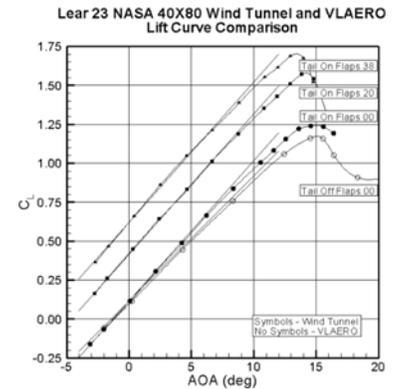
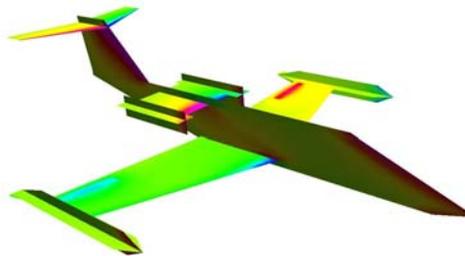


# VLAERO+™

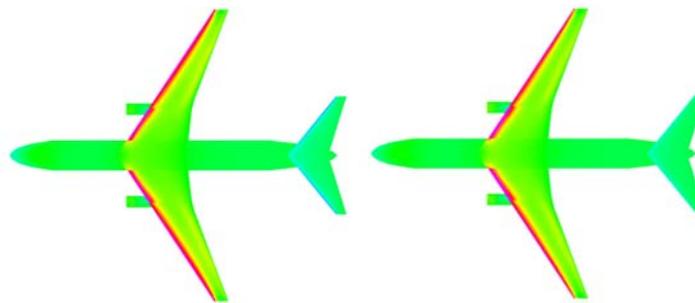
## Vortex Lattice Method

VLAERO+ is a planar vortex lattice method for the aerodynamic analysis of subsonic and supersonic aircraft configurations. With its own GUI, VLAERO+ is ideally suited for the preliminary design environment where it can be used to quickly produce loads, stability and control data. Thousands of calculations have demonstrated that VLAERO+ is not only extremely simple to use but is also highly accurate within the limitations of the governing equations. Geometry is represented by a series of trapezoidal patches. Camber and twist (including airfoil sections, wing twist, and control surface deflections) are easily specified using common aerodynamic design parameters. Output data are clearly tabulated, including interpolated geometry, surface pressures, force and moment coefficients, and distributed loads.

Lear 23 Calibration Case

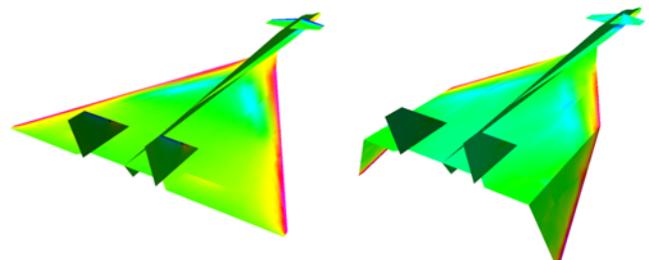


Trimmed Lift—Effect of Elasticity

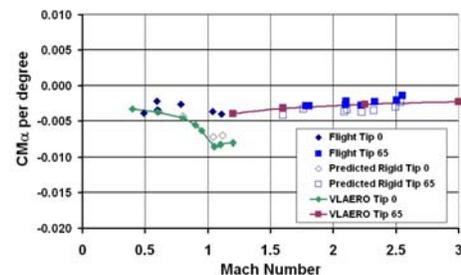


Mach 0.8,  $C_L$  0.635

Rigid: AOA 2.8 deg, stab -1.8 deg  
Elastic: AOA 4.0 deg, stab -1.7 deg



XB-70 Test Case



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VLAERO+ includes a graphical user interface for geometry creation, program execution, and solution visualization. Intuitive toolbars provide geometry creation and editing functions. Component ordering and input file creation are performed transparently without the need to edit fixed format text files. Airfoil data management and specification are greatly simplified. Execution of the flow solver is controlled by the interface, and the results are processed for visualization.

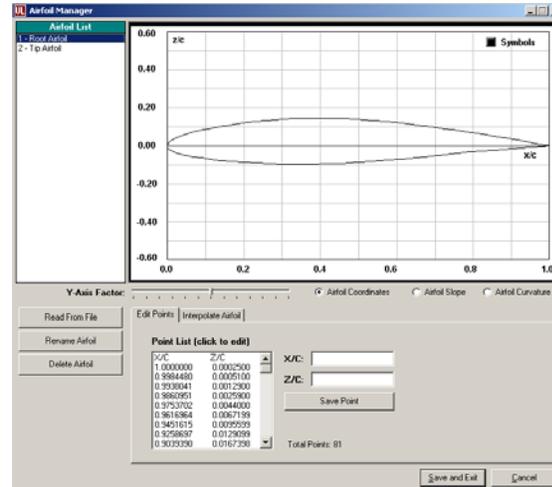
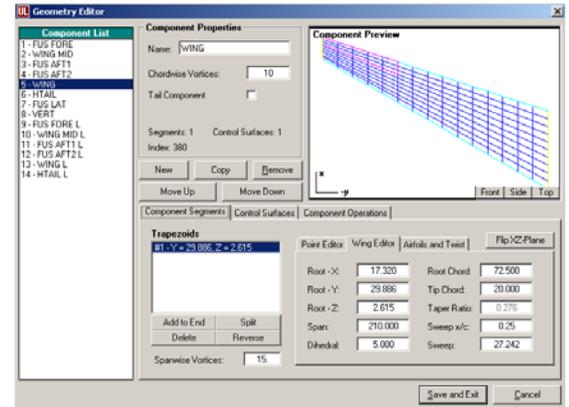
Intuitive design-based geometry editors

User features available from the graphical interface include:

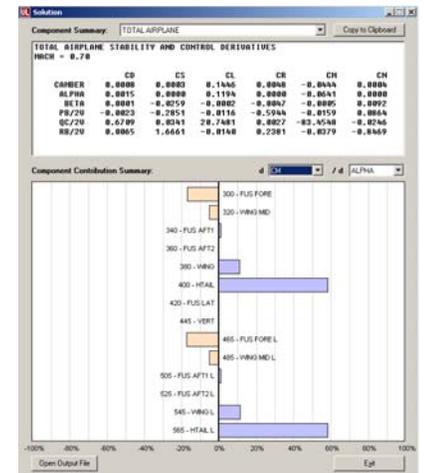
- Toolbar for quick intuitive access to file and visualization functions and asymmetric models.
- Display window for quick visualization of geometry, airfoils, and flaps.
- Geometry editor allows addition, deletion, and sorting of model components.
- Component operations for translation, scaling, and stretching of components.
- Control surface editor allows graphical specification of control surfaces.
- Wing editor for quick generation/modification of model geometry using standard wing design data.
- Advanced functions include viscous correction calculator, ground effect model generator, and batch processing.

Features that distinguish VLAERO+ from other vortex lattice methods are:

- Short run times for quick job turnaround.
- Rapid configuration modeling and modification, including control surface deflections.
- Data plotting also compatible with OMNI3D.
- Tables of longitudinal and lateral stability and control derivatives are obtained with a single run.
- Automatic aircraft trim calculation including servo tab effects.
- Built-in beam bending solver allows calculation of static aeroelastic effects with or without inertial relief. Static aeroelastic calculations include stability and control derivatives and trimmed conditions.



Airfoil manager simplifies camberline input



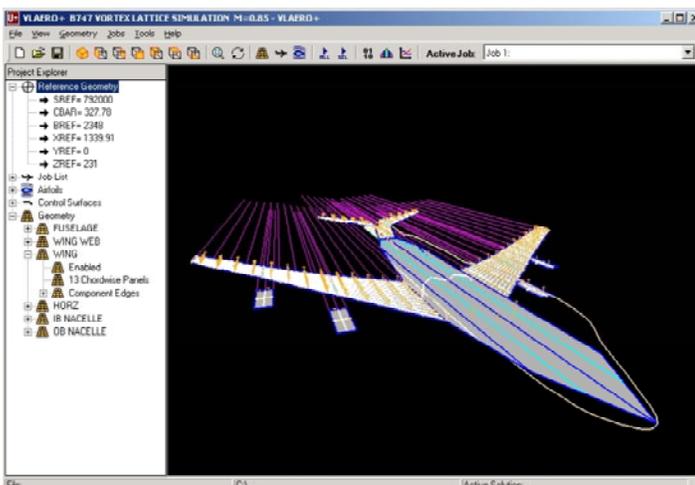
Flow solution controlled and displayed by interface

VLAERO+ is available on the Windows™ platform.

### Questions?

For more information about VLAERO+, please contact:

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Interactive and Associative Data Editing