



**ALOHA**

# Aircraft Design for Low Cost Ground Handling

Dipl.-Ing. Francisco Gómez Carrasco

08-02-22



## Objectives

- **A detailed cost breakdown for ground operations has to be carried out with the main cost drivers for A/C operators clearly identified.**
- **The A/C design requirements for Low Cost Carriers regarding the minimization of ground handling cost needs to be understood.**
- **A number of design proposals for minimizing ground handling cost for A/C operators will be provided.**

## Project Partners

### Sponsors

- Bundesministerium für Bildung und Forschung



### Research Partners

- Airbus
- Airport Research Center
- Hamburg Airport



## Market Analysis

- Passenger traffic will grow at 5% per year
- LCA sharing of the market up to 50% by 2020
- Single aisle fleet will grow to more than 20.000 aircrafts by 2025
- B737 design from 60s / A320 design from 80s based on requirements of conventional airlines

**Airfrance A320 fleet renewal with A320**

**Clear Demand for a A320/B737 sucessor**

**Opportunity for a new design  
based on LCA requirements**

## Reference Aircraft

The Airbus A320 has been chosen, as it is the most commonly used Airbus aircraft at Low Cost Carriers.



## Requirements for the New Design

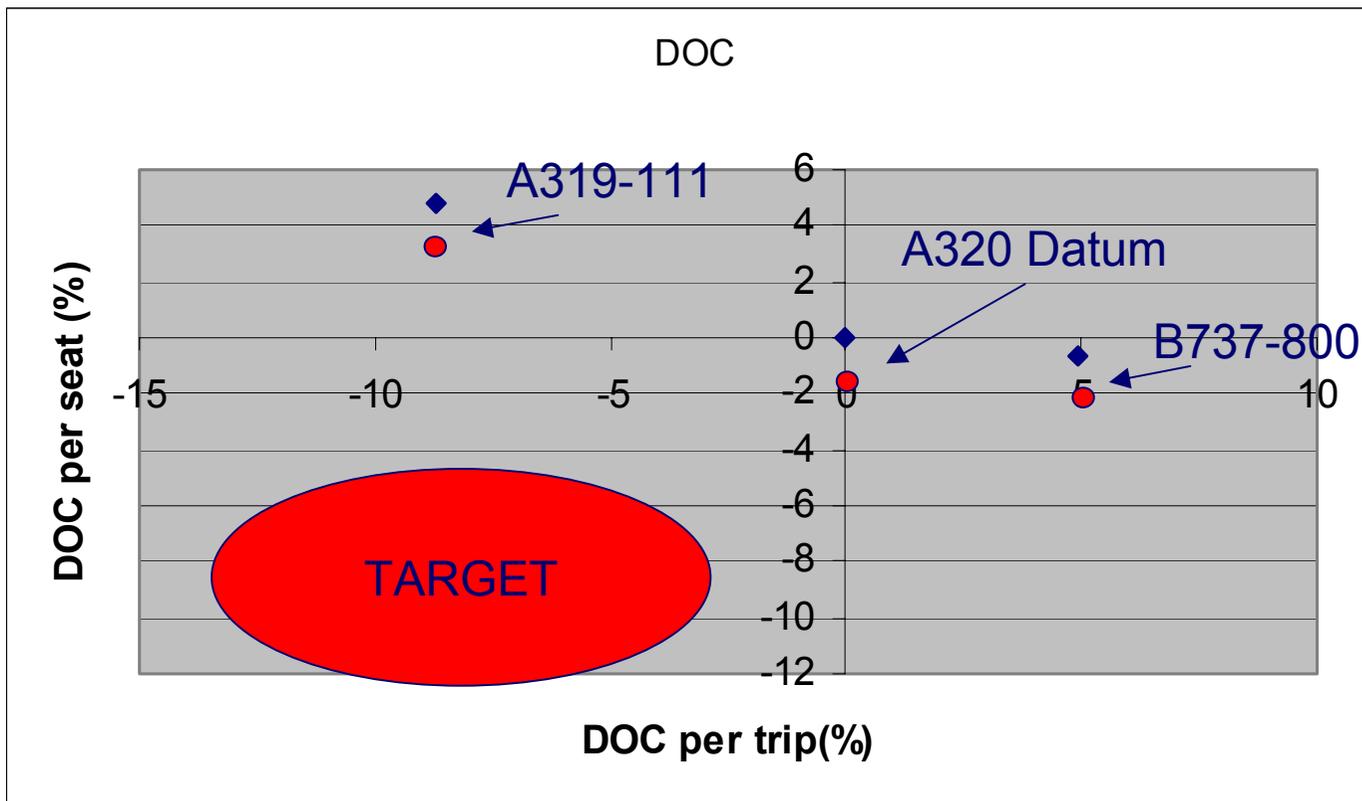
- Entry into service by 2020
- 180 passengers. Possibility of aircraft family design
- Design point at R=1025 km. Maximum range 4400 km
- DOC target reduction 15%
- Turn-around time reduction of at least 20%
- Sustainable (fuel burn, noise, emissions)
- Minimum impact on current airport operations
- Feasibility



## General DOC Reduction

- Turn-around time reduction
- Fuselage closer to ground leads to faster ground handling
- Use of composites involves less weight and low airframe maintenance
- Less MTOW leads to lower ATC and landing fees
- Similar A320/B737 cockpit, low cost pilot training
- Possibility to operate in secondary airports with lack of equipment.  
(No need for stairs or pushback tractor)
- New engine technology involve less TSFC, weight and noise
- Counter rotating fans, propfans, geared turbofan ...

# DOC Estimation

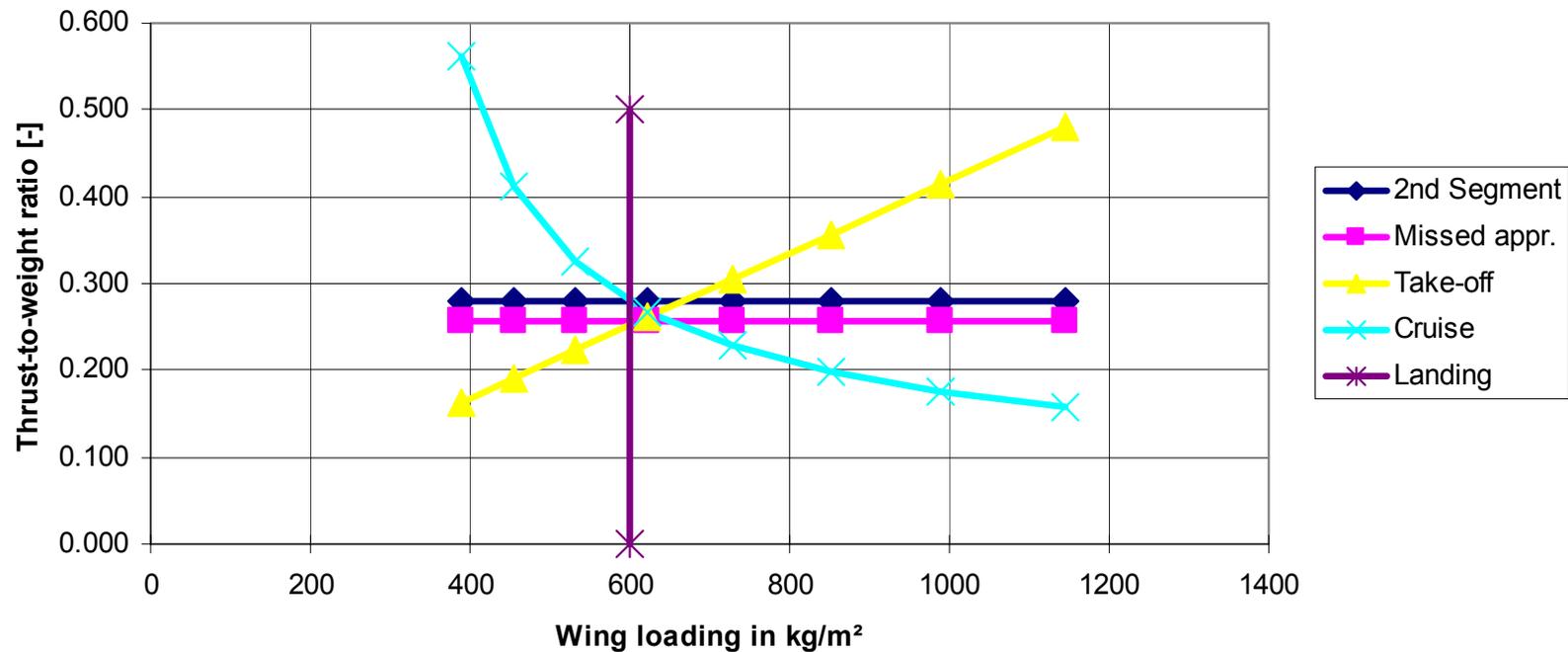


## Turn-Around Time and Cost Reduction

- Integrated stairs
  - Foldable or door stairs solution
  - Weight penalty
- Auto push-back
  - Electrical engine solution
  - Weight penalty
  - Safety issues
- New cabin layout
  - Alternative seating arrangement
  - Foldable seats
  - Reduced galley
- New handling operations
  - Luggage handling. Special Cargo doors
  - Optimun boarding methods

# Preliminary Sizing

Matching Chart



## Previous Studies



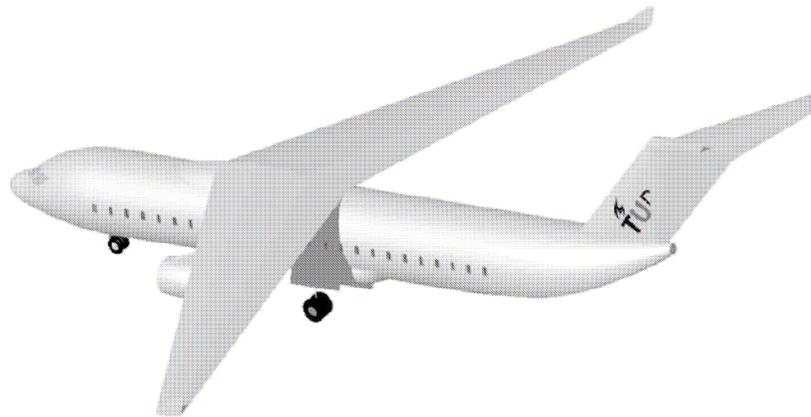
### **ORCA**

Aircraft design for minimum  
turn-around times

## Previous Studies



**A2007**  
Low fare airline optimized  
aircraft



TU Delft

## ALOHA Current Status

Definition of A/C requirements are completed.

Ground handling cost structure are still under study.

- Schedules of charges by airports.

- Ground handling agent fees.

- Self-handling procedures and costs.

A complete A/C model of the reference aircraft is being set up in order to analyze modifications in PrADO (Preliminary Aircraft Design and Optimization) software.