

## AAE 421 Semester Project

### Objectives

1. Starting with the work done in AAE421 last semester by the two BoilerXpress teams, develop software that starts with basic aircraft geometry and mass properties and generates the 67 constants required by AAE421 software. Be as general purpose as possible so that students in AAE 451 can use your software for dynamic analysis of future aircraft designs. The constants are listed in the m-file Cessna182.m which can be found at

[http://roger.ecn.purdue.edu/~andrisan/Courses/AAE421\\_S2001/Docs\\_Out/DC\\_Software/Cessna182.m](http://roger.ecn.purdue.edu/~andrisan/Courses/AAE421_S2001/Docs_Out/DC_Software/Cessna182.m)

2. Use your software to model the aerodynamic properties of the BoilerXpress aircraft.

3. Design a feedback control system that feeds back pitch rate to the elevator and achieves certain gain and phase margins. Specifications for this can be found at [http://roger.ecn.purdue.edu/~andrisan/Courses/AAE451%20Fall2000/Control\\_Flight.pdf](http://roger.ecn.purdue.edu/~andrisan/Courses/AAE451%20Fall2000/Control_Flight.pdf)

4. Develop an extensive detailed manual and on-line help.

### AAE 421 Assignment

1. Familiarize yourself with the software developed last semester by 421 students who modeled the basic aerodynamics of the BoilerXpress aircraft. Their work can be found at the following web sites.

[http://roger.ecn.purdue.edu/~andrisan/Courses/AAE421\\_Fall\\_2001/Proj\\_Spring2001/BX1/](http://roger.ecn.purdue.edu/~andrisan/Courses/AAE421_Fall_2001/Proj_Spring2001/BX1/)

[http://roger.ecn.purdue.edu/~andrisan/Courses/AAE421\\_Fall\\_2001/Proj\\_Spring2001/BX2/](http://roger.ecn.purdue.edu/~andrisan/Courses/AAE421_Fall_2001/Proj_Spring2001/BX2/)

2. Start thinking of a software design strategy for organizing your software. As part of this organization, I think you need to have one function for each non-dimensional stability derivative. BoilerXpress Team 2 seems to have organized themselves this way. Draw a sketch of how the various functions and programs will interconnect.

3. As part of your plan, determine how you will document your work so students who use your software in the future will have access to both a paper manual and on-line help. If your strategy is well thought out you may be able to generate large parts of the manual from the on-line help.

4. Familiarize yourself with the AAE 421 software for dynamic analysis which can be found at

[http://roger.ecn.purdue.edu/~andrisan/Courses/AAE421\\_S2001/Docs\\_Out/DC\\_Software/index.html](http://roger.ecn.purdue.edu/~andrisan/Courses/AAE421_S2001/Docs_Out/DC_Software/index.html)