

## MSD: Benchmarking

### 1. Competition Reports:

- RIT Aero Design Club: 2004 Aero SAE Competition Report: The latest competition report available from the Aero Design Club. The report outlines the design process, including preliminary design, airfoil selection, propeller selection, wing sizing, structural design, control surfaces design, and control system integration. This report serves as a good basis for the aeronautical aptitude of RIT and its students.
- University of Cincinnati: 2004 Aero SAE Competition Report: This document outlines the teams design procedure, and breaks up the report in sections comprising aerodynamic, structures, propulsion, stability and controls, and performance. This document is edited by an SAE Aero judge, and it was commented as “a very well written report.” This document should serve as the standard for which reports should be written.
- Purdue University: 2011 AIAA Design Build Fly Report: competition report for the 2011 Design Build Fly competition. This document provides an extremely detailed report of the team’s design process. While all aspects of the report are done excellently, the biggest takeaway is the conceptual/preliminary design process, representative of methods used in DPL. Examples include an objective tree, house of quality, weighted customer requirements diagrams, etc. Also, a design and build schedule is presented in the form of a gantt chart, serving as a good reference.
- NYU Polytech: 2012 SAE Aero Competition Report: This is another document that provides another team’s design methods. This report however, is more recent than the others, and the rules they faced are more aligned with the competition constraints and requirements today.
- Florida Institute of Technology: 2014 SAE Aero Competition Report: Recent design report and in-progress report. Details design process in depth and provides insight into potential challenges. Detailed Propulsion data.

### 2. Introduction to Flight (7<sup>th</sup>) - Anderson

- Textbook providing introductory theory in subjects concerning aircraft anatomy and design, aerodynamics, and flight dynamics. This was the course textbook for a class formerly known as Introduction to aerospace engineering.

### 3. Fundamentals of Aerodynamics (5<sup>th</sup>) - Anderson

- Textbook providing in-depth aerodynamic theory and applications to aircraft. This is the course text book for Aerodynamics (MECE – 409).

### 4. Aircraft Structures for Engineering Students (5<sup>th</sup>) - Megson

- Textbook providing in-depth coverage of solid mechanics, specifically applied to the analysis of aircraft structures. This is the course text book for Aerostructures (MECE-412).

### 5. Flight Stability and Automatic Control (2<sup>nd</sup>) – Nelson

- Textbook providing in-depth coverage of flight dynamics, specifically with respect to aircraft stability and control. This is the course text book for Flight Dynamics (MECE-410).

### 6. Aircraft Design: A Systems Engineering Approach - Sadraey

- Textbook covering the design process for aircraft. In-depth coverage of conceptual design, preliminary design, wing design, tail design, landing gear design, and control surface design is included. The design process is presented in an iterative manner that shows how each aircraft component affects the design of other components, as well as instructs how to design for specific mission requirements.

### 7. Basics of R/C Model Aircraft Design – Lennon

- Textbook outlining the design process specifically for R/C aircraft. Aeronautical theory is presented in a simplified manner that is easy for any hobbyist to understand. Also, build techniques are also discussed for aircrafts of this scale.
8. UIUC low Reynolds Number Airfoil Studies
- A sequence of studies produced by Michael Selig and others at the University of Illinois at Urbana-Champaign. These studies consist of wind tunnel testing of airfoils designed for, or commonly used in, situations with Reynolds numbers below at and below 300,000
  - Studies contain documentation of the S1210, S1223, and S1223RTL airfoils. These were designed for this competition by Michael Selig.

Source	Usefulness
RIT Aero Design Club – 2004 Aero SAE Competition Report	- RIT competence baseline - Design Process
University of Cincinnati – 2004 Aero SAE Competition Report	- Example of well-written design report - Design Process
Purdue University – 2011 AIAA Design Build Fly Report	- Excellence in design and build process - Conceptual and preliminary design process
NYU Poly – 2012 SAE Aero Competition Report	- More current design process reference
Florida Institute of Technology – 2014 Aero SAE Competition Report	-Most Recent set of reports -Work in progress reports -Detailed Propulsion Analysis
Introduction to Flight (7th) – Anderson	- Basic Aeronautics reference
Fundamentals of Aerodynamics (5th) – Anderson	- Aerodynamics reference
Aircraft Structures for Engineering Students (5th) – Megson	- Aerostructures reference
Flight Stability and Automatic Control (2nd) – Nelson	- Flight Dynamics reference
Aircraft Design: A Systems Engineering Approach - Sadraey	- Aircraft Design reference
Basics of R/C Model Aircraft Design – Lennon	- R/C Model Aircraft Design reference
UIUC Low Reynolds Number Airfoil Test Reports	-Well organized and documented windtunnel data for many airfoils at appropriate flight regimes.