



Department of Mechanical and Aerospace Engineering
Indian Institute of Technology Hyderabad
Kandi - 502285, Sangareddy, Telangana, India

MAE Seminar Series | Lecture 10



Title: Intelligent Guidance, Control and Path Planning for Autonomous Vehicles in Goal-Oriented Scenarios
Speaker: Dr. Rohit Vishwajit Nanavati
Date, Time, and Venue: 22 May, 2024 (Wednesday), 1400-1500 Hrs., C-LH-9 (Note: Online mode is not available)
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Abstract | Autonomous vehicles have the potential to revolutionize modern defense and emergency response measures of our country. However, this requires advanced algorithms that can navigate dynamic environments while prioritizing time sensitive objectives. A key goal of a country's defense infrastructure is to assess or neutralize potential threats with high accuracy and efficiency. Autonomous vehicles, such as homing missiles or drones, can help achieve this goal while accounting for target-specific interception criteria. Therefore, designing a sophisticated guidance system for these autonomous vehicles that guarantees threat neutralization using minimal target information is critical. However, in scenarios without an objective target or absence of target information, such as the release of chemical, biological, radioactive, or nuclear contaminants from an unknown source location, the design complexity increases. In such cases, autonomous platforms have to *actively interact with their surroundings and gather relevant information* to chart their mission paths and meet their desired objectives. This research seminar aims to highlight my research in addressing the challenges of designing energy and information-efficient guidance, control, and path planning strategies for the aforementioned goal-oriented missions.

About the Speaker | Dr. Rohit V. Nanavati is a post-doctoral researcher at the Aeronautical and Automotive Engineering Department in Loughborough University since December of 2021. He received his B.Tech. degree in Mechanical Engineering from IIT Gandhinagar in 2017, followed by a Ph.D. in Aerospace Engineering from IIT Bombay in 2021. His research interests include path planning algorithms for diverse applications involving autonomous robots, guidance and control of aerospace vehicles, optimal control techniques, and nonlinear control design. He is currently investigating the design and deployment of cooperative path planning algorithms aimed for autonomous multi-robot systems deployed to achieve gas distribution mapping of an area of interest or source term localization useful in CBRN response.
