

REQUEST FOR PROPOSAL

A+ Airways Wing Design

A+ Airways is requesting proposals for the wing design of our next-generation passenger aircraft. Our current fleet not fuel-inefficient, does not meet federal air quality regulations, and requires costly maintenance. We have already selected a manufacturer for the aircraft body, but we need engineering teams to design the best possible wing.

The wing design must maximize fuel efficiency and glide performance. In an emergency where engines are shut off, the aircraft must be able to glide as far as possible to ensure passenger safety.

Design Requirements:

Your wing design MUST meet the following requirements:

- 1. Glide Distance:** The balsa glider prototype with your new wing must glide farther than the standard baseline glider (class average: 12.1 feet).
- 2. Wing Shape:** The wing must use one of the six approved planform shapes: straight, elliptical, swept-back, delta, swept-forward, or tapered.
- 3. Symmetry:** Both wings must be identical in shape and size (symmetric lift on both sides).
- 4. Attachment:** The wings must fit in the slot in the fuselage. The slot is 52mm wide and 1mm tall (52mm x 1mm).
- 5. Evidence:** Your proposal must include glide-distance test data proving your design outperforms the baseline.

Design Constraints:

Your wing design must work within the following constraints:

- A. Materials:** Wings must be cut from the provided cardstock only.
- B. Fuselage:** You may NOT modify the fuselage body provided.
- C. Weight:** Additional weight (ballast) may only be added to the nose of the fuselage, not to the wings.
- D. Wingspan:** Maximum total wingspan (tip to tip) is 30 cm.
- E. Time:** You have four class periods to build and test your prototype before the Sales Pitch.

Baseline Data: Current Wing Performance

To beat the current design, you need to know how far it flies. The table below shows the baseline performance of the standard straight-wing glider.

Trial 1	Trial 2	Trial 3	Trial 4	Trial 5	Trial 6	Trial 7	Trial 8	Trial 9	Trial 10
12.5 ft	11.8 ft	12.0 ft	12.3 ft	11.9 ft	12.2 ft	11.5 ft	12.4 ft	12.1 ft	12.4 ft

Baseline Average	12.1 ft
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What A+ Airways Expects in Your Proposal

Your final proposal (Sales Pitch) must include:

1. Your chosen wing design and why you selected it
3. A 3D model of your wing (created in TinkerCAD)
4. Test results from your prototype (average glide distance)
5. A comparison showing how your design performs compared to the 12.1-foot baseline

1. What is A+ Airways asking you to design?

2. What is the most important requirement? Why?

3. What does your design need to beat? Write the target distance:

4. What are two constraints (limits) that will affect your design?