



DEPARTMENT OF AUTOMOTIVE AND AERONAUTICAL ENGINEERING

Ground Handling Simulation with CAST

Project work towards a thesis at ETSIA UPM

Background

Within the joint research project *Aircraft Design for Low Cost Ground Handling* (ALOHA), innovative conventional and unconventional aircraft designs are investigated and evaluated with respect to ground handling operation and their associated ground handling costs, by using the programs CAST Ground Handling and PrADO. The Comprehensive Airport Simulation Tool (CAST) is an in-house development of the research partner Airport Research Center in Aachen (CAST 2010). The ground handling part of it has been designed within ALOHA and allows for simulation of different service arrangements of different aircraft models. In order to evaluate aircraft designs out of PrADO (Heinze 1994), an interface has been programmed to transfer the three-dimensional geometry of the aircraft into CAST Ground Handling. This allows for ground handling simulation of different aircraft designs that have been predesigned (and evaluated) with PrADO. In this project work, the ground handling simulation shall be conducted with CAST for an aircraft optimized for ground handling that shall be compared, in terms of ground handling performance and associated costs (compare Crönertz 2008), with a preselected reference aircraft (i.e. a 150 passenger, twin engine subsonic transport aircraft). If possible, unconventional aircraft such as box wing or blended wing body shall be investigated to gather first aspects of the respective ground handling.

Task

The tasks of the project are as follows:

- Literature research on ground handling (process) optimization
- Definition of ground handling scenarios on the basis of real data
- Creation of standard turnaround Gantt charts on the basis of real data and with respect to the predefined ground handling scenarios
- Familiarization with the program CAST Ground Handling
- Ground handling simulation with respect to predefined ground handling scenarios of the reference aircraft and the aircraft optimized for ground handling
- Comparison and discussion of the results obtained
- Technology assessment of the aircraft optimized for ground handling

- If possible, further ground handling simulations of unconventional aircraft such as box wing or blended wing body

The report has to be written in English based on German or international standards on report writing.

References

Heinze 1994

HEINZE, Wolfgang; Zentrum für Luft- und Raumfahrttechnik, Technische Universität Braunschweig: Ein Beitrag zur quantitativen Analyse der technischen und wirtschaftlichen Auslegungsgrenzen verschiedener Flugzeugkonzepte für den Transport großer Nutzlasten. Braunschweig : 1994 (94-01)

CAST 2010

AIRPORT RESEARCH CENTER: CAST Comprehensive Airport Simulation Tool – CAST Overview. Aachen : Airport Research Center, 2010. – URL: <http://www.airport-consultants.com/> (2010-03-15)

Crönertz 2008

CRÖNERTZ, Oliver: *Prozessorientierte Kalkulation von Flughafenleistungen. Schwerpunkt: Bodenabfertigungsdienste von Passagierflugzeugen*. Saarbrücken : VDM Verlag Dr. Müller, 2008 – ISBN: 978-3-8364-8460-2