AGPS, proven to reduce development time for Computational Paneling of Complex Geometry

AGPS 19.10

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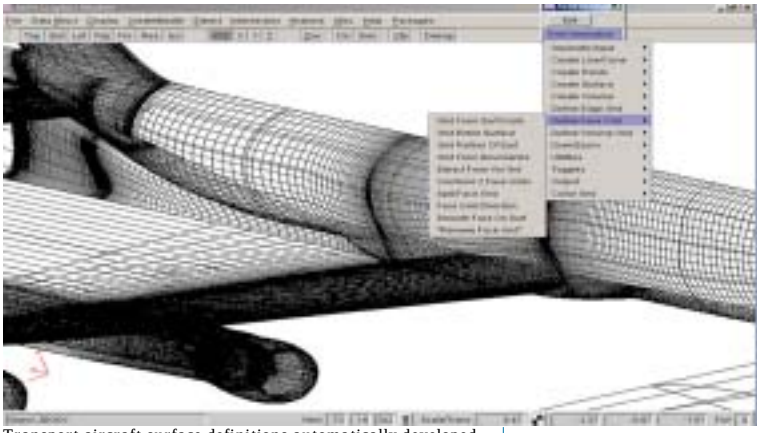
Access the World of Geometry

Engineers at Boeing Commercial Aircraft utilize the Aero-Grid and Paneling System (AGPS) to automate extraction of surface panel grids from wing/body/strut/engine configurations necessary for input into their proprietary inverse analysis code TRANAIR. In the past, this relatively complex configuration took engineers 2-4 weeks of highly interactive preprocessing, just to apply computational discretization and parametric layout appropriate for surface point placement. In reply, the technical staff of Boeing put to use, as they so often do, the easy programmability of AGPS to automatically enforce design philosophies that accurately and quickly prepare geometries essential for their analysis schemes. In doing so, it allowed them the luxury of performing multiple design iterations in hours instead of weeks. By archiving the application as a 'package', and encouraging refinements, Boeing is able to enhance its productivity and the value of AGPS, by sharing the tool throughout the corporation and also utilizing it for training of young engineers.



Transport aircraft surface definitions automatically developed for analysis. The entire automatic paneling of a single run on a Transport Aircraft is completed in seconds.

Knowledge migrated to Integrated Design Tool

An intelligent AGPS application was created that accepts surface geometry modeled with AGPS's surface mathematics and proceeds to interrogate, define, and check pre-programmed criteria necessary to extract superior quality panel grids. These extracted surface point placements are then exported by the application in the necessary formats to analysis solvers and then directly piped back in for visualization assessments. The solution scheme of the application even prompts users for the type of wingtip rounding preferred.

Since, computational methods for paneling require that surface definitions match exactly at intersection locations, this AGPS application transparently defines and refines intersection points to preserve the necessary abutment of points along edges.

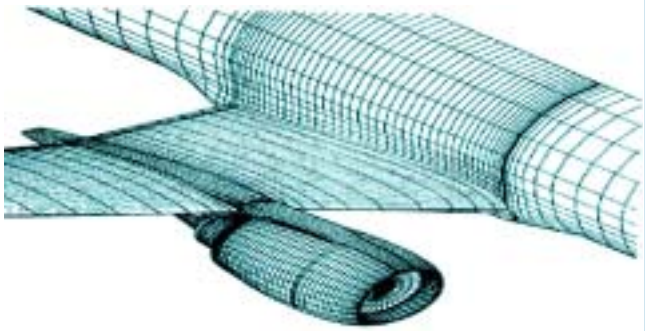
The surface point extractions are easily accomplished by utilizing exact mathematical replicas of the underlying model by leveraging AGPS's built-in 'Subrange' entities that directly map pointers to the original surface geometry. On completion the application interrogates the network of points for collapsed panels and writes out the panel locations to a file.

AGPS empowers an enterprise, with tools that perform tasks in an integrated manner.

Automatic paneling application in progress. This AGPS application proceeds without any user interaction, vigorously authenticating geometry creation and displaying necessary results.

Methodology

After sequestering model inputs the AGPS application records all parameter layouts of the model and adjusts accordingly to fit the intended computational scheme. Offending surfaces are manipulated to fit the engineers' design layout and readmitted to the solution scheme. Precise surface trimmings at wing-body, strut-wing, and strut-nacelle intersections are automatically handled by a combination of AGPS modeling tools and parameter mapping of intersection points to achieve exact internal surface removals.



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