

Overview

PhD in control and robotics with 15 years experience working in control system design and 10 years experience in design and implementation of guidance, navigation, and control systems for marine, space (rocket and satellite), and aerial autonomous robotic vehicles.

Experience in leading GNC/robotic teams working for projects on autonomous robotic systems in collaboration with the European Space Agency (ESA), European Commission, space and defense companies in Europe and UAE, and research universities across US, Europe, and Asia.

Expertise in control system design (PID, H_∞ , MPC, nonlinear control, ...), estimation methods (EKF), Guidance for target interception (PNG), swarm robotics, and good knowledge on sensor fusion for navigation systems (INS, visual, ranged-only with acoustic sensors).

Education

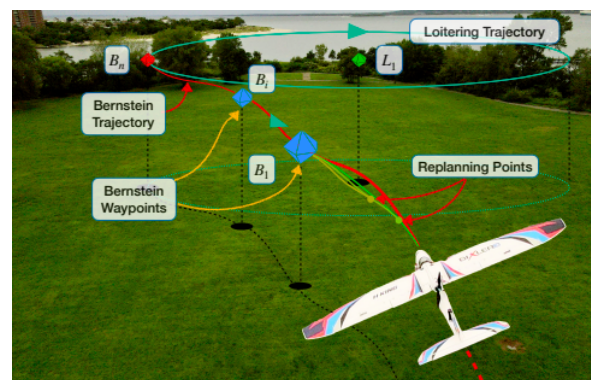
- July 2021 **PhD in cooperative control of multi autonomous robotic systems**, *Tecnico Lisboa, Uni. of Lisbon*, Portugal, and *Norwegian University of Science and Technology*, Norway.
Advisor: Prof. Antonio M. Pascoal.
- April 2015 **M.S. of Research in process control**, *University Technology Petronas (UTP)*, Malaysia.
- April 2010 **B.S. in automatic control**, *Ho Chi Minh City University Technology (HCMUT)*, Viet Nam.

Research and development work experience

- 2024–Current **Lead Engineer in GNC**, at *Autonomous Robotic Center, TII*, Abu Dhabi, UAE.
Being technical responsible for R&D projects on autonomous aerial vehicles, in collaboration with industry and academia partners:
- Swarm UAVs for simultaneous target attack: responsible for developing cooperative trajectory planning and trajectory tracking control for swarm fixed-wing UAVs, to attack targets simultaneously.
 - New York University: managing collaborative research on optimal trajectory planning and control for autonomous fixed-wing UAVs.
 - Beijing Institute of Technology: managing collaborative research on guidance for target interception and cooperative formation control of multiple fixed-wing UAVs.

Software used: ROS2, PX4, Gazebo, Matlab/C++/Python

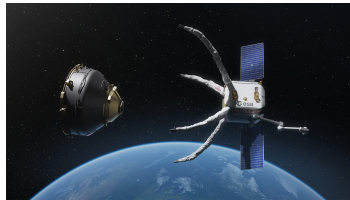
Vehicles: tested successfully with several types of UAVs, eg. AYK 250



2021–2023 **Technical lead and GNC Engineer**, at *Deimos-Space*, Lisbon, Portugal.

Responsible for GNC algorithm development and control system team lead for the following projects:

- ClearSpace (clearspace.today)
 - Control and Modeling Team Lead: responsible for the design of control systems for autonomous robotic space vehicles developed by ClearSpace, a client company based in Switzerland, with the mission of removing debris from the space. My responsibilities encompass various aspects, such as coordinating a control team, constructing simulation models, implementing control systems, conducting stability analyses, and testing. One of my key contributions is the 6DOF H_∞ controller developed for the rendezvous phase, which performed exceptionally well and helped the project pass the "proof of concept" phase assessed by ESA.
 - Orbital Phase Team Lead: responsible for the development of orbital propagator and estimator, attitude control, and guidance algorithms for the entire orbital phase.
- Launching vehicles with Orbex (orbex.space):
 - Control and Modeling Team Lead: responsible for the modeling, simulation, and the design of control systems for launching vehicles developed by Orbex, a customer company based in UK. This also includes filter design to mitigate impact of sloshing and flexible modes. The control system designed by the team worked robustly and passed the critical design review (CDR) of the project, meeting the requirements of both the customer company and ESA.



2016–2021 **PhD work**, at *ISR/IST, Lisbon, Portugal* and *AMOS center, NTNU, Trondheim, Norway*.

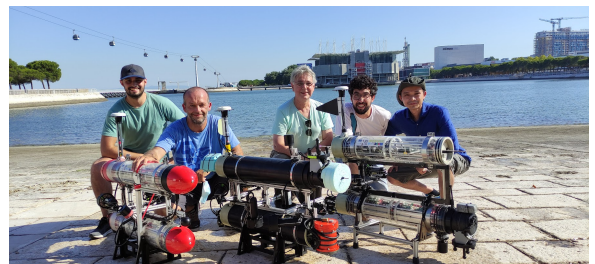
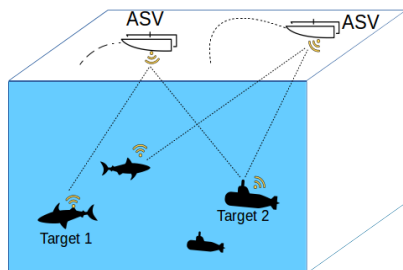
My PhD work involves development of guidance, control, and navigation algorithms for single and networked multiple autonomous robotic vehicles, including:

- Develop and test cooperative formation control, path following control algorithms for multiple autonomous vehicles using tools from nonlinear control, model predictive control, and network science.
- Develop cooperative motion planning, control, and navigation strategies for networked multiple robots to localize and pursue multiple targets using only range measurements from the robots to the targets. Tools used for this work include nonlinear and network control theory, distributed Extended Kalman Filter, and numerical optimizations.
- Implement and conduct field trials to test the algorithms developed with marine robots developed at IST Lisbon.

See more the PhD work at: <https://nt-hung.github.io/research/>

Software used: Matlab/C++/Python/ROS

Robots used: **MEDUSA** - marine robots developed by the IST Lisbon



2012–2015 **Modeling and control research engineer, EE department, UTP, Malaysia.**

My master research work involves system identification and control of industrial process plants, including:

- Develop black-box models (ARX, state-space, neuro-fuzzy) for a lab-scaled gaseous pilot plant.
- Develop and implement control strategies (PID/MPC) to regulate the pressure in the pilot plant.

Software used: *Matlab/Simulink*

Hardware used: PCI Card interface/ real gaseous pilot plant

2010–2012 **Control engineer, Schneider Electric automation design center, HCMUT, Viet Nam.**

At HCMUT my work includes

- Design and setup a research and training lab about industrial networked control systems using instruments sponsored by Schneider Electric.
- Develop a solution for Programmable Logic Controller (PLC) redundancy based with Unity Pro software and Premium PLCs of Schneider Electric

Technical skills

Experience working with ROS1/ROS2, PX4, Matlab/Simulink, C++, Python, Gazebo, and different optimization software (Casadi, OSQP,CVX...)

Research and selected publications

Research page: <https://nt-hung.github.io/research/>

Journals:

- J7. Zichao Liua, Ziyi Wua, Toshiharu Tabuchi, **Nguyen Hung**, Cristino Souza, Chang-Hun Lee, Shaoming He, "A Data-Driven Guidance Strategy for Target Interception with Terminal Time Constraint", Journal of Aerospace Engineering, 2025, accepted. [download](#)
- J6. **Nguyen Hung**, Eduardo Cunha, Francisco Branco, Antonio Pascoal, "Target localization and pursuit with networked robotic vehicles: theory, simulation, and experiments", Journal of Field Robotics, 2024. [download](#)
- J5. **Nguyen Hung**, Francisco Rego, Joao Quintas, Joao Cruz, Marcelo Jacinto, David Souto, Andre Potes, Luis Sebastiao, Antonio Pascoal "A review of path following control strategies for autonomous robotic vehicles: theory, simulations, and experiments", Journal of Field Robotics, 2022. [download](#)
- J4. **Nguyen T. Hung**, Francisco Rego, Antonio M. Pascoal, "Cooperative distributed estimation and control of multiple autonomous vehicles for range-based underwater target localization and pursuit", IEEE Transactions on Control Systems and Technology, 2021. [download](#)
- J3. **Nguyen T. Hung**, Antonio M. Pascoal, Tor A. Johansen, "Cooperative path following of constrained autonomous vehicles with model predictive control and event-triggered communications", International Journal of Robust Nonlinear Control, 2020. [download](#)
- J2. **Nguyen T. Hung**, N. Crasta, David Moreno-Salinas, Antonio M. Pascoal, Tor A. Johansen, "Range-based target localization and pursuit with autonomous vehicles: An approach using posterior CRLB and model predictive control", Robotics and Autonomous Systems, 2020. [download](#)
- J1. **Nguyen T. Hung**, Antonio M. Pascoal, "Consensus/synchronization of networked nonlinear multiple agent systems with event-triggered communications", International Journal of Control, 2020. [download](#)

Book chapters:

- B1. Francisco C. Rego, **Nguyen T. Hung**, Colin N. Jones, Antonio M. Pascoal and A. Pedro Aguiar, Chapter 8: "Cooperative Path- Following Control with Logic-Based Communications: Theory and Practice", Navigation and Control of Autonomous Marine Vehicles, IET books, 2019. [download](#)

Conferences:

- C8. Luca Morando, Sanket Ankush Salunkhe, Nishanth Bobbili, Jeffrey Mao, Luca Masci, Cristino De Souza Jr., **Nguyen Hung**, Giuseppe Loianno, "Trajectory Planning and Control for Differentially Flat Fixed-Wing Aerial Systems, ICRA 2025. [download](#).
- C7. Rodrigo Rego, **Nguyen T. Hung**, Antonio Pascoal, "Cooperative Motion Control Using Hybrid Acoustic-Optical Communication Networks", CAMS2021, 2021. [download](#).
- C6. **Nguyen T. Hung**, Antonio M. Pascoal, "range-based navigation and target localization: observability analysis and guidelines for motion planning", IFAC2020, to appear. [download](#)
- C5. J. Quintas, **Nguyen T. Hung**, et al., "AUV path planning, navigation, and control using geophysical data," OCEANS 2019 - Marseille, Marseille, France, 2019. [download](#)
- C4. **Nguyen T. Hung**, F. C. Rego and A. M. Pascoal, "Event-Triggered Communications for the Synchronization of Nonlinear Multi Agent Systems on Weight-Balanced Digraphs," 2019 18th European Control Conference (ECC), Naples, Italy, 2019. [download](#)
- C3. **Nguyen T. Hung**, F. Rego, N. Crasta, Antonio Pascoal, "Input-Constrained Path Following for Autonomous Marine Vehicles with a Global Region of Attraction", The 11th IFAC Conference on Control Applications in Marine Systems, Robotics, and Vehicles–CAMS 2018, Opatija, Croatia. [download](#).
- C2. **Nguyen T. Hung**, Antonio Pascoal, "Cooperative Path Following of Autonomous Vehicles with Model Predictive Control and Event-Triggered Communications", 6th IFAC Conference on Nonlinear Model Predictive Control, Wisconsin, USA, 2018. [download](#)
- C1. Francisco C. Rego, **Nguyen T. Hung**, Antonio Pascoal, "Cooperative Path Following of Autonomous Marine Vehicles: Theory and Experiments", IEEE OES Autonomous Underwater Vehicle, Porto, Portugal, 2018. [download](#)

Full publications: [Google scholar](#)

Academia services

Invited reviewer for IEEE Transaction on Automatic Control, IEEE Transactions on Robotics, IEEE Robotics and Automation Letters, Automatica, Journal of Field Robotics, ...

Awards/Honors

- 2019-2021 Research scholarship, awarded by the *IST Lisbon*.
- 2016-2018 Marie-Curie Fellowship for Early Stage Researcher, awarded by the *EU commission*.
- 2013-2015 Master scholarship, awarded by the *UTP*.
- 2011 First runner up for a "control and automation solution for saving energy in university campus", Singapore 2011, awarded by *Schneider Electric of South-East Asia*.
- 2011-2012 Exemplary young lecturer, awarded by *HCMUT*.
- 2005 Third place in selection of national gifted student in Physics, awarded by the *Ministry of Education of Viet Nam*.

Languages

Vietnamese (Native), English (Proficient), Portuguese (Basic)