Project Guidelines

CLARKSON UNIVERSITY
Department of Mechanical and Aeronautical Engineering

AE212 Intro to Aeronautical Design

Project: Aircraft Airload Estimation
Team: 2 students in each team
Report Due: April 21, 2011 (5 pm)

Project objective: Preliminary loads estimation for structural analysis/design of an airplane wing

The project report must include the following sections. You should write this report in the format of a journal paper (for example, see Journal of Aircraft). All tables, figures, etc. must be included in the body of the report and referred to as Fig. 1, Table 1, etc. You may include your m-file etc. in the appendix.

1. **Introduction** – General information, geometry, mass, and operational info (max speed, load factor, etc.) for any airplane from Jane’s All the World’s Aircraft (or any other source). Focus on wing geometry (planform, cross-sections at root, mid-span, and tip). Use the available airplane data as “inspiration” and add (using books, reports, engineering judgment, etc.) missing info.

2. **V-n Diagram** - Draw a V-n diagram for the airplane.

3. **Air Loads** – Compute shear force and bending moment for the wing. Use TOGW (max weight) and $n$ and $q$ values for max lift coefficient / max positive load factor flight condition (Point B or corner velocity on V-n diagram). Compute wing torsional moments for the wing using the same “stips” as for shear force calculations. For torsional moment at any station, sum all torsional moments outboard of that station (just like shear force).

4. **Discussion of Results** – Briefly discuss the results from your calculations. Highlight any trends that you observe and note their implications on aircraft structural design.