



ROBERTO MARTINEZ DE LA CRUZ

Aerospace Engineer

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WORK EXPERIENCE

senseFly | Aerodynamics Engineer (Lausanne)

Oct 2019 - Present

Design and analysis of fixed wing drone aerodynamics and flight dynamics.

- **eBee Vision** aerodynamic envelope and pitot probe design. Flight dynamics analysis. Improvement of flight time (+50%), handling qualities and trajectory tracking with respect to its predecessor (eBeeX).

Software tools and experimental methods developed.

- **Wind tunnel tests** planning, execution and data analysis. In-house test bench and data acquisition software developed. Tested in ETH (Zurich), Eiffel (Paris) and TU Delft (Netherlands). Model integrated with 6-axis balance, pitot, movable control surfaces and motor/propeller.
- **Flight tests campaigns**. Preparation of test matrix, flying prototypes (including sensors as 5-hole pitot), pilot support during flight, data analysis and presentation.
- **Drone design tool**. In-house developed software in python to design drone geometry, body structure, powertrain and control surfaces. Interfaced with AVL, Flow5 for aerodynamic calculations. Flight dynamics calculation from drone characteristics and aerodynamics results.
- **CFD framework**: Python wrapper for automatic CFD simulations and postprocessing. Wrapper around Pointwise (mesher), OpenFOAM (solver) and ParaView (postprocessing).

Renault Sport Formula 1 Team | Aerodynamics Intern (UK)

Jan - Jul 2017

Wind-tunnel's Particle Image Velocimetry (PIV) system calibration, set up and post processing. Automated and improved speed by a factor of 5.

AIRBUS Getafe | Aeroelasticity Intern (Madrid)

Mar - Jun 2016

Horizontal and Vertical Tail Plane (HTP & VTP) loads calculation during transport. Loads and Aeroelasticity Department.

Teaching Assistant | TU Delft (Netherlands)

Jan - Jun 2018

Teaching Assistant in two 2nd year courses of the Aerospace BSc degree at TU Delft:

- **Computational Modelling**: Preparation of tests and quizzes regarding differential equations numerical methods
- **Simulation, Verification and Validation**: Tutorial sessions regarding a wing box computational structural simulation, its validation and verification.

EDUCATION

UC Berkeley | MSc Thesis

Aug 2019

Research in the stability of an air layer over superhydrophobic surface. Application on frictional drag reduction for marine vessels (lubrication by air). Multiphase flow experimental testing and numerical simulations. 9/10

Publication 'Water impact on underside of horizontal hydrophobic plate'.

TU Delft | MSc Aerospace

Aug 2019

120 ECTS (2 years) Aerospace MSc, Aerodynamics specialization. 8,85/10. Top 3%

Universidad Politécnica de Madrid | BSc Aerospace

Jul 2016

240 ECTS (4 years) Bachelor. 8,17/10. Top 5%

COMPLEMENTARY EDUCATION & VOLUNTEERING

Technical Conference Volunteer | *IOWTC 2019, San Francisco*

Nov 2018

1st International Offshore Wind Technical Conference. Support for organization.

Formula Student/SAE Team Delft | *TU Delft*

Sept 2016 - Jan 2017

Design and manufacturing of carbon fiber aerodynamic structures.

Formula Student/SAE UPM Racing | *Universidad Politécnica de Madrid*

2014 - 2016

2015/16 Chief responsible for the Frame and Aerodynamics division:

- 9 people group, finances and sponsorships management.
- Front and rear wing aerodynamic and composite design, assembly and validation.
- Steel space frame TIG welding.

2014/15: Member of the Frame and Aerodynamics division

- Aerodynamic studies of bodywork and wings.
- Carbon fiber wet lay-up manufacturing of bodywork and wings.

SKILLS

Solidworks	Used at senseFly for simple parts, drawings and assembly design. See portfolio for some designs at earlier age.
CATIA V5/V6	Surface, Part, Assembly, DMU Kinematics and Simulation modules. Skeleton Methodology (CAE System) and FEA tools employed.
Pointwise	Generation and automatization of aircraft CFD meshes with TRex and Voxel cells.
OpenFOAM	Aerodynamic steady aircraft simulation (simpleFoam). Turbulence modelling with $y^+ \sim 1$.
ANSYS	Used in the Aerospace BSc Thesis. Meshing, Fluent and PostPro. Turbulence models, high lift low speed optimization.
STAR CCM+	Low Reynolds number studies for UPM Racing's wings and bodywork.
ParaView	Results analysis. Automatic extraction of scenes and data.
Python	Development of a framework for the design, analysis and calculation of fixed wing planes. Data analysis, geometry generation, software interface.
MATLAB	Script and Simulink programming. Multiple years of experience. i.e. temporal temperature simulation and closed loop controller in gym.
LaTeX	Coding, Lyx editor and Overleaf Collaborative Space.
LabView	VI design. Inputs, outputs & synchronization.
Wind Tunnel Testing	Responsible for wind tunnel multi day campaigns (senseFly). Contact with facilities, project management, preparation of sensors and actuators, acquisition and postprocessing of data.