

# Procedures for Live Demonstration

This document describes how to demonstrate the functionality of the CanSat. All activities will be performed during a video live stream.

Before the demonstration, teams should have submitted environmental test documents.

## Requirements

- A good internet connection and a good quality web camera is required so the judges can see the CanSat demonstration clearly enough.
- Ground station publishes data in CSV format to an mqtt broker during the demonstration so judges can see the data live.
- A spin table will be required to demonstrate the payload rotation sensors. The spin table can be manually rotated or by electric motor. It can be purchased or custom made.
- The science payload software shall be modified to always transmit data no matter the altitude.
- A white sheet of at least 8 x 8 feet shall be placed beneath the CanSat where it is hanging.
- Teams shall be able to accept a simulation file before the demonstration.
- Teams shall be able to accept a PDF file with the ground marker pattern to be placed below the CanSat for the camera bonus portion of the demonstration.
- Teams will have their unique username and password for the MQTT connection.
- Teams will have one half hour to perform their demonstration. An additional 15 minutes will be allowed to deal with internet issues but not CanSat issues.

## Demonstration Configuration and Sequence

The demonstration is designed to be performed indoors so all teams can perform the demonstration.

- The CanSat shall be suspended from the ceiling or structure using a non-stretching cord. Nylon/fishing line is not allowed.
- The CanSat shall be suspended 2 meters from the floor. The tie point is the point of measurement.
- At least 65 cm of cord shall be between the CanSat and the ceiling or structure. The length of the cord takes precedence over the distance from the floor.
- After attaching the CanSat, measure 60 cm up from attachment point and mark it on the cord.
- The floor underneath the CanSat shall be covered by a white material of 2 meters by 2 meters so any CanSat parts lost can be easily seen.
- Protective materials can be placed on the floor below the white material to protect any parts that may fall.

- The ground station shall be set up and operate during the demonstration.
- The CanSat shall be turned on at the beginning of the demonstration.
- The web camera should be positioned so the CanSat can be seen when held up 60 cm and the floor can be seen at the same time.

## Demonstration Procedure

### Start Up Procedures

1. Secure the CanSat to the cord by looping the cord through the parachute.
2. Slowly release the CanSat so it is suspended by the cord and verify the cord is secured.
3. Turn on the ground station laptop and start the laptop software.
4. Turn on the CanSat and verify power is turned on.
5. From the ground station, send the command to start the CanSat telemetry.
6. Verify that the telemetry is streaming to the ground station.
7. Verify judges are receiving the data.

### Drop Test Procedures

1. Wait for the judges to let you start the drop test.
2. When requested, raise the CanSat by holding the cord at the point where it is attached to the CanSat and raise it 60cm to the mark on the cord.
3. Make sure the web camera has a full view of the CanSat held in place and the floor.
4. At the request of the judges, let go of the CanSat.
5. All will observe if any parts of the CanSat fell off or any of the payloads fell out.

### Flight Simulation Demonstration

1. With the CanSat suspended and still operational, start sending the simulated flight profile. The flight profile will provide simulated altitude information once a second for the container to use to determine its altitude and perform the required operations.
2. Observe the operation of the CanSat during the simulated flight.
3. When a science payload is released, place the science payload on the spin table and rotate it at a constant rotation rate so the sensor data can be observed in the telemetry.
4. When the second science payload is released, put it on the spin table and rotate it so the rotation rate shows up in the telemetry.
5. When the altitude drops to a low constant value, observe that the container stops transmitting telemetry.
6. Wait for the judges to indicate they are done and request the CanSat to be turned off.

### Bonus Demonstration during Flight Simulation Demonstration

If you have selected the bonus, complete the configuration specified below.

1. The team will place a target marker provided by the competition directly under the CanSat to be in view of the camera. The team shall print out the provided target which will be sent just before the time for the demonstration.

2. In preparation for the drop test, the CanSat shall be spun so that the cord gets twisted. When the CanSat is released, the cord will start untwisting which will test the stabilization of the camera.
3. After the demonstration is completed, the team shall submit the video to the given website.