



Call for Teams at the World Drone Competition

co-sponsored by IFAC WC 2023 and ARF (Tentative)

Research and development of unmanned aerial vehicles are being carried out all over the world, and they are used not only for industrial purposes but also for disaster response and are useful for saving lives. The core technologies of UAV are the control system, and it can be understood that the academic field of automatic control IFAC World Congress 2023 and the industrial field of control application UAV have the strongest relationship. Therefore, we will hold a world drone competition during the IFAC world congress 2023 period. We have planned a competition to compete for the world's most advanced UAV systems, propulsion systems, control systems, communication systems, ground control station systems, and their integrated technologies, as well as advanced technologies for disaster response and emergency goods transportation use cases. We invite many teams from all over the world to participate, regardless of whether they participate in IFAC WC 2023 or not. The excellent team will be handed a certificate of honor by IFAC WC 2023, and the prize money of victory will be awarded by ARF.

◆Co-sponsored

IFAC WC 2023 and ARF*

*ARF: Advanced Robotics Foundation, which was founded in 2019, Japan

◆Date

July 11st~13rd, 2023 (During the IFAC World Congress 2023)

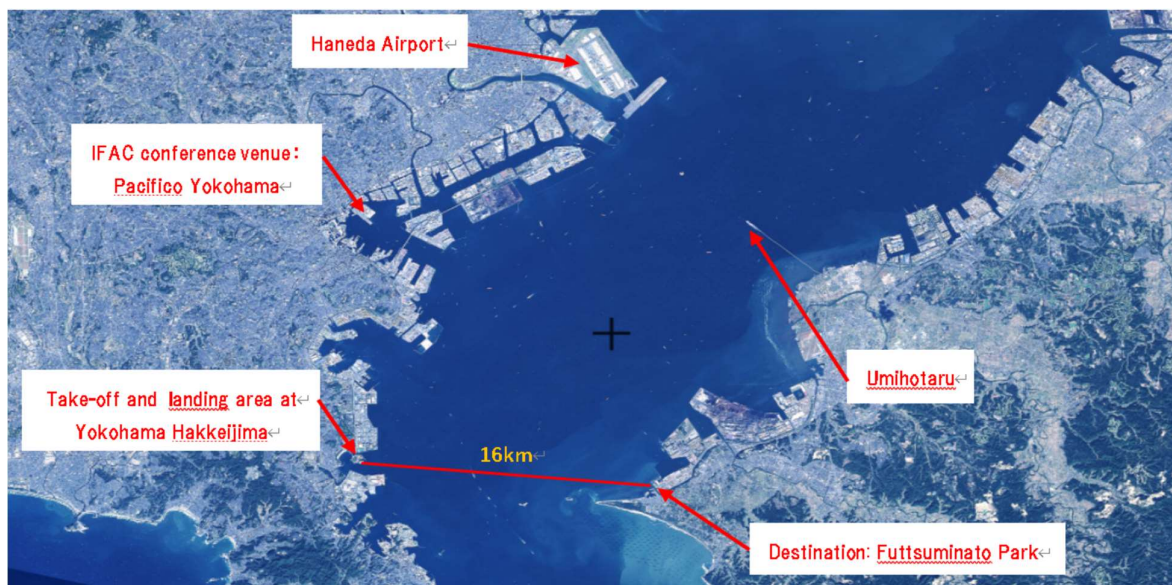
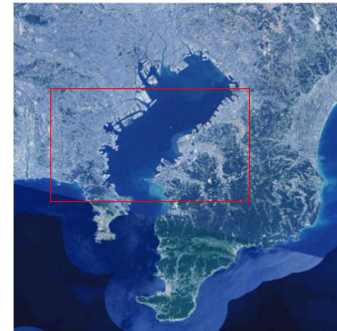
◆Location

Large area of Tokyo Bay

Between Yokohama City, Kanagawa Prefecture and Futtu City, Chiba Prefecture

◆Mission Theme

Long-distance flights by unmanned aerial vehicle for disaster response and logistics



The area of Tokyo Bay between Yokohama city and Chiba city is one of the most overcrowded sea traffic areas in the world with about 500 ships a day and is also near Tokyo International Airport (Haneda Airport), where airplanes take-off and land overcrowded schedules.

Mission Summary

The mission is to survey the disaster area and to support the victims immediately after the large-scale disaster occurred in Futtsu City, and includes the following three missions.

- (1) Survey and report on the entire disaster area.
- (2) Identifying and delivering relief supplies that are needed by disaster victims.
- (3) Deliver rare medicines to patients with intractable diseases as soon as possible.

◆Mission Scenario

Since a disaster has occurred near Futtsuminato Park, the drone rescue teams immediately dispatch from Hakkeijima, Yokohama City on the opposite shore, and will deliver therapeutic drugs from Yokohama City University Hospital to patients with intractable diseases hospitalized in Futtsu City Hospital. Then, the disaster occurrence situation and damage situation are surveyed and investigated in detail, and the image and movies are transmitted to the Disaster Response Headquarters at the takeoff point. In addition, neighboring residents are evacuating to a facility near Futtsuminato Park, and the letters drawn on the ground are identified by aerial photography, and the relief supplies requested by the disaster victims are recognized. Only one aircraft will be used, and it will make a round trip of about 16 km one way from Hakkeijima to Futtsuminato Park, but it will return without refueling or recharging the battery without landing from takeoff to landing. The therapeutic drug delivery location is a specified location in Futtsuminato Park, and the location should be searched from the air and the therapeutic drug will be dropped from the air at this specified location. However, in order to avoid collision with vegetation such as trees, the GNSS altitude must be maintained at 30m or more even when dropped.

◆Competition evaluation points

- 1 Compete on the accuracy of disaster occurrence surveys and damage surveys.
- 2 Compete on the accuracy of the relief supplies requested by the victims.
- 3 Compete for speed as a disaster response mission.
- 4 Compete for the accuracy of dropping the medicine to the designated delivery location.

◆Requirements

- As shown in the reference photo, the takeoff area is a road in the park, so it is a little difficult to glide, therefore the aircraft must be capable of taking off with a VTOL or STOL type.
- Use one aircraft for the purpose of "information gathering equipped with a camera".
- Use an aircraft capable of long-distance flight of about 40km round trip or more.
- Welcome the original aircraft. It is also possible to use purchased aircraft, including imported products, but the condition for participation is that originality should be recognized in either the aircraft itself,

peripheral equipment, or the operation method.

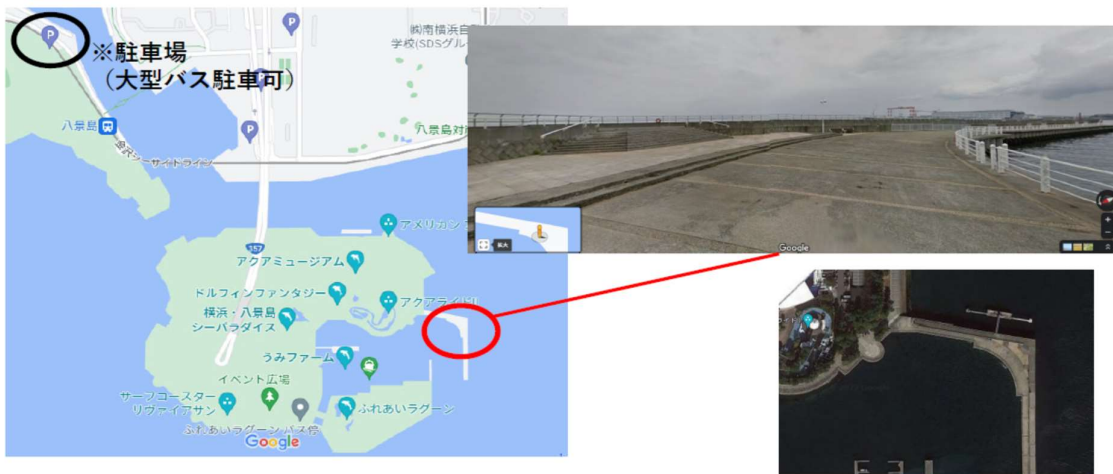
- Flight at BVLOS level 3 after takeoff. It is also subject to review whether the aircraft is sure to avoid overflight of the large ships over 300 tons.
- English letters are written on the ground for the relief supplies requested by the victims.
- Has a function that can transport a small box of about 300g of therapeutic medicine and drop it accurately at a designated place in Futsuminato Park. The command to drop is a radio communication from the base station in Hakkeijima, Yokohama City.
- Telemetry communication, image transmission, etc. are assumed to be transmitted to the base station via LTE communication of mobile phones and Internet line connection.
- In addition, since details related to wireless communication such as telemetry communication and image transmission must comply with Japanese domestic radio law, a webinar briefing will be held for the participating teams. We also offer individual consultations.

Competition Schedule

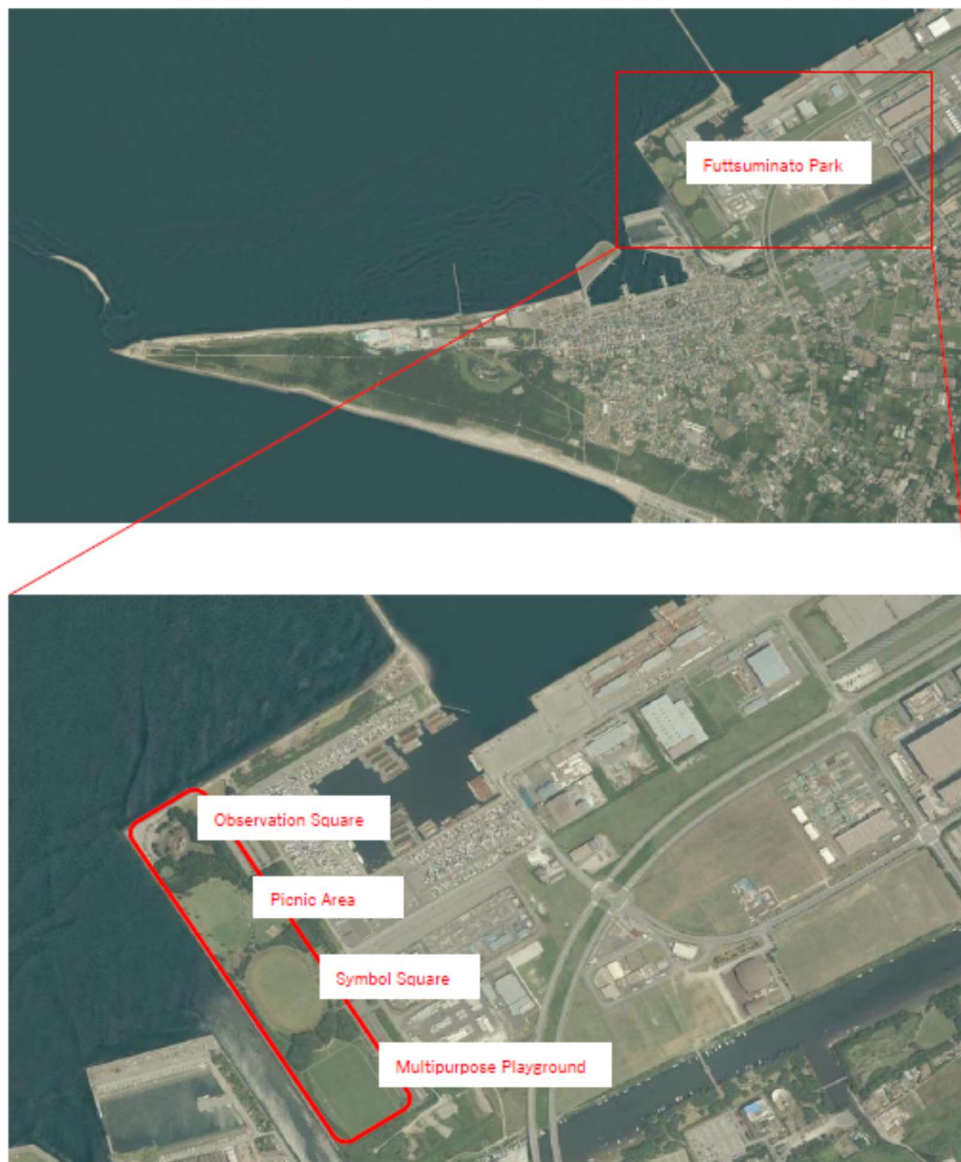
Phase	Period	Description
Application	October-December 2022	Information will be publicly announced on the IFAC WC 2023 and ARF websites on October 1, and applications will be accepted.
Document review	January 2023	Teams that pass the screening process will be announced at the end of January 2023.
Preliminary review by ARF of flight permit applications	February - March 2023	ARF will conduct a preliminary review and advice on the flight permit application to be submitted to the MLIT. *Ministry of Land, Infrastructure, Transport and Tourism
Formal Review by the MLIT of flight permit applications	April-June 2023	Teams that pass the above preliminary review will be announced as competition entrants and will submit a formal application to MLIT to obtain a flight permit.
Competition	July, 2023	Selected teams will compete in the development and operation of drones at Tokyo Bay.

◆Appendix





Take-off and Landing area at Hakkeijima, Yokohama city



Destination (Area surrounded by red lines) : Futtsuminato Park, Futtsu city