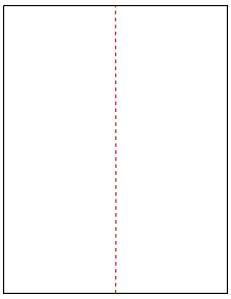
XP 22

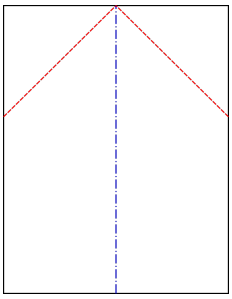
Although fairly simple in design this paper airplane can offer a lot of experimentation. With wing folds designed to give a thicker leading edge it should provide a nice airfoil shape; especially, since the wing folds are going to puff out to make the wing even thicker. A little difficult on thick folds for 24 lb paper but still doable with good results.

Note: Red lines are for folds, blue lines indicate existing creases, and green lines represent hidden edges.



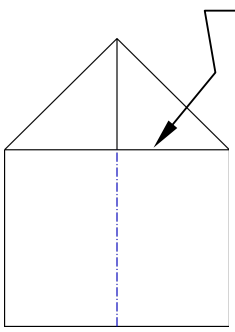
Step 1

Fold paper in half long ways and crease. Unfold.



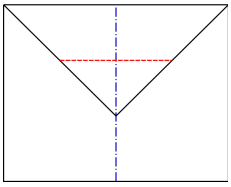
Step 2

Fold top corners down to meet at centerline. Flatten well.



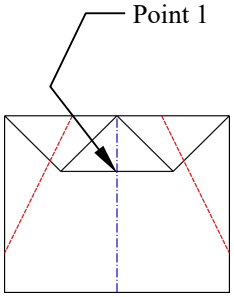
Step 3

Fold top point down along Line A. Flatten well.



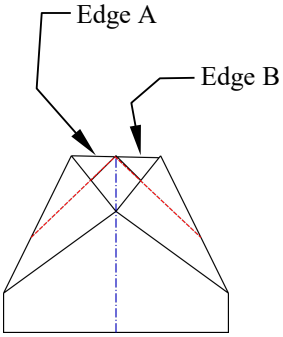
Step 4

Fold top point up along Line B to meet center of top edge as shown.



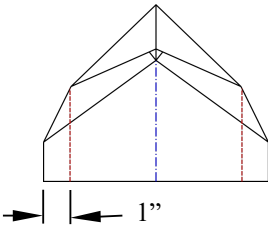
Step 5

Fold top corners down to meet Point 1 as shown.



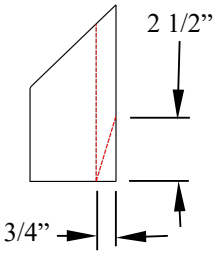
Step 6

Fold Edges A & B to centerline as shown.



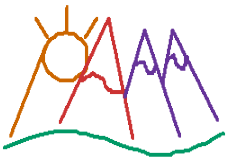
Step 7

Fold winglets up at 1” dimension as shown.



Step 8

Fold wings up at 3/4” dimension as shown. Fold tail as shown. Crease, unfold, and reverse fold into fuselage.



Have Fun
Pat Morgan
patsplanes.com

The cool paper airplane site!

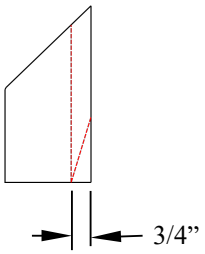
Paper Airplane Flying Instructions

Make sure wings are level (or slightly up) and winglets are vertical. Throw level at a “medium” to“very fast” speed. Trim per general instructions if required but the plane seems to do well “as folded” on a variety of paper. It may do better if nose and leading edges of wings are taped together.

XP 22 (Experimental Mods)

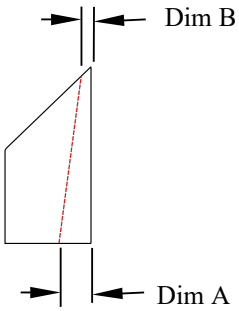
Now what experiments can I do – after all, it is an XP craft?

1. If you read the section on air plane types then you learned their is a definite difference between a glider and a dart. A glider's wings produce more lift at slower speeds then do the wings of a dart (where the wings, along with the fuselage, act as much as fins on a rocket then they do as wings). A glider often requires winglets on the ends of the wing to help maintain that lift, a dart does not since lift is less important. A glider requires a positive angle of attack to generate that lift and often a vertical stabilizer to maintain that angle of attack (see the science of flight section if you want to know why). As shown above this plane is folded as a glider. But it can be turned into an "in-between type" as follows:



Step 8 Old

Fold wings up at 3/4" dimension as shown.



Step 8 New

Fold wings up at Dims A & B as shown.

Notes:

If you fold this design using the original Step 8 dimensions for the fuselage, delete Step 7 winglets, and skip the tail; then, you should notice that when you fly it the nose wants to head to floor and the wings either wobble up and down or outright roll. The plane will also slow down fast like there is increased drag. These flight characteristics demonstrate the need a glider has for a tail and winglets. But, as we increase Dim A and decrease Dim B the plane reaches a point that the tail and winglets are no longer required. The body and wings take on more function like fins of a rocket and the trajectory of the plane is more like a dart. Experiment and observe.

2. Try folding the winglets and wings with the plane turned over allowing the fold to the bottom of the plane. The design is for the folds to be on top mainly to keep the plane folds tighter when the nose is taped. Allowing the folds to be on the bottom the wing cross section will be more like that of many real airplane wing airfoils. Just note you may need a glue stick to hold the folds tight to the body. Compare the flights of both designs at different speeds.

3. This plane is a very good candidate for cutting out unneeded surface area of the wing as was popular in the 1960's. The theory was that this would reduce drag. Make a copy of sheet 3 and fold the printed sheet in half. Cut out along black solid outlines so both halves are symmetric. You may have to look at the original electronic sheet and trace the missing parts of the paths since every printer is different on how close to the borders it will print. Fold as per original instructions except – skip forming winglets and tail from the original directions. Instead use the red dashed lines to fold both winglets and vertical stabilizers down. This plane may have an odd look; but, with a very little fold up on the elevator tabs, I have seen this plane stay with a proper and constant angle of attack and have great lift. Just throw hard.
Judge for yourselves if the designers of the 1960's were correct. Did the popularity of this style of design decline due to lack of flight improvement or just because it was too much work? That is up to the experimenter to answer. Also, try to change what is cut out to improve both looks and function.