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About Me

I fell in love with programming, hardware, and robotics—and along the way, I’ve learned a lot (and I keep learning every day). I am fluent in classics like **C**, **C++**, **Python**, and **JavaScript**, and I also explore **Go**, **VHDL**, and embedded C for hardware projects.

My main interests include:

- **Robotics & Embedded Systems:** STM32, ESP32, NRF24L01+, FPGA design, sensors, and motor control.
- **Computer Vision & UAV Navigation:** ROS2, SLAM, extended Kalman filters, and visual–inertial odometry.
- **Web Development & Cloud:** Next.js, Firebase, Firestore, Cloud Functions, and modern JavaScript frameworks.
- **Remote Sensing & GeoAI:** DJI drones, Mapillary, Google Earth Engine, and CBERS-4A satellite data.

“Striving to innovate at the intersection of hardware and software.”

Work Experience

Projects

Education

Publications

1. Mateus, M. G., Corçaque, P. L., Pedroso-Jr, A. A., da Silva, A. C., Oliveira, G. C., de Almeida, G. P., **Silva, T. G.**, Guerra, R. S., and Drews-Jr, P. L. J. (2023). *Visual sensors benchmark for development of an autonomous navigation setup for a hybrid unmanned aerial underwater vehicle*. In *Climbing and Walking Robots Conference*, Springer, pp. 203–214.
2. Oliveira, G. C., Evald, P. J. D., Mateus, M. G., Corçaque, P. L., Pedroso-Jr, A. A., da Silva, A. C., de Almeida, G. P., **Silva, T. G.**, Drews-Jr, P. L. J., and Neto, J. A. (2023). *Low-cost prototype for analysis and monitoring of underwater structures*. In *Climbing and Walking Robots Conference*, Springer, pp. 46–57.

Mar 2023–UFSM – Research & Development Projects
Current

Embedded Systems & Robotics Researcher

Designed and implemented digital circuits and FPGA modules (VHDL/Verilog) for robotics, reducing logic usage by 20%.

Developed firmware for STM32 microcontrollers (PWM, H-Bridge motor control, quadrature encoders) for the Very Small Size Soccer (VSSS) robot league.

Built wireless NRF24L01+ communication modules for real-time telemetry with low latency.

Engineered visual–inertial odometry and extended Kalman filter algorithms using ROS2 and Python, improving UAV navigation accuracy by 35%.

Integrated remote sensing pipelines (DJI drones, Mapillary, Google Earth Engine, CBERS-4A) to produce high-resolution maps (0.6 m/px).

Aug 2024–IEADSM Digital Platform
Current

Full-Stack Developer

Architected a Next.js 15 and Firebase platform for ministries, events, podcasts, and media sharing.

Implemented family-based registration with CPF linkage, reducing duplicate accounts by 90%.

Built dynamic pages (events, podcasts, ministries) with React-Hook-Form, Zod, and TailwindCSS.

Automated continuous integration and delivery using Firebase CLI and GitHub Actions, cutting downtime by 70%.

Integrated social media feeds and secured the platform with Firestore rules and App Check.

3. Schmitt, N. I., de Castro, B. S., Cukla, A. R., Tarnowski, G., Emmendorfer, L. R., de Andrade, T. A. N., and **Gomes Silva, T.** *A comparison between deep reinforcement learning methods applied to the control of a mobile robot in a Very Small Size Soccer environment.* Journal article (under review).
4. **Silva, T. G.**, Bonfá, K. F., Goulart, G. M., do Nascimento, M. F., Brisolla, L. M., Mahlke, A., Dorneles, E. L., Bevilacqua, S., dos Santos, L. M., Cukla, A. R., et al. (2025). *Simulation-based autonomous drone navigation for security and monitoring using deep reinforcement learning.* In *Brazilian Conference on Robotics (CROS)*, IEEE, volume 1, pp. 1–6.
5. Da Silva, L. M., **Silva, T. G.**, Costa, E. F. S., Righi, J. P. A., Schmitt, N. I., and Cukla, A. R. (2025). *Deep reinforcement learning using the Soft Actor-Critic method for goalkeeper control in a Very Small Size Soccer environment.* In *Brazilian Conference on Robotics (CROS)*, IEEE, volume 1, pp. 1–6.

6. Kolling, Á. H., Gonçalves, M., Castro, B. S., Glass, G., Pereira, L. F., Schmitt, N. I., Lik, V., **Gomes Silva, T.**, Bevilacqua, S., Cukla, A., et al. (2023). *Simulation-based approaches for autonomous security and monitoring using drones*. In *International Conference on Hybrid Intelligent Systems*, Springer, pp. 143–151.

VSSS-League

Robot Soccer Framework

C++, Python, ROS2, STM32, VHDL | GitHub

Developed firmware for STM32 with PWM and quadrature encoder reading for precise robotic motion.

Designed state machine logic in VHDL for motion sequencing and control.

Integrated ROS2 middleware connecting AI vision modules with embedded hardware for autonomous play.

NAVMS (Navigation Multi-Sensor) **Visual-Inertial Navigation Pipeline**

Python, ROS2, OpenCV, PyTorch | GitHub

Engineered a SuperVIO pipeline fusing IMU and camera data for UAV navigation.

Created ROS2 nodes for image fusion, improving pose estimation accuracy by 35%.

Applied deep learning models for feature matching and real-time scene recognition in outdoor drone flights.

GeoVPR Platform

Remote Sensing & GeoAI Pipeline

Next.js, Python, Google Earth Engine, Mapillary | GitHub

Integrated DJI drone imagery, Mapillary datasets, and CBERS-4A satellite data to build a scalable mapping system.

Automated tiling and rendering with the Earth Engine API, achieving high-resolution mapping (0.6 m/px).

Designed a pipeline for georeferenced alignment and visual place recognition in UAV localization tasks.

IEADSM Digital Platform **Full-Stack Community Website**

Next.js 15, Firebase, Firestore, Cloud Functions | <http://thxssio.com>

Built a dynamic community platform supporting user registration, ministries, events, podcasts, and media sharing.

Implemented CPF-based family registration with automatic merging, reducing duplicate records by 90%.

Automated deployment via Firebase CLI and GitHub Actions, ensuring stable releases with minimal downtime.

Mar 2022–B.Sc., Computer Engineering, Universidade Federal de Santa Maria, Santa Maria,
Current Brazil
Focus on Robotics, Embedded Systems, Computer Vision, and Reinforcement Learning.