DARcorporation

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What's New in AAA?

Version 3.2

May 2009

AAA 3.2 contains various enhancements and revisions to version 3.12 as well as bug fixes. This version has over 280,000 lines of code and over 4,400 unique input/output variables.

Section 1 shows the enhancements and modifications made to AAA. Major enhancements include new modules and calculations. The second section contains bug fixes.

The AAA Manual describes the installation procedure and all modules. The manual is available in pdf format on the installation CD.

1. Enhancements and Modifications

Differences between AAA 3.12 and AAA 3.2 are:

1. More GOTO buttons have been added to variables.
2. More feedback to the user when a problem occurs at startup of AAA.
3. Help expanded.
4. Databases have been cleaned up and can be accessed faster.
5. More interim variables are shown in the output.
6. A new module 'Wing Location' has been added to S&C > Analysis.
7. 'Component C.G. module has now been moved under 'Class II Weight > Center of Gravity'.
8. Critical Gear C.G. Angle is calculated with respect to the empty weight C.G. and the current flight condition C.G. in the 'Landing Gear' module under 'Geometry'.
9. 'Class I Weight' and 'Class II Weight' under 'Weights' are renamed as 'Class I' and 'Class II'.
10. Canopy and windshield selections are included in the configuration dialog window.
11. Class II empty weight plot now shows the side view of the airplane if the fuselage geometry is defined.
12. Control surface chord ratio limits have been increased.
13. C_{m_e} vs δ_e for various elevator chord ratios has been implemented in the $C_{m_{\delta_e}}$ window.
14. Number of decimals on the parameters can be changed by the user.
15. A new variable Δh is used in the climb segment of the mission profile indicating the change in altitude in this segment.
16. A new module 'Airplane' is included in the 'Geometry that shows the three view of the airplane.
17. The 'Forward-Aft C.G.' plot now shows the C.G. envelope.
18. The Z_{cg} is calculated in the forward-aft C.G. module.
19. Trim diagrams show C.G. limits that are not necessarily forward or aft C.G.
20. Variation of wing location and the effect on stability and control is expanded.
21. An airfoil folder is included in the installation with common airfoil data.

2. Bug Fixes

This section lists bugs found in AAA 3.12 and earlier versions which are fixed in AAA 3.2.

2.1 Weight

1. Current weight and moment of inertia values are not updated when the forward and aft C.G. locations are toggled in the flight condition dialog window.
2. Tail gear weight is not calculated in class II structure weight for tail dragger configurations.

2.2 Aerodynamics

1. Elevon input is not shown in the calculation of C_m.
2. The variable $\frac{c'_f}{c_w}$ should be c'_w / c_w in the trailing edge flap drag under class II drag.
3. The variable α_{w0} in trailing edge flap drag under class II drag is different from α_{w0} calculated in the wing lift module.
4. c'_w / c_w is limited in range between 0.1 and 0.5.
5. Drooped aileron drag is not shown in the trailing edge flap drag module under class II drag.
6. $C_D - \alpha$ plot for wing only selection is plotted as a straight line in class II drag.

2.3 Performance

No Changes

2.4 Geometry

1. Fuselage AeroPack geometry does not differentiate between airplane coordinate system and fuselage coordinate system.
2. Landing gear geometry is incorrectly exported for multiple wheels side-by-side on the same bogie.
3. Fuselage area in fuselage geometry module is negative if the Y-coordinates in the fuselage table are negative.

2.5 Propulsion

No Changes

2.6 Stability and Control

1. Dynamic pressure ratio is not recalculated in Trimmed Lift.
2. w_{f_w} is not shown as an input in the C_{m_q} module.
3. Inherent and Defacto modules are not enabled for V-tail configurations in Class I directional S&C analysis.
4. $C_{l_{i_h}}$ is not calculated for $\beta AR_{\text{exp}} / K < 1.0$.
5. SHP_{TO} is shown both as an input and output for a propeller airplane.
6. Recalculate All option does not check for class II drag gear down selection when the Trimmed Lift (T from D) is selected.

2.7 Dynamics

No Changes

2.8 Loads

V-n diagram for LSA category considers acrobatic type.

2.9 Structures

No Changes

2.10 Cost

CEF is incorrectly calculated for the year 2007.

2.11 General

Missing variable labels are added.