

# ZOUHAIR MAHBOUBI

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California, USA

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## SUMMARY

Accomplished technical, business, and people's leader with proven expertise in:

- Business planning and go-to-market strategy
- Product management, partnerships, and operations
- Optimization, Simulations, Estimation, Control Theory, Reinforcement Learning, and Data Visualization
- Unmanned Air Systems (design, control, and flight-testing) and Unmanned Traffic Management (UTM)
- Programming with Python, C/C++ , Julia, and Matlab

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## WORK EXPERIENCE

### Kitty Hawk - Cora (Mountain View, California)

June 2016 - December 2018

#### Director of Strategy and Partnerships

- Responsible for setting the product vision and technical requirements
- Advised Executive team on business plans and go-to-market strategies
- Setup operations in new country (export control compliance, equipment shipment, new business licenses, etc.)
- Interfaced and led negotiations with aviation regulatory agencies and key business partners
- Drafted application and secured *Certificate for Unmanned Aircraft Operator*

### Kitty Hawk - Zee.Aero (Mountain View, California)

June 2010 - 2016

#### Aerospace Engineer & Team Lead

as Guidance Navigation & Controls Engineer (2012 - 2016)

- Developed and patented non-linear control allocation scheme for over-actuated electric VTOL aircraft
- Identified linearized model shortcomings and improved non-linear simulation
- Implemented MIMO stability margins and uncertainty analysis for robust stability and performance
- Designed fault detection and fail-over logic for backup INS system
- Participated in flight-test operations for full-scale vehicle at NASA facilities
- Setup, designed and conducted experiments for handling qualities evaluation in pilot simulation

as Software & Avionics team lead (2010 - 2012)

- Interviewed, hired, and managed founding software and avionics team
- Designed avionics architecture, autopilot software, and Ground Control Station for unmanned vehicle
- Designed and implemented flight state machine and health monitoring system
- Participated in windtunnel and flight test operations for small-scale vehicles

### NASA Ames Research Center (Moffet field, California)

Sept. 2009 - May 2010

#### Research Assistant

- Performed aerodynamics and stability analysis of a foot-launched hang-glider being converted to an electric UAV and contributed to the design of the avionics architecture (*Intelligent Systems Division*)
- Implemented weight, power, communication, and trajectory modules for rapid analysis and design of conceptual satellite missions (*Mission Design Center*)

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## PUBLICATIONS

- Z. Mahboubi and M. J. Kochenderfer, "Learning Traffic Patterns at Small Airports from Flight Tracks", in *Journal of Intelligent Transportation Systems*, April 2017.
- Z. Mahboubi and colleagues, "Online Optimization Based Flight Control System". *U.S. Patent Application 15297029*, filed October 2016.
- Z. Mahboubi and M. J. Kochenderfer, "Continuous Time Autonomous Air Traffic Control for Non-Towered Airports", in *IEEE Conference on Decision and Control*, December 2015.
- Z. Mahboubi and M. J. Kochenderfer, "Autonomous Air Traffic Control for Non-Towered Airports", in *Air Traffic Management Research and Development Seminar*, June 2015.
- Z. Mahboubi, Z. Kolter, T. Wang, G. Bower, and A. Y. Ng, "Camera Based Localization for Autonomous UAV Formation Flight", in *AIAA@ Infotech Conference*, 2011. [Best student paper award].
- Z. Mahboubi. Altitude Record for Self-Piloting Planes in the Under 5 Kilogram Weight Class. Presentation to Stanford University AIAA Chapter, 2009.
- Z. Mahboubi, S. Clarke, ".NET API Wrapping for Existing C++ Haptic APIs", in *IEEE International Workshop on Haptic Audio Visual Environments and their Applications*, 2006.

## EDUCATION

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**Stanford University**, California, USA

**Ph.D.: Aeronautics and Astronautics**

**2012 - 2016**

CGPA: 4.00/4.00

**Thesis:** *Automated Air-Traffic Control for Non-Towered Airports*

- Modeled behavior of aircraft in the airport pattern as a hidden Markov Model (HMM)
- Used Bayesian Inference methods to learn HMM parameters from real-world radar observations
- Modeled collision advisories as partially observable semi-Markov decision process (POSMDP)
- Used Reinforcement Learning techniques to obtain optimal advisories

**Awards**

- Natural Sciences and Engineering Research Council of Canada Scholarship (awarded but declined)
- Fonds de Recherche du Québec, Nature et Technologies Scholarship (awarded but declined)

**Masters of Science: Aeronautics and Astronautics**

**2008 - 2010**

CGPA: 4.00/4.00

**Projects**

- Improved the reliability and maturity of autonomous UAVs
- Demonstrated capability by setting world altitude record for 'autonomous electrical UAV under 5kg'
- Collaborated on camera-based localization for autonomous UAVs flying in formation flight

**Awards**

- Nicholas J. Hoff Award for Outstanding Master's Degree Student
- AIAA Infotech@Aerospace 2010 Best Student Technical Paper
- Aero/Astro Departmental Fellowship
- NSERC CGS M and FQRNT A8 scholarships for Master studies in Aeronautics

**McGill University**, Montreal, Canada

**Bachelors of Engineering: Mechanical Engineering Honours**

**2004 - 2008**

Minor in Computer Science

CGPA: 3.99/4.00

**Honours Thesis Topic**

*Viscous Drag Minimization via Control Theory at Low Mach Numbers*

**Awards**

- British Association Medal & Dean's Honour list
- J.W. McConnell Award and Scholarships (for top 5% in faculty, held for 4 years)
- Antje Graupe Pryor International Award
- DAAD Undergraduate Exchange Award & Meq Exchange Bursary

**Technische Universität Muenchen**, Munich, Germany

**Study Abroad**

**2006-2007**

**Research Assistant**

- Implemented a proof of concept simulation for an assembly scenario
- Used Haptic devices for feedback, stereo-graphics for visualization, and a Kuka robotic arm
- Wrote a .NET C# wrapper for existing C++ Haptic APIs

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## ADDITIONAL INFORMATION

- Languages: fluent in English, French, and Arabic. Conversational German
- Licensed private pilot
- Volunteering: Marine Mega Fauna Foundation (2018), Stanford Young Astronauts Program (2009 - 2016), Stanford Educational Studies Program (2011 - 2014), Literacy Project in Uganda (Summer 2008)
- Activities: sailing, horseriding, snowboarding, open-water swimming, and scuba diving