Ethical Work Makes Character

Prelude:

NASHERO is opening its doors to interested candidates who would like to learn, and grow to be part of our team, and eventually work at our facility in San Giovanni in Croce (CR). NASHERO is proposing a selection of 4 topics for MS Thesis in Aerospace Engineering, which ranges from high end theoretical work to hands-on-practical.

Sailplane Project

Sailplane project is the result of a customer request to us for developing a sailplane for their specific needs. The sailplane has been designed by NASHERO and is currently in the prototyping stage. It will be certified under EASA CS22 norms.

The structure of SNAP will use a special design technology developed by Prof. Stephen W. Tsai, Professor Emeritus Aero-Astro dept of Stanford University, in collaboration with Dr. Sharma, CEO of NASHERO, called Double-Double bi-angled plies. The sailplane will be made using ZeroVoid (R) high-end proprietary technology for composite production developed by NASHERO. Coupons made using ZeroVoid have been tested by an FAA lab in the USA, with almost infinite fatigue life.

Tools and Requirements

Documentation in the English language will be preferred, and it will be the preferred language of work, however, everyone in the company speaks/understands Italian. The tools used during the thesis work will be, an array of CAD/FEA/CAM software used inhouse within NASHERO, any open-source product (Linux based or not), MATLAB based should be moved to Octave and be Octave compatible, LaTeX for documentation, local installation of SubVersion for revision control, Python for scripting, GNU Plot for plotting. High-end panel codes for Aerodynamic analysis. Point analysis is usually carried out using Open FOAM. A compute server will be available for aerodynamic calculations and for FEA optimizations. For projects 1-3, a very strong mathematical understanding and passion for mathematical problem-solving will be required. It is essential that the theoretical basis is sound and there is a passion to excel in the students attacking these problems.

Potential MS Thesis Topics

1. **Flutter analysis and aeroelastic optimization for aerobatics of a sailplane (two students).**
   - One student has been identified from another university he will start in Feb 2023.
2. **Control system evaluation, and optimization, for highly non-linear rapid aerobatic maneuvers (one student).**
   - We are looking for one or two students to work on this challenging topic and to get control laws under such behavior.

3. **Real-time data extraction and flexible body dynamics of a sailplane in actual maneuvers (one or two students)**.
    - One or at most two students who can work together may be required in this project. Furthermore, it is highly desirable that they have a penchant for mathematics and physics, such as **Hamiltonian dynamics**.
4. **Sailplane's flying model and its flight testing (multi-disciplinary, could use multiple students).**
    - A scaled model with all the scaling factors in mind will be designed with instrumentation and developed.
    - In this project the students will get exposure to high-end CNC machines.

About NASHERO s.r.l.

NASHERO is a leading light aircraft producer in the making. NASHERO was founded by Dr. Naresh Sharma, in 2009 and is based out of Casalmaggiore (Lombardia), 30km north of Parma, Italy. NASHERO is part of the Aerospace Cluster of Emilia Romagna (IR4I). Dr. Sharma earned a Ph.D. from the Technical University of Delft (TU Delft) in Aerospace Engineering and Computer Sciences in 1997 and has designed aircraft that have gained certification under CFR Pt23 (1990) and CFR Pt25 (1993). Dr. Sharma earned a master's in Aerospace Engineering (1987-1989) and a bachelor's degree in Mechanical Engineering (1982-1986) from the Indian Institute of Technology, Kanpur, India. He is also among the first 50 or so developers of the Linux operating system from 1991-1998. NASHERO, though Dr. Sharma is a very active participant in ASTM International for the development of the new regulations and norms for future aircraft certification. NASHERO, has just begun collaboration with the Polytechnic Univ. of Turin, Univ. of Parma and we also collaborate with Stanford University, Univ. of Porto, Univ. of Wichita, TU Delft, TU Munich, Univ. of Munich applied sciences, IIT Kanpur, and a few others.

NASHERO has three independent activities: Aircraft design development, production, and sales; Contract precision manufacturing for other Aerospace companies (AS/EN9100); Automation and AI. NASHERO has over 75 patent-pending technologies entirely developed internally in composites, production processes, controls, and automation.