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Title: Computing for Emerging Aerospace Autonomous Vehicles

Abstract: Aerospace autonomous vehicles are going through a renaissance. Consumer drones, enabled by autonomous visual navigation capabilities, are serving a rapidly-growing number of applications, ranging from entertainment to inspection. The fast-decreasing cost of access to space is enabling miniature autonomous satellites towards better communication, Earth observation, or even launching in-orbit manufacturing and maintenance. In this talk, we outline a set of bleeding-edge technologies enabled by new advances in algorithms, computer architecture, integrated circuits and sensor design. These technologies will enable a spectrum of new vehicles, ranging from the most miniature and long-endurance to the fastest and the most agile, with exciting new applications in aerospace autonomous vehicles. We outline some of the applications and recent progress towards enabling them.

Bio: Sertac Karaman is a faculty member at the Massachusetts Institute of Technology, and the Director of the Laboratory for Information and Decision Systems (LIDS) -- an interdepartmental research laboratory home to more than 30 faculty members and hundreds of researchers working on the next-generation automated inference and decision making systems that closely interact with the existing physical and social systems around us. Sertac Karaman's research focuses on computing for autonomous vehicles. It spans a large breadth of topics, ranging from the foundational aspects in algorithms, computer architecture, integrated circuits, control and estimation theory and robotics to its applications in driverless cars, next-generation drones and autonomous space vehicles. He is the director of the Autonomy and Embedded Robotics Accelerated (AERA) research group, which focuses on fast and agile autonomous vehicles (https://aera.mit.edu), and the co-director of the Low-Energy Autonomy and Navigation (LEAN) research group, which focuses on miniature or long-endurance autonomous vehicles, particularly focusing on the co-design of algorithms and computing hardware (https://lean.mit.edu). He is a co-founder of Optimus Ride, where he acted as President and Chief Scientist. Optimus Ride focused on safe, efficient and sustainable autonomous mobility for all. It was acquired by the automotive-supplier-giant Magna in 2020.