University *of* Dayton

Department of Mechanical and Aerospace Engineering
MEE 440/AEE 521 − Flight Vehicle Performance/Dynamics
Final Project

This is an Group project

Aircraft: Use the Aircraft that you have worked in Project-1

Using the flight simulator, you will perform the same maneuvers that you have performed on your aircraft in project-1 and plot all the system responses along with Project-1 and the sim responses.

For this project, you will:

1. Simulate the response of each aircraft to an elevator doublet (stabilator doublet for the F-4), aileron doublet, and rudder doublet using the flight simulator.

2. Analysis and Result – Present the following plots and comment on the stability of each response and steady state values

    (a) Elevator doublet: $u, \alpha, \theta, \delta_E$ vs time
    (b) Aileron doublet: $\beta, \phi, \psi, \delta_A$ vs time
    (c) Rudder doublet: $\beta, \phi, \psi, \delta_R$ vs time

3. Design a PID controller to maintain altitude of the aircraft (that deviates from anywhere between 100-1000ft from your cruise altitude).

4. Write a detailed write-up describing your results from project-1, and final project. Explain what you have done, describing your aircraft, flight conditions, EOM and your results. The report should follow a similar style to a technical paper from IEEE or AIAA (Page Limit: 8-10 pages).

5. Final project also involves a 10 minute group presentation (in-class). The presentation should discuss your report and results concisely. Each team member should present for at least 2 minutes.