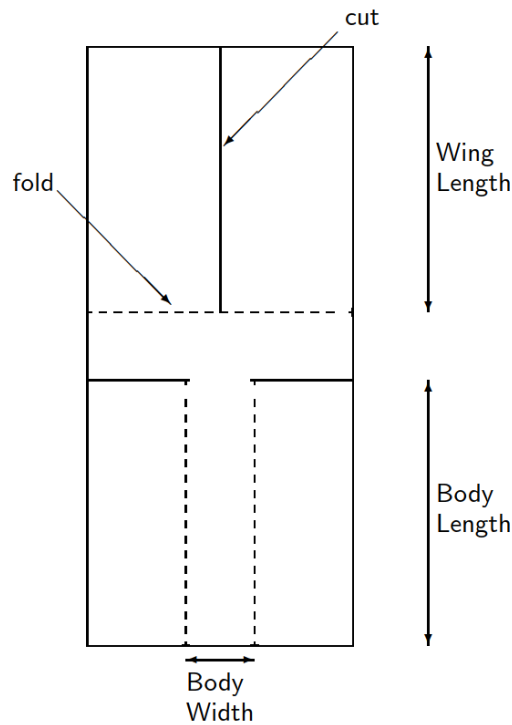# Designing a Helicopter — A Simulated Experiment

This exercise involves the design and analysis of an experiment that includes some of the complications that arise in real-world situations. You should divide into small teams to carry out this exercise. The figure below shows how to make a helicopter from a piece of $8\frac{1}{2} \times 11$ paper.

Note that in the figure there are three dimensions of the helicopter that are variable: wing length, body length, and body width. The goal of each team is to design a helicopter such that its flight time is maximized. To measure flight time you should stand on a table and release the helicopter above your head. The flight time is the length of time from release to contact with the floor.

You should consider varying three design characteristics in designing your helicopter: wing length, body length, and whether or not you use a paper clip on the bottom of your helicopter. (Ignore body width.) Each team will be provided with 14 pieces of specially chosen paper. The goal is to design a long-flying helicopter made of this paper, and so no other paper may be substituted. Also, the paper that you will be using is extraordinarily expensive, and thus extra sheets will not be available. You will also be provided with a paper clip.

● Reference

This experiment is a modification of one described by Box (1992).

Box, G. E. P. (1992) George's Column: Teaching Engineers Experimental Design with a Paper Helicopter, Quality Engineering, 4, 453–459.