CARLOS ALEXANDRE PONTES PIZZINO

Ph.D. in Eletrical Engineering (Robotics and Control Systems) | Robotics Engineer

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PROFESSIONAL SUMMARY

Senior Engineer with 15+ years' experience developing and deploying autonomous mobile robots and automated tests, with strong expertise in ROS, the Navigation Stack, localisation, and real-world autonomy integration. Holds a PhD in Electrical Engineering (Control and Robotics), completed through collaborative research. Proficient in ROS, C++, Python, and MATLAB/Simulink, with hands-on experience in multisensor fusion pipelines to deliver robust state estimation in real environments. Proven experience delivering production-grade robotics software on physical robots, alongside familiarity with computer vision pipelines for robotics. Recognised for strong problem-solving skills, a collaborative approach, and consistent success working across teams.

EXPERIENCE

Robotics Engineer

Ingeniarius LDA

Oct 2022 – Ongoing Valongo, Porto, Portugal

- Software programming (ROS, C++, Python and Bash);
- Algorithm implementations used in robotics: SLAM, Localisation, Mapping, Navigation, Planning, and Decision-making;
- Implementation of new robotics system architecture and methodologies: scientific paper contribution; and
- Systems validation and maturation.

Visiting Researcher

Heriot-Watt University, Robotics Laboratory

Feb 2022 – Apr 2022 Edinburgh, Scotland, UK

- Performed research on Simultaneous Localization And Mapping (SLAM) system using brain-inspired model;
- Developed algorithms on the Clearpath Husky robot using ROS, Python, C++, openCV and Pytorch.

Electronics Research Engineer

Brazilian Air Force (FAB), Department of Airspace Control (DECEA), Institute of Airspace Control (ICEA)

Jul 2020 – Sep 2022 São José dos Campos, Brazil

- Research Team Member of the "Flight inspection of radio navigational aids using UAS" project;
- Certification Coordinator of Ground Based Augmentation System (GBAS) system in Brazil;
- Project Management Office (PMO) Coordinator;
- Project analyst and Innovation manager.

Electronics Engineer

Brazilian Air Force (FAB), Department of Airspace Control (DECEA), Aeronautical Electronic Material Facility (PAME-RJ)

Nov 2009 – Jul 2020 Rio de Janeiro, Brazil

- Metrology Laboratory manager;
- Provided technical support to other departments as required for solving technical issues;
- Defined specifications and generate reports; and
- Developed, validate and maintain LabVIEW code.

Research Fellow in Robotics

GSCAR Lab - Electrical Eng. Dept., Federal University of Rio de Janeiro

Jan 2007 – Jan 2010 Rio de Janeiro, Brazil

- Participated in the definition and development of robotic platforms;
- Developed electronic circuits with microcontrollers, sensors, electrical actuators and bus interfaces; and
- Developed real-time control systems (MatLab/Simulink).

Electronics Engineer (Internship)

Infineon Technologies AG

Apr 2005 – Aug 2005 Munich, Germany

- Developed firmware for motor control, sensor acquisition and bus communication.

EDUCATION

Ph.D in Electrical Engineering
Area: Control, Automation and Robotics

Federal University of Rio de Janeiro

2017 – 2024

Thesis: "NeoSLAM: Long-term Visual SLAM using Computational Models of the Brain".
Overall objective: Provide robots with the increased capability to continuously learn a large number of variable-order spatio-temporal sequences using an unsupervised learning rule for improving long-term VPR.

M.Sc in Electrical Engineering
Area: Control, Automation and Robotics

Federal University of Rio de Janeiro

2006 – 2009

Thesis: "Sensorless Nonlinear Adaptive Control of an Induction Motor based on Rotor Current".

PGDip in Automation Engineering

SENAI Institute and Prominp (O&G Brazilian Program)

2008 – 2010

Work: "Dynamic System Identification Using Neural Networks".

B.Sc in Electronics Industrial Engineering

Federal Center of Technological Education (CEFET/RJ)

2001 – 2006

Work: "Speed Control of Three Phase Induction Motor with CAN Bus Interface".

PROJECTS

REMORA: Swarm Robotics for the Improvement and Observation of Aquatic Resources.

Ingeniarius LDA

Jul. 2025 - Ongoing Porto, Portugal

- REMORA is a project focused on improving aquatic resource management in Portugal and the EU through swarm robotics and digital twins, targeting TRL 6 for the blue economy.
- As a robotic engineer, I develop software for swarm robotic systems, focusing on coordination, communication, and collective behaviour in distributed robotics.

HARD-HAT: Socially aware navigation for safer heavy-duty construction.

Ingeniarius LDA

Jun. 2025 - Ongoing Porto, Portugal

- HARD-HAT aims to integrate the Cooperative Human-Aware Navigation (CoHAN) framework for controlling heavy robots, alongside rule-based Natural Language Understanding.
- As a Senior Robotics Engineer, I lead the integration of the CoHAN planner and rule-based NLU modules on heavy robotic platforms.

CRIARTE: Construction with Intelligent Robotics and Revolutionary Architecture of Emerging Technologies

Ingeniarius LDA

Jan. 2025 - Ongoing Porto, Portugal

- CRIARTE integrates mobile robotics, Artificial Intelligence, Digital Twins, and augmented reality within the construction sector to enable large-scale autonomous robots to collaborate with humans.
- As a robotic engineer, I design and implement real-time navigation algorithms for dynamic environments using C++, Python, and ROS Noetic, integrating mapping, localisation, and perception.

Fortis: Multi-Modal and Multi-Aspect Holistic Human-Robot Interaction

Ingeniarius LDA

Jan. 2024 - Ongoing Porto, Portugal

- FORTIS is an EU-funded project focused on enabling long-term, human-like interaction between robots and humans.
- As a robotic engineer, I design and implement navigation and perception algorithms for an Autonomous Pallet Loader using C++, Python, and ROS, enabling real-time obstacle avoidance and route optimisation in dynamic environments.

OpenSwam: Orchestration and Programming ENergy-aware and collaborative Swarms With AI-powered Reliable Methods

Ingeniarius LDA

Jan. 2023 - Ongoing Porto, Portugal

- OpenSwarm is an EU-funded project advancing collaborative and distributed intelligent node technologies.
- As a robotic engineer, I develop UAV mapping, localisation, and perception algorithms using the Multi-Robot Systems framework of the Czech Technical University, and actively participate in consortium meetings and EU reviews.

FEROX: Fostering and Enabling AI, Data and Robotics Tech for Supporting Human Workers in Harvesting Wild Food

Ingeniarius LDA

Set. 2022 - Ago 2025 Porto, Portugal

- FEROX is an EU-funded project applying AI, data, and robotics to improve working conditions for wild fruit harvesters and optimise harvesting operations.
- As a robotic engineer, I developed UAV-based mapping, localisation, and perception algorithms using the Multi-Robot Systems framework of the the Czech Technical University.

SafeForest: Semi-Autonomous Robotic System for Forest Cleaning and Fire Prevention

Ingeniarius LDA

Oct. 2022 - Jul. 2023 Porto, Portugal

- SafeForest is a project developing advanced robotic systems for forest fire prevention and urban–forest interface monitoring.
- As a robotic engineer, I implemented tightly coupled LiDAR inertial odometry with smoothing and real-time mapping for robot state estimation.

NeoSLAM: Long-term Visual SLAM using Computational Models of the Brain

Federal University of RJ and Heriot-Watt University

Dec. 2019 - Mar. 2024 Rio de Janeiro/Edinburgh

- NeoSLAM is a novel hybrid computational model which is inspired by the hippocampal–neocortical network for Visual Place Recognition used in SLAM and (re-) localization systems in changing conditions.
- I work on the development of the model and software based on Python, C++, Matlab, ROS/Gazebo with Clearpath Husky robot.

Flight inspection of NavAids using UAS

Brazilian Air Force - Institute of Airspace Control

July 2020 - Oct. 2022 São José dos Campos

- The aim of this project is to analyze the use of Unmanned Aerial Vehicles (UAV) for field measurements required for commissioning and regular maintenance of Instrument Landing Systems (ILS).
- In this project, I developed MATLAB codes for path planning.

LAICA

Brazilian Air Force - Department of Airspace Control

Jan. 2010 - Dec. 2011 Rio de Janeiro

- LAICA is an automatic calibration system which allows to calibrate a large number of electrical sourcing and measuring instruments. It drastically reduced the calibration time of many electrical testing equipment and electrical meters.
- In this project, I managed a team of two Electronics Engineer and three technicians. Besides, I developed a software based on LabVIEW. In 2018, I was recognized for exemplary performance and contributions to the Brazilian Airspace Control.

DIANE

ARES/COPPETEC/GSCAR

Jan. 2009 - Jan. 2010 Rio de Janeiro

- DIANE is an Explosive Ordnance Disposal Robot and was constituted of track for locomotion, arms to climb and descend stairs, a robotic manipulator of 3 DOF to manipulate the explosive, and cameras for operation.
- I worked on the electronic architecture based on Puma PC/104-Plus single board computer with QNX, EPOS positioning controllers by Maxon and CANopen.

CERTIFICATES

LabVIEW Associate Developer

National Instruments

SN: 100-311-2784, 2011-2013

IELTS Certificate

British Council

CEFR Level B2, 10/2019

COURSES

MATLAB and Simulink Fundamentals and Simulink for Aerospace System Design

Opencadd

Nov 2020 – Dec 2020 São José dos Campos, Brazil

Mastering ROS Robot Manipulators

The Construct

Feb 2020 – Feb 2020 Barcelona, Spain

LabVIEW Core 1, 2 and 3 and Connectivity

National Instruments

Dec 2011 – Dec 2011 São Paulo, Brazil

PROGRAMMING

ROS, ROS2
C/C++, Python, Linux, Bash
Matlab/Simulink
LabVIEW
Latex

HONORS & AWARDS

- **Federal Civilian Employee of the Year Award 2018** - Aeronautical Electronic Material Facility (PAME-RJ), Department of Airspace Control's organization.
- **I Technology Innovation Awards - 2016**, Department of Airspace Control, Brazil. The work *Development of a new automatic calibration method for Radio Frequency Plug-In Elements* was selected as 1st place with honor mention.

STRENGTHS

Creative | Proactive | Collaborative Attitude | Control Systems Design | Robotics | SLAM | ROS | C/C++ | Python | Comput Vis | Hands-on experience | Deploying in real robots

LANGUAGES

Portuguese (native)
English (IELTS B2)
Italian
German

MOST PROUD OF

Software patent: LAICA
BR512013000501-9

B.SC Diploma
Final mark 81/100