

Applicable to Airbus A350-941

Introductory note:

The following Special Condition has been classified as an important Special Condition and as such shall be subject to public consultation, in accordance with EASA Management Board decision 12/2007 dated 11 September 2007, Article 3 (2.) of which states:

"*2. Deviations from the applicable airworthiness codes, environmental protection certification specifications and/or acceptable means of compliance with Part 21, as well as important special conditions and equivalent safety findings, shall be submitted to the panel of experts and be subject to a public consultation of at least 3 weeks, except if they have been previously agreed and published in the Official Publication of the Agency. The final decision shall be published in the Official Publication of the Agency.*"

Statement of Issue

Airbus proposed not to publish engine management tables in A350 the AFM, based on the following rationale:

- the engine management tables published in current Airbus AFMs do not provide the exact engine parameters of the actual flight conditions (need interpolation in temperature and altitude, and mean correction for anti-ice and air conditioning)
- In any flight phase, the A350 Thrust target will be indicated to the crew on engine cockpit displays by THR rating limit value computed by the FADEC. This THR rating limit value will take into account the actual flight conditions, being therefore more accurate than AFM engine management tables.
- A350 AFM will require a check of actual THR of each engine versus displayed THR rating limit value in the take-off procedure. AFM engine management tables are not used for this thrust check.

Nevertheless, CS 25.1587 (b)(1) requires that the AFM must contain "*the conditions of power, configuration, and speeds, and the procedures for handling the aeroplane and any system having a significant effect on the performance information*".

In accordance with AMC 25.1581 6.d.(3), "*Thrust or power settings should be provided for at least take-off, maximum continuous and go-around thrust or power, along with the thrust or power setting procedures necessary to obtain the performance shown in the AFM*" and "*These data should be shown for each applicable thrust or power setting parameter*".

The removal of engine management tables from A350 AFM therefore required establishment of a Special Condition in accordance with Part 21A.16B(a)(1) to address this novel design feature and to achieve an equivalent safety level to CS 25.1587 (b)(1).

Airbus A350-941 - Special Condition G-06

- Cancellation of AFM Engine Management Tables -

1) The classification of failure conditions for A350 shall be assessed taking into account the take-off procedure as proposed, and

2) The compliance with allocated safety objectives shall be performed according to the assumption that the crew will only check that THR rating limit value is reached by the actual THR of each engine (i.e. erroneous thrust target computation is potentially catastrophic).

In addition, depending on design of the FADEC, thrust management may result in continuous and significantly changing THR rating limit value until and beyond the speed at which the thrust is checked during take-off roll.

For A350, if the above design characteristics are confirmed, the following is proposed:

3) It shall be checked that design characteristics are consistent with the safety analysis and assumptions regarding crew management of thrust variation during take-off, and

4) It shall be shown that normal thrust management leading to thrust change during take-off can be clearly distinguished from abnormal and erroneous thrust behaviour.