In addition to the common features an aircraft design software must have, ADS has the following specificities:

Foreword: Investing in Modeling Tools for Smarter Engineering Decisions **3**
ADS-Suite **3**
1. A set of modules designed to carry out the complete conceptual design of any type of aircraft 3
Unique User Interface **4**
2. Project concept and file sharing 4
3. Simple, Clear, and User-Friendly → Designed for Ease of Use and Clear Interpretation 4
All-in-One: Module based software **5**
4. Module: CAD → Unique toolset to generate exact geometry, quickly and efficiently 5
5. Module: Reverse Engineering → Perform a highly detailed analysis of existing aircraft 6
6. Module: Design Level 1 → To check, tune specifications 7
7. Module: Design Level 2 → To define the best configuration to fulfill the requirements 7
8. Module: Performance Analysis → To compute the performance for different flight conditions 8
9. Module: Dynamic Stability → To model the dynamic behavior of the aircraft 8
10. Module: Cost Analysis → To estimate R&D, manufacturing, operating costs, market price and breakeven point. 9
11. Module: Lift distribution → To optimize the wing planform for safety and performance 9
12. Module: Flight Data Analyzer → UAV/Aircraft Optimization and Flight Performance Analysis 9
Specific configurations **10**
13. Tandem-wing configuration 10
14. Boxwing configuration 10
15. Distributed propulsion 10
Specific flight conditions **11**
16. Ground effect 11
Set of optimization tools **11**
17. Aerodynamics → Set of tools to select the best airfoils and wing planform 11
18. Powerplant → List of engine candidates to fulfill the power requirement 11
19. Multiple Runs → Sequential computations performed to identify the optimal configuration 12
20. 3D Geometry → Unique set of features to optimize geometry 12
21. Design constraints → Automatically controls results to meet different types of constraints 12
22. Target values 13
Integrated expertise **13**
23. Different sources of energy 13
24. Level of stability → Provides the user some tips to improve stability 13
25. Tracks changes → Displays only results that have changed from one run to the next 14
26. Analyzes the results → Displays qualitative analysis of results 14
27. Checks compliance with regulation → Checks and informs if out of the limits of regulation 14
28. Tire selection → Selects tire size in function of ground run operation 15
29. Airfoil selection → Selects the best airfoil for the specified flight condition 15
30. Comparative analysis → Compares the airplane with its competitors on different criteria 16
31. Aircraft Structure → Displays structural parts to check for interference between components 16
32. Occupants → Displays occupants to check cabin volume 16
33. Systems → Displays systems to check the available volume reserved for them 17
34. Air Conditioning System → Size the system from the thermal load 17
35. Custom Components → Checks and warns if there is interference 18
36. Checks interference between components → Checks and warns if there is interference 18
37. Checks CG Range → Checks the CG position for all load cases 18
38. Display Load Distribution → Position of CGs vs Flight Weight 18
39. Visual Competitor Analysis → Select and compare competitors graphically 19
40. Visual Version Analysis → Select and compare versions graphically 19
41. Version comparator → Compare input data between versions 19
42. Overlay the competitor's 3D model 20
Toolbox **20**
43. Digitizer → Digitizes any curve to retrieve the coordinates of the points that were used to draw it 20
44. Glide Polar Analyzer → Analyzes the drag polar of a (motor)glider 20

Tools **21**
45. Aerodynamics / Zero Lift Drag → Sensitivity analysis in drag generation 21
46. Cost Analysis / Breakeven Point → Sensitivity analysis in breakeven point determination 21
47. Cost Analysis / RDTE & Manufacturing → Sensitivity analysis on RDTE & manufacturing costs 21
48. Mass → Sensitivity analysis on mass estimation 22
49. Standard Atmosphere → Lists the characteristics of the standard atmosphere at a given altitude 22
50. Unit Converter SI << >> FPSR 22
Database **23**
51. Database → Airplanes, Engines, Airfoils, Fuels, Batteries, Tires, Materials 23
3D Display **24**
52. Texture mapping 24
Export Functions **25**
53. Airplane Report → Airplane report available in .doc, .txt, .csv file format 25
54. 3D-Geometry → 3D Geometry may be exported in .stl file format 25
55. 3D-Geometry → 3D Geometry may be exported to OpenVSP 25
56. ADS Model → ADS Model may be exported to the flight simulator Xplane 26
57. Graphs → Graphs are saved in .bmp, .pdf, .png file format 26
58. Tables → Tables are saved in .csv file format 27
Import Functions **27**
59. Xplane Model → Xplane model may be imported in ADS 27
Customized software **28**
60. Add new modules → Great flexibility of the software 28
61. Frequent new releases → Frequent new releases demonstrate OAD's high level of responsiveness 28
Technical assistance **28**
62. Getting started with the software → OAD assists the customer getting started with ADS 28
63. Technical documentation → Technical notes and videos accessible directly from the software 29
64. Technical support → OAD may assist the customer at any time 29
References **29**
65. ADS for everyone → Serving customers from all sectors, including small, medium, and large companies, as well as individuals and universities 29

Foreword: Investing in Modeling Tools for Smarter Engineering Decisions

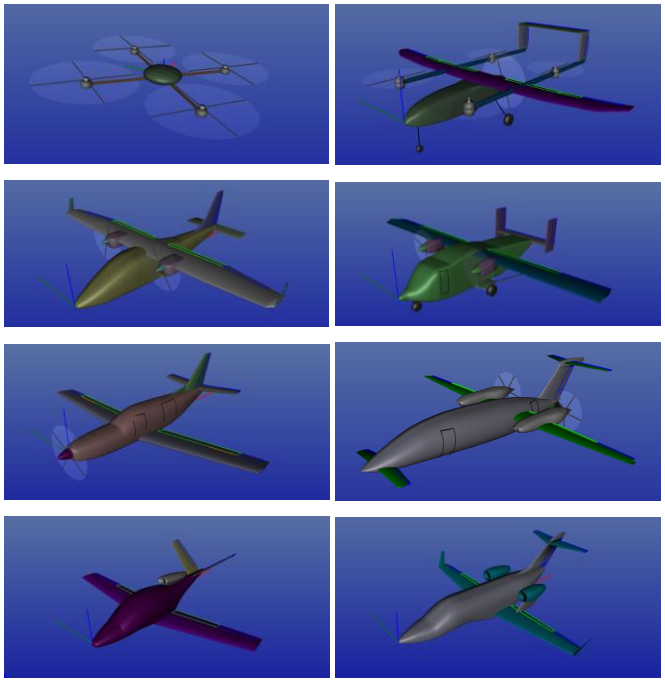
Modeling tools are essential assets for engineers aiming to make informed design decisions. In domains like aircraft design and other complex systems, these tools enable the creation of precise digital models that simulate real-world behavior.

By using modeling, engineers can analyze how systems perform, understand the interactions between components, and assess the impact of various inputs and modifications. This deep insight is crucial for identifying inefficiencies, weak points, and areas for potential improvement.

Moreover, modeling allows engineers to test and compare alternative scenarios without the need for costly real-world implementation. These simulations support better decision-making by enabling the exploration of multiple configurations, thus reducing risks and optimizing performance—while keeping costs under control.

ADS-Suite

1. A set of modules designed to carry out the complete conceptual design of any type of aircraft

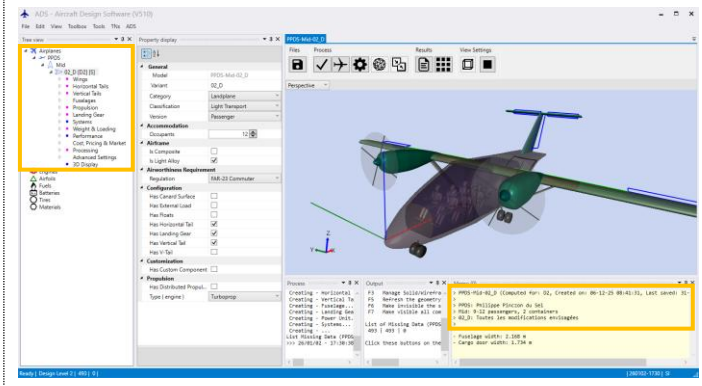


- From VTOL drones to commercial airliners
- Including their specific constraints such as regulatory requirements
- Including technological features such as distributed propulsion and blown control surfaces (STOL)
- Including various propulsion modes
- Including all types of systems and payloads (passengers, cargo containers, etc.)
- ...

There is an infinite number of possible solutions to meet a given set of requirements. If the user wishes to test a technical solution that is not yet supported by ADS, we encourage them to contact us. In most cases, such solutions are quickly integrated into future versions of the software.

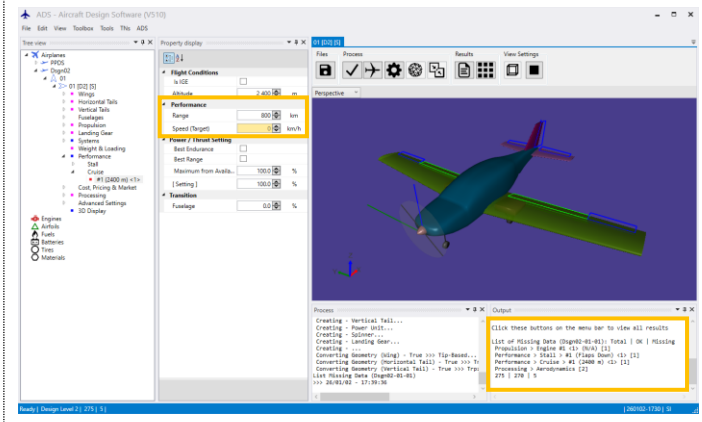
Unique User Interface

2. Project concept and file sharing



- **Tree view structure emphasizing the project concept.**
- Ability to add a description for Program, Version, and Variant.
- **The Memo window includes the first five lines reserved for project-related information.**
- Ability to import a .zip file, automatically unzip it, and copy its contents into the appropriate directory

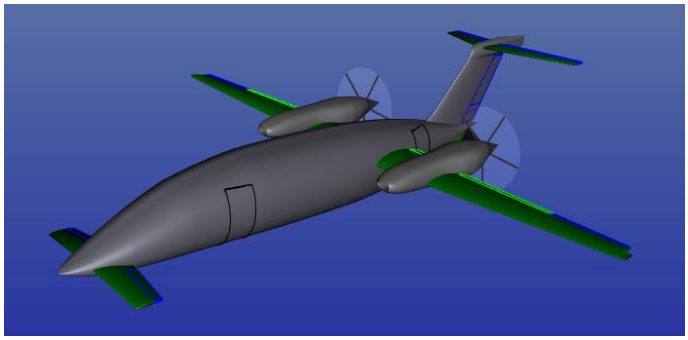
3. Simple, Clear, and User-Friendly → Designed for Ease of Use and Clear Interpretation

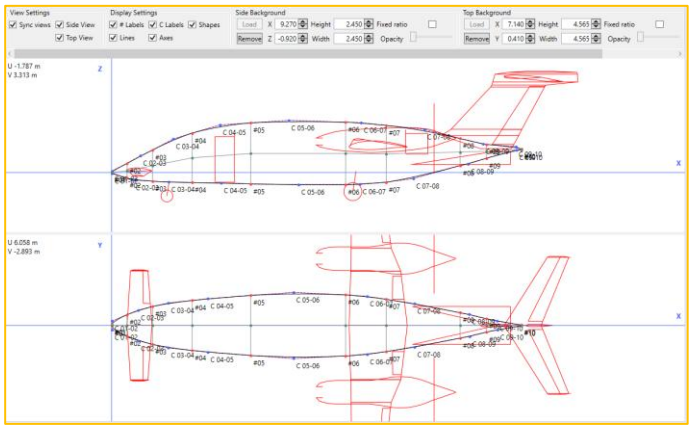


- User-Friendly
- All information and warning messages are displayed in a dedicated tab to improve readability and interpretation of results
- **Missing data are listed in the Output window and highlighted in the Tree view to facilitate correction**

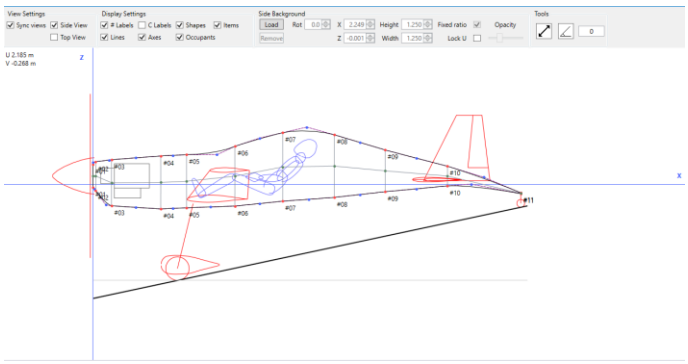
All-in-One: Module based software

4. Module: CAD → Unique toolset to generate exact geometry, quickly and efficiently





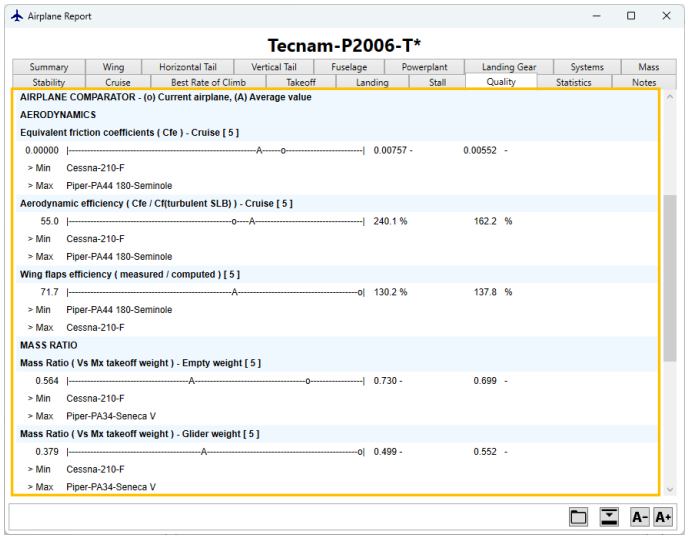
- To be used to generate a new design or reproduce an existing airplane
- **Bodies define from longitudinal control lines (LCLs) and control stations (CtS), based on conics**
- Lifting surfaces define from airfoil geometry
- Conics defined from Conic Shape Parameter (CSP)
- Operation on 3D-shapes:
  - Body lofting
  - Compute volume, wetted area
  - Stretch shapes
  - Align sections, force section to circular shape…
- Non-linear variation of control station offset and vertical position
- Non-linear variation of conic Shape Parameters
- Generate plots: volume, wetted area, cross section area (area rule)
- Geometry analysis and optimization (tangent continuity…)
- Representation of internal components:
  - Occupants
  - Payload
  - Systems
  - Tanks
  - Gears
- Export function (stl file)



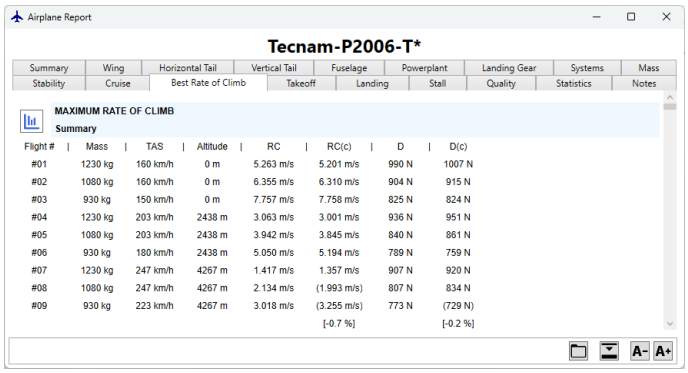
- The LCL line editor can also display: other geometric elements of the aircraft, a number of internal components such as occupants and the engine, as well as the ground position—both in-flight and on-ground.

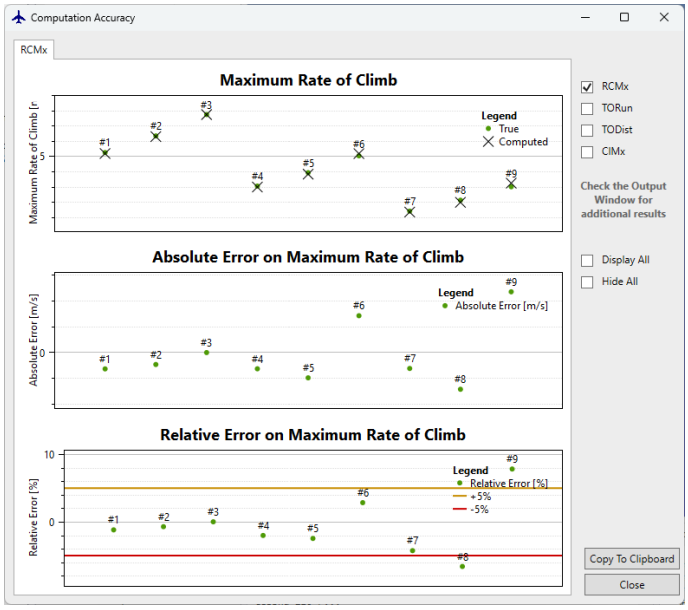
© 2026 OAD – www.oad.aero

5. Module: Reverse Engineering → Perform a highly detailed analysis of existing aircraft



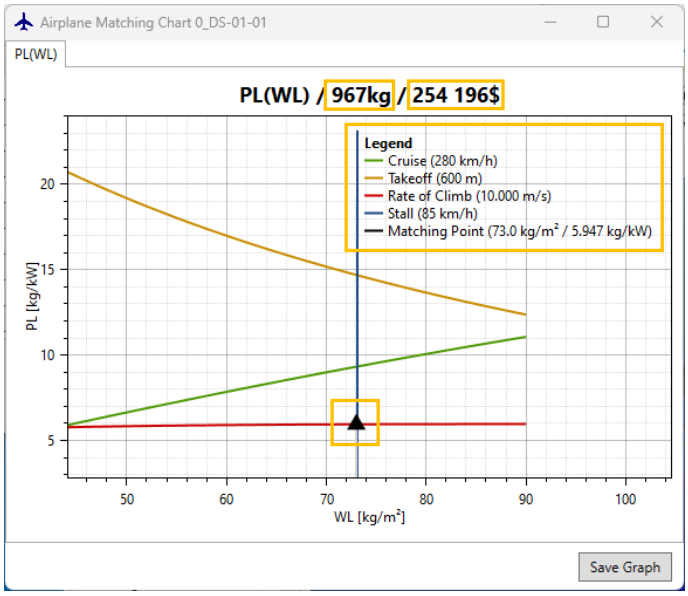
- Geometric analysis
- Performance analysis
- Weight breakdown
- Weight and balance
- Aerodynamic efficiency analysis
- Mass efficiency analysis
- Propulsion efficiency analysis
- **Comparative analysis with aircraft from the aircraft database**





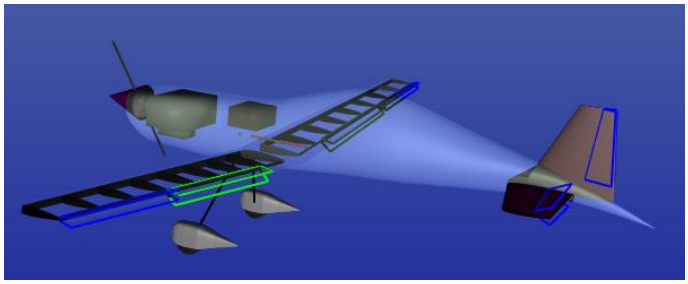
- Additionally, performance data provided by the manufacturer for specific flight conditions is compared to the values calculated by the ADS algorithms, in order to inform the user about the accuracy of ADS's computational algorithms when modeling an aircraft of this type
- A visual code using parenthesis symbols (), | |,)(immediately informs the user about the accuracy of the results
- The deviation between actual and calculated performance can be displayed as a chart, with different graph types available: actual values, absolute deviation, and relative deviation
- Charts can be copied to the clipboard and pasted into a report

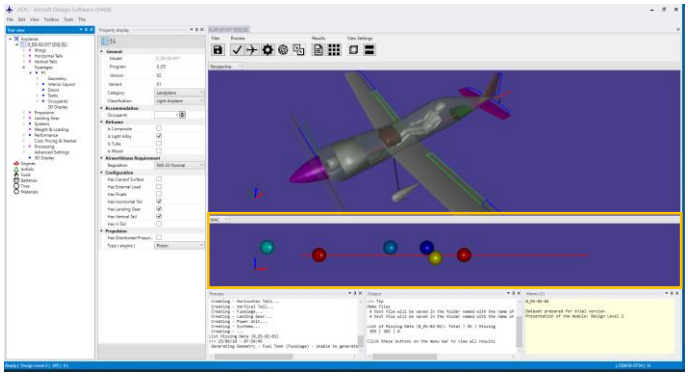
6. Module: Design Level 1 → To check, tune specifications

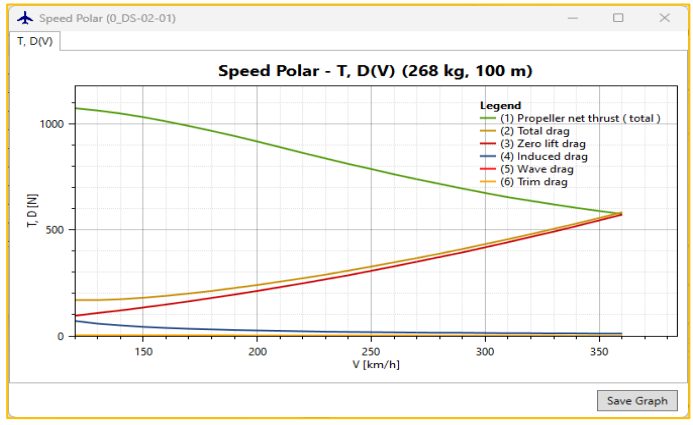


- **Matching Point** (Wing Loading, Power Loading)
- Geometry based on selected wing loading
- **Maximum takeoff weight**
- **Market price**, computed from geometry and technical choices
- **All performance analyzed** (Cruise, Stall, Takeoff, Climb)
- Propulsion based on selected power loading
- Generate a list of engine candidates from the engine database

7. Module: Design Level 2 → To define the best configuration to fulfill the requirements







- Defines the geometry
- Defines the propulsion
- Computes:
  - Lifting surface geometry
  - Weight and balance
  - Static and dynamic stability
  - Performance in stall, takeoff, climb, cruise, descent and landing, best range and best endurance flight conditions
  - Costs: market price, operating, R&D, manufacturing
- Checks
  - Interference between components (structure, systems…)
  - CG position in a specific window, for different weight
  - CG Range
  - Completion with regulation
  - Stall departure
  - Instability
- Tracks changes between runs
- Makes multiple runs
- Optimizes
  - Airfoil selection
  - Wing planform
- Provides expertise:
  - Modifications to be made to improve stability
  - Tire selection
  - To select the propeller
- Displays results under the form of:
  - **Graphs**
  - Tables
  - Reports
- Generates automatically a report (txt, doc file format)
- Exports results (csv, txt, doc) and geometry (stl file)

8. Module: Performance Analysis → To compute the performance for different flight conditions

```
Track Changes from previous run (34) - [ Item | Units | Value0 | Value1 | Change ]
 Airplane - Wetted Area                                  m²      43.792     43.478     -0.7 %
 Fuselage - Wetted Area                                  m²      15.615     15.301     -2.0 %
 Mass - Empty                                            kg      822.0      841.4      2.4 %
 Mass - Glider                                           kg      519.1      528.7      1.9 %
 Mass - Flight                                           kg     1037.4     1122.4      8.2 %
 Mass - Fuel                                             kg      174.9      255.1     45.9 %
 Mass - Wing                                             kg      163.2      163.1     -0.1 %
 Mass - Fuselage                                         kg       76.3       76.4      0.1 %
 Cruise - Flight speed                                 km/h        436        408     -6.5 %
 Cruise - Power, required                                kW    143.812    143.909      0.1 %
 Cruise - Propeller efficiency (free)                     %       92.1       92.6      0.5 %
 Cruise - Drag - Total                                    N       1192       1273      6.8 %
 Cruise - Drag - Zero lift                                N        947       1023      8.0 %
 Cruise - Drag - Induced                                  N        187        227     21.7 %
 Cruise - Drag coefficient - Total                        -    0.01978    0.01648    -16.7 %
 Cruise - Drag coefficient - Zero lift                    -    0.01572    0.01324    -15.8 %
 Cruise - Drag coefficient - Induced                      -    0.00310    0.00294     -5.1 %
 Cruise - Friction Coefficient                            -    0.00377    0.00380      0.9 %
 Cruise - Induced drag factor (airplane)                  -      0.801      0.819      2.2 %
 Cruise - Lift coefficient                                -       0.17       0.14    -15.3 %
 Cruise - Range                                          km       1411       1319     -6.5 %
 Best Rate of Climb - Rate of climb                    m/s     11.093     10.007     -9.8 %
 Best Rate of Climb - Flight speed                   km/h        212        184    -12.9 %
 Best Rate of Climb - Power, required                    kW    148.761    138.727     -6.7 %
 Best Rate of Climb - Propeller efficiency (free)         %       79.0       73.8     -6.7 %
 Best Rate of Climb - Propeller installation efficiency   %       93.5       93.4     -0.1 %
 Takeoff - Takeoff run                                    m        249        201    -19.4 %
 Landing - Landing run                                    m        555        450    -18.9 %
 Stall - Flight speed                                Km/h        114         99    -13.2 %
 Stall - Lift coefficient (Maximum)                       -       1.95       1.91     -1.7 %
 Stability - Static Margin                                %       22.8       15.6    -31.9 %
 Aerodynamic Center - X                                   m      1.843      1.765     -4.2 %
 Center of Gravity - X (Computed Position)                m      1.566      1.600      2.2 %
 Center of Gravity - Z (Computed Position)                m     -0.043     -0.065     50.6 %
```

```
Messages ( Expertise ) - Main Flight Condition
  Flight conditions: 408 km/h | 2 433 m | 1 122.4 kg

  Expertise: Lift due to angle of attack derivative (Cla) [/rad]
  Cla (6.302) is in the range of historical values |5.367 to 6.451|

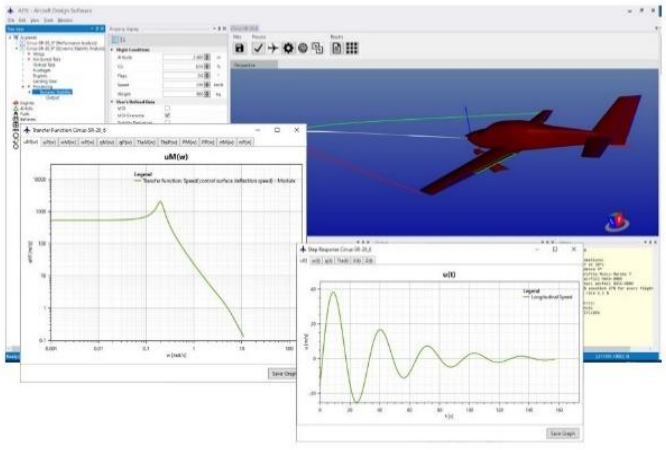
  Expertise: Pitching moment due to angle of attack derivative (Cma) [/rad]
  Cma (-0.980) is out of the range of historical values |-2.894 to -1.030|
  Cma | To get a more negative value, increase the static margin (do the opposite to get a more positive value)
  Cma | - Move the centre of gravity forward
  Cma | - Increase the size of the horizontal tail
  Cma | - Move the horizontal tail backwards
  Cma | - ...

  Expertise: Pitching moment due to rate of angle of attack derivative (CmRa) [/rad]
  CmRa (-3.588) is out of the range of historical values |-9.726 to -4.594|
  CmRa | To get a more negative value, increase the static margin (do the opposite to get a more positive value)
  CmRa | - Move the centre of gravity forward
  CmRa | - Increase the size of the horizontal tail
  CmRa | - Move the horizontal tail backwards
  CmRa | - ...

  Expertise: Pitching moment due to pitch rate derivative (Cmq) [/rad]
  Cmq (-13.526) is in the range of historical values |-33.902 to -13.220|
```

- Computes the performance for different flight conditions, defined by mass, altitude, power setting and CG position
- Computes the real impact of one modification made on the aircraft
- Makes multiple runs
- Checks
  - Interference between components (structure, systems…)
  - CG Range
  - Completion with regulation
  - Stall departure
  - Instability
- **Tracks changes between runs**
- Provides expertise:
  - **Modifications to be made to improve stability**
- Displays results under the form of:
  - Graphs
  - Tables
  - Reports
- Generates automatically a report (txt, doc file format)
- Exports results (csv, txt, doc) and geometry (stl file)

9. Module: Dynamic Stability → To model the dynamic behavior of the aircraft



- Computes the dynamic stability of a plane by analyzing:
  - the free response of the plane (eigenmodes)
  - the harmonic response to control inputs
  - the step response to control inputs

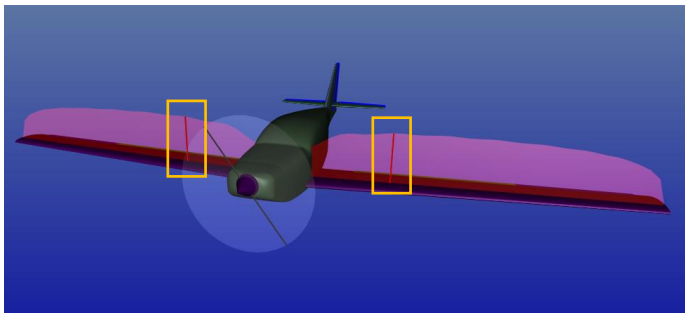
© 2026 OAD – www.oad.aero

10. Module: Cost Analysis → To estimate R&D, manufacturing, operating costs, market price and breakeven point.

Production Costs (DAPCA Model)				
Total FTA	1 -	1 -	1 -	1 -
Total Production	1 -	10 -	100 -	1 000 -
Unit Cost	33 852 158 $	5 441 515 $	1 398 652 $	585 380 $
Total Program Cost	33 852 158 $	54 415 151 $	139 865 185 $	585 380 446 $
Nonrecurring				
Development-support	5 263 824 $	5 263 824 $	5 263 824 $	5 263 824 $
Flight-tests	1 052 308 $	1 052 308 $	1 052 308 $	1 052 308 $
Materials				
Materials	476 050 $	1 858 670 $	10 929 047 $	68 308 753 $
Labor				
Engineering	13 273 917 $	17 525 814 $	25 155 652 $	36 559 644 $
Tooling	6 072 402 $	9 507 709 $	17 034 372 $	31 138 936 $
Manufacturing	3 488 641 $	10 404 681 $	43 098 888 $	187 488 361 $
Quality Control	499 801 $	1 490 630 $	6 174 575 $	26 860 577 $
Equipment				
Engine(s)	200 000 $	1 100 000 $	10 100 000 $	100 100 000 $
Propeller(s)	60 000 $	330 000 $	3 030 000 $	30 030 000 $
Avionics	40 000 $	220 000 $	2 020 000 $	20 020 000 $
Interior	40 000 $	220 000 $	2 020 000 $	20 020 000 $
Profit				
Production profit	3 385 216 $	5 441 515 $	13 986 518 $	58 538 045 $

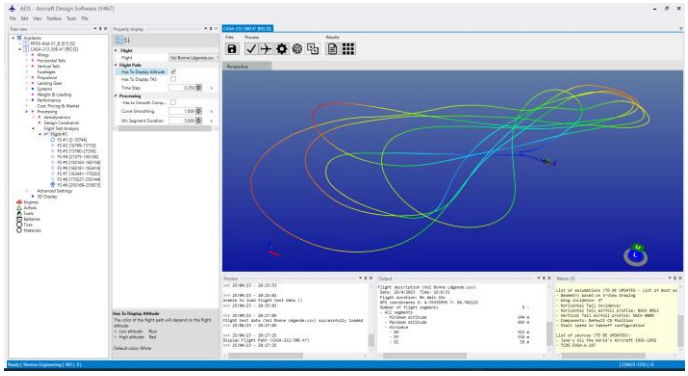
- Based on configuration, size and technology used on the aircraft, computes:
  - Research and Development costs
  - **Production costs**
  - Operating costs
  - Estimated market price
  - Breakeven point
- Models the influence of technical choices on the costs in general

11. Module: Lift distribution → To optimize the wing planform for safety and performance

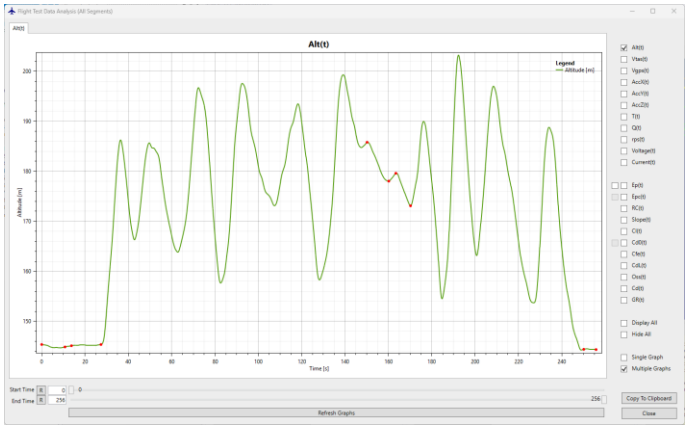


- According to the selected airfoils, the planform of the lifting surface and the flight conditions, computes:
  - Lift distribution
  - Load factor
  - **Position of the maximum lift coefficient**
  - **Position of the stall departure**
  - Oswald efficiency factor
  - Global lift coefficient
- Takes into account the presence of fuselage and external stores

12. Module: Flight Data Analyzer → UAV/Aircraft Optimization and Flight Performance Analysis

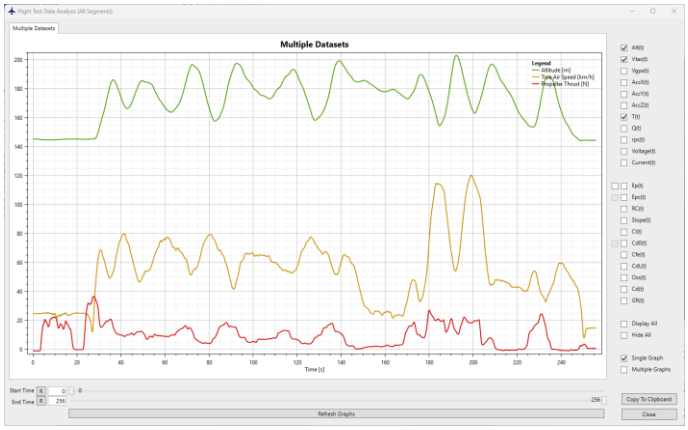


- Flight data collected by the AMS (Aircraft Monitoring System) is automatically loaded, and the flight trajectory is displayed in the 3D interface
- The flight is automatically divided into flight segments
- The full flight or a flight summary can be displayed in the Output window
- A color code can be overlaid on the trajectory to indicate either altitude or speed



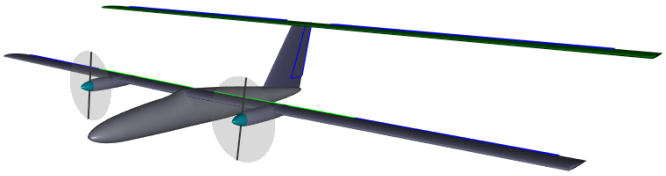
- Various time history plots can be displayed, either as single or multiple graphs
- The entire flight or selected portions can be visualized
- Segments can be added or removed
- Flight data collected by the AMS (Aircraft Monitoring System) that can be displayed includes: altitude, speed, accelerations, motor torque, propeller thrust, propeller RPM, and motor supply current and voltage
- Calculated values that can be displayed include: propeller efficiency, powertrain efficiency, rate of climb, climb gradient, aerodynamic lift and drag coefficients, Oswald efficiency factor, and lift-to-drag ratio
- Calculated values can be compared to target values
- A list of recommendations may be provided to help achieve unmet target values
- Graphs can be copied to the clipboard and then pasted into a report

© 2026 OAD – www.oad.aero



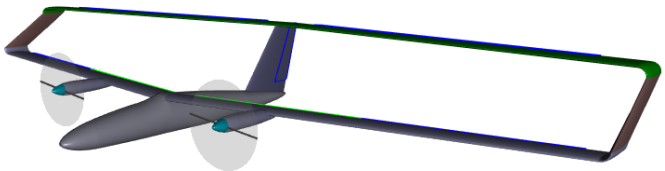
Specific configurations

13. Tandem-wing configuration



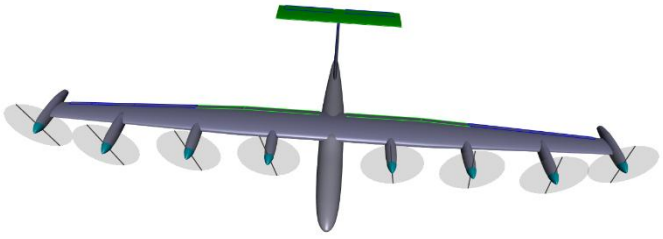
- Tandem-wing configuration
  - Geometric definition
  - Aerodynamic modeling (including wing-wing interaction)
  - Longitudinal stability and trim
  - Center of gravity envelope
  - Stall and low-speed performance
  - Performance analysis
  - Structural and mass properties (conceptual level)

14. Boxwing configuration



- Boxwing configuration
  - Geometric definition
  - Aerodynamic modeling (including closed-wing interaction effects)
  - Longitudinal stability and trim
  - Lateral-directional stability
  - Center of gravity envelope
  - Stall and low-speed performance
  - Performance analysis
  - Structural and mass properties (conceptual level)

15. Distributed propulsion

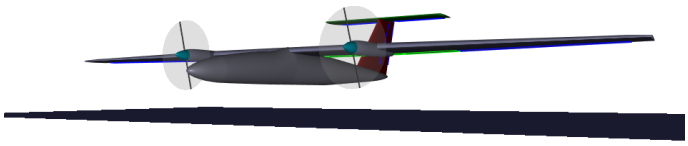


- Distributed propulsion
  - Geometric definition
  - Propulsor performance modeling
  - Aerodynamic-Propulsive interaction
  - Global aerodynamic model
  - Stability and control effects
  - Center of gravity envelope
  - Stall and low-speed performance
  - Performance analysis
  - Energy, power and mass modeling

© 2026 OAD – www.oad.aero

Specific flight conditions

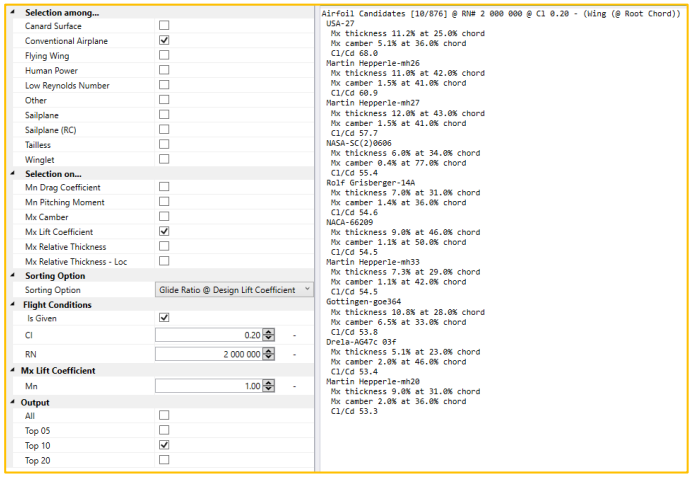
16. Ground effect



- Ground effect
  - Aerodynamic modeling (induce drag reduction & lift efficiency)
  - Performance analysis (range & endurance)
  - Takeoff and landing speed effects
  - Payload capability

Set of optimization tools

17. Aerodynamics → Set of tools to select the best airfoils and wing planform



- To generate the optimal wing planform
- **To select the best airfoil according to the flight conditions and some geometric and aerodynamic criteria**
- To compute the aerodynamic characteristics of any airfoil geometry using Xfoil

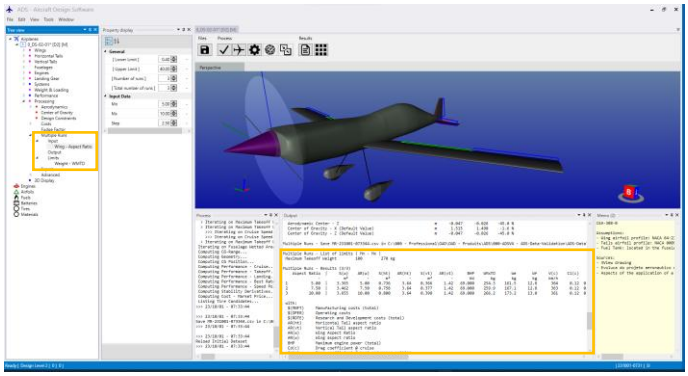
18. Powerplant → List of engine candidates to fulfill the power requirement

List of available engines in the engine database (161.147 kW | +0%/+50%)

	Engine Model	Power (MxC)	Mass
	-	kW	kg
00	Lycoming IO 540-AB1A5	171.511 (6.0%)	200.0
01	Lycoming O 540-J3C5D	175.239 (8.0%)	176.0
02	Lycoming LO 360-A1H6	180.099 (10.5%)	297.9
03	Lycoming IO 540-C4D5D	184.000 (12.4%)	186.8
04	Lycoming O 540-A1A	186.425 (13.6%)	183.7
05	Lycoming O 540-A1A5	186.425 (13.6%)	183.7
06	Lycoming O 540-A1B5	186.425 (13.6%)	184.1
07	Lycoming O 540-A1C5	186.425 (13.6%)	184.1
08	Lycoming O 540-A1D	186.425 (13.6%)	184.1
09	Lycoming O 540-A1D5	186.425 (13.6%)	184.1
10	Lycoming O 540-A2B	186.425 (13.6%)	183.7
11	Lycoming O 540-A4A5	186.425 (13.6%)	183.7
12	Lycoming O 540-A4B5	186.425 (13.6%)	184.1

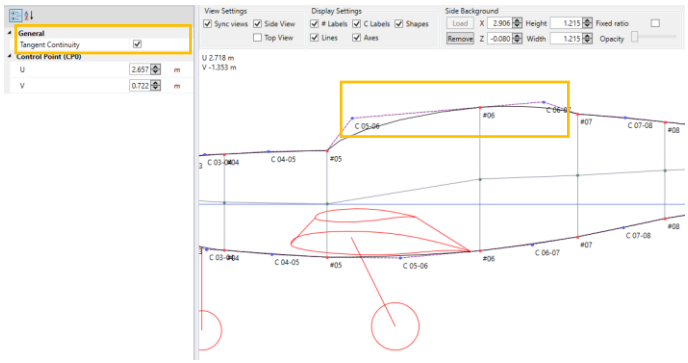
- Generates a list of engine candidates to power the aircraft based on the **computed power requirement** (Design Level 1).

19. Multiple Runs → Sequential computations performed to identify the optimal configuration



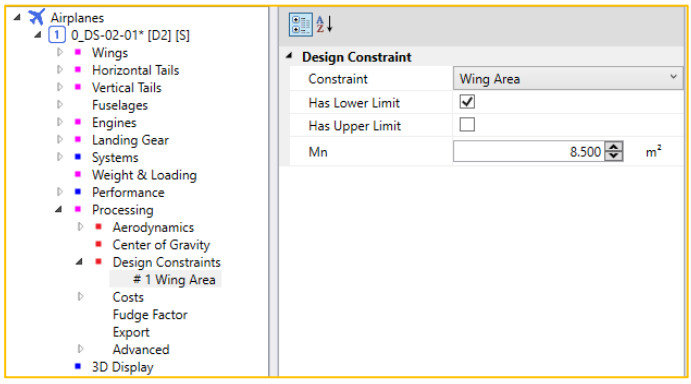
- Automatically runs a large number of different configurations by varying selected input parameters
- Defines constraint limits; a result is considered feasible if all defined constraints are satisfied (e.g., empty weight exceeds a minimum threshold)
- Automatically sorts the results
- **Displays results in tabular format, automatically copied to the clipboard for easy pasting into external documents**
- Generates a .csv file and saves it in a dedicated folder within the aircraft dataset
- Each configuration can be automatically saved under a specific name for further analysis in the **Version Comparator**
- The **Version Comparator** enables graphical visualization of results and allows quick identification of the optimal value for a geometric parameter

20. 3D Geometry → Unique set of features to optimize geometry



- Fuselage lofting
- **Forces tangent continuity**
- Plots cross section area (area rule)

21. Design constraints → Automatically controls results to meet different types of constraints



- Checks constraints due to the selected regulation:
  - Configuration
  - Speed
  - Mass
  - Load factors
  - Takeoff, climb and landing performance
- **Imposes some limits in the size of components** (the wing area must be higher than 8.5 m² to provide enough surface for solar cells for example)

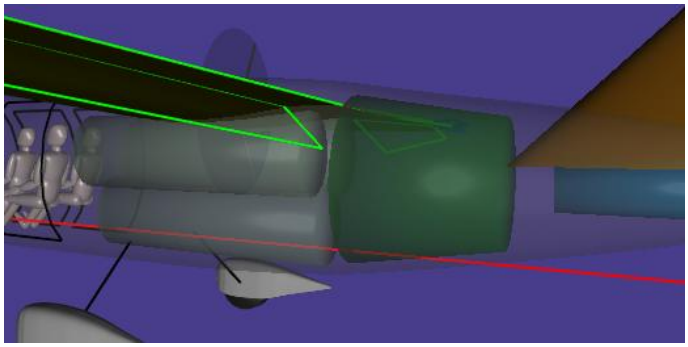
22. Target values

TARGET VALUES (PPDS-MID-02D)		
Passenger comfort / Cabin layout density		
Cabin Volume per Occupant	□	
Weight and Loading		
Empty Weight	□	
Maximum Takeoff Weight	□	
Payload-to-Empty Weight Ratio	□	
Payload Ratio	□	
Useful Load Ratio (⚠ Computed value, 0.418 -)	0.430	-
Empty Weight Ratio	□	
CG-Range	□	
Performance		
Stall Speed	130	km/h
Cruise Speed (⚠ Computed value, 347 km/h)	350	km/h
Rate of Climb	□	
Climb Slope	□	
Takeoff Run	600	m
Takeoff Distance	900	m
Landing Run	□	
Landing Distance	□	
Range	1 200	km
Endurance	□	
Energy Efficiency		
Fuel Consumption	□	
CO2 Emission	□	
Aerodynamics		
Equivalent friction coefficient, Cfe	□	
Interference and Miscellaneous drag Ratio	□	
Maximum lift coefficient (Power Off)	□	
Glide Ratio	□	
Economic Indicators / Cost Efficiency		
Market Price	□	
Operating Cost per Flight Hour	□	
Operating Cost per Occupant per Distance	□	

- Benefits of Using Target Values in Conceptual Aircraft Design
  - Clear Definition of Design Objectives
  - Design Space Bounding
  - Early Feasibility Assessment
  - Guidance for Initial Sizing
  - Efficient Trade Studies
  - Detection of Over- or Under-Design
  - Benchmarking Against Existing Aircraft
  - Improved Convergence of the Design Loop

Integrated expertise

23. Different sources of energy



- Various fuel types and grades
- Different types of batteries
- Hydrogen with a fuel cell system
- **And a mix of them**

24. Level of stability → Provides the user some tips to improve stability

```
Expertise: Rolling moment due to roll rate derivative (Clp) [/rad]
Clp (-0.567) is in the range of historical values |-0.535 to -0.448|

Expertise: Yawing moment due to roll rate derivative (Cnp) [/rad]
Cnp (-0.015) is out of the range of historical values |-0.045 to -0.022|
Cnp | To get a more negative value (do the opposite to get a more positive value):
Cnp | - Increase wing aspect ratio
Cnp | - Increase wing taper ratio
Cnp | - Move the vertical tail upwards
Cnp | - Move the winglets upwards
Cnp | - ...
```

- Computes all stability derivatives
- Informs the user if there is instability
- **Checks the level of stability is within limits (based on historical values)**
- **Gives the user some tips to improve stability if not within the limits**

25. Tracks changes → Displays only results that have changed from one run to the next

Track Changes from previous run (35) - [Item | Units | Value0 | Value1 | Change]

Airplane - Wetted Area	m²	17.326	17.934	3.5 %
Wing - Area	m²	3.462	3.655	5.6 %
Wing - Wetted Area	m²	6.552	6.996	6.8 %
Horizontal Tail - Area	m²	0.758	0.800	5.6 %
Horizontal Tail - Wetted Area	m²	1.499	1.485	-0.9 %
Vertical Tail - Area	m²	0.377	0.398	5.6 %
Vertical Tail - Wetted Area	m²	0.637	0.814	27.7 %
Mass - Maximum takeoff	kg	259.9	266.2	2.4 %
Mass - Empty	kg	167.1	173.2	3.6 %
Mass - Glider	kg	90.5	96.6	6.7 %
Mass - Flight	kg	259.9	266.2	2.4 %
Mass - Fuel	kg	12.8	13.0	1.8 %
Mass - Wing	kg	18.7	23.5	25.3 %
Mass - Horizontal Tail	kg	2.0	2.1	6.0 %
Mass - Fuselage	kg	22.6	22.7	0.3 %
Cruise - Flight speed	km/h	363	361	-0.5 %
Cruise - Power, required	kW	58.084	58.113	0.1 %
Cruise - Propeller installation efficiency	%	92.0	92.1	0.1 %
Cruise - Drag - Total	N	572	580	1.4 %
Cruise - Drag - Zero lift	N	555	566	2.1 %
Cruise - Drag - Induced	N	17	13	-21.6 %
Cruise - Drag coefficient - Total	-	0.02712	0.02611	-3.7 %
Cruise - Drag coefficient - Zero lift	-	0.02631	0.02552	-3.0 %
Cruise - Drag coefficient - Induced	-	0.00079	0.00059	-25.6 %
Cruise - Friction Coefficient	-	0.00523	0.00517	-1.1 %
Cruise - Induced drag factor (airplane)	-	0.875	0.857	-2.0 %
Best Rate of Climb - Rate of climb	m/s	14.127	13.909	-1.5 %
Best Rate of Climb - Power, required	kW	50.079	50.087	0.0 %
Takeoff - Takeoff run	m	158	159	0.5 %
Landing - Landing run	m	234	229	-2.1 %
Stall - Lift coefficient (Maximum)	-	1.71	1.67	-2.4 %
Aerodynamic Center - X	m	1.584	1.551	-2.0 %
Aerodynamic Center - Z	m	-0.047	-0.026	-45.0 %
Center of Gravity - X (Default Value)	m	1.515	1.490	-1.6 %
Center of Gravity - Z (Default Value)	m	-0.047	-0.026	-45.0 %

- Displays all results that have changed between two runs
  - Initial value
  - New value
  - Change
- Very powerful to understand the real impact of one modification made on the plane

26. Analyzes the results → Displays qualitative analysis of results

Messages (WARNING) - [0]
None

Messages (Information) - [21]
- Airworthiness Requirements: all design requirements are met
- Check CG Range: not performed !
- Check for Interference between Crew Members and Fuselage: not performed !
- Convergence Factor: at least one is greater than 0.5%. The computation accuracy can be improved if all the convergence factors are taken less than or equal to 0.5%.
- Expertise: At empty weight, the CG is located behind the main landing gear
- Expertise: At the maximum takeoff weight, the CG is located behind the main landing gear
- Expertise: Clr (0.046) is out of the range of historical values [0.080 to 0.142]
- Expertise: Cma (-0.664) is out of the range of historical values [-2.094 to -1.030]
- Expertise: Cn0 (0.042) is out of the range of historical values [0.042 to 0.092]
- Expertise: Cnp (-0.015) is out of the range of historical values [-0.045 to -0.022]
- Expertise: Oswald Efficiency Factor computed from McCormick (Processing/Advanced/Aerodynamics)
- Expertise: the initial values used to start the iterative process are updated from run to run
- Expertise: Total number of iterations (Fuselage Wetted Area): 1
- Fudge Factor used for the computation of Airfoil Maximum Lift Coefficient (Wing): 1.115
- Fudge Factor used for the computation of Weight: 0.870
- Fuel Tank volume: there is extra volume (1.64 l) to increase the range
- Fuel: Relative position of the fuel (computed): -0.6% MAC. Relative position of the fuel (given): 40.0% MAC
- Payload: Relative position of the occupants (computed): 44.2% of fuselage length. Relative position of the payload (given): 44.0% of fuselage length
- Payload: The maximum payload (80.0 kg) is higher than the computed mass of the occupants (61.5 kg). There is extra weight (18.5 kg) for luggage
- Propeller efficiency computed from Propeller Charts (high accuracy)
- Takeoff Performance: the propeller thrust has been computed by polynomial regression

- Displays warning messages, if any
- Displays information messages, if any
- Provides information about:
  - The compliance with the regulation
  - The CG position
  - The level of stability
  - The way some parameters were computed (propeller efficiency, Oswald efficiency factor…)
  - …

27. Checks compliance with regulation → Checks and informs if out of the limits of regulation

		0	1	2	3	4	5	6	7	8	9	10	11	12	13	
		CS-VLA	CS-LSA	CS-23N	CS-23U	CS-23A	CS-23C	CS-25	FAR-103	FAR-23N	FAR-23U	FAR-23A	FAR-23C	FAR-25	USAR	
	25	13	13	16	16	16	15	11	5	16	16	16	15	11	11	<<< Number of requirements for each regulation
General	Maximum fuel capacity								x							
	Number of engines	x	x	x	x	x	x	x		x	x	x	x	x	x	
	Maximum number of occupants	x	x	x	x	x	x		x	x	x	x	x			
	Type of engine	x	x	x	x	x	x	x		x	x	x	x	x		
	Maximum operating altitude			x	x	x	x			x	x	x	x			
Mass	Maximum takeoff weight	x	x	x	x	x	x			x	x	x	x		x	
	Minimum weight		x	x	x	x	x			x	x	x	x		x	
	Empty weight								x							
	Useful weight	x														
Speed	V_S			x	x	x	x			x	x	x	x			Stall speed determined by certification flight tests
	V_{SO}	x	x						x							Stall speed or minimum flight speed in landing configuration
	V_{S1}															Stall speed or minimum steady flight speed in a specific configuration
	V_F	x	x	x	x	x	x	x		x	x	x	x	x	x	Design flap speed
	V_C	x	x	x	x	x	x	x		x	x	x	x	x	x	Design cruise speed
	V_D	x	x	x	x	x	x	x		x	x	x	x	x	x	Design diving speed
	V_H								x							Maximum speed in level flight with maximum continuous power
Load factors	n_1	x	x	x	x	x	x	x		x	x	x	x	x	x	Positive maneuvering load factor
	n_{L1}															Landing load factor
Takeoff speed	V_R			x	x	x	x	x		x	x	x	x	x	x	Rotation speed
	V_{LOF}							x						x		Lift off speed, speed at which the airplane first becomes airborne
	V_{TO}			x	x	x	x	x		x	x	x	x	x		Final takeoff speed
	V_{CLAEO}			x	x	x	x	x		x	x	x	x	x	x	Climb speed, all engine operative
	V_{15m}	x	x	x	x	x				x	x	x			x	Speed above the 15m (50ft) obstacle
Climb	V_Y	x	x													Rate of climb
Landing	V_{Ref}	x	x	x	x	x	x	x		x	x	x	x	x	x	Reference landing approach speed

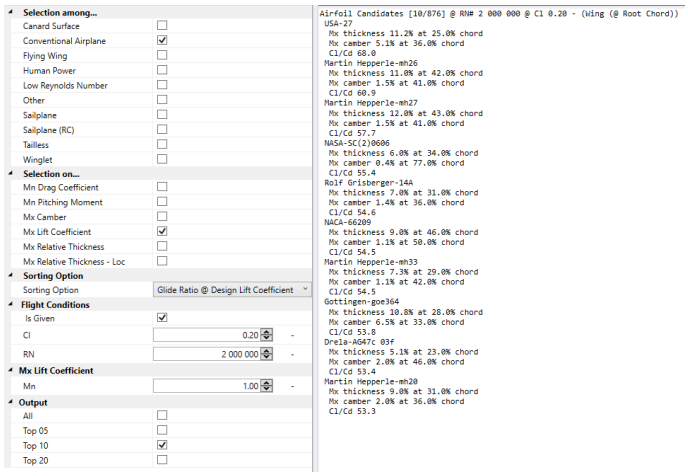
- Checks compliance with regulation regarding:
  - Maximum fuel capacity
  - Number of engines
  - Maximum number of occupants
  - Type of engine
  - Maximum operating altitude
  - Mass
  - Speed
  - Load factors
  - Takeoff, climb and landing performance

28. Tire selection → Selects tire size in function of ground run operation

MAIN GEAR (0DS-02-01_GEAR*)		
General		
Fixed gear		
Main gear - Fairing		
Tires		
Tire	N/A	
Tire diameter	270	mm
Tire width	90	mm
Maximum static load	1 226	N
List of candidate tires from the tire database (sorted by increasing diameter)		
- Max load (imposed by MxTOW, gear geometry, and number of wheels) > 1 226 N (< 12 265 N)		
- Max Speed (imposed by takeoff/landing ground speed) > 109 km/h		
- Max Inflation Pressure (imposed by runway surface) < 17.895 bar		
#1 Type III-3.00	150	mm
#2 Type III-5.00-4 PR 06	330	mm
#3 Type III-5.00-4 PR 14	330	mm
#4 Type III-5.00-4.5 PR 06	335	mm
#5 Type III-5.00-5 PR 04	354	mm
#6 Type III-5.00-5 PR 06	354	mm
#7 Type III-5.00-5 PR 10	354	mm
#8 Three Part-15x6.0-6 PR 06	378	mm
#9 Type VII-1644 PR 06	400	mm
#10 Type VII-16x4.4 PR 04	400	mm
#11 Type VII-16x4.4 PR 06	400	mm

- Generates a list of tire candidates in function of:
  - Landing gear configuration
  - Maximum takeoff weight
  - Maximum ground speed
  - Runway surface

29. Airfoil selection → Selects the best airfoil for the specified flight condition



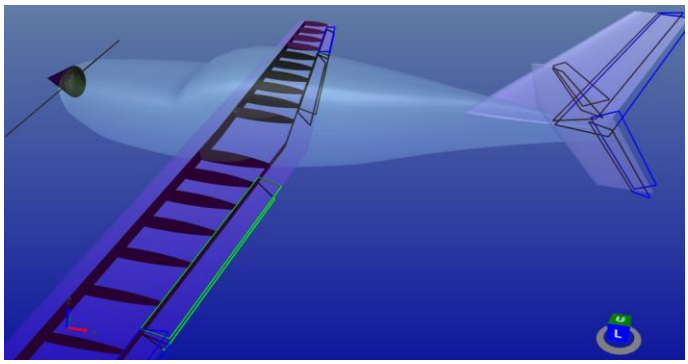
- Generates a list of airfoil candidates in function of:
  - Type of airplane
  - Flight conditions
  - Some geometric parameters:
    - Maximum relative thickness
    - Maximum camber
  - Some aerodynamic parameters:
    - Minimum drag coefficient
    - Maximum lift coefficient
    - Minimum pitching moment
- The candidates are sorted according to predefined criteria:
  - Maximum glide ratio
  - Maximum lift coefficient
  - Zero angle of attack pitching moment
  - Minimum drag coefficient
  - Zero lift angle of attack

30. Comparative analysis → Compares the airplane with its competitors on different criteria

QUALITY		
Symbols		
+ : best plane		.
- : Worst plane		.
AERODYNAMICS		
Friction coefficients (-) - Cruise		
0.00167 |-----o----------| 0.04659	0.00515	-
+	Cessna-210-G	
-	PIUMA ALMERICO-12-000ELECTR	
Aerodynamic efficiency [Cf(limit) / Cf] (%) - Cruise		
8.9 |----------o----------| 209.2	62.9	%
+	Cessna-210-G	
-	PIUMA ALMERICO-12-000ELECTR	
Flat plate area perpendicular to flow (m^2) - Cruise		
0.051 |-o----------| 1.719	0.076	m^2
+	0CEA 311-02-01	
-	Edgley-Optica-01*	
Flat plate width perpendicular to flow (m) - Cruise		
0.226 |---o----------| 1.311	0.276	m
+	0CEA 311-02-01	
-	Edgley-Optica-01*	
FUEL		
Fuel (l/100km) - Cruise		
4.9 |--o----------| 83.6	7.3	-
+	Michel Colomban-MC 100-0b	
-	Cessna-208 F-Caravan	
Fuel (l/100km/100kg) - Cruise		
N/A	9.1	-

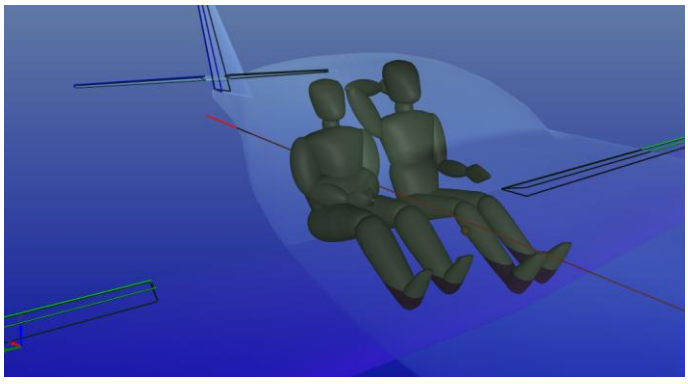
- The current airplane is compared with other airplanes taken from the database. The analysis focuses on:
  - Aerodynamics
  - Fuel consumption
  - C02 emissions
  - Mass
  - Performance
- The best airplane is displayed as well as the worst one
- The current airplane is located between the two limits

31. Aircraft Structure → Displays structural parts to check for interference between components

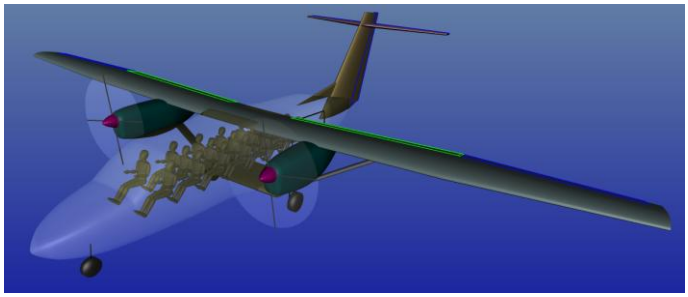


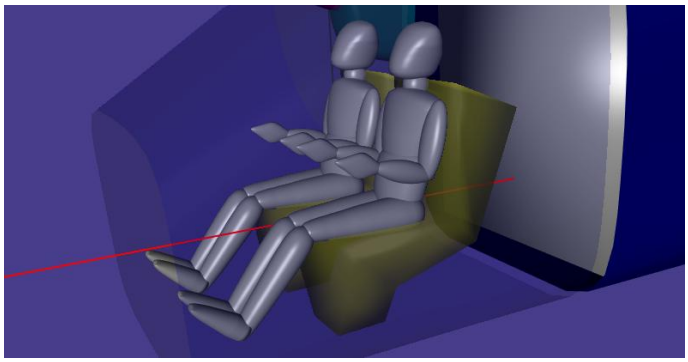
- The structure is generated automatically
- Some elements of the structure are represented, such as:
  - Spars
  - Ribs
  - Frames
  - Stringers
- The representation is mainly used to check the absence of interference between components, between the structure and the control surfaces, between the structure and the high lift devices…

32. Occupants → Displays occupants to check cabin volume



- The occupants are generated automatically
- Controls on measurements:
  - Height
  - Fatness
  - Shoulder breath
- Controls position and attitude
- Checks interference with the fuselage
- Checks clearance with fuselage
- Checks minimum cockpit size to fit the occupants
- Lists anthropometric characteristics
- Puts in default sitting and standing position



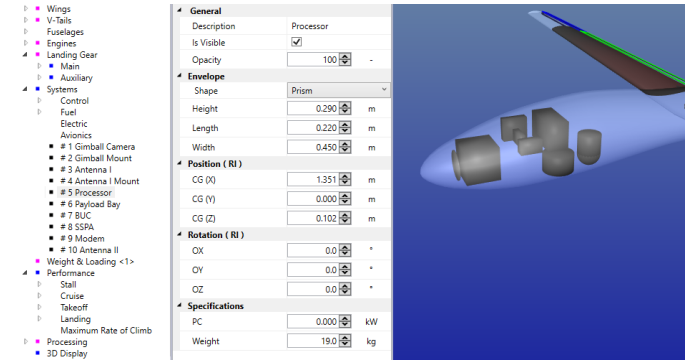


- For passenger transport aircraft, the seat layout can be quickly determined by specifying the row spacing and the number of seats per row.
- The seat is modeled by its envelope, that is the maximum volume it occupies when moving from the upright to the reclined position. This approach allows for the cabin space to be sized according to the desired comfort level, while ensuring there are no interferences between seats and passengers, regardless of the seat's position
- The seat dimensions are provided for three comfort classes (Deluxe, Normal, and Economy) and for three configuration types (single, double, and triple)



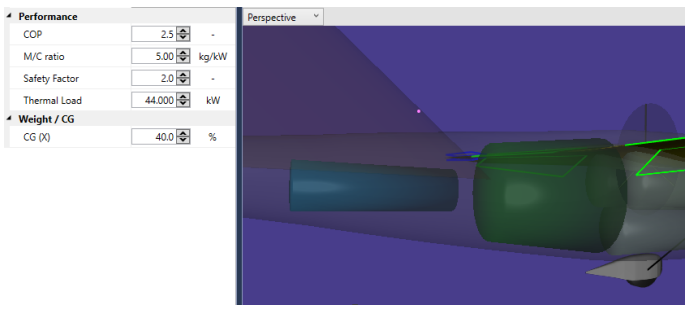
- In cargo aircraft, a range of standard container types can be selected, including LD-2 through LD-8 units, along with standard pallets.

33. Systems → Displays systems to check the available volume reserved for them



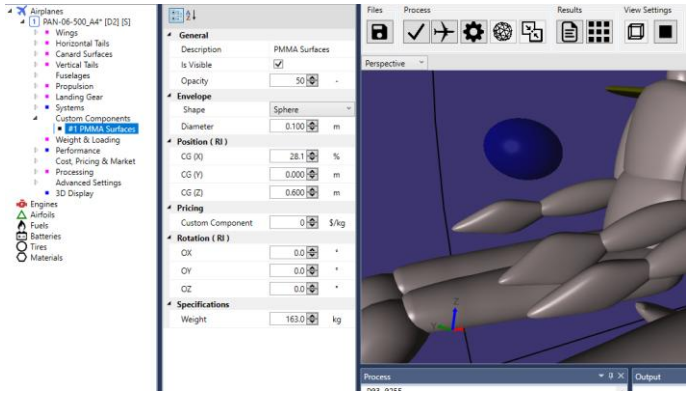
- The user may define unlimited number of systems
- Each system is defined with:
  - An envelope of different shape (prism, cylinder, cone, sphere) and size
  - Power consumption
  - Mass

34. Air Conditioning System → Size the system from the thermal load



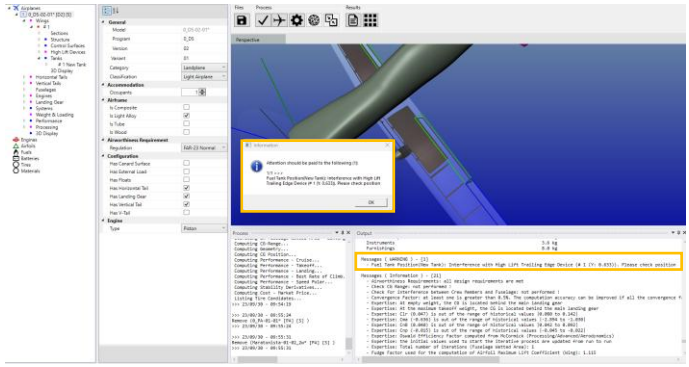
- **Air conditioning** takes into account the total thermal load (heating and cooling) to calculate the power and energy required to operate the system.

35. Custom Components → Checks and warns if there is interference



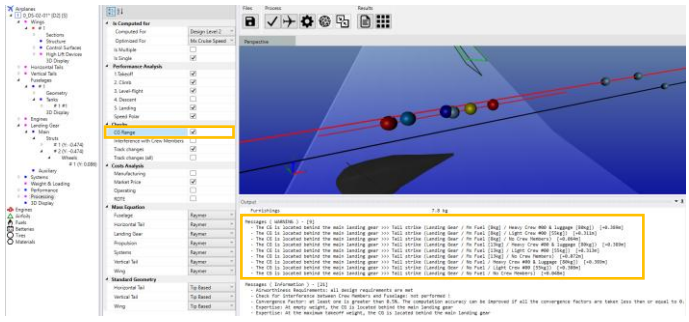
- Allows the definition of custom components.
- Each component is defined by :
  - its shape,
  - its dimensions,
  - its position within the aircraft,
  - its price per unit mass,
  - its mass
- This could be useful, for example, to model a special coating on part of the aircraft or a specific component.

36. Checks interference between components → Checks and warns if there is interference



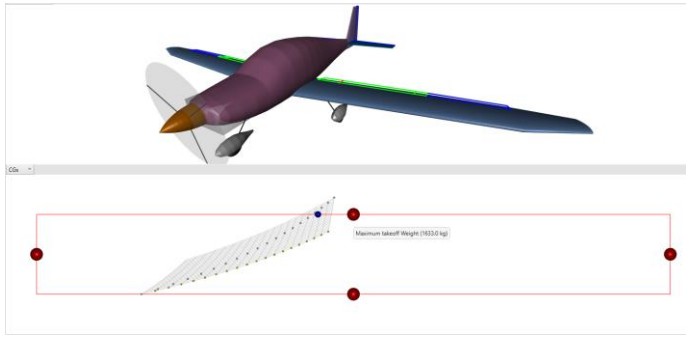
- Warning messages are displayed if exist interference between components:
  - Occupants
  - Tanks
  - Structure
  - High lift devices
  - Control surfaces
  - …

37. Checks CG Range → Checks the CG position for all load cases



- **Checks CG position for all load cases. The CG must be between the limits. If not, warning messages are displayed**
- Displays the CG of each component of the airplane (light blue)
- Displays on the mean aerodynamic chord:
  - The most forward position (red)
  - The most aft position, neutral point (red)
  - The true airplane CG (blue)
  - The default airplane CG (yellow)

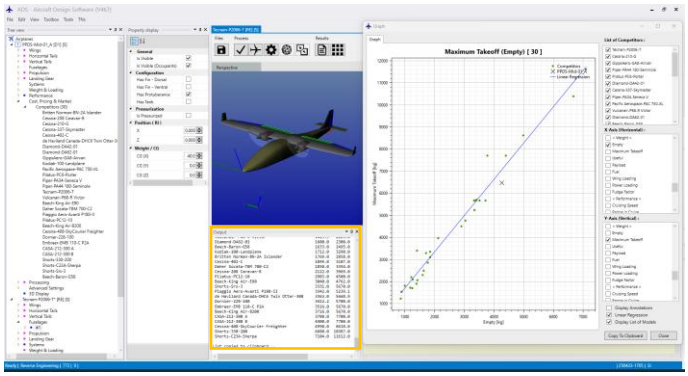
38. Display Load Distribution → Position of CGs vs Flight Weight

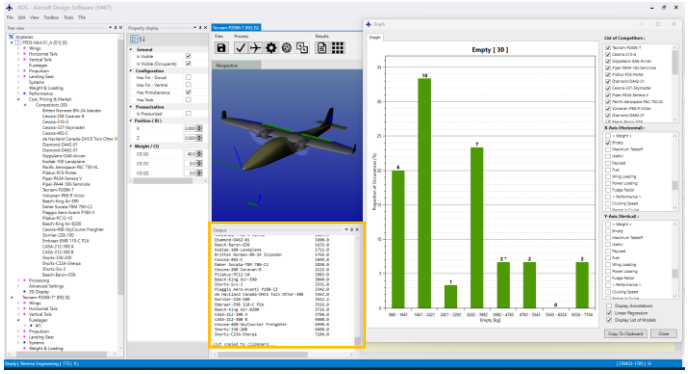


- Display the center of gravity (CG) envelope showing all possible CG positions for different payload distributions and fuel loads
- The envelope is plotted within a frame defined by:
  - The forward CG limit on the left
  - The aft CG limit (stability limit) on the right
  - The empty weight at the bottom
  - The maximum take-off weight (MTOW) at the top.

© 2026 OAD – www.oad.aero

39. Visual Competitor Analysis → Select and compare competitors graphically





- Competitors are selected from various categories
- Graphs can be generated either as scatter plots or histograms
- **The values displayed in the graph are also listed in the Output window**
- More than 70 parameters can be plotted
- Charts can be copied and included in reports
- A linear regression line can be displayed on the chart, with its equation shown in the Output window
- Annotations (model names) can be displayed on the chart
- The technical specifications associated with each aircraft can be displayed in the Output window: engine model, number of engines, propeller type, wing type, high-lift device type, landing gear type

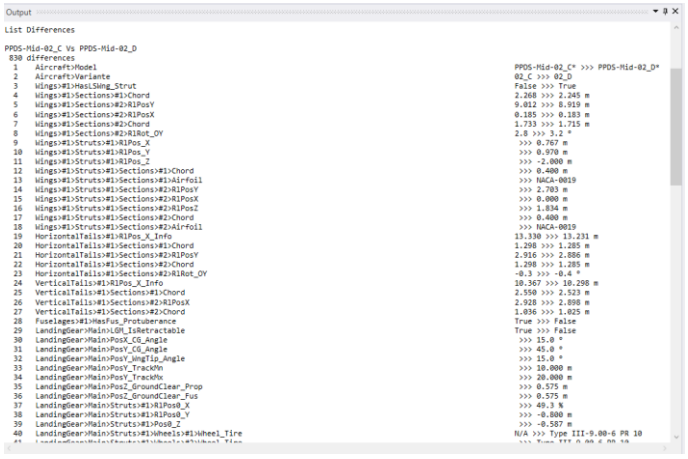
40. Visual Version Analysis → Select and compare versions graphically

Unlike a competitor, a version is a variant of the same project. The **multiple run** feature can automatically generate a large number of versions, whose characteristics can be analyzed graphically in the **version comparator**.

It provides the same features as for competitors, except for:

- A polynomial regression curve can be displayed on the chart, with its equation shown in the Output window

41. Version comparator → Compare input data between versions



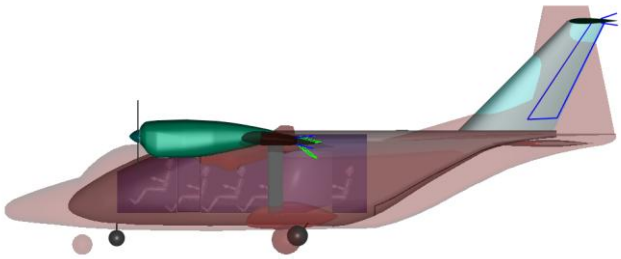
```
Output
List Differences

PPDS-Mid-02_C Vs PPDS-Mid-02_D
 830 differences
   1  Aircraft>Model                                          PPDS-Mid-02_C* >>> PPDS-Mid-02_D*
   2  Aircraft>Variante                                       02_C >>> 02_D
   3  Wings>#1>HasLSWng_Strut                                 False >>> True
   4  Wings>#1>Sections>#1>Chord                              2.268 >>> 2.245 m
   5  Wings>#1>Sections>#2>R1PosY                             9.012 >>> 8.919 m
   6  Wings>#1>Sections>#2>R1PosX                             0.185 >>> 0.183 m
   7  Wings>#1>Sections>#2>Chord                              1.733 >>> 1.715 m
   8  Wings>#1>Sections>#2>R1Rot_OY                           2.8 >>> 3.2 °
   9  Wings>#1>Struts>#1>R1Pos_X                              >>> 0.767 m
  10  Wings>#1>Struts>#1>R1Pos_Y                              >>> 0.970 m
  11  Wings>#1>Struts>#1>R1Pos_Z                              >>> -2.000 m
  12  Wings>#1>Struts>#1>Sections>#1>Chord                    >>> 0.400 m
  13  Wings>#1>Struts>#1>Sections>#1>Airfoil                  >>> NACA-0019
  14  Wings>#1>Struts>#1>Sections>#2>R1PosY                   >>> 2.703 m
  15  Wings>#1>Struts>#1>Sections>#2>R1PosX                   >>> 0.000 m
  16  Wings>#1>Struts>#1>Sections>#2>R1PosZ                   >>> 1.834 m
  17  Wings>#1>Struts>#1>Sections>#2>Chord                    >>> 0.400 m
  18  Wings>#1>Struts>#1>Sections>#2>Airfoil                  >>> NACA-0019
  19  HorizontalTails>#1>R1Pos_X_Info                         13.330 >>> 13.231 m
  20  HorizontalTails>#1>Sections>#1>Chord                    1.298 >>> 1.285 m
  21  HorizontalTails>#1>Sections>#2>R1PosY                   2.916 >>> 2.886 m
  22  HorizontalTails>#1>Sections>#2>Chord                    1.298 >>> 1.285 m
  23  HorizontalTails>#1>Sections>#2>R1Rot_OY                 -0.3 >>> -0.4 °
  24  VerticalTails>#1>R1Pos_X_Info                           10.367 >>> 10.298 m
  25  VerticalTails>#1>Sections>#1>Chord                      2.550 >>> 2.523 m
  26  VerticalTails>#1>Sections>#2>R1PosX                     2.928 >>> 2.898 m
  27  VerticalTails>#1>Sections>#2>Chord                      1.036 >>> 1.025 m
  28  Fuselages>#1>HasFus_Protuberance                        True >>> False
  29  LandingGear>Main>LGH_IsRetractable                      True >>> False
  30  LandingGear>Main>PosX_CG_Angle                          >>> 15.0 °
  31  LandingGear>Main>PosY_CG_Angle                          >>> 45.0 °
  32  LandingGear>Main>PosY_WngTip_Angle                      >>> 15.0 °
  33  LandingGear>Main>PosY_TrackMn                           >>> 10.000 m
  34  LandingGear>Main>PosY_TrackMx                           >>> 20.000 m
  35  LandingGear>Main>PosZ_GroundClear_Prop                  >>> 0.575 m
  36  LandingGear>Main>PosZ_GroundClear_Fus                   >>> 0.575 m
  37  LandingGear>Main>Struts>#1>R1Pos0_X                     >>> 49.3 %
  38  LandingGear>Main>Struts>#1>R1Pos0_Y                     >>> -0.800 m
  39  LandingGear>Main>Struts>#1>Pos0_Z                       >>> -0.587 m
  40  LandingGear>Main>Struts>#1>Wheels>#1>Wheel_Tire         N/A >>> Type III-9.00-6 PR 10
```

- Benefits of Comparing Input Data Between Two Datasets:
  - Design Change Traceability
  - Impact Analysis
  - Error Detection and Data Validation
  - Sensitivity and Trade Study Support
  - Collaboration and Review Efficiency
  - Certification and Audit Readiness
  - Scenario and Configuration Management
  - Time and Cost Reduction
  - Improved Decision Confidence

© 2026 OAD – www.oad.aero

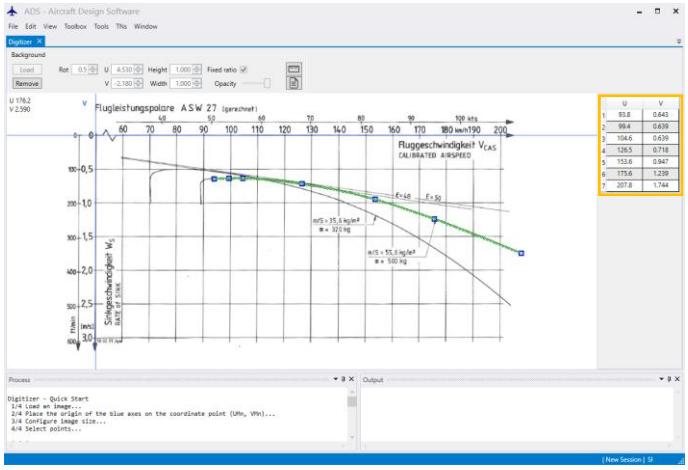
42. Overlay the competitor's 3D model



- Benefits of 3D Model Overlay with a Competitor Aircraft
  - Geometric Benchmarking
  - Configuration Assessment
  - Packaging and Volume Analysis
  - Design Space Validation
  - Proportion and Scaling Verification
  - Integration and Interference Awareness
  - Technology Differentiation Analysis
  - Communication and Design Review Support
  - Early Risk Reduction
  - Support to Trade Studies and Concept Selection
  - Strategic Decision Support

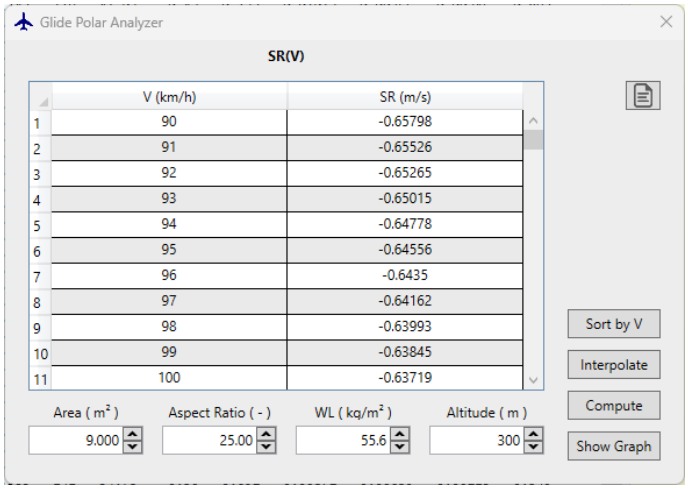
Toolbox

43. Digitizer → Digitizes any curve to retrieve the coordinates of the points that were used to draw it



- **Generates a list of points that can be copied/pasted in any spreadsheet or tables in ADS**
- In reverse engineering the analysis of the coordinates of a glide polar obtained by digitalization will make it possible to know at any speed the zero lift drag coefficient and the Oswald efficiency factor

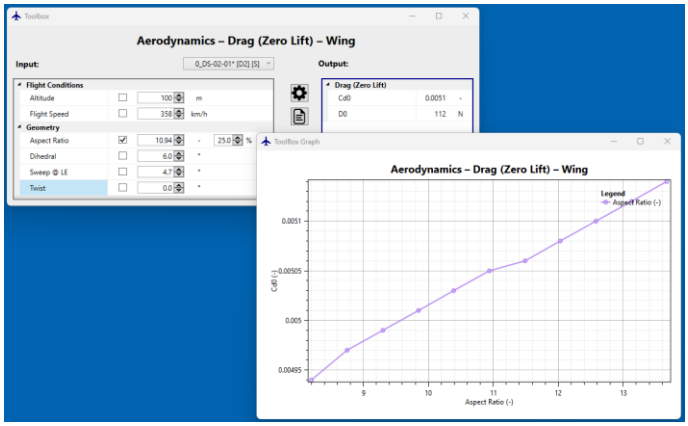
44. Glide Polar Analyzer → Analyzes the drag polar of a (motor)glider



- Computes at every speed of the glide polar, from the lower to the upper speed, every 1 km/h, the following information:
  - Total drag
  - Glide ratio
  - Lift coefficient
  - Drag coefficient
  - Zero lift drag coefficient
  - Induced drag coefficient
  - Osswald efficiency factor

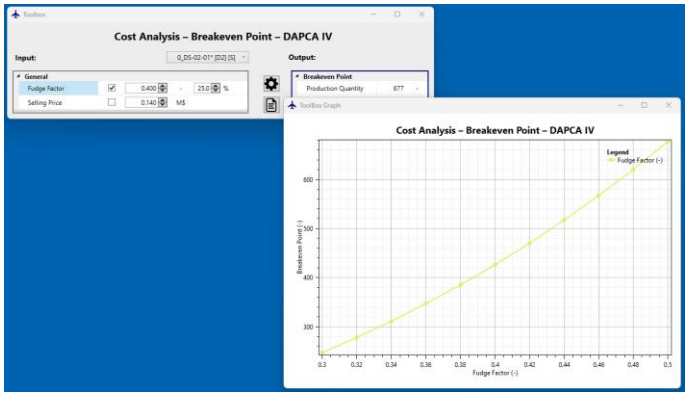
Tools

45. Aerodynamics / Zero Lift Drag → Sensitivity analysis in drag generation



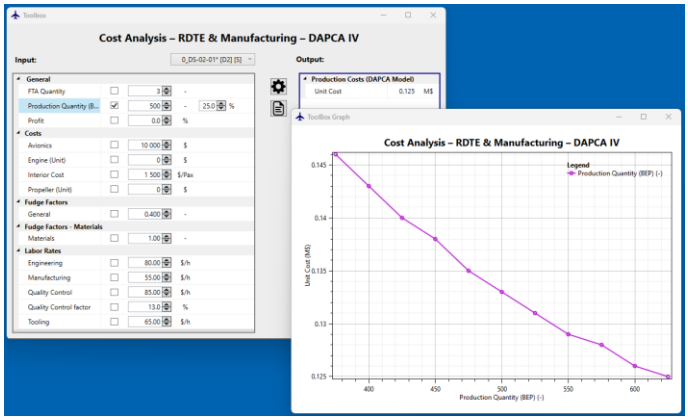
- Performs a sensitivity analysis and identify the predominant parameters in drag generation, or which parameter should be modified as a priority to minimize drag. The analysis can be done on the following components:
  - Airplane
  - Wing
  - Empennages
  - Fuselage
  - Landing gear
  - Floats
  - Tailboom
  - Engine
  - Nacelle
  - Miscellaneous
- A technical note presents the equations used in the computation of drag and lists the references.

46. Cost Analysis / Breakeven Point → Sensitivity analysis in breakeven point determination



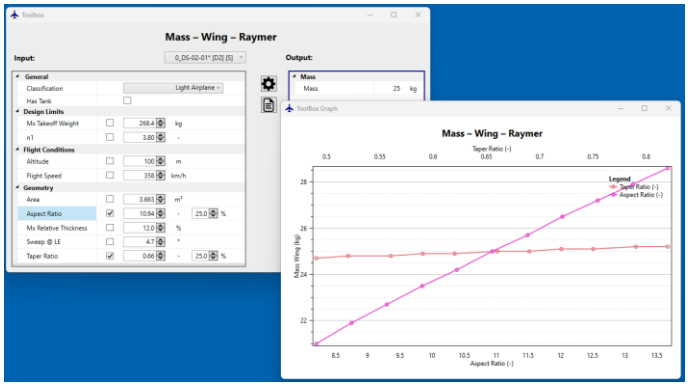
- Performs a sensitivity analysis in the determination of the breakeven point.

47. Cost Analysis / RDTE & Manufacturing → Sensitivity analysis on RDTE & manufacturing costs



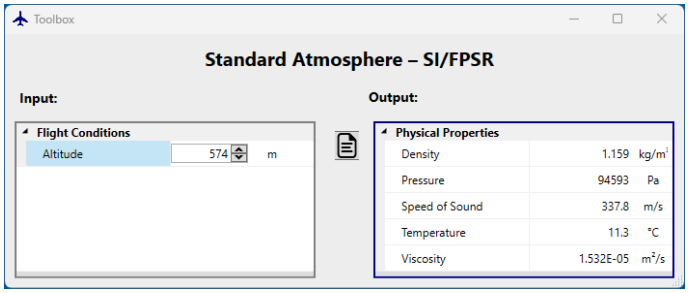
- Performs a sensitivity analysis and identify the predominant parameters which influence RDTE & manufacturing costs, or which parameter should be modified as a priority to minimize the cost.
- A technical note presents the equations used and lists the references.

48. Mass → Sensitivity analysis on mass estimation



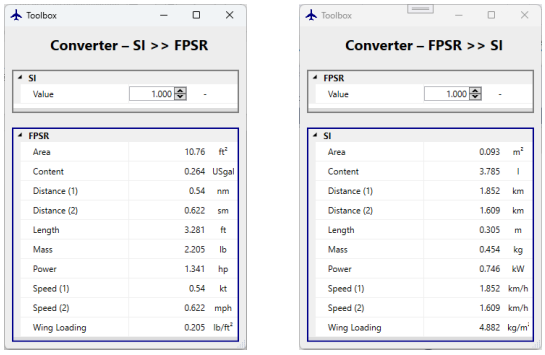
- Performs a sensitivity analysis and identify the predominant parameters in mass estimation, or which parameter should be modified as a priority to minimize the mass. The analysis can be done on the following components:
  - Wing
  - Empennages
  - Fuselage
  - Landing gear
  - Floats
  - Tailboom
  - Engine
  - Nacelle
  - Systems
  - Furnishing
- A technical note presents the equations used in the computation of mass and lists the references.

49. Standard Atmosphere → Lists the characteristics of the standard atmosphere at a given altitude



- Lists the characteristics of the standard atmosphere at a given altitude

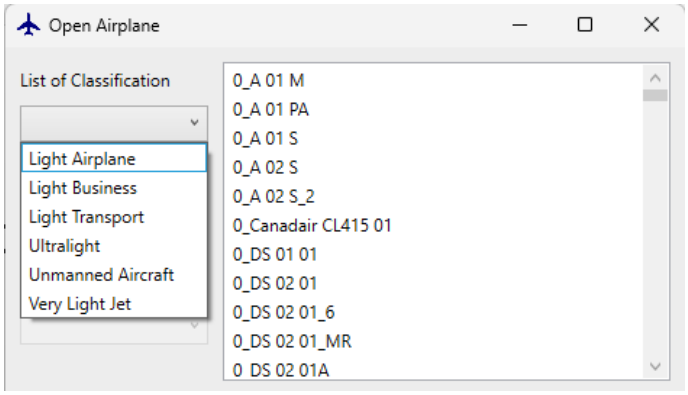
50. Unit Converter SI << >> FPSR



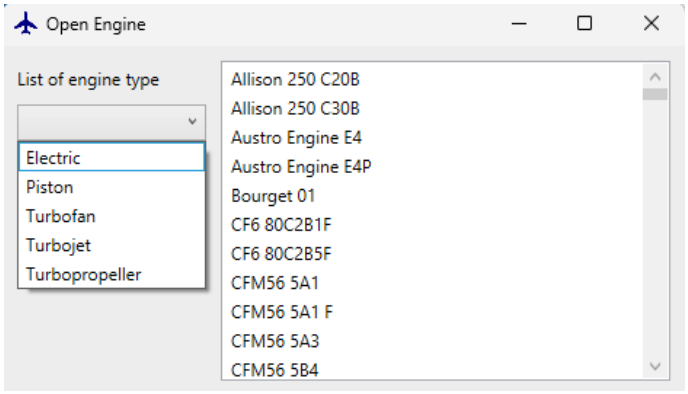
- The unit converter allows for the conversion of major physical quantities between the SI system and the FPSR system, in both directions

Database

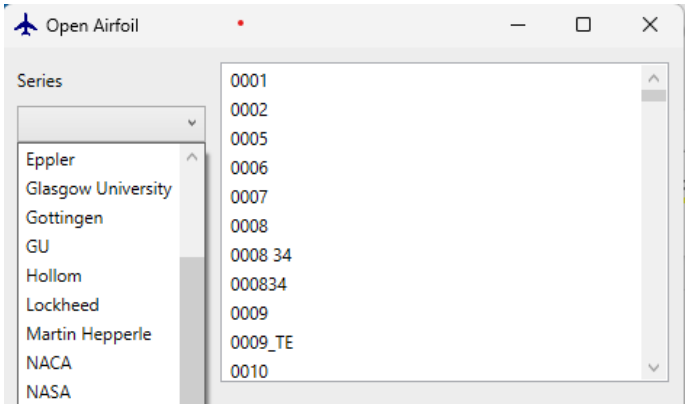
51. Database → Airplanes, Engines, Airfoils, Fuels, Batteries, Tires, Materials



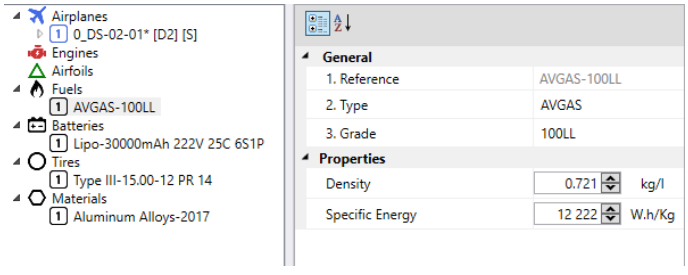
- The airplane database is divided in different categories:
  - Light Airplane
  - Light Business
  - Light Transport
  - Ultralight
  - Unmanned Aircraft
  - Very Light Jet
- For each aircraft in the database:
  - General information
  - Geometry
  - Systems
  - Mass
  - Performance
- The database is continuously updated with new airplanes
- The user may updated it himself with his own data



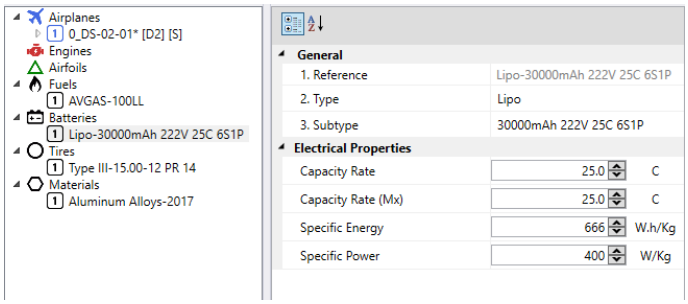
- The engine database is divided in different categories:
  - Electric
  - Piston
  - Turbofan
  - Turbojet
  - Turbopropeller
- For each engine in the database:
  - General information
  - Geometry
  - Systems
  - Performance
- The database is continuously updated with new engines
- The user may updated it himself with his own data



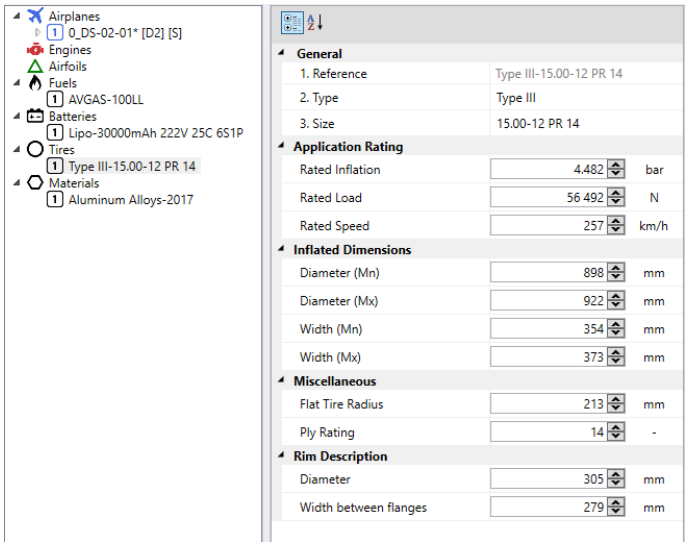
- The airfoil database is divided in different categories. Among them:
  - Eppler
  - NACA
  - NASA
  - Worthmann
  - …
- For each airfoil in the database:
  - General information
  - Airfoil coordinates
  - Aerodynamic characteristics for different Reynolds Number and Mach Number
- The database is continuously updated with new airfoils
- The user may updated it himself with his own data



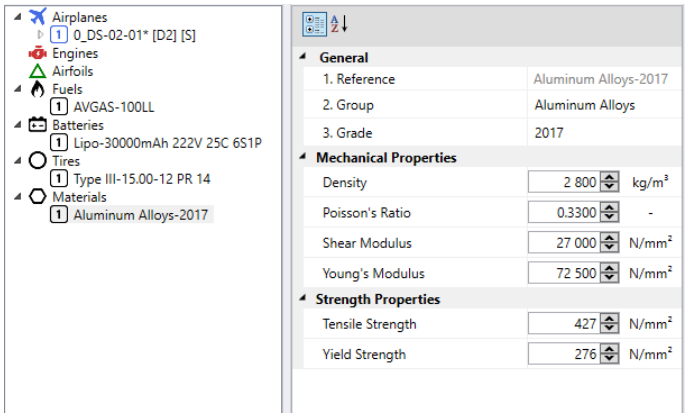
- For each fuel in the fuel database:
  - General information
  - Physical and chemical properties
- The user may updated it himself



- For each battery in the battery database:
  - General information
  - Electrical properties
- The user may updated it himself



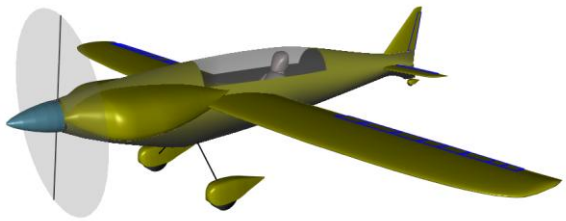
- For each tire in the tire database:
  - General information
  - Application rating
  - Inflated dimensions
  - Rim Description
- The user may updated it himself



- For each material in the material database:
  - General information
  - Mechanical properties
  - Strength properties
- The user may updated it himself

3D Display

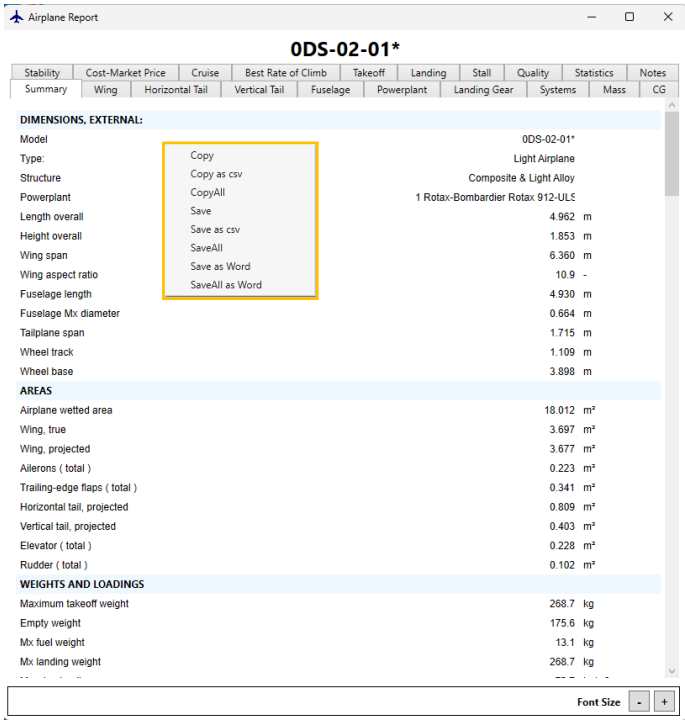
52. Texture mapping



- Ability to apply a texture to the fuselage, in particular to represent transparent areas.
- Generation of a template file and an associated technical note.
- Ability to simultaneously modify the appearance (color and opacity) of all aircraft components.

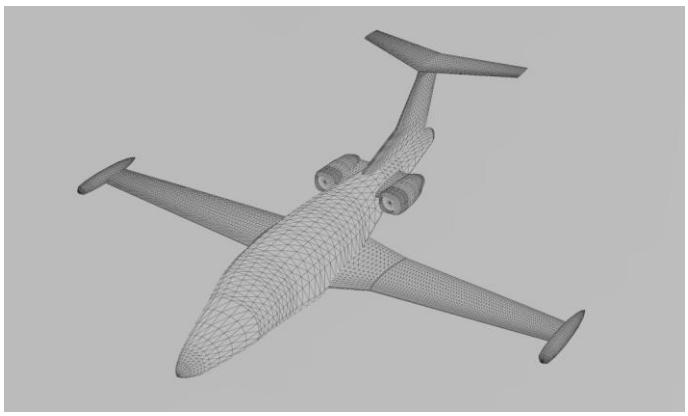
Export Functions

53. Airplane Report → Airplane report available in .doc, .txt, .csv file format



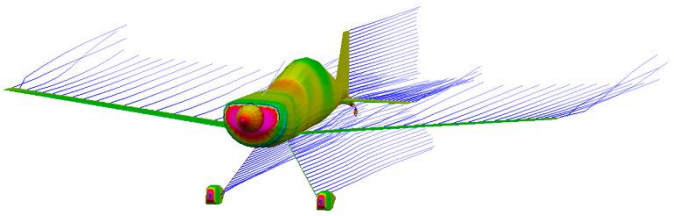
- Airplane report ready to be published
- **Airplane report may be**:
  - Copied in the clipboard
  - Copied as csv
  - Saved as doc
  - Saved as txt
  - Saved as csv
- One file for the whole document
- One file for a specific item
- Files are stored in a specific folder of the airplane dataset
- File path is displayed in the process window

54. 3D-Geometry → 3D Geometry may be exported in .stl file format



- One file for the whole geometry
- One file for each component (wing, fuselage…)
- Files are stored in a specific folder of the airplane dataset

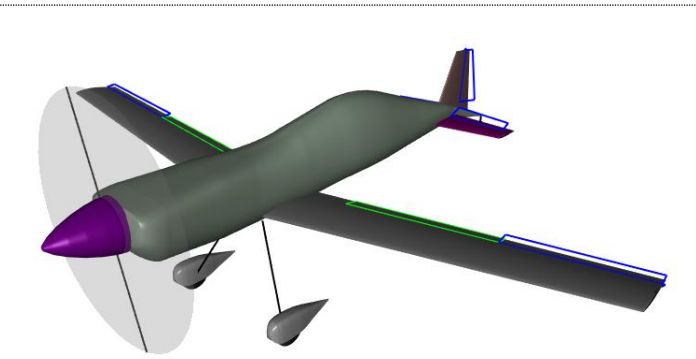
55. 3D-Geometry → 3D Geometry may be exported to OpenVSP

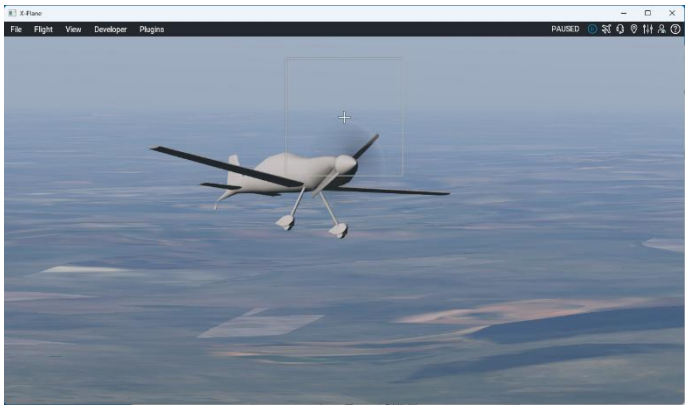


- The user may select which components to export
- The OpenVSP dataset is exported “ready to use” to perform :
  - Aerodynamic analysis (VLM, panel method, wave drag, parasite drag),
  - Geometric analysis (areas, intersections),
  - Mass property analyses
- OpenVSP can also prepare geometries for external high-fidelity CFD/structural solvers

© 2026 OAD – www.oad.aero

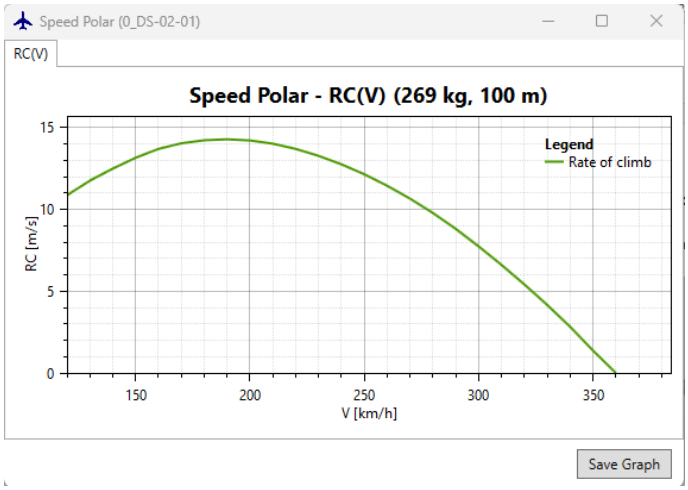
56. ADS Model → ADS Model may be exported to the flight simulator Xplane





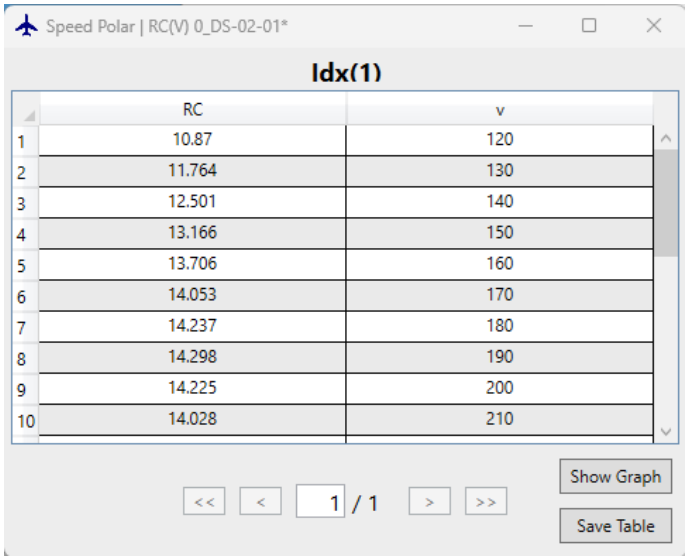
- The aircraft geometry can be exported from ADS to Plane Maker, the aircraft editor of the Xplane flight simulator, and then used directly in X-Plane.
- ADS automatically generates the main flight-relevant parameters required by the simulator, including:
  - Aircraft masses
  - Center of gravity positions
  - Aerodynamic drag characteristics
  - Airfoil aerodynamic data for different Reynolds numbers
- The exported aircraft is configured to be immediately usable in the simulator:
  - Instrument panel preconfigured for flight
  - Aircraft systems already initialized
- Both landplanes and seaplanes can be exported.
- Several propulsion configurations are supported, including internal combustion engines, electric motors, turbojets, and turbofans.

57. Graphs → Graphs are saved in .bmp, .pdf, .png file format



- Save graph generates:
  - .bmp
  - .pdf
  - .png
- Files are stored in a specific folder of the airplane dataset

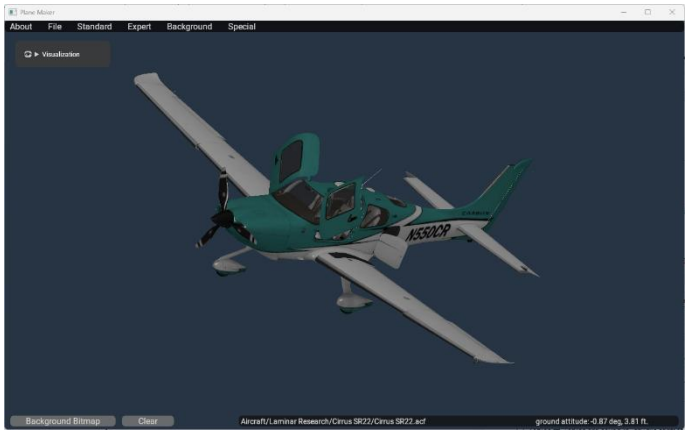
58. Tables → Tables are saved in .csv file format

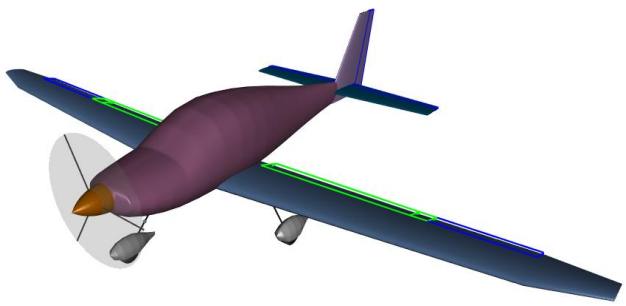


- Save table generates .csv file format:
- Files are stored in a specific folder of the airplane dataset
- File path is displayed in the process window

Import Functions

59. Xplane Model → Xplane model may be imported in ADS





- Xplane aircraft models can be imported into ADS in a single click, enabling analyses ranging from reverse engineering studies to aircraft performance evaluation.
- The import process retrieves the aircraft geometry together with the main aircraft components, systems, and airfoil sections.
- The propeller geometry is reconstructed from the propeller definition contained in the Xplane model.
- The import function can automatically ignore certain components when they are too small or when they are nested within other components.
- During the import process, ADS automatically generates a list of assumptions made to complete the model reconstruction.
- Because Xplane only provides limited engine data (maximum power output and maximum RPM), ADS generates a list of candidate engines that could match the imported aircraft configuration.

Customized software

60. Add new modules → Great flexibility of the software

Thanks to its modular architecture, the software can be easily extended by adding new modules to meet specific customer requirements. The following features have been implemented in ADS in response to specific requests:

- VTOL (Vertical Take-Off and Landing)
- STOL (Short Take-Off and Landing)
- Seaplane
- Solar-powered aircraft
- Airliners
- Ducted fan systems

61. Frequent new releases → Frequent new releases demonstrate OAD's high level of responsiveness

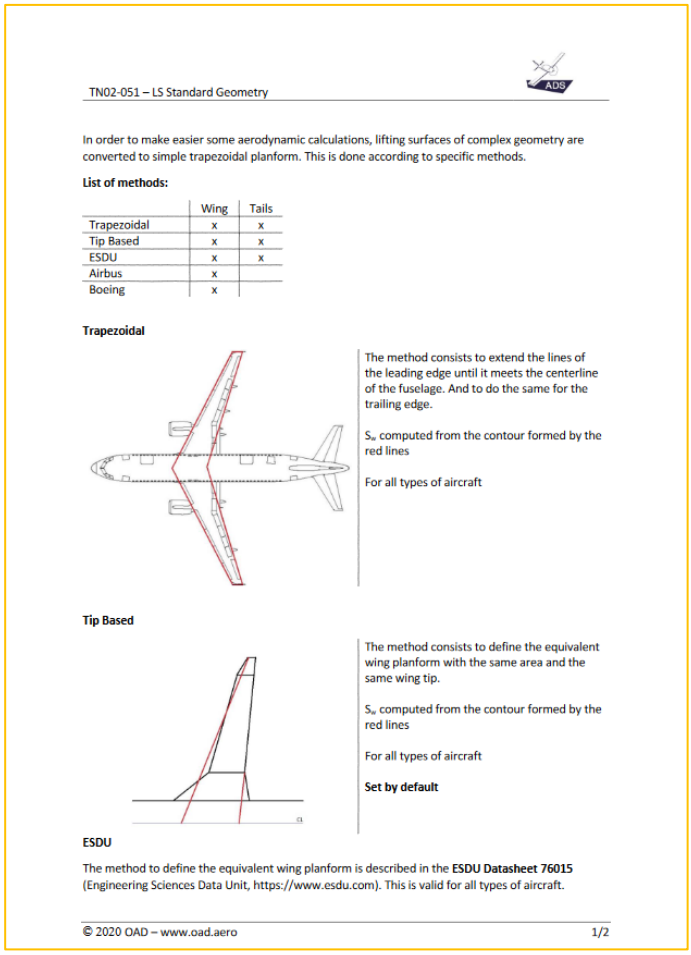
- As soon as an issue is reported, OAD makes every effort to resolve it as quickly as possible
- When a customer requests a new feature, OAD evaluates the request and, when feasible, includes it in the next software release.
- Customer satisfaction is OAD's top priority.

Technical assistance

62. Getting started with the software → OAD assists the customer getting started with ADS

- Online training sessions are available to assist users during their initial use of the software.
- OAD provides expert support to review the user's work until they feel confident using the software independently

63. Technical documentation → Technical notes and videos accessible directly from the software



TN02-051 – LS Standard Geometry

In order to make easier some aerodynamic calculations, lifting surfaces of complex geometry are converted to simple trapezoidal planform. This is done according to specific methods.

List of methods:

	Wing	Tails
Trapezoidal	x	x
Tip Based	x	x
ESDU	x	x
Airbus	x	
Boeing	x	

Trapezoidal

The method consists to extend the lines of the leading edge until it meets the centerline of the fuselage. And to do the same for the trailing edge.

S_w computed from the contour formed by the red lines

For all types of aircraft

Tip Based

The method consists to define the equivalent wing planform with the same area and the same wing tip.

S_w computed from the contour formed by the red lines

For all types of aircraft

Set by default

ESDU

The method to define the equivalent wing planform is described in the **ESDU Datasheet 76015** (Engineering Sciences Data Unit, https://www.esdu.com). This is valid for all types of aircraft.

© 2020 OAD – www.oad.aero 1/2

- **Concise technical notes** provide explanations on many topics
- Short videos show how to complete a task
- Many additional information displayed on the user interface regarding:
  - Historical values
  - Reference
  - Theory

64. Technical support → OAD may assist the customer at any time

- Users may contact OAD at any time for clarification regarding the algorithms used to solve a problem or to better understand the results provided by the software.
- Users may also request OAD to carry out specific tasks as part of a consulting service

References

65. ADS for everyone → Serving customers from all sectors, including small, medium, and large companies, as well as individuals and universities