

MAE155B Green Aircraft

Introduction March 31 2009

Tony Hays

Reserve Books

- Hoerner, S.F., "Fluid-Dynamic Drag", Hoerner Fluid Dynamics, 1965.
- Jenkinson, Lloyd R., Simpkin, Paul, Rhodes, Darren, "Civil Jet Aircraft Design" AIAA Education Series, 1999.
- Thomas, G., et al., "Plane Simple Truth", Aerospace Technical Publications International, 2008.
- Torenbeek, Egbert, "Synthesis of Subsonic Airplane Design", Delft University Press, 1982.
- Whitford, Ray, "Evolution of the Airliner", The Crowood Press, 2007.

Risk Reduction Experiment

- Examples
 - Drag reduction component (wind tunnel experiment)
 - Drag reduction from stability modification (e.g. relaxed longitudinal static stability)
 - New material (structural test, e.g. carbon fiber landing gear)
 - New fuels (freezing point characteristics of fuels)



Team Status Reports

- Oral presentation
 - Summarize activities of previous reporting period
 - Include quantitative data and figures (not just talking points)
 - Max 10 minutes
 - Max 5 minutes for Q&A
 - Different team member to give presentation each week
- Written submission
 - Annotated PowerPoint
 - Identify authors

Media for submission of documents

- Email to Tony Hays and Andrew Cavender before the start of the class.

Tasks for this week

- Discuss possible configurations/ideas
 - Box wing
 - Joined wing
 - Canard
 - Engine types
 - HBPR
 - Geared turbofan
 - Unshrouded rotor

Tasks for this week

- More configurations/ideas
 - Engine location
 - Under wing
 - Over wing
 - Rear fuselage
 - Structures/Materials
 - B787 is 50% composites
 - Difficult to increase that percentage

Tasks for this week

- Systems
 - All-electric secondary power
 - No hydraulics
 - No bleed
 - Flight control systems
 - Relaxed longitudinal static stability

Tasks for this week

- Build computer models
 - Mission
 - Constraints
 - Zero-lift drag
 - Weights

Tasks for this week

- CAD model (use Jenkinson for guidance on dimensions)
 - Fuselage and components therein
 - Seats
 - Flight deck
 - Toilets
 - Galley
 - Cargo containers
 - Landing gear