2024-25 Design, Build, Fly Q&A #3

<u>Clarification on pylon attachment and X-1 test vehicle release mechanism</u>: The designs for the pylon attachment and X-1 test vehicle release mechanism attachment must comply with the mission theme. That means that the airplane that flies Mission 1, the Delivery Flight, has not been modified to conduct the X-1 Supersonic Flight Test Program. So there can be <u>no external</u> features on the wing to attach the pylons with the exception of small or threaded holes with a maximum diameter of 0.25 inches flush with the wing surface. Fairings or "bumps" in the wing airfoil to conceal pylon attachments are not allowed. Internal features that are not visible externally are acceptable. For the release mechanism, if it attaches externally to the fuselage, no features external to the fuselage are allowed other than small or threaded holes with a maximum diameter of 0.25 inches flush with the fuselage surface. For Mission 1, the airplane must be flown in the configuration without any external features. The airplane must start the Ground Mission in this same configuration. There should be no confusion on the difference between an internal and external feature or component.

Further, if the pylon is attached to an internal feature in the wing that can only be accessed through an opening in the wing, the opening must be covered with a hatch or panel for M1 and at the beginning of the GM. Internal features that are flush with the wing surface are not allowed, they must be covered by the wing surface. The hatches or covers may be removed to install the pylons and do not have to be reinstalled as long as the pylon fills the opening created by removing the hatch or cover.

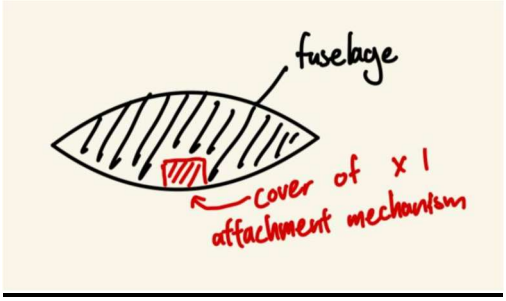
Similarly, for the X-1 test vehicle release mechanism, if it is fully internal and can only be accessed by opening a non-removable bomb bay door(s) as defined in the rules, it may be installed prior to the start of all missions. If the release mechanism attaches internally but protrudes through the fuselage once installed, there must be a cover or hatch covering the opening for M1 and at the start of the GM. The hatch or cover may be removed to install the release mechanism and does not have to be reinstalled as long as the release mechanism fills the opening created by removing the hatch or cover.

<u>Update to Tech Inspection for pylons and release mechanisms as a result of the above clarification</u>: The airplane will enter tech with all pylons installed. If the pylon(s) attachment is internal to the wing, teams must demonstrate to the tech inspector how the opening in the wing surface will be covered for M1 and the start of the GM. The cover must be adequately secured for all phases of flight.

The airplane will enter tech with the release mechanism installed. If the release mechanism extends through and out of the fuselage, teams must demonstrate to the tech inspector how the opening will be covered for M1 and the start of the GM. The cover must be adequately secured for all phases of flight.

General Questions

1. If our X-1 attachment mechanism is located within the fuselage, while the X-1 itself remains outside, do we need to include a small door to cover the hole at the attachment point on the bottom of the fuselage, or can we leave the attachment point uncovered? If our X-1 attachment mechanism is exposed but flush with only 1 side of the fuselage, would this still qualify as the X-1 attachment mechanism being within the fuselage?

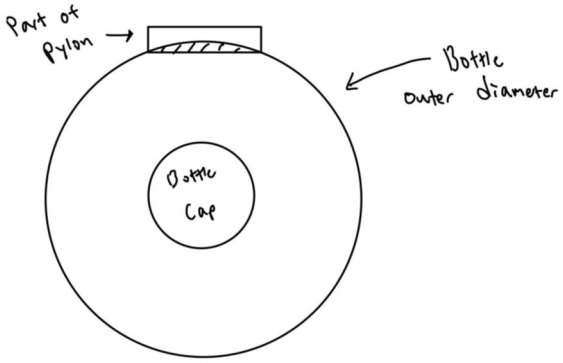


Answer: This would not be allowed or would require cover or door to conceal the mechanism for M1 and at the start of the GM. In this example with the release mechanism flush with the outside of the fuselage, the cover or door may be permanently removed for M2 and M3 and after installing the release mechanism during the GM.

2. Can we have multiple pylons/different versions? (i.e. different pylons for different missions)?

Answer: The rules clearly state that there can be NO configuration changes between missions other than specifically allowed in the rules. Different pylons for different missions are not allowed. This does not mean that the pylons at different locations on the airplane all have to be the same. The configuration for M2 and M3 and as installed during the GM must be the same.

3. Can the bottle be slightly covered by the pylon?



Answer: This does not meet the definition of fully visible as required in Q&A#1 and is therefore not allowed.

4. Do we need to demonstrate the X1 drop for the video?

Answer: No.

5. Can there be multiple switches in parallel to turn on the radio control system for redundancy?

Answer: Yes.

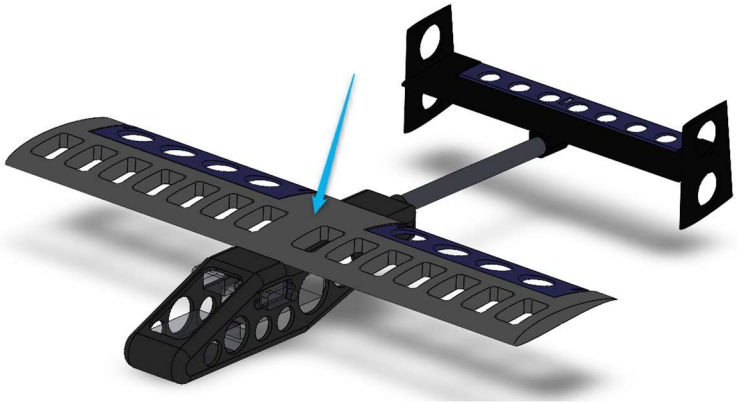
6. For the X-1 glider, can we use a single cell LiPo battery, that does not come with a connector or leads, and solder the connector and lead to the battery tabs ourselves?

Answer: Yes.

7. Is an elastic rubber band allowed as a form of securing the X-1 vehicle?

Answer: No.

8. If the wing is mounted flush on top of the fuselage like the example shown in the image below, is the section directly above the fuselage (denoted with the blue arrow) considered part of the wing and subject to said clearance rule, or part of the fuselage and exempt from the rule?



Answer: In the example shown, the wing aero profile extends across the top of the fuselage and is therefore subject to the 0.25 inch clearance rule. If the release mechanism connects to the wing, it must extend a minimum of 0.25 inches away from the fuselage to be compliant.

9. If a threaded fastener is used to connect the pylon to the wing mount, is it classified as a permanent fastener and subject to the appropriate safety requirements (locking device required)? Or is it just treated as an access panel latch (positive mechanical latching method required)?

Answer: The pylons, once installed for flight missions, are considered a permanent feature of the airplane potentially carrying high loads and are therefore subject to the permanent fastener locking requirements.

10. Would a valid method of verifying the volume of a beverage bottle with the label removed be by bringing an identical bottle which still has the label on it which we do not intend to fly with?

Answer: As stated in Q&A#1, Q2, it is up to each team to prove their bottle is compliant. It will be up to the tech inspector to decide if a team has sufficiently demonstrated the bottles are compliant. The Q&A will not be used to pre-approve how a team demonstrates compliance.

11. Will the fuel tanks be at maximum weight for Ground Mission? The original rules document says that they may be empty, but question #41 from Q&A #1 says they must be the maximum weight declared at tech inspection?

Answer: The response in Q&A#1, Q41 was incorrect regarding the fuel tanks and the Ground Mission. The requirement is hereby corrected AND includes the internal tank, if implemented, which is part of the GM. For the Ground Mission, the external and internal (if implemented) fuel tanks may be empty for this mission.

12. For the glider drop mechanism to be defined as internal (and therefore non-removable), must it be inside a bomb bay with a door? That is to say, are having a removable drop mechanism or having a bomb bay with a door the only two permissible options?

In the answer to Q&A #1 question 49, it is stated that "if the release mechanism is external to the fuselage, it must be absent for M1 and installed as part of the timed mission for GM." Would this only be applicable to components of the release mechanism external to the fuselage (in the airstream as with the pylons) or every component whose purpose is to hold and release the X-1 glider?

Answer: An internal release mechanism requires a permanently attached bomb bay door for access. For clarification, the release mechanism is considered a "system" in the airplane and not made up of components. If any part of the release mechanism is external, then the release mechanism is external. This and other options and requirements for mounting the release mechanism are further defined within this Q&A#3.

13. The rules state that for Ground Mission, “blocks cannot exceed the height of the airplane fuselage from the ground while resting on its landing gear” but our fuselage rests at an angle. Will this height be defined as the height of the fuselage when it is parallel to the ground (and resting only on its main gear) or sitting at an angle (on its main gear and tail wheel). If it is the latter, at what point along the fuselage will the "height be measured to: point A, point B, or some other point? (see image below)?

Answer: The rules clearly state "while resting on its landing gear", which means ALL gear and contact points (in the case a rear tail skid is used in place of a wheel). In the example provided, the maximum height of the blocks cannot exceed point "A".

14. Are we allowed to secure the plane onto the blocks with tape or some other adhesive, or must they rest on the blocks without additionally being secured?

Answer: How the airplane is secured to the blocks is up to each team to determine.

15. The rules state that decorations or paint may be added to the beverage bottles if they do not alter the external shape of the bottle. If decorations are added that involve light sanding of the surface and nothing more, is this still maintaining the general external shape of the bottle and therefore permissible?

Answer: Prep of the bottle for painting or other decorations is acceptable, but as always, if the amount of prep appears to have altered the external shape of the bottle at the discretion of the tech inspector, it may not be allowed.

16. Can the pylons be attached to the fuselage?

Answer: Yes, subject to the same rules for wing mounted pylons.