PEP

Panel Editing Program

Frustrated by geometry preparation for CFD codes? PEP has been created to solve these problems. Intended to be a complement to SURFGEN, PEP has features that make short work out of building VSAERO, USAERO and MGAERO models.

Besides working with SURFGEN output, PEP has powerful features for creating models from scratch. Once a model has been created, PEP is the tool of choice for modifying an existing model.

PEP can also be used for preparing the field grid for MGAERO models. A multitude of other features take care of such things as calculating many input parameters necessary for running CFD codes and for diagnosing problems with models. A full list of features can be found on the back of this brochure.

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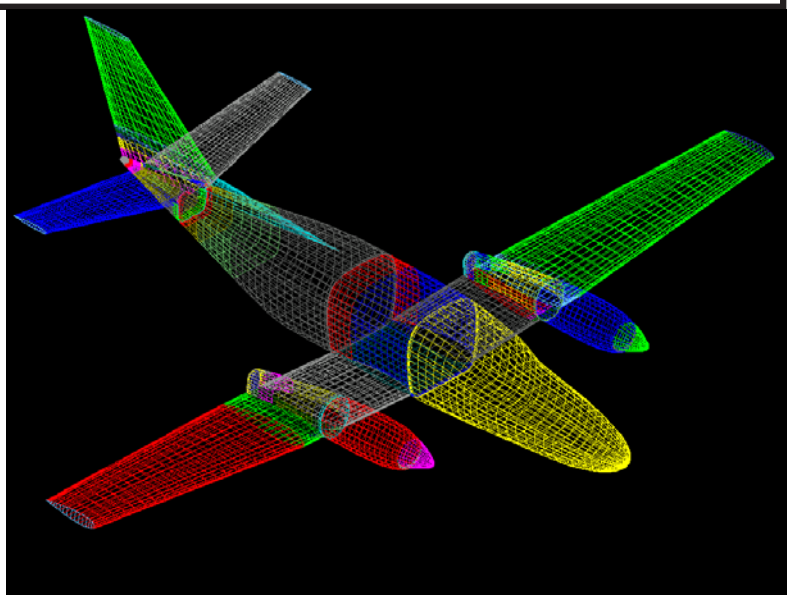
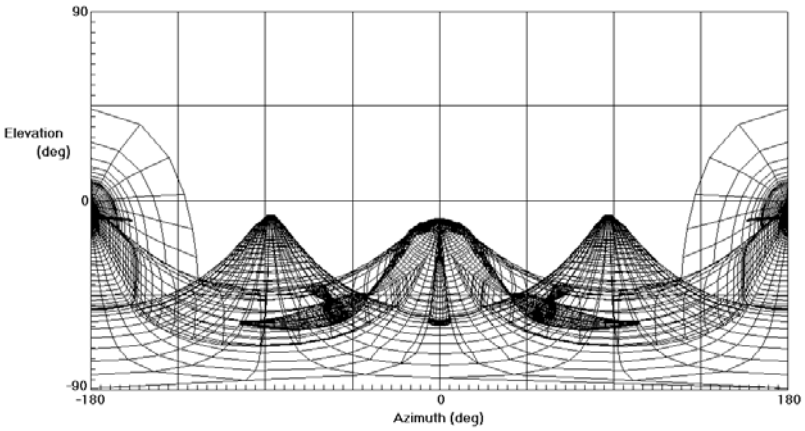
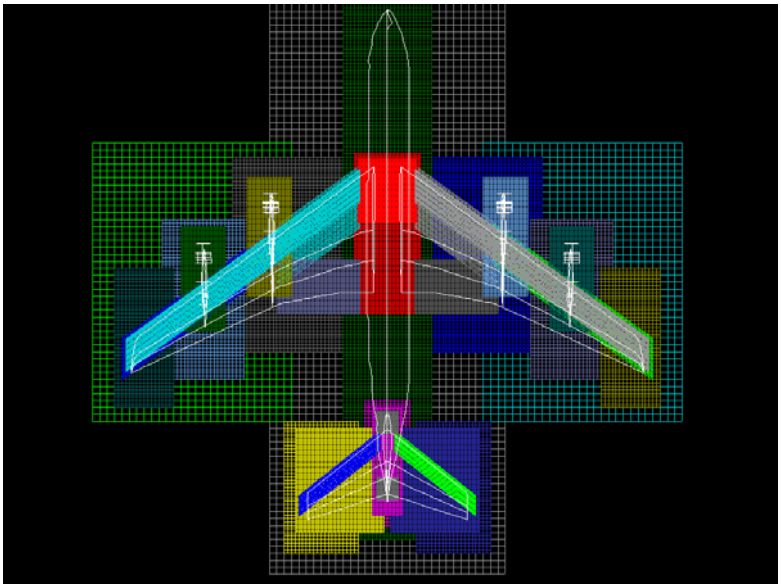


VSAERO surface grid on a twin turboprop



Cockpit field of view plot for a Formula One racing plane



MGAERO field grid layout for a jet airliner

PEP is a Microsoft Windows™-based program for the preparation of CFD models. It has a large toolbox of functions intended to make constructing and modifying models an easy process. The user is presented with a visual display of the geometry being manipulated and the execution of all functions is driven interactively using the mouse cursor. The development goal was to present the user with a CAD-like interface for the manipulation of CFD models.

PEP can read existing models in one of many common formats. Alternatively, models can be creating using several lofting functions. PEP does not have the ability to read IGES files or work with surfaces developed in CAD. Instead, PEP is intended as a complement to the AMI SURFGEN product, which can handle such files. PEP was developed for the manipulation of surface grids and the building of MGAERO field grids. Completed models can be written out in one of many common formats for input to CFD codes. Supported input/output 3-D formats include VSAERO, MGAERO, USAERO, PMARC, QUADPAN, A230, PAN AIR (A502), TRANAIR (A633), FLO22, PLOT3D, EMM, DXF R12. Supported airfoil formats include MSES, LED, EPPLER, KOO and SD.

The most important PEP functions are section point redistribution, interactive section interpolation (including constant X, Y or Z for MGAERO) and patch intersection calculation. These are accomplished by splining section defining points. A Monotone Spline is the default for these operations, but the user can instruct PEP to use Linear, Cubic, Biquadratic, Bicubic or Biquintic Splines.

Other important functions include: breaking a patch along a section or a section at a point, combining two patches or two sections, swapping rows and columns in a patch, reordering sections in a patch, points in sections or patches in a model. Complete models or portions of the model can be translated, rotated, copied, deleted or mirrored. Portions of the model can be extracted and written to a file or imported and added to the model under construction. Wing tip patches can easily be created. A built-in editor allows the points in a section to be manually edited. Special functions allow the trailing edge thickness of a wing to be changed and the addition of twist and deformation to a wing.

Diagnostic functions allow panel normals and patch paneling order to be displayed. Points can be selected to be identified or to have the distance and angles between pairs of points to be calculated. Other functions find the area enclosed by a section, the circle through any three points, section length, or the wetted area of a patch. Models can be checked for duplicate patches or zero area panels.

Functions within PEP allow the following axisymmetric bodies to be created: Tangent Ogive, Secant Ogive, Von Karman Ogive, Sears-Haack Body, Haack-Adams Body, Parabolic Spindle, Ellipsoid of Revolution and Power Law Body. Other functions allow airfoils of the following families to be created: NACA 4-digit, NACA 5-digit, NACA 4-digit modified, NACA 5-digit modified, NACA 1-series, NACA 6-series, NACA 6A-series, NASA 6-series modified, Bolkow 4-digit E series, NPL EC series, NPL ECH series, NPL EQ series and NPL EQH series.

A specialized function allows the model to be displayed as a cylindrical projection (azimuth vs. elevation) for field-of-view plots. For aerial applications, the horizon elevation can be displayed and fringe points on the cylindrical projection can be extracted to a file.

A number of MGAERO field grid preparation functions make this task much easier. These functions allow selected grid blocks to be shown, location to grid indices are given, grid levels 1-3 to be automatically created, new grids to be interactively created, existing grids to be edited, deleted, copied, translated or mirrored.

To support the final preparation of CFD input files, there are a number of operating condition calculation functions. These include: atmospheric properties, water properties, airspeed/Mach/q conversion, lift coefficient calculation, Reynolds number calculation, inflow/outflow calculation, actuator disk properties and Cpstar and Cpvac calculation.

PEP makes use of a full .ini file, saving session view, colors, open files and window positions. The screen display can be printed screen in either color or B&W or captured to a .bmp file. PEP also has help screens for every option. The program has been tested to run under Microsoft Windows 95, Windows 98, Windows NT4.0 and Windows 2000. An evaluation version of PEP may be downloaded via ftp.

Questions?

For more information about PEP, contact:

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