



# 2024 CONTEST PRE-TECH & FLIGHT CERTIFICATION

University: \_\_\_\_\_

Inspector (Print Name): \_\_\_\_\_

Inspector Affiliation: Faculty Advisor

Non-Student Pilot

## 1. Systems

Pass	Fail	Verify that the receiver(s) is powered by a <b>separate</b> NiCad, NiMH, or LiPo battery with an accessible <b>switch</b> <b>EXTERNAL</b> to the aircraft. - <b>NOTE:</b> If a Battery Elimination Circuit ( <b>BEC</b> ) exists on the Speed Controller, it <b>MUST</b> Be <b>disabled</b> .
Pass	Fail	Verify all components are adequately secured to the vehicle and all permanent fasteners are tight and have either safety wire, thread locker (Loctite™), or nuts/screws with a mechanical interference fit such as nylon inserts or patches or self-locking threads. Clevises on flight controls must have an appropriate mechanical locking device to prevent their disengaging in flight.
Pass	Fail	Verify all control rods are of the proper gauge/strength, and are securely attached to control horns.
Pass	Fail	Verify all control horns are properly secured to the control surfaces. Commercially available control horns <b>MUST</b> be installed per manufacturer's instructions. (NOTE: Control horns cannot be adhered to film surfaces.)
Pass	Fail	Verify control surfaces and wing-surfaces are of adequate flutter & aero-elastic resistance

## 2. Propulsion System

Pass	Fail	Verify all propeller(s) and hub/pitch mechanism(s) is commercial availability and verify their mounting integrity.
Pass	Fail	Verify all propulsion is provided by an unmodified commercially available electric motor.
Pass	Fail	Verify a <b>blade-style</b> fuse holder is connected to the <b>positive (+)</b> battery terminal of each propulsion system. - A propulsion system is defined as a 1 Battery, 1 Fuse, 1 or more ESCs, and 1 or more Motors.
Pass	Fail	Verify the fuse holder is located <u>ahead of a pusher propeller</u> or <u>behind a tractor propeller</u> and is externally mounted and accessible such that the fuse can be installed and removed without removal or opening of any cover(s).
Pass	Fail	Verify all connections are fully insulated (shrink-wrap preferred) and no wires are visible.

## 3. Propulsion Battery (check all flight packs to be used)

Pass	Fail	Verify ALL propulsion packs are of the same chemistry. Circle one of the permissible options below: <i>Nickel-Cadmium (NiCad)</i> <i>Nickel-Metal-Hydride (NiMH)</i> <i>Lithium Based</i>
Pass	Fail	Verify all Propulsion packs commercially available and labeled by manufacturer with manufacturer name, Voltage, Discharge C-Rating, and Capacity (must be less $\leq$ 100Wh) - If multiple propulsion packs are used in 1 mission, they must be identical and $\leq$ 100Wh combined.
Pass	Fail	Verify that only 1 battery pack can be connected to each propulsion system. No batteries may be connected in Parallel or Series.
Pass	Fail	Verify battery pack(s) is properly shrink wrapped over its entirety and all contacts and external connectors are insulated.
Pass	Fail	Verify all packs can be properly secured within the air vehicle.
Pass	Fail	Verify arming fuse does not exceed <b>100 amps</b> OR the Lithium battery discharge limit. Lithium battery Discharge Limit (mAh x C-Rating/1000): _____. - If packs used for different missions have different discharge rates, each pack must have its own corresponding arming fuse up to 100 amps each.



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## 4. Tip Test

<p><b>Declare Maximum Gross Take-off Weight (MGTOW) of Aircraft:</b> _____ (lbs)  <b>(Configure aircraft for flight with the heaviest flight battery and with heaviest payload, added margin recommended)</b></p>	
<input type="checkbox"/> Pass <input type="checkbox"/> Fail	Verify aircraft in MGTOW configuration is < 55lbs.
<input type="checkbox"/> Pass <input type="checkbox"/> Fail	Verify aircraft has a CG Mark for all possible mission configurations (and that it is correct & reasonable).
<input type="checkbox"/> Pass <input type="checkbox"/> Fail	Have students lift the aircraft configured in the MGTOW condition from the wingtips at the appropriate CG mark. All other parts of the aircraft must not be supported, and structural integrity must be maintained without <b>ANY</b> damage.

## 5. Radio Range Check and Failsafe Validation

- The Vehicle must be controlled by a commercially available Radio-Controlled Transmitter (Tx) and Receiver (Rx) that are capable of supporting the required failsafe requirements listed below. The failsafe must automatically engage upon loss of Tx signal.
- With one member holding the aircraft, the operator (pilot) must perform a range check **per the instructions of the radio manufacturer**.
- Always ensure the propeller area is clear before installing fuse and/or advancing the throttle.

<input type="checkbox"/> Pass <input type="checkbox"/> Fail	Start by turning on the radio system and with fuse(s) pulled. Cycle throttle; verify no engine/prop movement/propulsion and verify all other controls work properly.		
<input type="checkbox"/> Pass <input type="checkbox"/> Fail	Verify the BEC has been eliminated by installing the arming plug, turning the RX switch off, and verifying the transmitter does not command the aircraft.		
<input type="checkbox"/> Pass <input type="checkbox"/> Fail	Verify the area is clear and install the fuse. Apply 1/4 power, have the pilot check the following responses:		
<input type="checkbox"/> Right Roll	<input type="checkbox"/> Left Roll	<input type="checkbox"/> Right Yaw	<input type="checkbox"/> Left Yaw
<input type="checkbox"/> Nose Up	<input type="checkbox"/> Nose Down	<input type="checkbox"/> Throttle cutoff	<input type="checkbox"/> Throttle back to ¼

### Verify Lost-Link Failsafe works properly by turning off the Transmitter(s):

<input type="checkbox"/> Throttle closed	<input type="checkbox"/> Full up elevator	<input type="checkbox"/> Full right rudder	<input type="checkbox"/> Full right aileron	<input type="checkbox"/> Full flaps down (if applicable)
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## Mission Compliance

<input type="checkbox"/> Pass	<input type="checkbox"/> Fail	Verify wingspan does not exceed 5 feet.
<input type="checkbox"/> Pass	<input type="checkbox"/> Fail	Verify that airplane in parking configuration fits within a 2 ½ foot wide space while resting on primary landing gear.
<input type="checkbox"/> Pass	<input type="checkbox"/> Fail	Verify the cockpit (Crew Compartment) and Passenger compartment are separated by a solid bulkhead.
<input type="checkbox"/> Pass	<input type="checkbox"/> Fail	Verify passenger compartment has a singular coplanar horizontal floor.
<input type="checkbox"/> Pass	<input type="checkbox"/> Fail	Verify heads of pilot and co-pilot are above fuselage forward of the cockpit.
<input type="checkbox"/> Pass	<input type="checkbox"/> Fail	Verify no single access hatch to the passenger compartment exceeds 6 inches in length and the hatch opening cannot extend past the fuselage vertical center line on top or bottom.
<input type="checkbox"/> Pass	<input type="checkbox"/> Fail	Verify that the Pilot and Co-pilot have a separate door(s)/hatch/canopy separate from the passenger compartment.
<input type="checkbox"/> Pass	<input type="checkbox"/> Fail	Verify that the restraint system for the Crew, Passengers, Patient & Gurney, and Medical Cabinet is adequate to prevent motion during flight and do not touch each other or any other part of the airplane.
<input type="checkbox"/> Pass	<input type="checkbox"/> Fail	Verify that Patient gurney is at least 1.5 inches high
<input type="checkbox"/> Pass	<input type="checkbox"/> Fail	Verify medical supply cabinet is at least 3 inches long by 3 inches wide by 3.5 inches high

## Flight Certification

The following items must be completed successfully to begin on-site tech inspection at the contest:

### 1. Technical Inspection Follow-up

Pass  Fail Verify correction of non-compliant Pre-Tech items

### 2. Successful flight validation

Pass  Fail Verify competition aircraft has flown a complete successful flight including a minimum of:

- Ground take-off meeting all requirements outlined in the contest rules.
- Minimum flight pattern demonstration, which requires a 180° turn to the left or right, followed by a 360° turn in the opposite direction of the first turn, followed by a 180° in the same direction as the first, while maintaining altitude and adequate control of the vehicle.
- Landing within a designated area with no damage to aircraft

**Inspector Signature:** \_\_\_\_\_

**Date of inspection:** \_\_\_\_\_