

# ALEXIS N. BENINI, PH.D.

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Italian Citizenship

U.S. Lawful Permanent Resident (Green Card holder)

**Pronouns: She/Her/Hers**

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## PROFESSIONAL EXPERIENCE

REDWIRE SPACE, LITTLETON, CO, USA

### **Subject Matter Expert - Optical Navigation Capability Lead** (January 2021 - Present)

I currently work on the GN&C system for the Orion Capsule, at Lockheed Martin Human Spaceflight facility. Furthermore, I work with the TT&V team for Orion at the Nasa Johnson Space Center (JSC).

#### *Key Achievements:*

- Machine Learning (ML) algorithms for the RedWire ARGUS camera
- Software modules and plugins for the RedWire ACORN simulation system
- During year 2021 I have been the Vision Navigation Lead for the Firefly Blue Ghost Lunar Lander and I have contributed to the successful completion of the first three major milestones for the Blue Ghost Lunar Lander (SRR, PDR and CDR) with NASA and Firefly representatives.
- Recipient of the RedWire 'At Our Core' Award for year 2022, along with other Orion team members.

DEEP SPACE SYSTEMS, LITTLETON, CO, USA

### **Senior Staff Engineer** (May 2018 – January 2021)

Contributed in the design, development and testing of FPGA based systems, using VHDL. Carried out extensive testing (thermal, radiation, vacuum) of embedded systems. Provided support to third companies concerning the development of vision-based navigation algorithms for spacecrafts, using embedded CPU and GPU systems. Extensive use of lab equipment such as oscilloscope, logic analyzer, programmable power supplies, for testing and debugging. Jira and BitBucket administrator.

#### *Key Achievements:*

- Designed, implemented and delivered computer vision algorithms for autonomous navigation and hazard detection and avoidance for spacecrafts, tested in simulated environment. Algorithms were designed in MatLab and implemented in C/C++ and were heavily based on OpenCV.
- Contributed in the development and testing of firmware for embedded systems based on STM32 MCU, commissioned by NASA. Software developed in C.
- Deep Space Systems Excellence in Engineering Award (October 2021).

GERMANDRONES GMBH, BERLIN, GERMANY

### **Research Scientist** (April 2017 – March 2018)

Led development of the autopilot firmware for the Songbird VTOL UAV. Management of research projects in collaboration with Universities. Research in the field of autonomous navigation of UAVs and fault diagnosis.

#### *Key Achievements:*

- Designed, implemented and delivered embedded C++ software solutions consistent with the product roadmap and released plan milestones. Managed software releases using Jira and Git.
- Organized and conducted extensive field-testing of new firmware features for autonomous navigation of UAVs.

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UNIVERSITY OF DENVER, DENVER, CO, USA

**Research Scientist** (April 2015 – December 2016)

Led research and development for wide range of projects, utilizing analytical, communication, and collaboration skills to capture project success.

*Key Achievements:*

- Directed autonomous landing algorithms for rotary wing UAVs project, integrating vision and inertial sensor, parallel computing, and embedded CPU/GPU systems. All algorithms developed in C++.
- Designed modular HW/SW framework for development of unmanned systems, performing development and testing of mechanical structures, sensors, communication systems, algorithms, and communication protocols to ensure success and reliability.
- **Publications and Patents List:**
  - <https://scholar.google.com/citations?user=y1S4rmqAAAAJ&hl=en&oi=sra>

CIVITANAVI SYSTEMS S.R.L., CIVITANOVA MARCHE, ITALY

**Algorithm Engineer** (February 2014 – March 2015)

Led design, development, and testing of algorithms necessary in providing quality software products. Collaborated with cross-functional team members in development of new products and functions while complying with Civitanavi System's policies and procedures.

*Key Achievements:*

- Developed algorithms for Attitude Heading and Reference Systems (AHRS), Inertial Navigation Systems (INS) and North Finders Systems using Kalman Filter and embedded systems. Algorithms were designed in MatLab and implemented using C and C++.

THALES ITALIA S.P.A., CHIETI, ITALY

**Internship** (January 2011 – December 2013)

Completed European Research Project ARTEMIS Joint Undertaking R3-COP (file number: ART-010000-2010-5). Achieved project goals of overcoming fragmentation of robotic sector through creation of cross-domain platform of methods and tools for design of usable autonomous systems. Additionally, contributed to research on Pedestrian Localization using MEMS IMU and UWB. Designed and implemented Navigation Algorithms for different drone platforms using C and C++.

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## EDUCATION AND TRAINING

POLYTECHNIC UNIVERSITY OF MARCHE, Ancona, Italy

**Ph.D. Degree**, Automation Engineering

Thesis: "Localization and Navigation of Autonomous Systems in Complex Scenarios"

POLYTECHNIC UNIVERSITY OF MARCHE, Ancona, Italy

**Master Degree**, Automation Engineering (Summa Cum Laude)

Thesis: "Designing of a Simulation Environment for Fast Prototyping of Cooperating Avionics Systems"

POLYTECHNIC UNIVERSITY OF MARCHE, Ancona, Italy

**Bachelor Degree**, Automation and Computer Engineering

Thesis: "Designing and Development of Response Plans to Cyber Attacks"