

**Julien Esposito, Ph. D.**

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## EXPERIENCE

### **Specialist Engineer – Flight Controls (September 2022 – December 2023)**

*Virgin Galactic, Irvine, CA*

Single-handedly developed as sole contributor:

- Complete modularization of the pilots' training simulator (Simulink, C++)
- Interfacing Simulator with custom drivers to enable control (BAE SYSTEMS and Brunner, C++)
- Developed fully functional X-Plane 11/12 real-time interactive visualization plugin (Simulink, C++)
- Implemented handling quality requirements (inceptor mapping for different Mach numbers)
- Wrote and implemented requirements for Flight Control Computer (FCC)
- Fully Developed Q-Feel for FBW (Fly-by-Wire) usage of BAE SYSTEM inceptor
- Brought Simulations to Model-Based-Design (MBD) for F-16, deHavilland Beaver, and Unity
- Fully modularized Unity/Imagine/Delta spacecraft Simulators, enabling team work

### **Senior Guidance, Navigation, and Control Software Engineer (March 2022 – August 2022)**

*Terran Orbital, Irvine, CA*

- Developed comprehensive analysis study of Reaction Wheel friction increase over 1 year
- Implemented simulation for a customer's new satellite
- Created Linux virtual serial ports to convert a HITL simulation into digital twins
- Provided GNC debugging support to customer

### **Guidance, Navigation, and Control Engineer – Lead (June 2021 – March 2022)**

*Talyn Air, Inglewood, CA*

- Develop 6 DoF nonlinear dynamic models for fixed – wing aircraft (Simulink/MATLAB/C++)
- Develop total energy controllers for longitudinal/lateral maneuvers using state machines
- Simulink Codegen integration of simulations with C++ flight software stack

Environment: MATLAB, Simulink, Real-time embedded coder, Aerospace Toolbox, Linux, docker, C++, Python, multi-system variable sharing via udp sockets, GIT, PX4, PixHawk

### **Research Scientist (Algorithms) – Electro-Optics Systems (September 2019 – June 2021)**

*Intellisense Systems, Torrance, CA*

- Design simulations to design and validate research concepts catering to D.o.D. and other private customers (SBIR)
- Write technical reports
- Proposal Writing (SBIR)
- Embedded Code Optimization
- Data classification and prediction (A.I., Machine Learning)

Environment: Python, scipy, scikit learn, conda, numpy, matplotlib, cuda, C++, OpenGL, RT-Linux, MATLAB, Simulink, FPGA, Intel Quartus Standard 18+, Model-advisor. Research: diverse (night vision, fragmentation, LiDAR, spectroscopy, A.I.)

### **Guidance and Navigation Engineer III (October 2018 – August 2019)**

*Boeing, Long Beach, CA*

- Implement Tier 4 requirements for next generation of avionics software (Simulink)
- Design Simulink DO-178C models (traceability)
- Verify and optimize generated C code
- Integrate code in Boeing Flight Management System (Hardware in the loop, HIL)

Environment: DO-178C, MATLAB, Simulink, Model Advisor, MA, Simulink Code Inspector, SLCI, DOORS, Requirements, Traceability, C, C++, TLC, Target Language Compiler, VxWorks, Codegen, Git, Jira, Confluence, Atlassian, Linux, VxWorks. Xilinx ZCU102 w/ VxWorks 653 Arm (embedded)

### **Software Instructor (August 2015 – March 2019)**

*California College San Diego, San Marcos, CA*

- Teaching and preparing the following class topics:  
IOS Development with Swift – Relational Database Data Modelling – Android Development with Android Studio (SDK 6.x) – Java EE (OOP Best Practices) – API Architecture and Development with C++ (Design Patterns, MS Visual Studio 2017) – ASP.NET Website Back-End Development with C# – Database Development with MS SQL Server 2014 and MySQL – Linux Bash Scripting – Front-End Website Development (JavaScript, CSS, HTML)

### **Engineer – Robotics (April 2015 – August 2015)**

*Neato Robotics, Newark, CA*

- Main Function: Write and review functional requirement documents for a new Simultaneous Localization And Mapping (SLAM) API, geared toward easier debugging
- Assess navigation bug fixes for Neato's BotVac, Slide, and Vorwerk's intelligent vacuum cleaner robots
- Refactor Neato's navigation code (250K lines of C/C++) to improve its maintenance
- Test refactored code by compiling it with QNX Momentics Compiler on a remote server, to subsequently integrate it to a custom QNX image which is then burnt to the robot's EMMC
- Maintain development branch of refactored navigation code on local SVN servers, and merge to trunk after peer code review
- Write MATLAB scripts to fix bugs in Neato's User Interface asset generator

### **Algorithm Engineer – (August 2013 – January 2015)**

*Blast Motion, Carlsbad, CA*

- Main Function: Development of Activity Discrimination Algorithms (ADA) to prevent unwanted actions to be transferred through the BLE link between the Blast Sensor and Blast's IOS proprietary App. The ADAs are filtering uninteresting actions for Golf Putt, Golf Swing, Hockey Slapshots, Baseball Bat Swings, and Tennis Forehand. ADAs must run on an 8051 processor while the latter must maintain at the same interrupt level the BLE connection active.
- Developed a proof of concept for Baseball uninteresting actions to filter using the MATLAB neural network toolbox with a failure to filter of less than 10%
- Ported the "Fast Artificial Neural Network" (FANN) neural network library to enable it to work in an environment deprived of file system
- Developed a "C-friendly" mex-file-based MATLAB environment to develop ADAs in C while testing those same algorithms within MATLAB, in order to be able to easily produce statistical data regarding acceptance / failure rates for the dual entities Valid Baseball Swings / Misfires.
- Developed a C++ tool to convert JSON files generated during data capture to CSV files
- Working knowledge of ST Micro MEMS sensors and their calibration process

### **Flight Test Engineer (January 2007-May 2010)**

*Department of Aerospace Engineering, University of Kansas, Lawrence, KS*

- Data polling driver development for the NAV420 Inertial Measurement Unit (I.M.U.) in C/C++
- Conversion of a Simulink-designed UAS robust control and guidance system to Freescale MPC565 machine code using embedded C/C++ and MATLAB TLC scripting
- Managing and testing and maintenance of AeroComm (Radio) and Iridium (Satellite) connections between flight computer rugged laptops and Unmanned Aerial System (UAS) avionics box
- Maintenance, testing, and test case writing for a real-time multi-threaded UAS health monitoring system
- Remote flight test log file analysis
- Development of a real-time customizable plotting system to graph over the air in-flight UAS telemetry data (QT for General GUI layout, QML for the MathType-like legends)

**Software Developer and Beta Tester (January 2006-July 2006)***CBA, Avignon, France*

- Software tool development in C++ for a hand-held electronic device to merge and extract text-based results of beta tests in order to automate analysis summary generation, reducing running time from several hours using the naked eye to a few seconds.

**Flight Test Engineer – Data Transfer (April 2005 - August 2005)***Department of Aerospace Engineering, University of Kansas, Lawrence, KS*

- C++ module development for a Yamaha R MAX UAS helicopter (drone) to reduce telemetry data download times from 2 minutes to 3 seconds using on-the-fly data compression and migration from serial interface to Ethernet.

**Aerospace Engineer – Non-Destructive Analysis Software Optimization (September 2004 - December 2004)***SKF, Rouvignies, France*

- Reduced the running time of homegrown LabVIEW-developed B.E.A.V.E.R.S. (**B**arkhausen **E**ffect **A**nalysis, **V**isualization and **E**stimation of **R**esidual **S**tresses in ferromagnetic materials) software from 45 minutes to 47 seconds.

**SOFTWARE DEVELOPMENT**

Core Languages	Scripting Languages	Mobile Development
C++ (19 yrs, Qt 5) C# (3 yrs, WinForms, ASP.NET 4.x) Simulink (20+ yrs)	JavaScript (3 yrs) Python (3, 3 yrs) MATLAB (20 yrs, Scientific Development), Simulink Octave (Scientific Development) Bash Scripting (15 yrs, Linux)	Java SE/EE (Android Studio, 3 yrs) Swift (iOS, 1 yr)

**TECHNOLOGIES**

Technology	Application
Design Patterns	Software Development
SVN & Git Version Control	Software Development
MEMS Sensors	Algorithm Engineering
Neural Networks, Machine Learning	Algorithm Engineering
Simultaneous Localization And Mapping (SLAM)	Robotics
Linear Control Theory	Aviation
Windows Server 2012	Administration
Principal Component Analysis (PCA)	Data Reduction
Code Coverage Analysis (Test)	Simulink Test
Operating System	Linux Kernel Dev, Windows win32 API

**EDUCATION**

Ph.D. Aerospace Engineering	University of Kansas, USA	June 2013
Master Computer Science	ENSIAME, Valenciennes, France	Sept. 2005
Master (Finances, Marketing, Management)	Univ. Tertiales, Valenciennes, France	Sept. 2005