ASSIGNMENTS

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Contents

1 Assignment 1.1

Assignment: To write down an initial list of requirements for an aircraft that shall replace A350, with an entry into service in 2030. Please, while listing the requirements, refer to the categories reported in Sect.1.4

List of Requirements

(Mainly based on Airbus A350-900 [1])

Deisgn and Performance

- Number of pilots: 2

- Cruise Mach: 1.25

- Max Operating Speed Mach: 0.9

- Cabin Crew: 8 (2 for each emergency exit)

- Number of passengers: 440

- Wing Span: under 70 m

- Fuselage Length: under 75 m

- Range: over 16000 km

- Height: under 18 m

- Wing Surface: 450 m²

- Max Payload: over 50 metric tonnes

- Number of engines: 2

Operational requirements

- Cruise altitude: 10 - 13 [km]

- Turn around time: under 60 mins

- Takeoff distance: under 1 km

- Landing distance: under 2.5 km

- Rate of climb: 3000 ft/min (Initial climb)

- Ceiling: 13.15 km (FL431)

Analysis of applicable regulations

- Number of exits: 8

- External noise (a terra a 5km di distanza) decollo: under 90 dB

- External noise (a terra a 5km di distanza) atterraggio: under 95 dB

- N max in condizioni operative: 2.5

- N min in condizioni operative: -1

2   Assignment 1.2

Assignment: On the basis of the list of Requirements elicited in the previous step, identify a good list of reference aircraft and collect data to be used as meaningful statistical population.

3   Assignment 1.3

Assignment: *Critical Analysis of statistical trends.* Verify whether your statistical population fits the trend reported in literature (e.g. Raymer) or suggest improvements to the simple mathematical models (e.g. updates of coefficients).

4   Assignment 1.4

Assignment: *Guess data estimation for the reference case study.* Apply the original or improved statistical trends to perform the first guess data estimation for the reference case study. Please, report all iterations needed to convergence to the design maximum take-off mass.

References

[1] Airbus. *A350-900*. https : / / www . airbus . com / aircraft / passenger - aircraft/a350xwb-family/a350-900.html. Accessed on 2020-11-11.