

Morten Nissov

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SUMMARY

Robotics researcher specializing in state estimation and control of robotic systems in challenging, field environments. Experienced with multi-sensor fusion (radar, vision, and LiDAR), from low-level sensor integration to high-level algorithmic development. Developed hardware-software solutions for real-time multi-sensor synchronization. Collaborating with a team of researchers to develop a software framework for enabling autonomy across diverse aerial and ground robot platforms.

EDUCATION

Ph.D. in Engineering Cybernetics

Apr. 2022 – Expected May 2026

Norwegian University of Science and Technology

- Attended EECI 2024 Equivariant observers: applications to autonomous systems
- Thesis: *Perception in Degraded Environments: Sensor Fusion through the Lens of FMCW Radar*
- Advisors: Prof. Dr. Kostas Alexis (advisor), Prof. Dr. Stefan Leutenegger (co-advisor)

M.Sc. in Electrical Engineering

Sep. 2019 – Jul. 2021

Technical University of Denmark

- Graduated in the Honors program
- Attended EECI 2020 Introduction to Nonlinear Systems and Control
- Thesis: *Cyber-resilient Navigation System for Highly Automated Vessels*

B.Sc. in Electrical Engineering

Sep. 2016 – Jul. 2019

Technical University of Denmark

- Thesis: *Manoeuvring Control of Remotely Operated Vehicles*

National Outdoor Leadership School

Sep. 2014 – Dec. 2014

Lander, Wyoming

EXPERIENCE

Ph.D. Candidate

Apr. 2022 – Expected May 2026

Department of Engineering Cybernetics, NTNU

Trondheim, Norway

- Developed and field tested radar-based methods for GNSS-denied estimation on aerial robotic platforms
- Designed, implemented, and tested hardware and software necessary for performant estimation and control systems for real-world robotic applications
- Currently co-developing the Unified Autonomy Stack, a software framework for enabling autonomy across robot embodiments

Visiting Researcher

Jun. 2023 – Aug. 2023

Jet Propulsion Laboratory, NASA

Pasadena, California

- Investigated the use of radar for navigation of high-speed ground vehicles in challenging environments, demonstrating increased robustness in featureless environments
- Collaborated with JPL researchers (from 347J) from the RACER team to field test developed methods

Robotics Engineer

AgriRobot

Sep. 2021 – Mar. 2022

Kgs. Lyngby, Denmark

- Integrated and field tested perception systems (including LiDAR, radar, and vision sensors) for autonomous agricultural vehicles
- Implemented a geofencing algorithm to ensure vehicle remains within user-defined boundaries

Teaching Assistant

Department of Automation and Control, DTU

Sep. 2018 – May 2021

Kgs. Lyngby, Denmark

- Teaching assistant for Linear Control Design 1 and Linear Control Design 2 courses

SKILLS

Computer Languages

C, C++, Python, MATLAB

Tools

Git, PX4, ROS, ROS2

Libraries

Eigen, GTSAM, OpenCV, PCL

Theoretic

Computer vision, Lie theory, state estimation, Kalman filtering, factor graphs, control theory

Practical

Camera calibration, embedded programming, field testing, Linux, basic PCB design, rapid prototyping, sensor integration, sensor synchronization

OPEN SOURCE CONTRIBUTIONS

RadVIO

A tightly-coupled radar-visual-inertial odometry system for robust state estimation in degraded environments.

Unified Autonomy Stack MIMOSA

A field-tested software framework for enabling autonomy across diverse robot platforms. A multimodal fusion framework, able to integrate LiDAR, radar, or vision data with IMU measurements for robust state estimation in degraded environments.

PX4-CBF

A PX4-autopilot integrated control barrier function (CBF) safety filter for ensuring safety of autonomous aerial vehicles.

Scientific Contributions

PUBLICATIONS

Journal Articles

- 2025 P. De Petris, **M. Nissov**, and K. Alexis, “Morphy: A Compliant and Morphologically Aware Flying Robot,” *Advanced Intelligent Systems*, vol. 7, no. 7, p. 2400493, Jul. 2025. DOI: 10.1002/aisy.202400493
- 2024 **M. Nissov**, J. A. Edlund, P. Spieler, C. Padgett, K. Alexis, and S. Khattak, “Robust High-Speed State Estimation for Off-Road Navigation Using Radar Velocity Factors,” *IEEE Robotics and Automation Letters*, vol. 9, no. 12, pp. 1146–1153, Dec. 2024. DOI: 10.1109/LRA.2024.3486189

Conference Proceedings

- 2026 **M. Nissov**, M. Singh, and K. Alexis, “Tightly-Coupled Radar-Visual-Inertial Odometry,” in *2026 European Control Conference (ECC)*, Reykjavik, Iceland: IEEE, Jul. 2026
- 2025 J. Hatleskog, **M. Nissov**, and K. Alexis, “IMU-Preintegrated Radar Factors for Asynchronous Radar-LiDAR-Inertial SLAM,” in *2025 IEEE International Conference on Advanced Robotics (ICAR)*, San Juan, Argentina: IEEE, Dec. 2025, pp. 725–732. DOI: 10.1109/ICAR65334.2025.11338704
- 2025 M. Kulkarni, M. Dharmadhikari, N. Khedekar, **M. Nissov**, M. Singh, P. Weiss, and K. Alexis, “UniPilot: Enabling GPS-Denied Autonomy Across Embodiments,” in *2025 IEEE International Conference on Advanced Robotics (ICAR)*, San Juan, Argentina: IEEE, Dec. 2025, pp. 456–463. DOI: 10.1109/ICAR65334.2025.11338632
- 2025 N. Misyats, M. Harms, **M. Nissov**, M. Jacquet, and K. Alexis, “Embedded Safe Reactive Navigation for Multi-rotors Systems using Control Barrier Functions,” in *2025 International Conference on Unmanned Aircraft Systems (ICUAS)*, Charlotte, NC, USA: IEEE, May 2025, pp. 697–704. DOI: 10.1109/ICUAS65942.2025.11007827
- 2024 P. De Petris, **M. Nissov**, M. Harms, and K. Alexis, “Design, Modeling, Control and Experimental Evaluation of Flexy: A Novel Compliant Quadrotor,” in *2024 International Conference on Unmanned Aircraft Systems (ICUAS)*, Chania - Crete, Greece: IEEE, Jun. 2024, pp. 31–38. DOI: 10.1109/ICUAS60882.2024.10557063
- 2024 **M. Nissov**, N. Khedekar, and K. Alexis, “Degradation Resilient LiDAR-Radar-Inertial Odometry,” in *2024 IEEE International Conference on Robotics and Automation (ICRA)*, Yokohama, Japan: IEEE, May 2024, pp. 8587–8594. DOI: 10.1109/ICRA57147.2024.10611444
- 2024 **M. Nissov**, S. Khattak, J. A. Edlund, C. Padgett, K. Alexis, and P. Spieler, “ROAMER: Robust Offroad Autonomy using Multimodal State Estimation with Radar Velocity Integration,” in *2024 IEEE Aerospace Conference*, Big Sky, MT, USA: IEEE, Mar. 2024, pp. 1–10. DOI: 10.1109/AERO58975.2024.10521170
- 2021 **M. Nissov**, D. Dagdilelis, R. Galeazzi, and M. Blanke, “Analysing Cyber-resiliency of a Marine Navigation System using Behavioural Relations,” in *2021 European Control Conference (ECC)*, Delft, Netherlands: IEEE, Jun. 2021, pp. 1385–1392. DOI: 10.23919/ECC54610.2021.9654972

Reports

- 2025 **M. Nissov**, N. Khedekar, and K. Alexis, *Simultaneous Triggering and Synchronization of Sensors and Onboard Computers*, Jul. 2025. arXiv: 2507.05717 [cs.LG]