

Drones for Infrastructure – A Technical Workshop

March 19-22, 2019
New Jersey Institute of Technology
Newark, New Jersey

CALL FOR DEMONSTRATIONS



Introduction

Individuals and organizations are invited to submit proposals for live demonstration of drone operation as part of the official conference program. The purpose of these demonstrations is to showcase state-of-the-art drone technology and solutions, and their practical application for different use cases. Demonstrations will be an opportunity for drones technology developers, service providers, and practitioners to present their latest products and solutions in scaled-down application scenarios; at the same time, the conference participants will get to see the practical side of advancement in drone technology, and complement the knowledge gathering and exchange experience from the conference sessions. Both indoor and outdoor demonstrations will be included in the program. Demonstrations will be selected by the Demonstration Selection Committee based on the type of technology, type of application, scale, and relevance.

Demonstration Locations and Schedule

Indoor demonstrations will be performed in the Naimoli Family Athletic and Recreational Facility at NJIT. This facility normally houses four indoor tennis courts, but it will be converted to open demonstration area during the conference. The floors will be covered to prevent accidental damage on the tennis courts during drones landing. The dimensions of the demonstration area inside the Naimoli Center are the following:



- Width x Length: 30 feet x 60 feet (1,800 sq. feet)
- Maximum altitude: 24 feet

Outdoor demonstrations will be performed in on the soccer field in front of the Wellness and Events Center (WEC) building. The central area of the field will be used for drone demonstrations. The demonstration observation area will be located on the nearby spectators' stands, as well as inside the WEC building. The dimensions of the demonstration area and the maximum flying altitude are the following:



- Width x Length: 60 feet x 100 feet (6,000 sq. feet)
- Maximum altitude: 400 feet

Underwater drone demonstrations will also be considered, depending on the scope and the type of innovation proposed by the applicants. Underwater drone demonstrations will be performed at the NJIT's 25-yard swimming pool located inside the Wellness and Events Center (WEC).



A **secure storage facility** will be available to confirmed demonstrators for storage of drones and auxiliary equipment **from Monday, March 18 through Friday, March 22.**

Demonstration schedule during the conference is the following:

Date	Time	Session
Wednesday, March 20, 2019	1:15 – 3:30 PM	Concurrent Indoor, Outdoor, and Underwater Demonstrations
Thursday, March 21, 2019	1:15 – 3:30 PM	

Demonstration Topics

The topics and types of drone applications that will be considered for demonstration reflect the conference theme, focus areas and specific topics of interest. The Demonstration Selection Committee is looking to make a selection of high-quality demonstrations focusing on diverse set of topics and applications of drones, especially those demonstrating innovative design, instrumentation, flight control systems and protocols, telematics, navigation, data collection, communication, and analytics. The following is the list of subject areas and drone applications for consideration by the prospective demonstrators:

- Advanced drone flight control, navigation, and collision avoidance systems;
- Autonomous drones and use of machine learning and artificial intelligence in drone operation;
- Design and instrumentation of drones for infrastructure inspection and surveillance;
- Design and instrumentation of drones for inspection and surveillance of enclosed spaces and infrastructures;
- Design and instrumentation of drones for underwater applications;
- Applications of drones for remote sensing, mapping, SLAM, and aerial data collection;
- Drones formation flying and swarming;
- Use of drones for parcel delivery;
- Applications of drones in telecommunications;
- Applications of drones in traffic operations and management; and
- Use of drones in education.

Demonstration Application Process and Guidelines

The demonstrations to be conducted during the 2019 Drones for Infrastructure – A Technical Workshop will be selected by the Demonstration Selection Committee from the applications received during the demonstration application period. The demonstration application and selection process will be accomplished in the following five phases:

- 1) Demonstration Abstract Submission;
- 2) Selection of the Prospective Demonstrations for Detailed Proposal;
- 3) Detailed Proposal Submission;
- 4) Final Selection of Demonstrations; and
- 5) Demonstration Agreement between NJIT and the Selected Applicants.

Demonstration Application and Abstract Submission

All interested demonstration applicants are invited to submit applications and abstracts describing their intended drone demonstration. The purpose of the demonstration abstract is to provide a general understanding of the type of drones application or technology to be demonstrated, as well logistical and technical aspects of the proposed demonstrations. The demonstration abstracts will be submitted as part of demonstration application form, which is provided through the [conference online submission portal](#).

The abstract should not exceed 500 words. The demonstration application form should at minimum include the following information:

- Institution or organization submitting the proposal
- Point of contact with detailed contact information
- Description of the type of application to be demonstrated. The description should reflect the aspect of innovation in advancement of drones technology or its use.
- Number of drone aircraft units to be used during the demonstration, their size and weight, make and model (if known).
- Number of demonstration team members and their roles in demonstration.
- Preliminary flight plan, including intended flying altitude, area, flight maneuvers, and expected duration of the flight (demonstration).
- Description of equipment or resources that will be required to complete the demonstration.

The deadline for submission of the Demonstration Application is **September 14, 2018**.

Review of Abstracts and Selection of Prospective Demonstrations

The Demonstration Selection Committee will review all submitted applications and will evaluate them based on the following criteria:

- Application of innovative technology in the demonstration.
- Effectiveness of the demonstration given the constrained demonstration areas.
- Consideration of the ability to execute the demonstration indoors or outdoors.
- Alignment of the proposed demonstration with the conference theme and the various focus areas.

Based on the evaluation of submitted applications, the Demonstration Selection Committee will make the first-round selection of prospective demonstrations ensuring they present diverse drone applications and technologies. The selection will also strive to strike a balance between the number of demonstrations that can be executed indoor and outdoor, and will include a few promising underwater drone demonstration proposals. The applicants selected in the first round will be contacted no later than **September 28, 2018** and will be asked to submit a detailed demonstration proposal.

Detailed Proposal Submission

The applicants selected in the first-round will be invited to submit an expanded, final proposal for drone demonstration. The detailed proposal should provide refined, more detailed demonstration plan and the flight plan, as described in the **Demonstration Requirements** section of this Call for Demonstrations. In the final proposal the prospective demonstrators should indicate that they are able to meet all listed requirements, provide the required certificates and approvals, or state that certificates and approvals will be submitted to NJIT at the time of the final acceptance of Demonstration Terms and Conditions. The deadline for submission of detailed demonstration proposals is **November 16, 2018**.

Final Demonstration Selection

The final selection of demonstrations to be conducted as part of the conference will be made by the Demonstration Selection Committee among the applicants invited to submit detailed proposals. Besides the criteria used in first-round selection, additional criteria for the final selection of drone demonstrations will include the clarity of the proposed demonstration plan and anticipated

outcomes, presented capability to meet all demonstration requirements, safety and security aspect of the proposed demonstration, and feasibility of providing (installing) all the equipment required for successful demonstration. In the process of review of detailed demonstration proposals, the Demonstration Selection Committee may contact the applicants to discuss details of the proposed demonstrations, obtain additional information if needed, and resolve any potential issues. The applicants selected for the demonstrations will be informed of the final acceptance of their proposals no later than **December 14, 2018**.

Demonstration Agreement between NJIT and the Selected Applicants

The Demonstration Selection Committee will prepare a Demonstration Agreement outlining all terms and conditions pertaining to the demonstrations to be conducted as part of the conference program. The applicants selected for demonstration in the final selection will be required to accept these terms and conditions and sign the Demonstration Agreement. The Demonstration Agreement will be provided together with notification of final selection no later than January 15, 2019. The Demonstration Agreement must be signed by the demonstration participants and sent to NJIT no later than **February 1, 2019** in order to secure participation in drone demonstration.

Demonstration Requirements

All invited demonstrators must ensure **air-worthiness of the drone units** to be used during the demonstrations, as well as **operability and proper functioning of all auxiliary equipment**, including all communication systems. All demonstrators will be asked to perform basic safety and air-worthiness checks immediately prior to performing drones demonstrations.

All drone aircraft units **must be equipped with fully functioning collision avoidance systems**. The collision avoidance systems must be functional both in indoor and outdoor conditions.

In addition, **all demonstrators will have to meet the following requirements:**

- Provide name, company name, and contact information for all crew members.
- Flight crews must consist of at minimum one Remote Pilot in Command (RPIC) and one visual observer:
 - Provide a copy of RPIC license (certificate) for all pilots participating in demonstration.

- A minimum of one visual observer will be required. Name and contact information (see mitigation strategies of the flight plan).
- Provide copies of drone registration card(s) and drone specifications for all drone units to be used in the demonstration.
- Submit signed statement that the flight crew will comply with drone regulations and Small Unmanned Aircraft Systems rules codified in the United States Code of Federal Regulation 14 CFR Part 107 (Aeronautics and Space, Small Unmanned Aircraft Systems). More information about Part 107 can be obtained from the Federal Aviation Administration (FAA) website: https://www.faa.gov/uas/getting_started/part_107/ .
- Provide copy of any airspace waivers.
- Submit signed statement that the flight crew will comply with all manufacturer recommendations including but not limited to operating temperature, wind, and maintenance requirements.
- Submit a detailed flight plan of the demonstration:
 - The plan should include written section as well as visual maps.
 - The plan should include sufficient detail to understand the proposed flight, parameters, and safety of the operations.
 - The plan should outline a risk assessment of location, hazard identification, and mitigation strategies to reduce risk.
 - The plan should also specify take-off/landing requirements, estimated operational altitude(s), approximate flight path, visual line of sight (VLS) plan, observer plan (i.e. not just for the drones, but also other obstructions and objects, pedestrians on-campus, etc.) and should be also represented on a map as part of the plan.
- Submit a safety plan that covers emergency procedures.
- Certificate of Insurance for a minimum of \$1,000,000 aviation liability.

Demonstration Rehearsal

All confirmed demonstration teams will be required to conduct full-scale rehearsals of their demonstrations on March 19, 2019. The rehearsals will be scheduled throughout the day at the Naimoli Family Athletic and Recreational Facility for indoor demonstrations, at the Wellness and Events Center (WEC) Soccer Field for outdoor demonstrations, and WEC swimming pool for underwater drone demonstrations.

Important Dates for Drone Demonstrations

Milestone	Deadline
Demonstration Abstract Submission	September 14 th , 2018
Selection of the Prospective Demonstrations for Detailed Proposal	September 28 th , 2018
Detailed Proposal Submission	November 16 th , 2018
Final Selection of Demonstrations	December 14 th , 2018
Demonstration Agreement between NJIT and the Selected Applicants	February 1 st , 2019
Storage Facility at NJIT Available	March 18 th , 2019
Mandatory Demonstration Trials/Rehearsal	March 19 th , 2019
Concurrent Indoor and Outdoor Demonstrations	March 20 th – 21 st , 2019