

Comparative Analysis of Airbus A350 Design Performance versus Operational Performance

Task for a *Bachelor Thesis* according to university regulations.

Background

In the past, Top Level Aircraft Requirements (TLARs) such as cruise Mach number or cruise altitude were defined at Airbus for new aircraft without the ability to fully account for details of the operational environment, the aircraft is faced with during its life. The situation changed in 2017 with the introduction of the Airbus Skywise Datacloud supplied by Palantir Technologies. On the Airbus A350, Skywise is based on the "Smart Access Data" which is relayed to the airline's headquarters during flight. In case of the A350, 250000 parameters are taken in small intervals. Such a huge amount of data is called "Big Data". Airbus receives the information from cooperating airlines. With the availability of "Big Data", the aircraft's true operational performance can be analyzed and compared with the TLARs. Largest impact on fuel consumption is from the aircraft's performance in cruise flight. Reason for the large impact of cruise comes simply from the fact that cruise is usually the longest of the flight phases.

Task

The task is to implement a method to extract and analyze the operational cruise performance data of the A350-900. Afterwards, a comparison with the design cruise performance data is made. Following subtasks have to be considered within this thesis:

- Give an introduction to the topic.
- Outline the relationship between aircraft requirements (TLARs) and performance parameters in cruise flight as far as flight mechanics and aircraft design are concerned.
- Present the Airbus design parameter performance tool.
- Write a program on the Airbus Skywise Platform to retrieve Airbus A350 Smart Access Data and customize the data for later analysis and comparison.
- Analyze the data and compare the operational cruise performance data with the design cruise performance data.
- Discuss the results in view of how TLARs should be adapted in the future to match aircraft better to the environment they will have to operate in.

The report has to be written in English based on German or international standards on report writing. The thesis is part of an internship at Airbus Deutschland GmbH. Industrial supervisor of the thesis is Dipl.-Ing. Steffen Hammel.