2021-22 Design, Build, Fly Q&A #1

General Questions

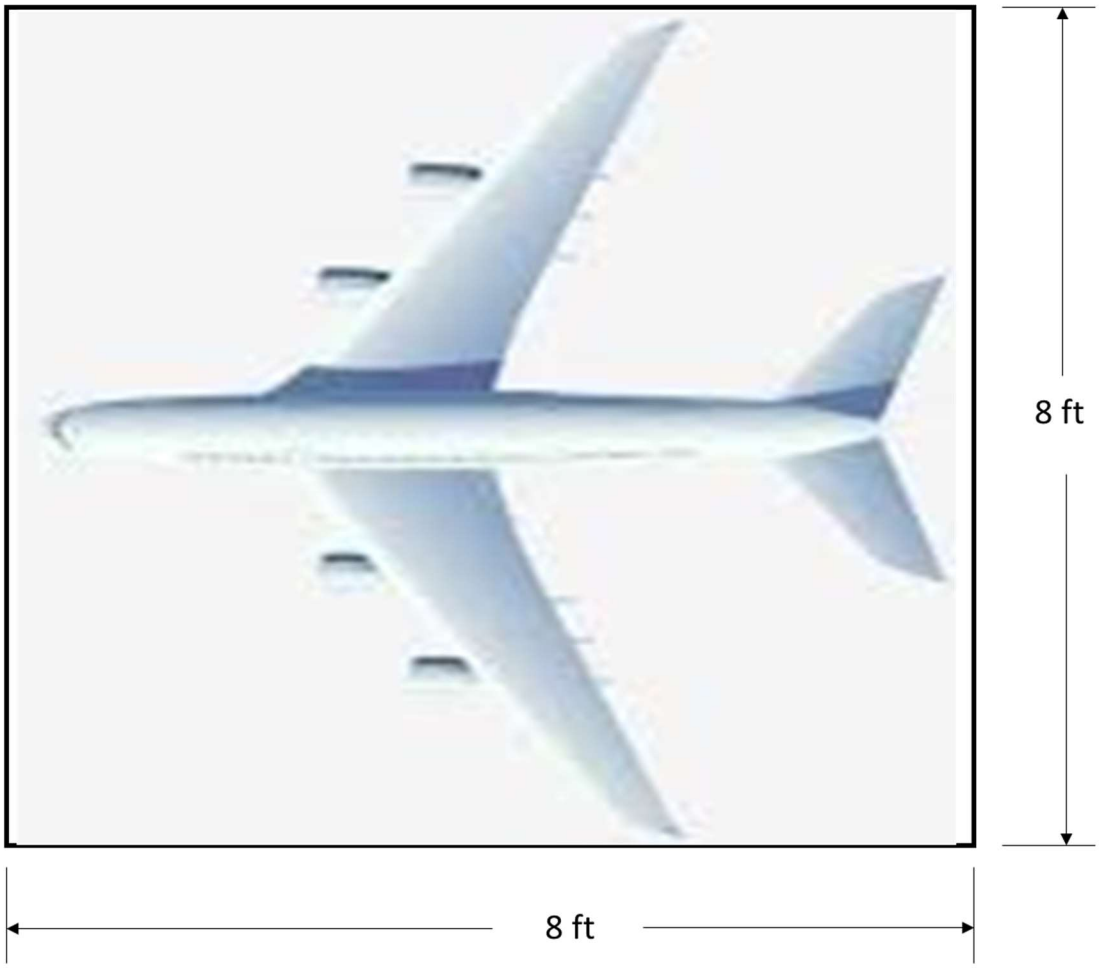
1. What does max linear distance refer to? (Example for the wings, is it measured wing tip to wing tip or diagonally across the wing)?

   Is the maximum linear dimension of 8 feet stating that the max length, width, or height of the aircraft must not exceed 8 feet? For example, if our wingspan was 80 inches with a 60 inch fuselage length and 12 inch height, the maximum linear dimension would be 80 inches, which is smaller than 8 feet.

   Does 8ft linear dimension mean any two points on our plane must be less than or equal to 8 ft?

   Does the 8 foot max linear dimension refer to 8 feet in the x, y, and z directions, 8 feet point to point on the airframe, or 8 feet total like how airline luggage dimensions are measured?

Answer: Depending on the airplane configuration, the linear distance is either the wingspan or the total length of the airplane including propeller. The basic requirement is that it must fit inside an 8 foot x 8 foot box as shown in the figure below.



2. Do the syringes need to remain in the sterile packaging?

   How are the syringes provided and meant to be stored during the fly-off, are they in individual wrapping, a small box, completely loose?

Answer: The syringes will be provided at the competition and will NOT be in the sterile packaging. When a team approaches the Ground Mission or the staging box for Mission 2, they will be provided with the number of syringes requested to start the mission in bulk, either loose or in a temporary container to the teams.

3. The rules state that the 8 foot linear dimension requirement is due to available hanger space. Can a [modification] be made, such as removable wingtips, so that the plane is smaller than 8 feet while in a storage configuration for the hanger, but larger than 8 feet once put into a flight configuration on the flight [line]?

Answer: The 8 foot limit is in the flight configuration.

4. How is take off field length measured? The rules state "All ground contact points must be forward of the start/finish line" but it is not clear if the entire aircraft is forward of the start/finish line?

Answer: As stated in the rules and quoted above, only ground contact points must be forward of the Start/Finish line. This does not require the entire airplane to be forward of the Start/Finish line.

5. Are flight controllers allowed onboard for stabilization purposes? Such as an electronic gyroscope.

Answer: Commercially procured (COTS) flight stabilization systems and gyros are allowed. Autopilots are not.

6. Following FAA & AMA guidelines, can the plane be flown FPV for competition?

Answer: No.

7. Is the 25' constraint on takeoff applicable to every take-off during mission 3?

Answer: Yes.

8. Can any portion of the aircraft be open, have holes, and be non-enclosed as long as the payloads are within?

   What is considered as "All payloads must be carried internally to the aircraft"? Can the payload be in an upside-down U-shaped payload bay without the payload doors? Can there be an open hole at the rear of the fuselage? Does the payload bay have to close after a successful deployment of a single vaccine vial package?

Answer: Yes. There is no requirement to open and close a payload door for deployment.

9. Will the blocks be made of a homogeneous wood that is naturally 8.0 +- 0.10 oz when cut to specification, or will they be made of a lighter wood and ballasted?

   What type of wood will the vaccine be made of? How will it be 8 oz.? Will it have lead shot in it?

Answer: The type of wood is not specified. Each block with sensors installed will be weighed to verify it meets the requirements in the rules. Modifications for the sensors or to achieve the required weight will have minimum impact on the CG of the payload.

10. Are any devices to hold syringes or assist in loading allowed if they do fly in the flight missions? I.e., are external loading mechanisms allowed?

Answer: Devices for loading payloads are allowed, but placing payloads in the devices will be part of the flight line staging time and ground mission time. If the device are separate fixture, jig, etc is used to hold the payloads inside the airplane, the fixture, jig, etc must fly in ALL flight missions and be included for all phases of the ground mission.

11. Can propellers that are commercially procured but manufactured in a limited batch be used?

Answer: Commercially procured propellers are required by the rules.

12. Can propellers be modified in any way after commercial procurement?

Answer: Allowed modifications to commercially procured propellers are defined in the rules under General Aircraft Requirements.

13. Do modifications to the shape or mechanical function of aircraft components (e.g. tail, landing gear), on the same individual component, constitute a change to "configuration"?

Answer: Allowed modifications from the design report configuration are defined in the rules under General Aircraft Requirements.

14. Can we attach wires / other things to the vaccine vial package? Can we drill holes on it?

Answer: The vaccine vial packages will be provided at the competition at the flight line staging box and for the ground mission and all payloads must be returned after the mission attempt. No modifications to the payloads of any kind will be allowed by the teams.

15. Is it allowed to use Pixhawk for datalogging? Is it allowed to connect all the servos to the pixhawk to monitor control input and the movement of control surfaces?

    Is it allowed to connect the ESC and the Battery to the Power Management Board of Pixhawk solely for battery voltage monitoring? (without using any auto pilot function)

Answer: Auto-pilots are not allowed for the competition, regardless of its function on the airplane.

16. "Aircraft will use ground rolling takeoff and landing." Can the aircraft be restrained by its landing gear brakes during propeller power up?

Answer: Yes.

17. Must the payload be loaded one by one? Can it be loaded all at the same time?

Answer: There is no requirement to load the payloads one at a time.

Batteries:

18. Can we have 3 batteries for mission 3? This would mean one 100 watt-hour battery is dedicated for propulsion, one battery dedicated for our receiver and flight controls, and one battery dedicated for mechanisms we are creating to deploy the vaccine vials?

Answer: Yes as long as ALL rules for implementation and use of batteries are in compliance.

19. Can Lithium-ion batteries be used for any missions of the competition?

Answer: Yes.

20. How are we measuring energy? Nominal or fully charged voltage?

Answer: It is based on the capacity of the battery as defined on the original, manufacturer's label that is on the battery.

Ground Mission:

21. May we change the orientation of the plane for syringe installation and removal during the ground mission?

Answer: Yes.

22. During the ground mission, can we utilize our mechanisms used to deploy the vaccine vials to deploy the syringes?

Answer: Yes, but there is no requirement for this. Additionally, the removal of the syringes will be part of the Ground Mission time.

23. Are we allowed to prestack syringes in advance of the ground mission to improve our time?

    Before the ground mission time starts, can the syringes be place in a box, fixture, or jig? Or must they be laying scattered on the ground?

    Can we use an external device to package syringes prior to loading for GM?

Answer: Once the syringes are provided to the crew member, they can be arranged as desired before the mission starts. However, this does not include any fixture, jig or holding device to assist in loading the syringes or carrying the syringes inside the airplane prior to starting the mission. Using a fixture, jig or holding device will be part of the mission time.

24. How far away is "mission box" from start/finish line in GM?

Answer: The exact configuration for the GM will be determined based on available space at the fly-off. Historically, it has been about 10 feet.

25. How many people can load/unload the aircraft for GM?

Answer: As specified in the rules, only the crew member can touch the airplane and load/unload the payloads during the Ground Mission (and in the flight line staging box as well).

26. Will the deployment of mission 3 payloads (blocks) be counted as part of the ground mission time?

Answer: As stated in the rules, the mission 3 payloads will be deployed during the ground mission AFTER the time has stopped.

27. During GM, does the ground mission member have to return Mission 2 payload, after removing it from the airplane, to the judges, or can it remain in the mission box, before loading the Mission 3 payload?

Answer: The ground mission starts with all payloads staged in the mission box as stated in the rules. Payloads not currently in use shall remain in the mission box until the mission is completed.

Mission 2:

28. The rules appear to indicate that the syringes are not required to be restrained in flight beyond being stored internally to the plane. Is there anything else required for the syringe's restraint mechanism?

Answer: There are no specific requirements to restrain the syringes, but the method of carrying the syringes must be deemed safe in tech inspection (they can't be allowed to shift around and cause changes in the airplane CG).

29. Will the syringes be empty or full of some liquid for mission 2?

Answer: Empty.

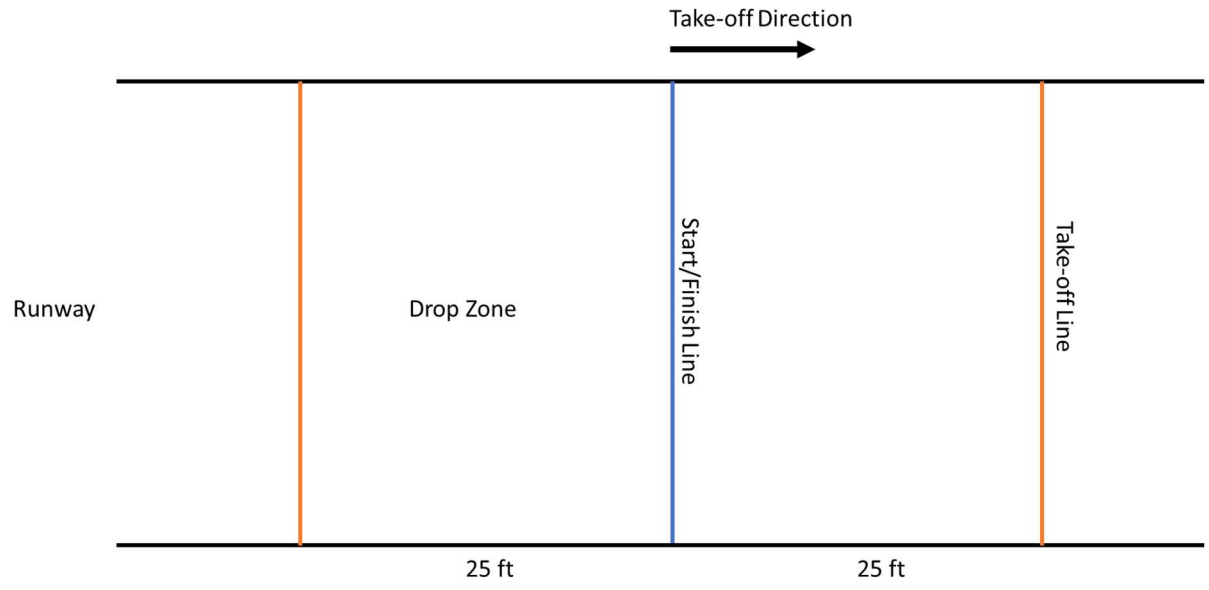
Mission 3:

30. Do we have to drop all vaccine vial packages in this mission? For example, we have 5 vaccine vial packages but we drop 2 vaccine vial packages and there was a problem in the mission mechanism of the aircraft. Will we get the score of 2 successful vaccine vial packages deployed?

Answer: You do not have to drop all vaccine vial packages carried in M3. You will receive a score based on the number of vaccine vial packages successfully dropped without tripping the shock sensor.

31. Can you provide us with an accurate map of where the deposit area for the vaccine vials is in relation to the starting take-off line?

Answer: See the figure below.



32. Can the vaccine vial packages be deployed in a protective wrapping, or rolled out on a cart for mission three?

    Can anything used to lower the vaccine vial packages be attached to and left with the vial package after deployment?

We were wondering if the payload block could be encased inside another object, like a sort of packaging around the payload. And once released from the plane the ground crew member could take the payload out of its packaging to be inspected?

Can we wrap the packages in a soft material?

Can it be put into a container that carries it during flight and deployment?

Answer: No, the vaccine vial packages must be carried and deployed as provided at the competition. Protective materials and devices for securing the payloads are allowed, but must stay on the airplane during deployment and must be present for all flight missions and all phases of the ground mission.

33. Can a secondary transmitter/radio be used to control the vaccine vial package deployment?

Answer: Yes.

34. If the aircraft overruns the time limit prior to the last landing/deployment, is the time prior to take-off counted? What if time stops after landing but before a deployment?

Answer: For a payload deployment to count, it must be completed within the M3 10 minute time limit.

35. During Mission 3, does the aircraft have to come to a complete stop while deploying the package in the vaccine vial drop area?

Answer: No.

36. Will there be any penalty if more than one vaccine vial package falls out at once?

Answer: If more than one vaccine vial package is deployed at one time, the deployment will not count towards the mission 3 score and will result in a failed ground mission attempt.

37. What if the shock sensors are already triggered during landing before deployment? How will the judge determine the triggering point and score calculation?

Answer: Any event that triggers the shock sensor once installed in the airplane in the flight line staging box or during loading for the ground missions will result in a “no score” for that deployment.