

MGAERO V3.4 RELEASE NOTES

September 2007

Included here is a summary of recent bug corrections and new features introduced to MGAERO.

1.1 SELECTED BUG CORRECTIONS

1. FLIDYN-MGAERO Error

When more than one moving frame was specified, the frame names and their attributes were unable to be read in properly. This error has been corrected and the code is able to read multiple moving frames and components correctly.

2. Numeric/Alpha Input Length

When the length of numerical input exceeded 10 digits (including +, -, decimal), all entries on the same line were incorrectly read in and produced unexpected warning or error messages, often without pointing out the real problem. This has been corrected in two steps. First, the code issues a warning message stating the input exceeded 10 digits (or 20 alpha characters). Second, the code truncates the input to 10 digits (or 20 alpha characters) and prints out the truncated value and proceeds to the rest of the program.

3. Small Panel

The detection of small panel had a flaw and good panels may have been labeled as "small" in the past. This has been corrected and when a small panel is detected, the code will print out more detail information about that panel.

4. Contradictory In-Air points

Due to a shortcoming in the identification procedure of grid point, some grid points had been identified as having a contradictory condition from the In-Air check and the grid point connectivity check. Several new codings have been added to strengthen the grid point identification procedure.

5. The section number in rotated normal set had been incorrectly counted in the previous versions. Due to symmetry and open wing-tip sections, the first and the last sections are reserved for additional sections within the code. v 3.4 correctly renumbers the user input sections 1 through N as MGAERO internal sections 2 through N+1.

6. When the number of V-cycle iterations exceeded the maximum steps, there was no appropriate message output. This has been corrected to issue an error message warning the user that the maximum step was exceeded.

1.2 CHANGES AND ENHANCEMENTS

1. Rotated Normal set has been increased from 25 to 50.

2. Rotated Normal angle is recorded in the plot file instead of a simple on-off identification.

3. The section coordinate outputs in the SOUT file were changed from the local coordinates to the global coordinates, i.e., the new outputs reflect all user specified coordinate transformations.
4. OUTPUT.PLOT3D=2 option is added for writing out all grid blocks to the PLOT3D file.
5. IBLANK array is added to the PLOT3D grid file.
6. The total pressure coefficient of a user specified SCAN.POINT can be output in the convergence history section of the SOUT file. This option is activated by PRINT.SCAN and the presence of OFF.BODY.SCAN.POINTS data in the ANALYSIS DATA block. (Caution: Large number of scan points may result in a voluminous output file.)
7. The default option of SLOPE.CONVERGENCE is changed from ON- to OFFdefault.
8. In the previous versions, the user specified value for CL.CONVERGENCE was treated as the convergence tolerance normalized by the calculated Total CL value. In v3.4, the user specified value is directly compared to the variation of Total CL calculated. Convergence is obtained when the variation becomes smaller than the tolerance value. This will not result in significant change in the convergence profile if the calculated Total CL is in the order of 1.
9. TARGET CL methodology is changed when operated in conjunction with the AUTOMATIC CONVERGENCE criteria. In the previous versions, the Angle of Attack (or Rotated Normal) was adjusted from the lower mesh levels to meet the specified TARGET CL value. In v3.4, the Angle of Attack (or Rotated Normal) will not be adjusted until the Euler solution is converged in the last mesh level VCycle. Then the TARGET CL iteration begins continuing the last mesh level VCycle. When the fixed ITERATIONS is specified, previous TARGET CL methodology is still used. Users should be cautioned that the new approach may alter the results of TARGET CL to some degree.

1.3 NEW FEATURES ADDED IN THE RECENT VERSIONS OF MGAERO

1. Enhancements of propeller model (see Section 1.7).
2. MACH=0 simulation (see Section 4.4).
3. FLIDYN-MGAERO coupling (see Section 4.5).
4. PITCH.TRIM operation (see Section 4.6).

1.4 NEW PREPROCESSING OPTION FOR MGAERO

An MGAERO glyph option to Surfgen (or Gridgen) is offered by AMI which supports all MGAERO input features including its specialized surface and off-body grid formats. (See Section 8.)