

MEHRNAZ SABET

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EXECUTIVE SUMMARY

I am a researcher and technical leader developing AI-enabled software platforms and large-scale simulation infrastructures to advance, validate, and deploy collaborative autonomous systems. My work bridges the gap between learning-based autonomy and safety-critical deployment by designing systems that enable safe, reliable operation across the national airspace and other safety-critical robotics domains.

I serve as Principal Investigator on a NASA-funded project advancing AI-enabled autonomy, traffic management, and validation infrastructure for advanced air mobility, where I design and deploy city-scale multi-agent simulation systems, develop cooperative learning algorithms under partial observability, and study safety-critical behaviors such as detect-and-avoid and vehicle-to-vehicle coordination. My work has supported government and industry stakeholders in evaluating autonomy under operational constraints, contributing to aviation safety, FAA-aligned evaluation, and national infrastructure readiness.

KEY TECHNICAL CONTRIBUTIONS (SELECTED)

- Engineered a city-scale simulation, training, and validation platform for AI-enabled cooperative autonomous airspace operations, incorporating a patent-pending distributed neural simulation engine.
- Enabled decentralized, hardware-in-the-loop autonomy development and validation by designing real-time multi-agent simulation infrastructure resilient to latency and network degradation.
- Applied the platform to deployment-informed autonomy validation, communications evaluation, and safety-case-relevant testing for next-generation airspace operations.

AWARDS, GRANTS & COMPETITIVE FUNDING

National & Federally Competitive Awards

- **National Artificial Intelligence Research Resource (NAIRR) Award — Principal Investigator — 2025**
Competitive \$200,000+ federally coordinated AI compute resources, administered by the National Science Foundation (NSF), across multiple providers (Hugging Face, Groq, Cerebras, NVIDIA) to support AI-enabled traffic management and autonomous systems research.
- **NASA University Student Research Challenge (USRC) — Principal Investigator — 2024**
Competitive \$80,000 NASA grant awarded by the Aeronautics Research Mission Directorate to advance novel approaches to aviation safety and autonomy.
- **NSF Innovation Corps (I-Corps) National Award — 2023**
Competitive \$50,000 national award recognizing research with strong potential for real-world impact and commercialization.

Infrastructure & Strategic Research Support

- **Partnership Expansion for AI-Enabled Traffic Management — 2024**
Led expansion of my NASA-funded project through industry and government partnerships, supporting FAA-aligned test site initiatives, public safety autonomy research, next-generation aerial communications, and deployment-informed validation of cooperative airspace systems; secured 8+ strategic partners and \$40,000 in additional external support.

Select Honors & Recognition

- **Commercial UAV Expo Innovation Spotlight — Orion | Real-Time Validation Infrastructure — 2026**
Selected for the Commercial UAV Expo's industry-facing Innovation Spotlight showcase recognizing innovative commercial UAV products and services.
- **Special Recognition for Outstanding Review — ACM/IEEE International Conference on Human-Robot Interaction (HRI) Full Papers — 2026**
- **NVIDIA-NASA Hackathon — Selected Participant — 2024**
Chosen for an exclusive cohort working on large-scale, NASA-aligned autonomy projects with direct NVIDIA technical mentorship.
- **Cornell Engineering Commercialization Fellowship — 2023**
Awarded to a small cohort of PhD researchers advancing impactful research-based technologies.
- **NSF Spirit of I-Corps Award — 2023**
Recognized for leadership, execution, and technical excellence during the national I-Corps program.
- **ACM Best Paper Award — 2022**
Awarded for outstanding research contribution.
- **Best Undergraduate Thesis Awards (Multiple) — University of Tehran — 2020**
Recipient of six awards from industry and academia recognizing technical innovation and applied impact.

RESEARCH & TECHNICAL LEADERSHIP

Principal Investigator & Technical Lead

NASA | University Student Research Challenge (USRC) | 2024 - Present

AI-enabled traffic management and simulation platform for cooperative autonomous airspace

- Direct a NASA-funded research project advancing learning-based coordination, detect-and-avoid behaviors, and vehicle-to-vehicle (V2V) interaction for UAS Traffic Management (UTM) and Advanced Air Mobility (AAM) operations under safety-critical and partially observable conditions.
- Conceived, designed, and implemented Orion, a real-time validation infrastructure integrating distributed simulation, hardware-in-the-loop testing, and deployment-informed scenarios for scalable development, testing, and validation of cooperative autonomous airspace operations.
- Developed predictive, decentralized tactical deconfliction and cooperative perception mechanisms that support safe separation under network delay, packet loss, dynamic occlusion, and uncooperative aircraft, and deployment-informed operational stressors.
- Built and validated a first-of-its-kind, all-airborne, intent-first V2V communication and coordination stack using sidelink-class C-V2X modules, supporting fresh, trusted tactical neighborhood exchange for UTM operations under degraded communications.
- Deployed the platform as a shared national testing and research infrastructure, supporting FAA-aligned test site initiatives, public safety autonomy research, national workforce development efforts, and multi-sector partnerships with government and industry.

Lead Researcher — Collaborative Aerial Autonomous Systems

Cornell University | 2021 - Present

- Lead independent research on multi-agent learning and human-autonomy teaming, with a focus on enabling reliable cooperative behaviors between humans and autonomous aerial systems in shared operational environments.

- Developed novel multi-agent training frameworks for learning cooperative behaviors from expert demonstrations in partially observable, multi-agent simulation environments.
- Built a suite of high-fidelity, human-in-the-loop simulation environments to study real-world search-and-rescue and airspace coordination scenarios to support data collection, training, and evaluation.
- Designed and implemented VLM- and LLM-based multi-agent task planning and coordination frameworks enabling zero-shot, decentralized cooperation in complex, partially observable environments without retraining.
- Developed a high-performance multimodal data collection and rendering pipeline enabling large-scale synthetic data generation and reducing deployment risk; the system received multiple competitive awards, including NSF support, and remains actively used for research.

Technical Lead — NVIDIA–NASA Hackathon

NVIDIA | Aug-Sep 2024

- Pretrained and optimized state-of-the-art navigation transformer models on NVIDIA DGX cloud infrastructure, achieving a 55% improvement in training performance and a 40% increase in memory efficiency through accelerated computing techniques.
- Designed and evaluated a compact navigation model architecture optimized for deployment scenarios requiring a balance between performance, generalizability, and computational efficiency.
- Presented results at the Open Accelerated Computing Summit 2024 in a dedicated session on accelerating AI for autonomous navigation at scale.

Entrepreneurial Lead — NSF I-Corps National Program

NSF I-Corps | Jul-Aug 2023

- Led customer discovery and commercialization assessment for an advanced modular simulation platform I developed to validate, optimize, and accelerate deployment of autonomous robot software, hardware, and AI systems.

SWE Intern — Autonomous Systems Group

Microsoft | Jun-Aug 2022

- Designed and implemented a procedural synthetic data generation framework for aerial autonomy, increasing dataset variability by 75% and improving generalization of trained models.
- Developed an adaptive domain randomization approach for type-agnostic, realistic scene augmentation to address sim-to-real transfer challenges.
- Proposed and validated an iterative data collection optimization strategy for efficiently generating synthetic datasets to meet predefined performance targets.
- Conducted experimental evaluations of representation learning methods for localization and vision-based drone navigation using multimodal synthetic data.

SELECTED PUBLICATIONS AND PATENTS

- **Sabet, M.** (2026). *Tactical Separation Provision in High-Volume UTM: Evidence, Requirements, and Communications Architecture for Mixed Airspace*. Computing and Information Science Technical Reports, Cornell University.
- **Sabet, M.** (2026). *Intent-First Aerial V2V for Tactical Coordination and Separation: Protocol and Performance Under Density and Disturbance*. arXiv:2605.20595. Under review at IEEE Transactions on Intelligent Transportation Systems.
- **Sabet, M.** (2026). *When Strategic Deconfliction Alone Becomes Insufficient: A Scenario-Driven Evaluation of Tactical Separation Provision in High-Volume UTM*. Under review at Journal of Air Transportation.

- **Sabet, M.** (2025). *Adaptive Neural Engine for Efficient Distributed Simulation and Training*. U.S. Provisional Patent Application No. 63/821,681, filed 6/11/2025.
- **Sabet, M.,** Palanisamy, P., & Mishra, S. (2023). *Scalable modular synthetic data generation for advancing aerial autonomy*. Robotics and Autonomous Systems, 166, 104464.
- **Sabet, M.,** Orand, M., & McDonald, D. W. (2021). *Designing telepresence drones to support synchronous, mid-air remote collaboration: An exploratory study*. Proceedings of the ACM CHI Conference on Human Factors in Computing Systems.

OPEN-SOURCE SOFTWARE

- **SyncOrSink**, Communication-focused cooperative multi-agent POMDP benchmark with long-horizon coordination tasks, unified interfaces for MARL and LLM-based agents, and scenario families designed to stress collaborative autonomy under partial observability.
Link: <https://github.com/mehrnazZz/SyncOrSink>
- **DAA-MicroBench**, 2D/3D benchmarking environment for evaluating drone detect-and-avoid and tactical deconfliction algorithms across controlled multi-agent scenarios, including optimization-based, and learning-based baselines.
Link: <https://github.com/mehrnazZz/DAA-MicroBench>
- **Squadrone**, Aerial drone-based telepresence platform supporting synchronous remote collaboration through embodied, mid-air human-drone interaction.
Link: <https://github.com/squadrone-core/Squadrone>

PROFESSIONAL LEADERSHIP & NATIONAL SERVICE

Conference & Technical Leadership

- **Technical Discipline Chair**, Human–Machine Teaming | AIAA SciTech 2027
- **Deputy Technical Discipline Chair**, Human–Machine Teaming | AIAA SciTech 2026
- **Session Chair**, Machine Learning & AI/xAI; Human–Machine Interaction | AIAA SciTech 2026
- **Session Chair**, Human–Machine Teaming: Human Performance & Cyber-Physical Systems | AIAA SciTech 2025
- **Session Chair**, Designing Autonomy: Data Foundations | AUVSI XPONENTIAL 2023
- **Founder & Project Director**, *Shaping Autonomy* | 2023–2024
Led this initiative identifying critical gaps between autonomy research and real-world deployment, informed by 100+ structured interviews with industry, government, and academic experts; translated findings into applied research directions and collaboration frameworks, with results presented at AUVSI XPONENTIAL 2024.

Government & Standards-Adjacent Committees

- Technical Committee Member, Human–Machine Teaming — AIAA — 2024–Present
- Technical Committee Member, Intelligent Systems — AIAA — 2024–Present
- Working Group Member, Multi-Vehicle Control (m:N) — NASA — 2022–Present
 - Sub-Group Lead: *Data for Safety Cases* | Co-Lead: *Queueing Algorithms*

Peer-Review Service

- **Reviewer**, IEEE Transactions on Circuits and Systems II: Express Briefs, ACM/IEEE Human–Robot Interaction (HRI), Journal of Aerospace Information Systems, ACM CHI Conference on Human Factors in Computing Systems, AIAA SciTech, ACM CSCW

INVITED TALKS, PANELS & WORKSHOPS

- **Invited Guest Lecturer**, Building the Safe Airspace of the Future | Computer-Mediated Communication, Cornell University | Apr 2026
- **Speaker**, AI-Enabled Traffic Management for Advanced Air Mobility | DFR Working Group | Sept 2025

- **Speaker**, AI-Enabled Traffic Management for Advanced Air Mobility | NASA Tech Talk | Jul 2025
- **Speaker & Workshop Facilitator**, Defining Opportunities on the Bleeding Edge for “DARPA hard” technologies | AIAA SciTech 2025 (Idea Challenge Workshop)
- **Speaker**, Data for Safety Cases in m:N Operations | NASA m:N Working Group | Oct 2024
- **Speaker**, Accelerating AI for Autonomous Navigation | Open Accelerated Computing Summit 2024
- **Speaker**, Towards Adaptive Autonomy for Cooperative Airspace | UAM Working Group | Jul 2023
- **Speaker**, Shaping Autonomy: Enabling New Collaborations | AUVSI XPONENTIAL 2024
- **Speaker**, Advancing the Field Through New Collaborations | Women & Drones Coffee Connection | Oct 2023
- **Panelist**, From Simulation to Field Validation: Advancing Public Safety UAS Communications Test Methodology | IEEE World Forum on Public Safety Technology (WF-PST) 2026
- **Panelist**, Generative AI Applications for Human–Machine Teaming | AIAA SciTech 2024
- **Panelist**, From Lab to Launch: Research-Backed Startups | Cornell Entrepreneurship Celebration 2024

MEDIA, PODCASTS, & INDEPENDENT COVERAGE

- “Project Orion Tests Tactical Deconfliction Layer For Dense Drone Ops”, Aviation Week, by Ben Goldstein, July 06, 2026
- “Smart drones, safe skies: Student’s system tests, coordinates drone fleets”, Cornell Chronicle, by Louis DiPietro, June 23, 2026
- “Cornell Students Aid NASA with Drone Safety in Sky,” NASA.gov, by Jim Banke, May 7, 2026
- Featured Guest, “The Missing Layer of Drone Airspace,” Hangar X Studios, Episode 90, Apr. 2026
- “Students Win NASA Grant to Develop AI for Safer Aerial Traffic,” Cornell Chronicle, by Louis DiPietro, May 14, 2024
- “NASA Selects University Teams to Explore Innovative Aeronautical Research,” NASA.gov, by Jim Banke, Feb. 21, 2024
- “Ph.D. Student Mehrnaz Sabet Advances Autonomous Drone Systems with Industry Partners,” Cornell Graduate Student Spotlight, Oct. 26, 2023
- “Commercialization Fellows Assess Innovations’ Potential,” Cornell Chronicle, by Bridget Hagen, May 8, 2023
- “From Ideas to Impact,” Rev: Ithaca Startup Works, Oct. 4, 2023

EDUCATION

Ph.D. Information Science — Computer Science minor

Cornell University, College of Computing and Information Science

Jan 2021 – Present

Concentrations: Artificial Intelligence, Robotics, Human Computer Interaction

Committee: Susan Fussell, Sanjiban Choudhury, Malte Jung, Qian Yang

MSc. Information Science

Cornell University, College of Computing and Information Science

May 2023

Awarded upon completion of PhD Candidacy Exam (A-Exam)

BSc. Computer Engineering

University of Tehran, Department of Electrical and Computer Eng.

Sep 2014 – Jul 2020

Thesis: Integrating quadcopter drones to ad-hoc operations during disaster response