Aircraft Design and Systems Group (AERO)

Current Status

Prof. Dr.-Ing. Dieter Scholz, MSME

2013-04-30

Aircraft Design and Systems Group (AERO)

- **AERO is part of:**
  Research Focal Point Aeronautical Engineering
  Department of Automotive and Aeronautical Engineering
  Faculty of Engineering and Computer Science
  CCNF – Competence Center Novel Flight

- **AERO's aim is to guide research assistants to cooperative dissertations and to conduct funded projects in research, development and teaching (short courses).**

Aircraft Design and Systems Group (AERO)

Emphasis of our work is on:

- **Aircraft Design**
- **Aircraft Systems**
- **Flight Mechanics**

AERO: Research Assistants

Dipl.-Ing. Andreas Johanning

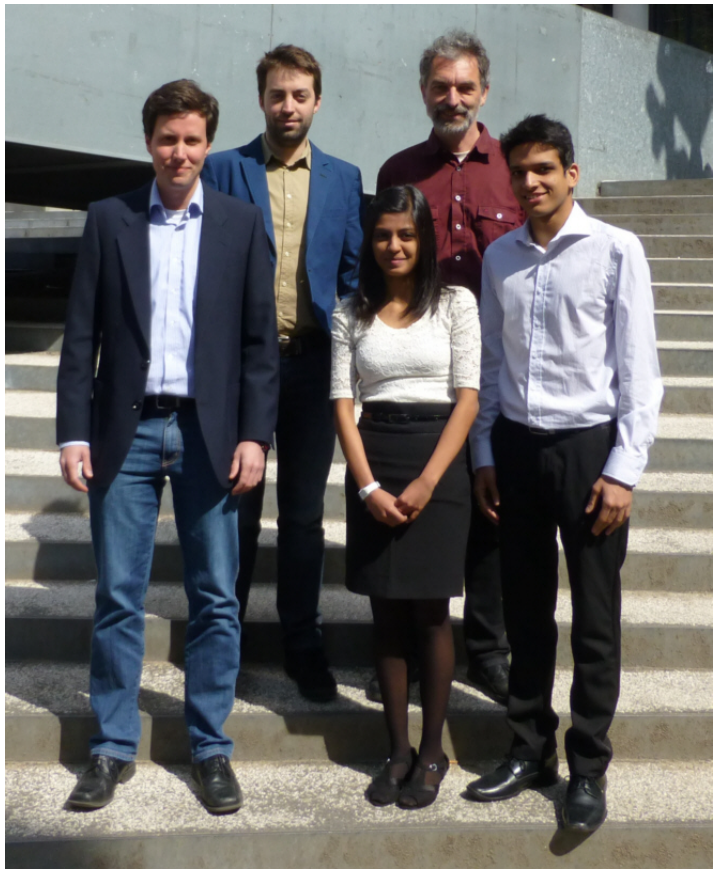
Dipl.-Ing. Ricardo Caja Calleja, MSc

Tahir Sousa, B.Tech (Hons.)

Priyanka Barua, B.Tech (Hons.)

Dipl.-Ing. Mike Gerdes (PAHMIR)

Dr.-Ing. Mihaela Niţă (CARISMA, OPerA)



AERO: Finished Projects and Activities

- EPMA – Building an International Master Program in Aviation
- FLECS – Simulation of the Environmental Control System
- Green Freighter – Design of Freighter Aircraft
- ALOHA – Aircraft Design for Low Cost Ground Handling
- PAHMIR – Health Monitoring of Aircraft Systems
- CARISMA – Optimization of Aircraft Cabin Design Processes
- OPerA – Optimization in Preliminary Aircraft Design
- MOZART – Health Monitoring of Fuel Cell Systems in Aviation
- TOC – Take-Off Calculation

AERO: Current Projects and Activities

- **Airport 2030 – Airport Compatible Innovative Aircraft Designs (Aviation Cluster Hamburg)**
- **PreSTo – Preliminary Aircraft Design Environment**
- **SAS – Simple Aircraft Sizing**
- **Off-Take – Fuel Consumption due to Off-Takes from the Engine**
- **Training on Airbus A320 System Simulators**
- **Short Courses:**
  - **Aircraft Design**
  - **Introduction to Aeronautical Engineering**

AERO: Cooperative Dissertations

Dipl.-Ing. Kolja Seeckt (Tekn. Lic; licentiate)
(Green Freighter)

Dr.-Ing. Mihaela Niţă
(CARISMA, OPerA)

Dipl.-Ing. Mike Gerdes
(PAHMIR)

Dipl.-Ing. Andreas Johanning
(Airport2030)

Technische Universität München

AERO: Publications

ICAS

PUBLIC VERLAG

AST
Workshop on Aircraft System Technologies

CEAS

mobiles
Fachzeitschrift für Konstrukteure

Aero days 2011

EWADE

ATOS 2010

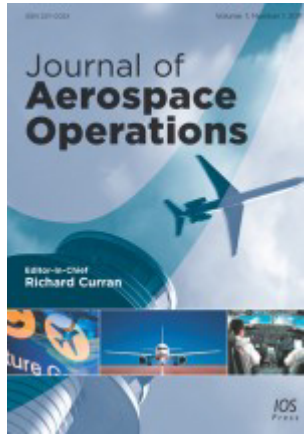
DGLR

Springer

CZECH AEROSPACE Proceedings

AIAA
The World's Forum for Aerospace Leadership

RRDPAE 2008



AERO: Publications

Advances in Aerospace Science and Technology

Editor-in-Chief: Prof. Dr. Dieter Scholz

Website: http://www.scirp.org/journal/aast

- international
- scholarly, peer-reviewed
- online and print on demand
- open access
- application oriented
- review: single blind – open choice

Scientific Research

OPEN ACCESS

AERO: Information on the WWW

http://AERO.ProfScholz.de

- **Link to all Projects and Publications**
- **Reports@AERO – Full Text**

http://News_at_AERO.ProfScholz.de

- **List of Activities**

http://library.ProfScholz.de

- **Digital Library: Student Projects, Thesis Work – Full Text**

An example of a research project:

Airport2030 - Evolutionary Aircraft Configurations

- **Leading-Edge Cluster Competition**
- **HAW: 217 k€**
- **5 years**
- **Up to 4 employees**
- **Partner: Airbus, DLR, …**
- **Sponsor: Federal Ministry of Education and Research**

Airport 2030

AIRBUS

Bundesministerium für Bildung und Forschung

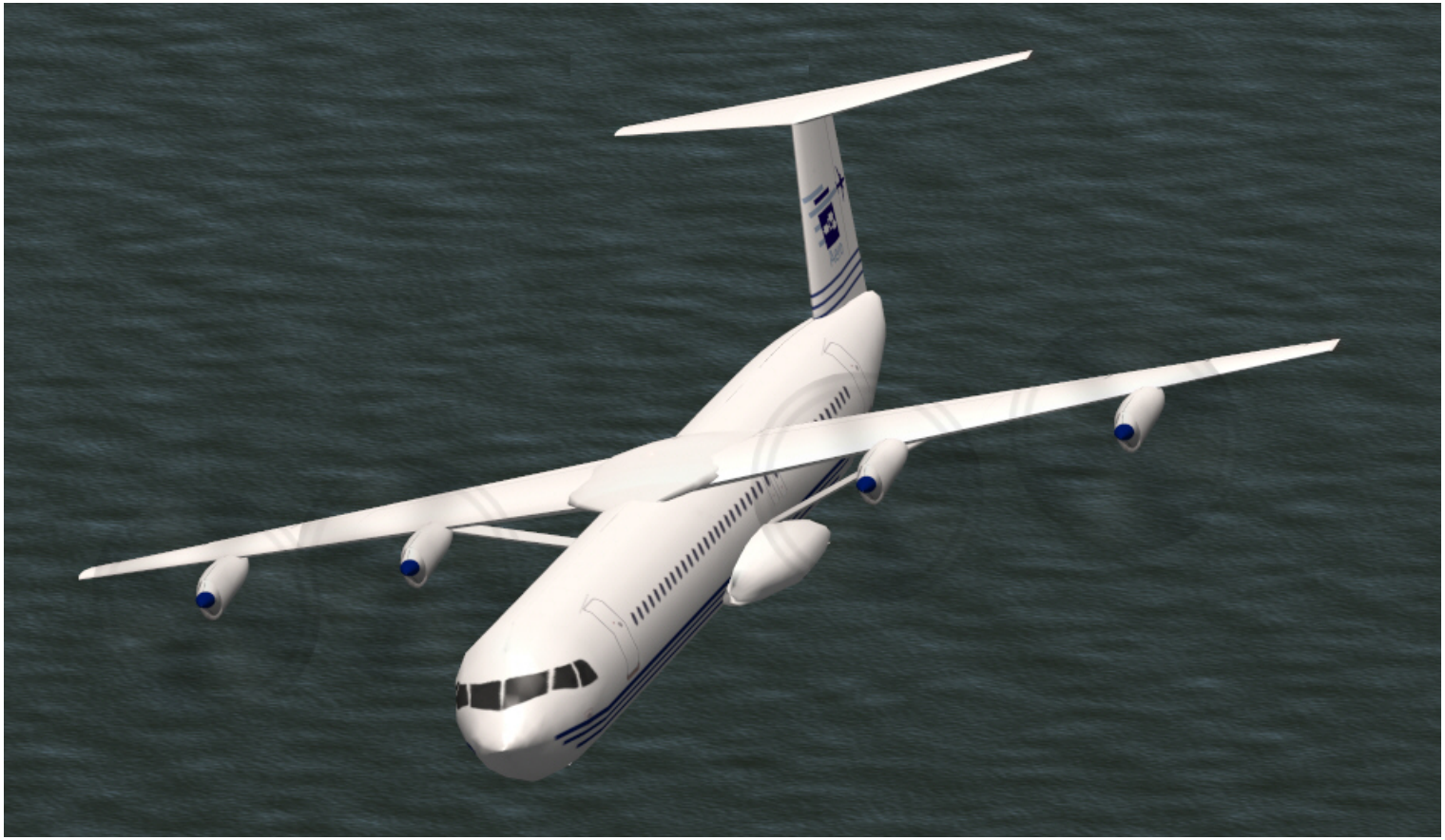
Aim of the Project Airport2030

- Investigation of evolutionary passenger aircraft configurations
- Only configurations which could be certified today
- Balanced design for optimized ground handling and cruise flight
- DOC and/or fuel optimized configurations

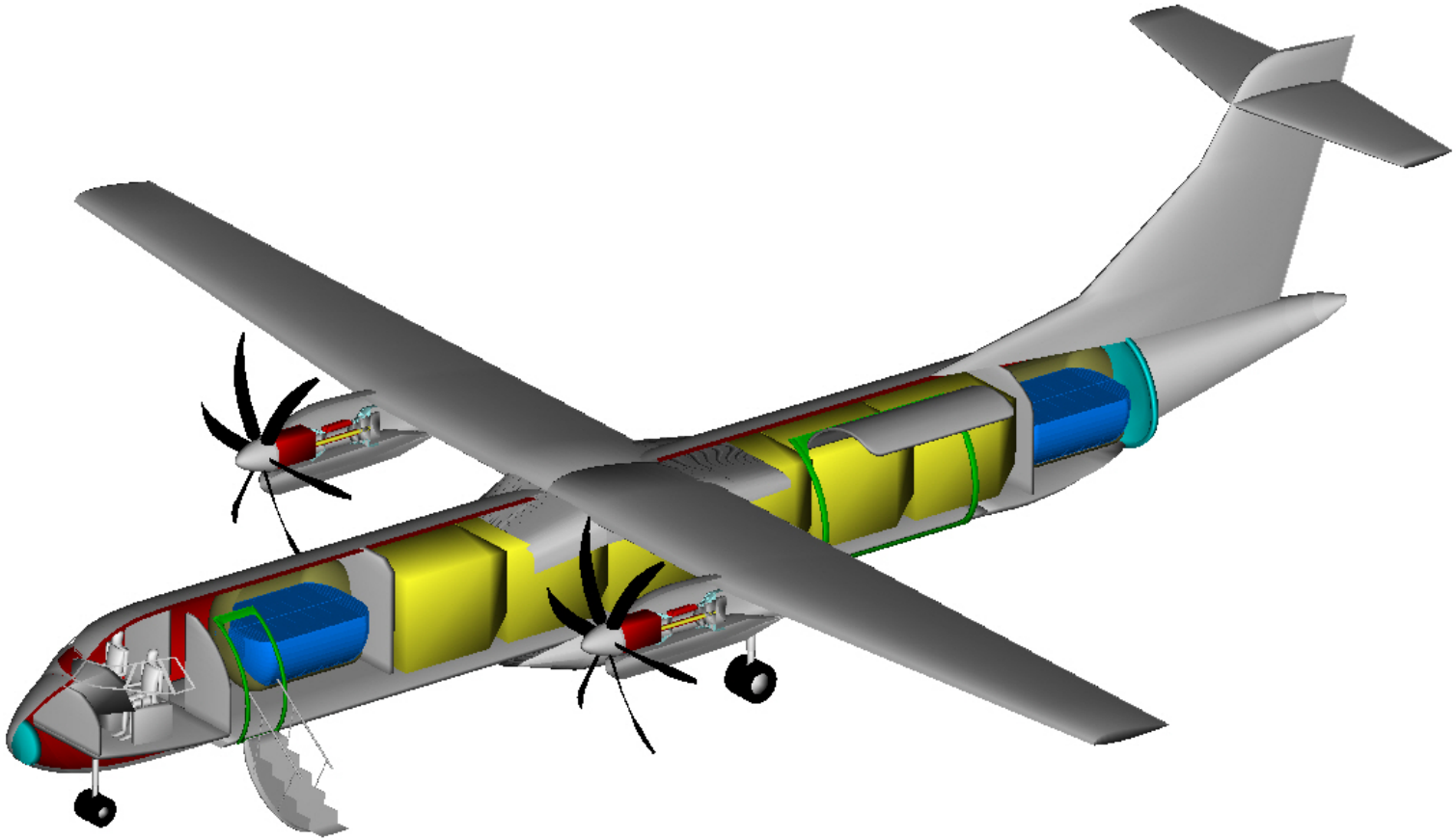
- Optimization Tools: OPerA (jet) and PrOPerA (turboprop)

- Configurations investigated (reference A320):
  - Box Wing Aircraft (diamond wing)
  - Smart Turboprop (slower and lower flying)
  - Strut Braced Wing Aircraft
  - Box Wing Aircraft (double deck wing)

Box Wing Aircraft (diamond wing)



„Smart Turboprop“ with Wing Brace



LH2 feeder freighter from „Green Freighter“ Project

Aircraft Preliminary Sizing Tools @ AERO

PreSTo

Aircraft Preliminary Sizing Tool

OPerA

Optimization in Preliminary Aircraft Design

SAS

Simple Aircraft Sizing (and Optimization)

Many Possibilities to Connect Tools

SAS → …

OPerA → …

SAS → PreSTo → …

OPerA → PreSTo → …

… → OADconnect → OpenVSP

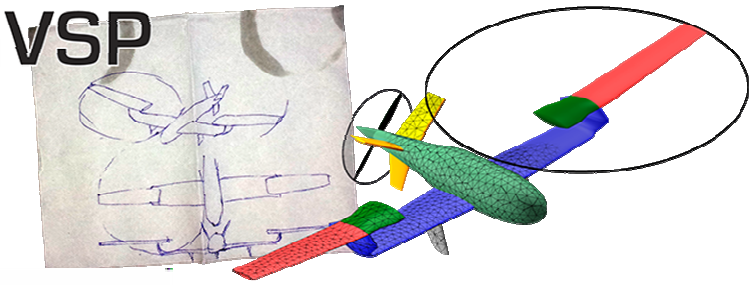
… → external Tools

External Tools

CEASIOM

Computerised Environment for Aircraft Synthesis and Integrated Optimisation Methods

OpenVSP



Tornado

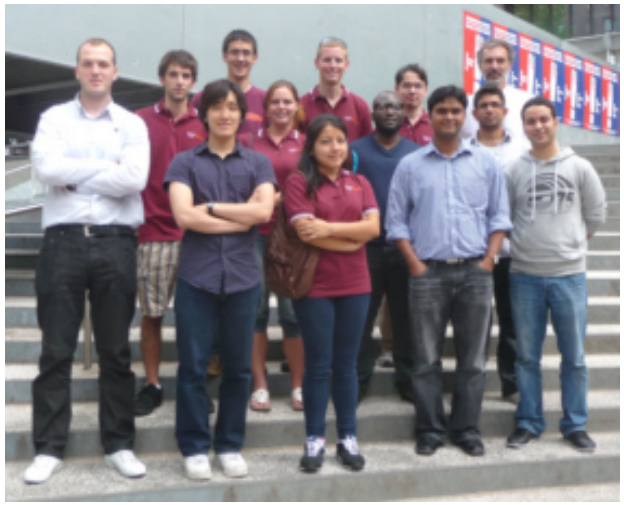
JSBSim

USAF Digital DATCOM

Training on Airbus A320 System Simulators

Short Course: Aircraft Design

Continously from 2007 …



… up to 2011 at HAW Hamburg.

Now offered at Customers Premises!

AIRBUS

Luftfahrtstandort Hamburg

epma

W·In·Q e.V

Summary: Aircraft Design and Systems Group (AERO)

- Many research projects
- Almost 100% third party funds
- Several cooperative dissertations
- Many publications

- Training on Airbus A320 System Simulators

- Short Courses:
  - Aircraft Design
  - Introduction to Aeronautical Engineering