Fowler Flap Angle Study and Animation

By Cameron Parvini

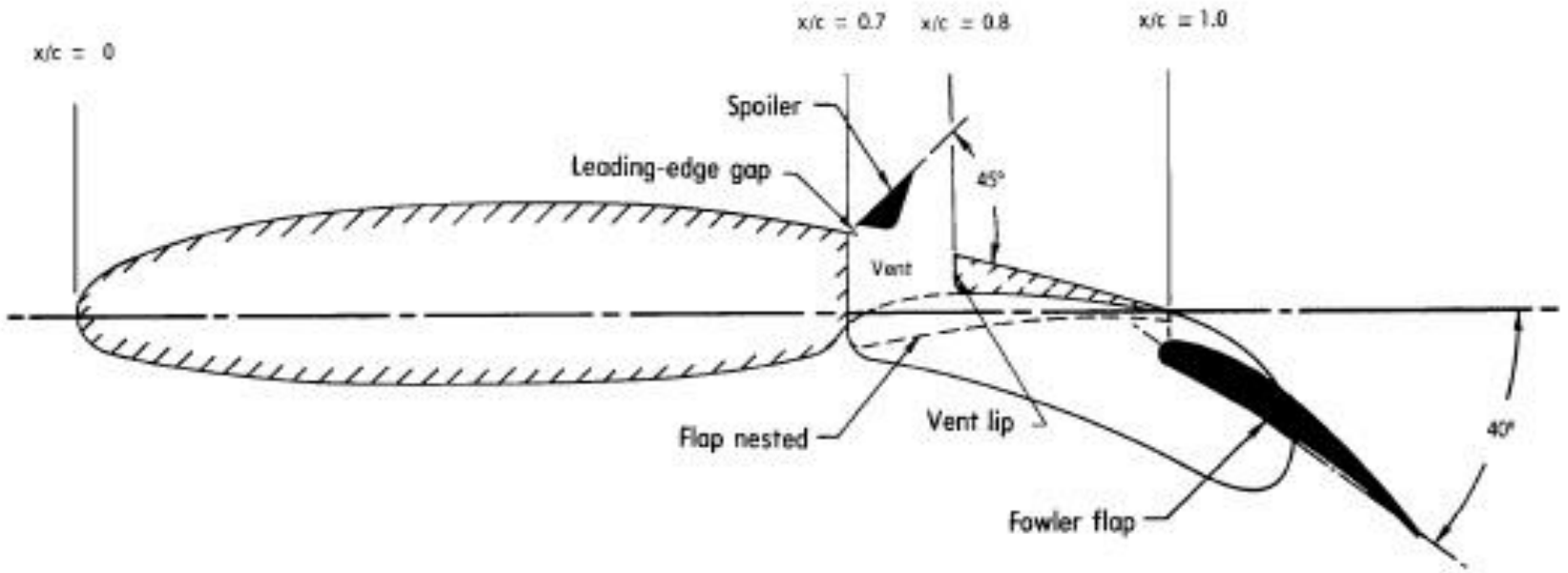
Fowler Flap History

- Theorized in 1924 by Harlan D. Fowler
- Tested in 1927 by Fowler & Crewfoot
- Approved by NACA several years later

Figure 1: Extended Fowler Flap

http://www.decodedscience.com/wing-flaps-for-lift-augmentation-in-aircraft/11831/2

Geometry



(a) GA(W)-1 airfoil with Fowler flap and spoiler.

Figure 3.- Flap deflections and positions.

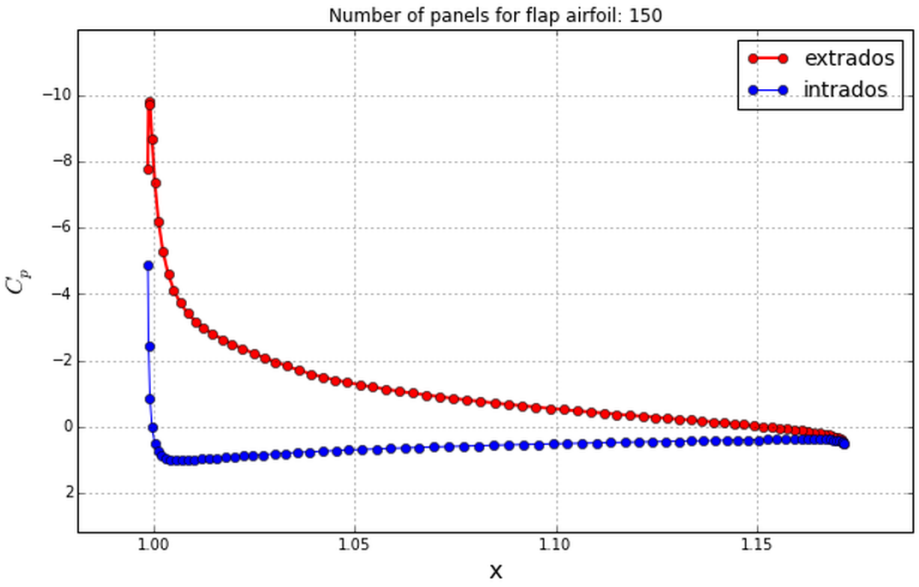
Figure 2: Fowler Flap Geometry

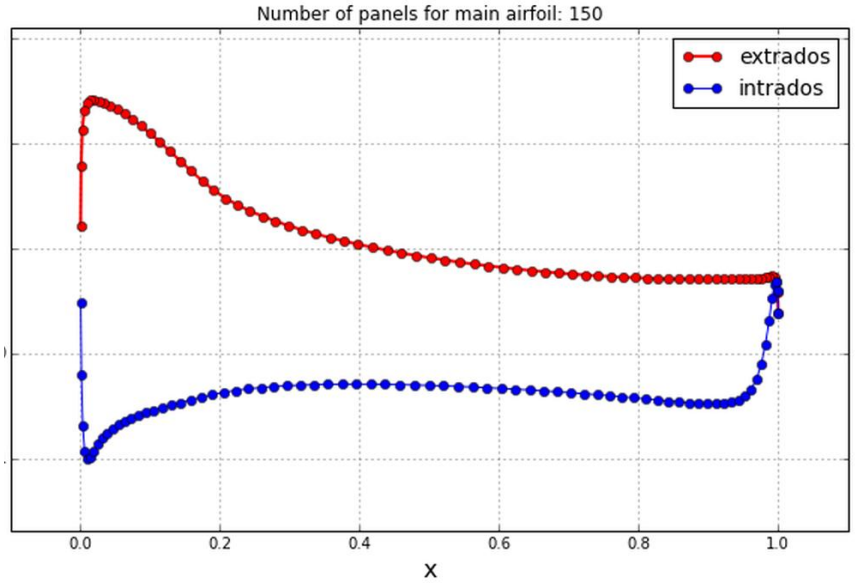
- Paulson, John W. Jr., *"Wind-Tunnel Investigation of a Fowler Flap and Spoiler for an Advanced General Aviation Wing,"* Langley Research Center, Hampton, VA 23665. June 1976. NASA TN D-8236.

Changes to Legacy Code

- Several functions were altered to accept two foils
- Two new functions added:
  - init( ); Initialization function for the animation
  - animate( ); Script for plotting each frame of the animation

Results

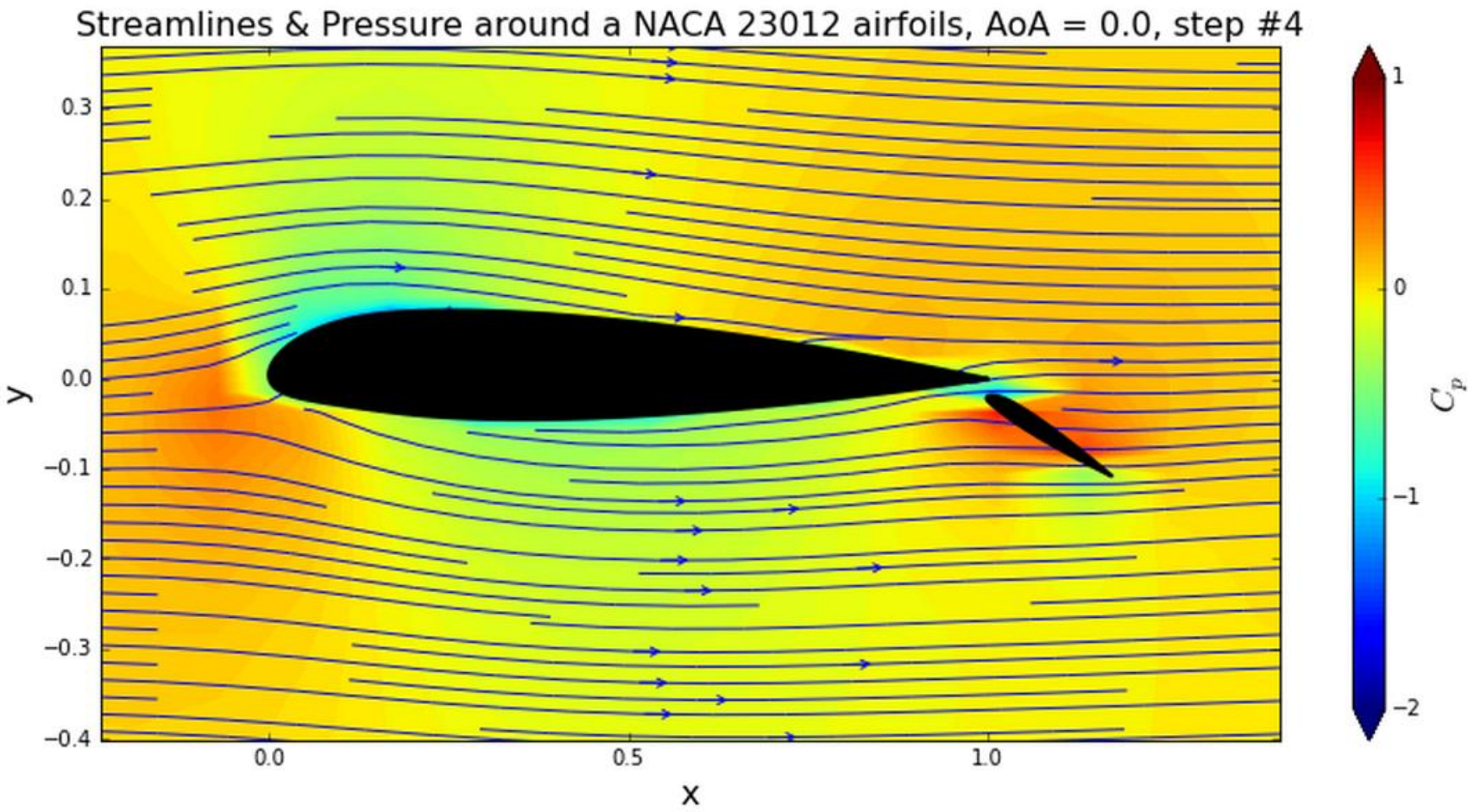




- C_P appears within reason for the first several steps
- Lift and Accuracy calculations are reasonable
- Animation functions were slow, but the video is clean

Results

- Streamlines and C_P:



Moving Forward

- Could add functionality to slide flap out into position
- Time required to render all the steps is **terrible,** and should be improved
- Animating the intrados/extrados plots based on step
- Extension could be made to 3-body flow