**SimCenter: National Center for Computational Engineering**

**Euler-based Aircraft Design Paper Contest**

Goal: To inspire students to learn about Aerospace Engineering and motivate them to pursue a career in a STEM field such as Engineering.

Background: Using the tutorial supplied on the website, students can gain an understanding of the basics of sub, trans, and supersonic flight using a NACA0012 airfoil. Based on the pressure solutions given after each Euler solve, students will be able to make lift and drag predictions.

Contest: Use the online Euler solver and online research into the basics of flight (lift and drag) to write a three-page paper explaining the following three scenarios:

1. Subsonic: How and why do lift and drag change based on angle of attack at Mach = 0.55?
2. Transonic: How and why does shock formation change based on angle of attack at Mach = 0.75?
3. Supersonic: How and why do lift and drag change based on angle of attack at Mach = 1.05?

Rules: Students must submit a three-page write-up, double-spaced, using 12 point Arial or Times New Roman font, with 1 inch margins; this must include at least one self-made chart or graph. Entries will be judged for grammar, correctness of results, amount of content fit within constraints, and best use of graph/chart.

Contact: Submissions can either be sent electronically (in MS Word, OpenOffice, or PDF format) to [Vincent-Betro@utc.edu](mailto:Vincent-Betro@utc.edu) OR via mail to:

Vincent Betro  
UTC SimCenter: STEM Outreach

701 E. MLK Blvd

Chattanooga, TN 37403

Deadline: Submissions must be RECEIVED by noon, February 22, 2010.

Prizes: All participants will receive a certificate, and the top three authors will be notified of their status by February 26, 2010 and will each receive a special prize. There will be an awards ceremony at the SimCenter on March 16, 2010 at 10 am, where all entering students will be presented their awards and then given a tour of the facility!