

AEM 313 MEMO

Subject: Aerodynamics I Endurance Glider Project

TO: AEM 313

Date: 17 Nov 2017

CC:

Memo: AEM313-P2-Assign

From: Charles O'Neill

REF:

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Summary:

Design and construct a glider carrying 8 quarters which maximizes **endurance**. A design report (50 pts) including concepts, analysis, and an aircraft photo are due on 1 Dec 2017. Flight trials (50 pts) will be held **indoors**. Aircraft must be **human powered**; no additional power sources. The aircraft structure is restricted to **foam and paper**. Design group sizes can be 1-4 with a preferred size of 2. The 3rd highest endurance determines the 100% score; all others are prorated. If you beat Dr. O'Neill, you receive a minimum 90% score.

Discussion:

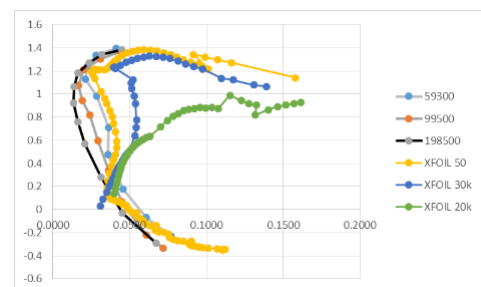
Endurance means optimizing $C_L^{3/2} / C_D$. I suggest 1) drawing a few concepts: monoplane, biplane, canard, and 2) evaluate and optimize performance 3) flight test and iterate.

Grading

50% of from your report. 50% from the normalized endurance.

Reynolds Number

These airplanes operate at low Reynolds numbers. Use XFOIL to determine C_L and C_D performance of airfoils. Traditional airfoils are probably not a good choice. You may wish to investigate flat and curved plates. Higher AR will give lower induced drag but at the expense of lower Re and thus higher profile drag.



Quarters:

US dimes and quarters are \$20 per pound. Quarters are 0.0125 lbf each.

Structural Materials:

Materials are available from the SupeStore on campus, Home Depot, Hobby Lobby in Northport, and online. You are restricted to **any** foam and/or paper (i.e. processed wood fiber) materials for the structure. Unprocessed wood fibers (e.g. balsa) are **not** permitted.