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What's New in AAA?

Version 5.0

February 2022

AAA version 5.0 contains many enhancements and modifications over AAA version 4.0. This document shows the improvements and modifications made to AAA. Major enhancements include new modules and calculations.

Enhancements and Modifications

Differences between AAA 5.0 and AAA 4.0 are:

1.1 Weight

1. $\bar{x}_{cg_E}$ has been added to the Class II Empty Weight Center of Gravity module. (#8182)
2. Sensitivity table will not allow values in non-calculated cells. (#8251)
3. Useful Load module under Weight > Weight Sizing has been renamed to Payload-Range. (#8267)
4. Trapped fuel and oil C.G.-locations are now flight condition independent. (#8328)
5. Troops module has been added to the Useful Load Weight module. (#8451)
6. Troops module has been added to the Useful Load C.G. module. (#8452)
7. Troops added to Class II Forward-Aft C.G. table. (#8453)
8. Troops added to Class II Aircraft Inertia table. (#8454)
9. Fwd-Aft C.G. warning for maximum weight exceeding maximum take-off weight updated to explain it is not necessarily an error. (#8281)
10. Added Go To button for useful weight under Weight > Weight Sizing > Payload-Range. (#8289)
11. Weight sizing useful loads such as crew, passengers, cargo, etc. are now linked to the useful load definition dialog. (#8294)
12. Empty weight component C.G.-locations are now automatically flight condition dependent. (#6082)
13. Landing gear C.G. is now flight condition dependent to account for moving gear. (#6292)
14. Class I C.G. tables can now have entries left blank where previously zeros would be automatically populated. (#8342)
15. Trapped fuel and oil has been removed from Class I C.G. tables and moved to regular inputs. (#8341)
16. Added “Useful Load Weight” module under Class II weight which shows weight only, separated from C.G. (#8321, #8475)
17. Passenger bags are now separated from passenger location and have their own inputs for C.G., inertia and C.G. excursion (#8319, #8322, #8320)
18. Useful load items that are not defined will not be included when sizing take-off weight of aircraft. (#8135)
19. Class II furnishing weight input for baggage weight is linked to sum of all baggage weight in Class II useful load. (#8162)
20. Fuel tank C.G. is now automatically flight condition dependent. (#8362)

21. Class II empty weight C.G. table is now flight condition dependent to account for moving items such as landing gear and variable sweep wings. (#8357)
22. Class II weight module now uses Class II trapped fuel and oil in all submodules unless it is undefined, in which case it uses Class I values. (#8338)
23. Useful Load weights under Weight Sizing is now independent of Class II Useful Load Weights. (#8270)
24. Troop weight and number of troops has been added to the Payload-Range module under Weight > Weight Sizing. (#8472, #8473)
25. Store module under Weight > Class II > Structure has been renamed to 'Fixed Store'. (#8535)
26. Removable Store module has been added to Class II Useful Load Weight. (#8533)
27. Removable Store module has been added to Class II Useful Load C.G. (#8541)
28. Store description added to Class II Weight modules. (#8535)
29. Removable Store weight added as input in Aircraft C.G. module under Weight > Class II > Center of Gravity > Aircraft C.G. (#8543)
30. DAR method implemented for Class II Air Induction weight for G.A. Aircraft. (#8557)
31. Fuel tank weight and C.G. is added to Fuel module in Class II Useful Load Weight and Class II Useful Load C.G. if the fuel tank is removable. (#8621)
32. Fuel module in Class II Useful Load Weight and Class II Useful Load C.G. renames to Fuel Tank/Fuel if a fuel tank is removable. (#8622)
33. Class II Weight module has been rearranged to be in three categories; Weight, Center of Gravity and Moment of Inertia. (#8797)
34. If a file that was made prior to AAA 4.0 is opened in AAA 4.0 or 5.0, the Pre-4.0 Forward-Aft C.G. table is saved so the user may copy any data out. When the file is opened the user is asked if they want to delete this Pre-4.0 table. (#8805)
35. Miscellaneous Weight module has been split up and placed into Weight, Center of Gravity and Moment of Inertia modules. (#8797, #8798)
36. Gun weight, weapon launcher weight and other weapon provision weight variables no longer included in Class II Weapon Provision weight. Any weapon provisions must now be defined as fixed weapons in the Weapon Dialog box. (#8841)
37. The Class II Empty/Take-off Weight Iteration table has been reworked. Each individual component is now its own line item instead of being combined into one summed weight. (#8883)
38. The number of payload items in the Payload-Range module has been increased to match the maximum number of passengers + troops. (#9039)
39. Fuel Tank Weight, C.G. and inertia modules added if fuel tank is fixed. (#8618, #8881, #9050)
40. For a pure electric airplane, the engine weight table is now showing up. (#9398)
41. To exclude/include values in the Class II weight iteration table, right click on the cell and select Exclude/Include in Calculation. (#9391)

42. If a value is missing from the Class II weight iteration table the user will now be prompted to return to that value's submodule and recalculate it before the iteration can occur. (#9387)
43. Troop total weight added to total useful load weight. (#9473)
44. Passenger and bag total weight added to total useful load weight. (#9472)
45. Removable fuel tank total weight added to total useful load weight. (#9461)
46. Removable fuel tank added to aircraft C.G. calculation. (#9549)
47. Removable store total weight added to total useful load weight. (#9464)
48. Removable store added to aircraft C.G. calculation. (#9465)
49. Removable weapon total weight added to total useful load weight. (#9461)
50. Removable weapon added to aircraft C.G. calculation. (#9466)
51. Useful load items are now displayed in Class II wing structure weight for commercial aircraft and aircraft that use commercial weight estimation methods. (#9493)
52. The default unit for A_{Power} is now %. (#8157)
53. The default unit for F_{int}, R_{wf}, $F_{fin_{DOC}}$ and $F_{v_{struct_f}}$ is now %. (#9448)
54. $\bar{x}_{cg}$ variable output added to Class I Center of Gravity module. (#9333)
55. Fuselage center of gravity is now based on wetted area. (#9205, #9433)
56. Trapped fuel and oil inputs removed for all electric airplanes. (#9318)
57. Warning message added for empty weight C.G. table if not all rows are filled out. (#1205)
58. Aircraft C.G. is now showing top view. (#9587)
59. Empty Weight C.G. is now showing top view. (#9588)
60. Miscellaneous C.G. is now showing top view. (#9589)
61. Component C.G. has the ability to show top and side view of the component. (#9586, #9590, #9591, #9592)
62. Variable $W_{E_{additional}}$ added to cover additional empty weight not covered by regression analysis. (#9684, #9661)
63. In Class I Weight Fraction, the weight columns for estimated weight and delta weight are locked. (#9713)
64. In Class I Center of Gravity the non-applicable component rows are grayed out. (#3544)
65. Class I and Class II Weight now have a subscript for better identification of variables. (#9782)
66. A message explaining L/D is held constant in the Payload-Range diagram has been added. (#9760)
67. Payload-Range Diagram is now also applicable to UAV trading Payload for Fuel. (#9751)
68. Operating Empty Weight added. (#2004)
69. Class II Weight fractions added. (#9899)
70. Empennage Weight added. (#9943)

71. Engine Control Weight, Flight Control Weight, Hydraulics Weight, Instrumentation Weight for flying wings is a function of wing root chord instead of fuselage length. (#10230, #10232, #10233, #10234)
72. Furnishing weight for flying wings is calculated using the cabin volume to replace the fuselage wetted area. (#10236)
73. FLOPS column added in Class II empty weight so the user can enter the weight from FLOPS to be taken into account in the averaging. (#10241)
74. Detailed Class I Empty Weight C.G. removed. (#9780)
75. Copy Class I C.G. button removed. When opening older files user has the option to export the old tables to ASCII or Excel. (#10315)
76. "C.G. outside of aircraft" messages combined into 1 warning message. (#10367)
77. Pylon C.G. automatically calculated. (#5244)
78. Trapped fuel and oil is checked on whether the location is inside the aircraft geometric boundaries. (#10403)
79. C.G.-locations for non-wing lifting surfaces are no longer hard-wired in the code and can be set manually. (#9665)
80. Warning added if fuselage width is smaller than Y-offset. (#3092)
81. Empty weight C.G.-location added to empty weight C.G. plot. (#9820)
82. Added Go To buttons for removable stores. (#11395)
83. Added Go To buttons for removable fuel tanks. (#11393)
84. Added Go To buttons for removable weapons. (#11392)

1.2 Aerodynamics

1. Y-location of vertical tail aerodynamic center is now calculated. (#8194)
2. Airfoil selection in the Airfoil aerodynamic module is now linked with the airfoil selection in the Geometry module. (#8165)
3. Added separate outputs for profile drag and induced drag for both individual flaps and all flaps combined. (#8209)
4. Added warning when attempting to overwrite airfoil files. (#8263)
5. Outputs added for $\frac{b_v}{2r_1}$ and $\frac{Z_h}{b_v}$ values used in interpolation of Figures 10.14 and 10.15, Airplane Design Part VI, have been added for effective aspect ratio calculation. (#8301)
6. Store, nacelle and tailboom laminar flow transition is now flight condition dependent. (#8367, #8376, #8377)
7. Pylon c_{m_o} and $c_{l_\alpha @ M=0}$ are now flight condition independent. (#8374, #8375)
8. Flap immersed area ratio percentage is now flight condition dependent. (#8373)

9. Output added for $C_{N_{\alpha_{prop\ K=80.7}}}$ in Aerodynamics > Power Effects > Propeller > Gradient. (#8363)
10. Store description added to Class II Store Drag module. (#8532)
11. End plating effects for twin vertical tails added. (#8183)
12. External Fuel Tank module added to Class II Drag. (#8575)
13. External Fuel Tank module added to Aerodynamic Center. (#8585)
14. External Weapon module added to Class II Drag. (#8576)
15. External Weapon module added to Aerodynamic Center. (#8586)
16. The Airfoil Selection box in the Airfoil Definition module has been changed to ask only for the airfoil name and data source instead of asking the user to select an airfoil. (#8870)
17. C_L/C_D versus C_L plot added to Class II Drag Plot module. (#9087)
18. $\sqrt{C_L}/C_D$ versus C_L plot added to Class II Drag Plot module. (#9084)
19. ${C_L}^3/{C_D}^2$ versus C_L plot added to Class II Drag Plot module. (#9084)
20. Fuselage laminar wetted area can now be equal to fuselage wetted area. (#9393)
21. Go To button added for $\Delta\bar{x}_{ac_{w_{power}}}$ in aircraft aerodynamic center. (#8155, #9544)
22. Z_{ac} variable added for plotting. (#9358)
24. Added variable output for aerodynamic center locations of lifting surfaces and bodies in terms of wing M.G.C. (#8181)
25. Reynolds number used to calculate skin friction is shown in the lifting surface output. (#3723)
26. Discontinuity with power effects fixed for $T_{c/prop}$ larger than 8. (#9635)
27. Downwash gradient variable description in workpad have been expanded to give more details on flap and power effects. (#9886)
28. $C_{L_{w_o}}$ removed from input non-linear lift (aircraft and wing) as it is not needed. (#10309)
29. Lift gradient airfoil parameters now have Go To buttons to the airfoil module. (#10299, #10300, #10301, #10302. #10303)
30. Airfoil parameters in non-linear lift have Go To buttons to the airfoil module. (#10281, #10282, #10283, #10284, #10285)
31. Critical Mach number uses pylon root and tip thickness-to-chord ratios. (#10388)
32. Hint for reference x-coordinate in pitching moment calculation updated to reflect it is only used for plotting. (#10363)
33. Windmilling drag now shows a warning if RPM of a propeller is 0 but engine is operating. (#10396)

34. Wing surface maximum lift reporting on sufficient maximum lift clarified. (#9807)
35. Ground effects are extrapolated below $h_{agl} = 0.3c_{r_w}$. (#10310)
36. High lift device gap drag is recalculated in Recalculate All Drag module to prevent missing data when high lift devices are added or removed. (#10439)
37. Go To buttons added for upper limit of linear range and post stall angle of attack in the $C_L - \alpha$ module. (#10510)
38. Power off zero lift angle of attack added to C_{L_o} & α_o module for aircraft. (#9812)
39. $c_{l_{max}}$ has been made flight condition independent. (#8430)
40. $C_{L_{\text{no empennage}}}$ is now also accounting for nacelles and pylons. (#10673)
41. Nacelle drag is split in table for each individual nacelle to show induced drag and total drag per nacelle. (#10702)
42. Progress bar added to non-linear aircraft component C_L . (#10433)
43. $X_{ac_{wf}}$ is replaced by $X_{ac_{no\ empen}}$ (#10778)
44. Slenderness parameter ($k_2 - k_1$) shown in zero lift pitching moment output for all bodies. (#10828)
45. Aerodynamic center due to bodies is now dependent on the pitching moment coefficient due to angle of attack derivative for that body, for which the calculation is added. (#10854)
46. $C_{m_{o_{py}}}$ calculation moved from aircraft pitching moment calculation to pylon pitching moment calculation module. (#10924)
47. $C_{m_{o_n}}$ calculation moved from aircraft pitching moment calculation to nacelle pitching moment calculation module. (#10924)
48. $C_{L_{n_o}}$ calculation added for individual nacelles in nacelle lift module. (#10923)
49. Go To button added for $\Delta C_{m_{\text{propwash}}}$. (#10929)
50. $\alpha_{o_{\text{no empen}}}$ moved from non-linear lift to output in Aircraft C_{L_o} (#10950)
51. $\Delta C_{L_{o_g}}$ added to include ground effects in C_{L_o} (#10946, #10948)
52. Pylon downwash based on wing mgc and pylon mgc rather than wing aerodynamic center. (#10944)
53. $\frac{AR_{v(hf)}}{AR_{v(f)}}$, $\frac{Z_h}{b_v}$ and K_{vh} removed from output in Aerodynamics > Lift > Vertical Tail > $C_{y_{v_\beta}}$ module if no horizontal tail is present. (#11057)
54. Go To button added for width of fuselage at canard in canard aerodynamics module. (#11029)

55. Go To button added for canard contribution to aircraft zero-angle-of-attack lift coefficient. (#11053)
56. Added extended chord ratio in flap table as output. (#11134)
57. Go To button added for canard pressure ratio power-off and power-on added. (#11204)
58. Drag from drag rudders are now accounted for in trim. (#11214)
59. Added variable for nacelle lift contribution to C_{m_α}. (#10911)
60. Effects of power on drag of control surfaces are now accounted for. (#10872)
61. Added Go Back button for wind tunnel drag polar. (#11262)
62. Go To button added for v-tail contribution to airplane lift curve slope. (#11290)
63. Exposed geometry calculations are now done outside of aerodynamics modules to speed up certain calculations. (#11375)
64. Clarified that non-linear lift modules do not include ground and power effects. (#6797)
65. Tail surface aerodynamic center output variables expanded. (#11453, #11454, #11455)

1.3 Performance

1. Minimum stall speed can now be 0.1 kts instead of 5 kts. (#9798)
2. Go To button added for Engine Tilt angle. (#9883)
3. Minimum and Maximum speed input for maximum cruise speed relabeled and hint is updated. (#9937)
4. Go To buttons for V_S and $V_{S_{clean}}$ check if thrust-speed (or power-speed) table is defined. (#10865, #10864)

1.4 Geometry

1. Sub menu in Aircraft 3-View has been added that allows for individual components to be selected for plotting. (#8136)
2. The width of the fuselage in the region of the vertical tail is now calculated. (#8188)
3. Added option to plot control surfaces to 3-view. (#5982)
4. Extrapolation of Figure 10.15 from Airplane Design Part VI has been improved for values of $\frac{Z_H}{b_v}$ close to -1. (#8195)
5. Pivot point location for tiltable components has been added. Tiltable components include nacelle, inlet/duct, propeller and engine. (#7307)
6. If a component is tiltable, the component incidence, toe and camber angle allow the component to be moved about the pivot point. (#8186)

7. Engine module with coordinates for tilting engines has been added to Geometry. (#8413)
8. Cross sections that have non-unique Y and Z coordinates now displays which cross section is causing the error. (#6176)
9. Landing gear frontal area is calculated based on width and diameter. (#4549)
10. Plotting option in Landing Gear Geometry now plots the lateral tip-over angle based on the most critical landing gear. (#4812)
11. Critical forward and aft landing gear for lateral tip-over is identified in the Landing Gear geometry output for each flight condition. (#8348, #9062)
12. Select all option added to Aeropack export. (#8137)
13. Cross sections that have ρ values greater than or equal to one or less than 0.5 now displays which cross section is causing the error. (#8440)
14. Cross section area plots now implemented for float, nacelle, tailboom and stores. (#8384)
15. Fuel Tank and Weapon Geometry module added. (#8577)
16. Store maximum volume is now calculated. (#8644)
17. AAA no longer allows negative values for Landing Gear Wheel Base and Wheel Track, $S_{B_{wheel}}$ and $S_{T_{wheel}}$ respectively. AAA gives a warning if an old file is opened that has negative $S_{B_{wheel}}$ or $S_{T_{wheel}}$. (#9080)
18. Flight Control System, Hydraulic System and Electrical System plotting has been moved to geometry. (#9526, 9487)
19. Components can now be scaled in X, Y and Z. (#9640)
20. Geometry can now be shifted in X, Y and Z. (#9633)
21. Pylon thickness-to-chord ratio can now be greater than 30%. (#9289)
22. High lift devices area split over leading edge and trailing edge devices. (#9850, #10435)
23. First cross section coordinates are checked to see if they match the coordinate system definition. (#9948)
24. Missing data warnings in Aircraft 3-View are combined in one single warning. (#9719)
25. Pylon thickness-to-chord input for pylon root and tip added. (#10387)
26. Calculation of fuselage width for horizontal tail, wing, canard, v-tail and fuselage depth for vertical tail added. (#5022)
27. Calculation of slenderness parameter ($k_2 - k_1$) is moved to the geometry module for fuselage and other bodies. (#10912, #10913)
28. Geometry plot for vertical tail now correctly oriented. (#771)
29. Cranked vertical tail plot aspect ratio is corrected and or orientation is changed. (#10089)
30. Cranked lifting surfaces can now be made using up to 100 panels. (#10954)
31. Pylon mgc calculation moved to geometry module. (#10941, #10942)
32. Fuel Tank Slenderness ratio no longer shown when fuel tank is internal. (#11036)
33. Wing incidence can now be increased to 90 degrees. (#5509)

1.5 Stability and Control

1. Outputs shown for effective aspect ratio calculation $\frac{AR_{v(f)}}{AR_v}$ and $\frac{AR_{v(hf)}}{AR_{v(f)}}$ in calculation for C_{y_β}. (#8240)
2. Sizing plot for varying elevator chord and deflection added for $C_{L_{\delta_{el}}}$ and $C_{m_{\delta_{el}}}$ similar to elevator. (#8075)
3. External fuel tanks and external weapons aerodynamic center added to C_{m_u}. (#8587)
4. External fuel tanks and external weapons aerodynamic center added to C_{m_α}. (#8588)
5. Individual tailbooms, floats, stores, nacelles, fuel tanks, engines and weapons may be selected to move with the wing in the Wing Location module in Stability & Control > Analysis > Wing Location. (#8749, #9432)
6. Aerodynamic pitching moment of horizontal tails, canards and v-tails are included in the take-off rotation calculation if the surface airfoils are non-symmetric. (#9121)
7. Moment due to miscellaneous components is included in the take-off rotation calculation. (#9123)
8. Thrust and moment terms due to engine out and windmilling engine and/or stopped propeller are accounted for in the take-off rotation calculation. (#9128)
9. Added aerodynamic center coordinates to the stick free static margin module. (#9560)
10. Added X-plot to longitudinal stability surface area sizing. (#1207)
11. Stick fixed static margin plot added. (#9563)
12. Trim diagram will plot independently of C.G.-location(s). (#9524)
13. Analysis module buttons are reorganized. (#9548)
14. Stick free static margin top view plot added. (#9562)
15. C_{n_β} calculations standardized and all moved to Derivatives section. (#9553, #9788)
16. Steady State coefficients have been reorganized to the Steady State submodule. (#9803)
17. Ventral fin contribution to C_{n_r} added. (#10113)
18. C_{l_β} input simplified. (#10162)
19. C_{n_β} input simplified. (#10146)
20. $C_{y_{\dot{\beta}}}$ input simplified. (#10147)
21. $C_{l_{\dot{\beta}}}$ input simplified. (#10143)
22. $C_{n_{\dot{\beta}}}$ input simplified. (#10143)
23. C_{y_p} input simplified. (#10145)

24. C_{l_p} input simplified. (#10161)
25. C_{y_r} input simplified. (#10144)
26. C_{n_p} input simplified. (#10148)
27. C_{l_r} input simplified. (#10159)
28. C_{n_r} input simplified. (#10160)
29. Ventral fin contribution to C_{l_β} added. (#10134)
30. Ventral fin contribution to C_{l_p} added. (#10129)
31. Ventral fin contribution to C_{n_p} added. (#10128)
32. Ventral fin contribution to C_{y_p} added. (#10130)
33. Ventral fin contribution to C_{y_r} added. (#10127)
34. Ventral fin contribution to C_{l_r} added. (#10126)
35. Ventral fin contribution to $C_{y_{\dot{\beta}}}$ added. (#10131)
36. Ventral fin contribution to $C_{l_{\dot{\beta}}}$ added. (#10132)
37. Ventral fin contribution to $C_{n_{\dot{\beta}}}$ added. (#10133)
38. Contribution of tailboom to C_{n_β} added. (#10187)
39. One Engine Out module has been consolidated with other lateral directional analysis modules. (# 9802)
40. Forward and ft static margin added to trim diagram legend. (#10082, #10457)
41. Flap deflection added to trim diagram legend. (#10061)
42. Forward and aft static margin calculated in C_{m_α} module. (#10458)
43. Longitudinal and Directional Hingemoment calculations added. (#10643)
44. Straight Line Flight Trim has vertical tail and v-tail input parameters for non-zero incidence. (#10711)
45. Lateral Control and Directional Control derivatives are now calculated in separate modules. (#10751)
46. Wing location can be plotted against tailboom if there is no fuselage. (#10376)
47. Differential horizontal tail can be selected as trim surface for straight line flight trim. (#10716)
48. C_{L_1} and C_{D_1} removed from longitudinal trim output as they are calculated in other modules of the program. (#10870)
66. C_{L_α} and C_{m_α} modules simplified input and output. (#10908, #10909)

67. User can now set required C_{n_β} in stability and control module. (#10996)
68. User can now set required static margin in stability and control modules. (#10995, #11058)
69. De facto directional stability input simplified. (#10982)
70. Inherent directional stability plot added for v-tail. (#11021)
71. Inherent directional stability plot added for vertical tails. (#11022)
72. Go To button added for $C_{l_{\delta_{el0}}}$. (#11040)
73. Changed button prompts in trim module. (#11150, #11154)
74. Updated trim diagram capabilities. (#11155, #11147)
75. Added differential canard capabilities. (#8174, #11184, #11185, #11188)
76. Simplified differential stabilizer inputs in lateral-directional control module. (#11179)
77. Direction stability of twin vertical tails is now more accurate. (#11024)
78. Specified what control surfaces are missing when going into a module that needs info on them. (#11273)
79. Shows control surface effectiveness ratio k' in output whenever it is used. (#11260)
80. Added a Go To button for power effects. (#11263)
81. Ground effects can now be accounted for in trim. (#11113)
82. Drag rudders can now be used in S&C module. (#11239, #11240, #11242, #11201, #11261, #11202, #11199)
83. Added miscellaneous lift and moment to trim modules. (#11112)
84. The effects of thrust on static margin are now accounted for. (#11276)
85. Hinge moments can now be calculated for all control surfaces. (#9740)
86. Inherent tail surface sizing in the longitudinal stability module will automatically choose the solution resulting in the smallest possible tail area. (#11397)
87. In inherent tail surface sizing, the aerodynamic center location will now be kept constant, and the apex of the tail surface will be calculated. (#11352)

1.6 Dynamics

1. Differential canard added to dynamics module. (#11183)
2. Drag rudder added to dynamics module. (#11203)
3. Outputs of dynamics module now change depending on which dynamic modes are present. (#11267, #11234)
4. Streamlined UI of dynamics module. (#11266)

1.7 Cost

1. Flight Attendant cost added to direct operating cost. (#10386)
2. Crew cost only shows cost of crew that are present. (#10313)
3. Production parameter description updated. (#10785)
4. N_{rdte} added to input for total acquisition cost. (#10844)

1.8 General

1. Ctrl+N allows the user to begin a new AAA file. (#8161)
2. Ctrl+O allows the user to open a AAA file. (#8161)
3. Ctrl+S allows the user to save the current AAA file. (#8161, #8230)
4. Ctrl+P allows the user to print using a number of options. (#8161)
5. Removed wing Yes/No option from the Configuration Dialog box. A wing must always be present. (#8175)
6. Enabled Copy and Paste macros for table cells. (#8210)
7. User can now copy and paste tables from Excel to AAA. (#1157)
8. Warning messages have been made consistent so that they are all AAA type windows. Messages related to overwriting, printing and exporting still use Windows style windows. (#8241, #8258, #8259, #8260, #8261, #8262)
9. The printer selection dialog will now popup when print window button is clicked. (#8247)
10. Removed “Cancel” button from do you want to delete warning as it had the same function as “No” button. (#8243)
11. Clicking ‘NO’ in the Save As overwrite warning will leave the Save As dialog box open. (#8244)
12. Number of Troops have been added to the Payload/Crew dialog box. (#8444)
13. AAA gives a warning if a user attempts to open a AAA file that is open on another computer on the same network. (#4742)
14. Added preferences button in File drop down menu so user can modify the AAA options presented when first opening AAA. (#8108)
15. Table inputs that will be the same for all flight conditions can no longer be selected to be flight condition independent. (#5392)
16. In setup options, “save WMF to file” has been changed to “save copy window to file.” (#8114)
17. User can now export a list of variables where the flight condition dependency has been changed. (#8329)
18. A Weapons Configuration Dialog Box has been added. (#8139)

19. Store description added to Store Configuration Dialog Box. (#8542)
20. Pivot point for the propeller, nacelle and inlet/duct can be set to be the same as the engine if it is tiltable. (#8476)
21. When a next page button is available, the total number of pages is now shown above the table. (#8711)
22. Class II Component Weights have been added to the Recalculate All module. (#8787)
23. Configuration Menu Bar is split up into three tabs, Configuration, Propulsion and Useful Load. (#9086)
24. Files can be exported from AAA 5.0 in the format of a AAA 4.0 file. (#9344)
25. In Flight Condition the Untrimmed Trend line can now be used as the Drag Polar. (#9396)
26. All warning messages can be turned back on by checking the Show All Messages box in Options. (#9332)
27. In Configuration Controls window Partially Shielded Horn is now spelled out for clarity. (#9249)
28. Aerodynamic Center added to Recalculate All dialog (#7942)
29. Tab key jumps to the next consecutive field now in the flight condition dialog window. (#9677)
30. User is notified to update power effects when opening files from older AAA versions. (#9571)
31. Reference length and Reynolds number calculation added to atmosphere module. (#9787, #4809)
32. After hitting cancel in the controls configuration, no other windows will show up anymore. (#9721)
33. Turbulent Coefficient of Friction added to atmosphere module. (#4809)
34. Laminar Boundary Layer Thickness, Laminar Coefficient of Friction and Turbulent Boundary Layer Thickness added to atmosphere module. (#9806)
35. The user can now select Class I or Class II Take-Off/Empty Weight in the Flight Condition Dialog. (#9799)
36. Lock/unlock value is not called lock value to avoid confusion. (#9897)
37. Class II Weight category selection moved to certification dialog window. (#9898, #9930)
38. Wibu Server message at startup can now be hidden. (#9947)
39. Plot is refreshed when reading off to make sure no discolored lines on the plot are left over. (#10014)
40. Weight, C.G. and Inertia tables can now be copied to select flight conditions and to all flight conditions. (#10096)
41. Flight condition dialog shows there are no high lift devices instead of undefined if there are no high lift devices. (#10298)
42. Fuselage can now be disabled for flying wing configurations. (#3576, #10175, #10188)
43. Hitting cancel in the aircraft 3-view no longer opens up other dialog windows. (#9711)

44. Variable changed color also changes font color to optimize contrast. (#10195)
45. Recalculate all added the ability to save the file after each flight condition finished calculating. (#10390)
46. Miscellaneous weight items, lift, drag and moment can now be enabled/disabled in the project settings. (#10361, #10409, #10410, #10392, #9455, #10649, #9111)
47. Recalculate all displays when it is exporting to Excel. (#10373)
48. If no horizontal tail, v-tail or canard are defined, it will pop up only one message rather than 3 individual messages. (#10438)
49. If any lifting surface attached to fuselage is not defined, it will only pop up one message. (#10440)
50. Surface tip shape selection moved from controls dialog window to configuration dialog window. (#10578)
51. In the Recalculate window, Trimmed Lift (T from D) and Trimmed Lift (T = Const) can no longer be selected at the same time. (#2505)
52. Recalculate log file can be saved. (#10629)
53. V-tail configurations now allow for vertical tails as well. (#10626)
54. If there is more than one type of directional control surface, the user can choose which one is used for trim. (#10625)
55. If a file has different wing tip surfaces (aileron and elevon), a warning will show to select the tip surface for the wing. (#10588)
56. Path to save exports is now separated from the "Export to Excel" button. (#10975)
57. User can now define feedback control system. (#10997)
58. Time progressed while recalculating is now displayed more clearly. (#10979)
59. Fixed equipment flight condition dependency option added to configuration dialog. (#11100, #11283)
60. Removed excessive messaging about flying wing configuration. (#11105)
61. Improved configuration window for more structure and clarity. (#11028)
62. Twin vertical tails can now be mounted to twin tailbooms. (#11186)
63. AAA can now detect and repair corrupted files. (#10397)
64. Users can now select drag rudders for lateral trim. (#11198, #10892)
65. Temporary files now get deleted upon exiting AAA as opposed to upon opening. (#11200)
66. Changed several plot colors for legibility. (#9895)
67. Introduced the option for alternate units for wing loading. (#11418, #11417, #11416, #11415)
68. Variable boxes controlled by a spin edit button now increase in size when needed. (#11473)
69. Wings can now be tilted to allow for VTOL configurations. (#8187)

1.9 Other Improvements

AAA 5.0 airplane examples have been added and are available for download from www.darcorp.com. More examples will be added over time, so keep visiting www.darcorp.com for updates.