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Department of Automotive and Aeronautical Engineering

Aero – Aircraft Design and Systems Group





ALOHA PAHMIR







Department of Automotive and Aeronautical Engineering



Aero - Aircraft Design and Systems Group Forschungsgruppe Flugzeugentwurf und Systeme

Head: Prof. Dr.-Ing. Dieter Scholz, MSME

Hamburg University of Applied Sciences, Berliner Tor 9, 20099 Hamburg, Germany

Aero

- Conducting funded projects in research, development and teaching (short courses)
- Guiding research assistants to cooperative dissertations
- Incorporating students with project or thesis work
- Contributing to the research focal point "Aeronautical Engineering" at Hamburg University of Applied Science





FLECS

<u>Functional Library of the Environmental Control System</u>

Simulation and configuration of aircraft air conditioning system

Funding: LuFo-Hamburg



<u>Green Freighter</u>

Aircraft design for environment-friendly and cost-effective cargo aircraft with unconventional configuration

Funding: Federal Ministery of Education and Research



ALOHA

Aircraft Design for Low Cost Ground Handling Development of aircrafts for low budget flying Funding: Federal Ministery of Education and Research









<u>European Postgraduate Master in Aeronautical Engineering</u> Development of a joint master programme with European partner universities Funding: EU - ERASMUS

http://Aero.ProfScholz.de

Partners:







Airport Research Center

Hamburg Airport



und Forschung

Education, Audiovisual &

Culture Executive Agency





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Department of Automotive and Aeronautical Engineering



FLECS

Functional Library of the Environmental Control System

Christian Müller, Dieter Scholz

Hamburg University of Applied Sciences, Berliner Tor 9, 20099 Hamburg, Germany

General

- Support of design activities:
 innovative air conditioning systems
 optimum system configurations
- Model library based on MATLAB/Simulink
- Library with simulation models of all relevant components from:
 air conditioning system
 aircraft cabin
 - FLECS Database Definition Parameter

🗑 Simulink Library Browser		
File Edit View Help		Function Block Parameters: Vol_20
D 🛎 🖘 🖊 🗌		Volume Element (1D) (mask)
Cabin_Zone: mimolb2/Cabin_Zone		Represents a volume element with one input.
E 🔛 Smulnk	Cabin Zone	Parameters
Discontinuities Discrete	Cabin Zone Controller	Volume [m^3]
		1
- 한날 Logic and Bit Operations - 한국 Lookup Tables	Codenser	Initial Parameter, Pressure (Pa)





 Combined simulation of heat and mass flow systems





Achievements

• Functional simulation of entire aircraft air conditioning system and cabin

- Simulation of network topologies
- Conduction, convection and radiation
- Condensation and evaporation
- Graphical User Interfaces for industrial use
- Production for real time capable code



- Simulation of temperature variations with respect to ECS requirements
- Investigation of different temperature control strategies

http://FLECS.ProfScholz.de

Partner:



Sponsor:





Freie und Hansestadt Hamburg

Behörde für Wirtschaft und Arbeit





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GF - Green Freighter Aircraft Design for Environment-Friendly and Cost-Effective Cargo Aircraft with Unconventional Configuration

Kolja Seeckt, Dieter Scholz

Hamburg University of Applied Sciences, Berliner Tor 9, 20099 Hamburg, Germany

General

- Research and comparison of conventional and unconventional cargo aircraft, e.g. Blended Wing Body (BWB) or flying wing configurations
- Tentative entry-into-service: 2025
- Main focus on environment-friendly and cost-effective aircraft operation





Targets

- Low fuel consumption
- Future fuels (liquid hydrogen, synthetic fuels, bio-fuel)

- Low noise (night time operation)
- Low emissions (carbon dioxide, nitrogen oxides, ...)
- Low operating costs (zero-pilot operation, reduced aircraft systems)

Methods and Tools

- Aircraft preliminary sizing with HAW spreadsheets
- In-depth design, analysis and optimisation with IFL's PrADO (Preliminary Aircraft Design and Optimisation program)

http://GF.ProfScholz.de

Finances

 HAW involvement funded by the FH3-program of the Federal Ministry of Education and Research • IFL involvement funded by Airbus Deutschland





European Postgraduate Master in Aeronautical Engineering

Modules *

Introduction to Aeronautical Engineering

Oostende:

Avionic Systems Engineering and Flight Control ** Air Transport Economics ** Spacionic Systems Design Noise and Vibration Engineering Unmanned Aeronautical Systems

A Part time study programme ✓ Joint European master programme Awards joint/double master degree Funded by European Commission

Bordeaux:

Aircraft Maintenance Management ** Composite Materials and Maintenance ** Aircraft Propulsion and Maintenance Reliability and Integrated Logistic Support Finite Element Dimensioning for Composite Materials

Hamburg:

Aircraft Design ** Design of Lightweight Aircraft Structures ** High Performance Fibre Reinforced Composite Materials Aircraft Systems Technology Aircraft Systems Integration

Other Location: CFD for Aircraft Aerodynamics

to be confirmed mandatory module



Target group: Graduates





with aeronautical engineering degree • minimum of 4 years of academic training (or equivalent credits) and some years of relevant industry experience

Study programme:

- 60 ECTS (equivalent to 1 year full time study)
- 10 short courses:
 - duration one week each
 - preparation and homework required
- master thesis
- combined in teaching
 - academia's and industry's expertise

Partners in the programme: Hochschule für Angewandte Wissenschaften Hamburg • Katholieke Hogeschool Brugge - Oostende Université Bordeaux 1

http://www.EPMA.aero





Hochschule für Angewandte Wissenschaften Hamburg Hamburg University of Applied Sciences

