1.       Let’s consider a similar plane to that defined in your class project.  To simplify things, let’s initially accept the same weight sizing criteria and performance targets (we’ll verify on the next step) and develop a performance matching graph for the airplane which trades wing and power loading required to meet at least:

a.       Takeoff distance (water and/or ground)

b.      Climb rate

c.       Landing distance / stall speed

d.      Maximum speed at a couple of altitudes (say 5,000 ft and 10,000 ft)

Perform a parametric study of wing AR, Cdo, e, CLmax, and propeller effectiveness to either justify the existing configuration or select a new wing with parameters more appropriate to the mission.

2.       Recommend type and rough size for flaps or other surfaces to meet the requirements of (1).  Based on the selected W/P vs W/S design point and the existing weight data, establish the wing area and power required.

3.       Improve your estimate of Cdo based on your proposed configuration from (2) and see how well it correlates with the Cdo initially selected for the performance sizing.

4.       Build a drag polar from Cdo, e, and AR, and estimate the range and endurance of the airplane for the following two missions:

a.       Maximum endurance starting for loiter above a potential observation or water drop site at 10,000 ft.  No drop.

b.      Maximum distance of a drop-point from home base (i.e., what is the farthest target that can be reached from takeoff, perform a drop, and return home).

        Once we get some of the calculations above working, I’ll send you a series of brief questions on this model and some of the same exam topics we did in class.