

CEASIOM 75 User Guide: Writing the xml file

Andrés Puelles
KTH

Fuselage

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Forefuse_Xs_distortion_coefficient
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- Span
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- taper_kink
- taper_tip
- quarter_chord_sweep_inboard
- quarter_chord_sweep_outboard
- LE_sweep_inboard
- LE_sweep_outboard
- vertical_locale
- apex_locale
- thickness_root
- thickness_kink
- thickness_tip
- dihedral_inboard
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- root_incidence
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- X_locale
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d_max
Propeller_diameter
Max_thrust
Bypass_ratio_to_emulate
Thrust_reverser_effectivness
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Fore_wing_spar_loc_root
Fore_wing_spar_loc_kik1
Fore_wing_spar_loc_kin2
Fore_wing_spar_loc_tip
Aft_wing_spar_loc_root
Aft_wing_spar_loc_kin1
Aft_wing_spar_loc_kin2
Aft_wing_spar_loc_tip
Wing_fuel_tank_cutout_opt
Outboard_fuel_tank_span
Unusable_fuel_option
Assumed_fuel_density
Incr_weight_for_wing_tanks
Centre_tank_portion_used
Increment_for_centre_tank
Fore_fairing_tank_length
Aft_fairing_tank_length
Aft_fuse_bladder_length
Increment_for_aux_tanks

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installation_type
gross_volume
Baggage_combined_length
Baggage_apex_per_fuselgt

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Cabin_length_to_aft_cab
Cabin_max_internal_height
Cabin_max_internal_width
Cabin_floor_width
Cabin_volume
Passenger_accomodation
Seats_abreast_in_fuselage
Seat_pitch
Maximum_cabin_altitude
Cabin_attendant_number
Flight_crew_number

miscellaneous

- Design_classification
- Target_operating_ceiling
- Spoiler_effectivity
- Undercarriage_layout

weight_balance

- Ramp_increment
- Weight_cont_allow_perc_of_MEW
- Manufacturer_weights_tolerance

flight_envelope_prediction

- VD_Flight_envelope_dive
- VMO_Flight_envelope

Fuselage

The fuselage is taken to be a three segment body: the nose, the centre and the aft.

The cross-sections of the fuselage centre-section consist of upper and lower lobes with a stipulation of symmetry about the x-z plane imposed, as shown in Figure A. 1. One can assume a basic circular geometry can be distorted into an ovoid shape by displacing the original origin by some proportion (henceforth designated as the distortion coefficient, or, ξ_x) of the maximum cross-section height (d_v), i.e. a circular geometry distortion coefficient would be $\xi_x = 0.50$, and all others would fall between, $0 < \xi_x < 1$

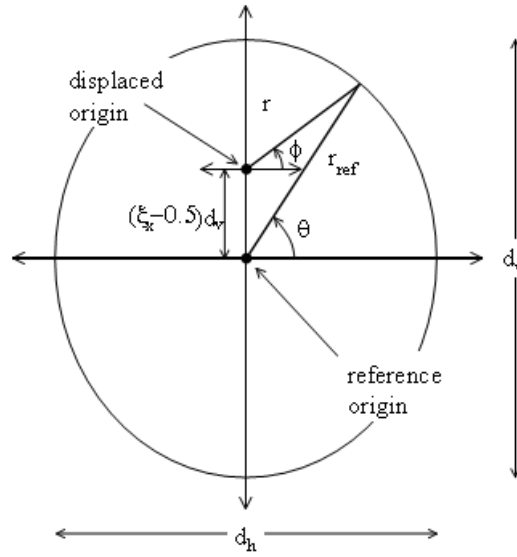


Figure A. 1. Geometrical definition of centre-fuselage cross-section.

The nose is modelled by

$$z(x) = \begin{cases} + \frac{d_v^{(1-\beta)}}{2} \left(\frac{x}{\varepsilon} \right)^\beta - (\varepsilon d_v - x) \tan \varphi & \forall x \text{ above body apex} \\ - \frac{d_v^{(1-\beta)}}{2} \left(\frac{x}{\varepsilon} \right)^\beta - (\varepsilon d_v - x) \tan \varphi & \forall x \text{ below body apex} \end{cases}$$

Figure A. 2 shows the nose of an aircraft. Each section is partitioned into two segments delineated by a sweep line (down-sweep denoted by φ) originating from the body apex or extremity to the fuselage centre-section vertical midpoint (at Fuselage Reference Plane or FRP). A supplementary parameter designated as the shield-sweep, ω , is also introduced and is essentially a measure of the angle of the body frontal face in the x-z plane. The convention discussed for the forward fuselage example is equally applicable for the aft fuselage body as well. Instead of down-sweep, generally an up-sweep would be considered, and the shield-sweep would be replaced by tail-sweep of the body lower portion, both measured anti-clockwise with respect to the FRP.

Forefuse_X_sect_vertical_diameter

Vertical diameter (in metres) of the first cross-section of the centre fuselage. It is represented in Figure A. 1 as d_v .

Forefuse_Xs_distortion_coefficient

Distortion coefficient of the first cross-section of the centre fuselage. It is represented in Figure A. 1 as ξ_x .

Forefuse_X_sect_horizontal_diameter

Horizontal diameter (in metres) of the first cross-section of the centre fuselage. It is represented in Figure A. 1 as d_h .

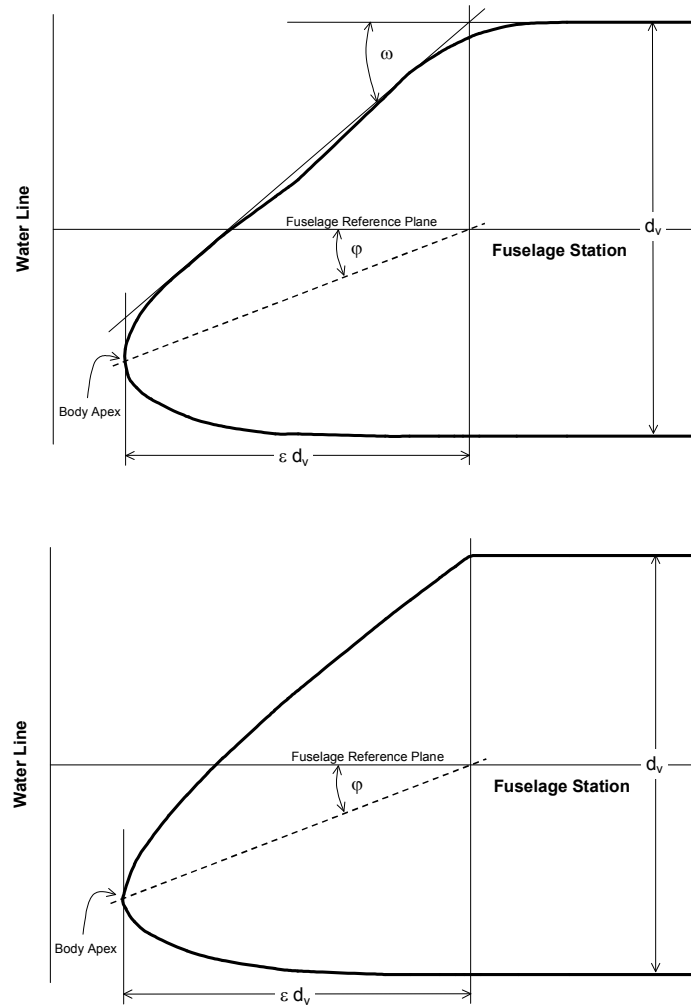


Figure A. 2. Comparison between Saab 2000 and Saab 340 actual (above) and modelled forward fuselage geometric definition.

omega_nose

Angle (in degrees) of the body frontal face in the x-z plane. It is represented in Figure A. 2 as ω . It can be negative.

phi_nose

Down-sweep angle (in degrees) originating from the body apex or extremity to the fuselage centre-section vertical midpoint. It is represented in Figure A. 2 as ϕ . It can be

negative. Notice that negative values indicate up-sweep, and 'omega_nose' should be negative too.

epsilon_nose

Nose length to diameter ratio. It is represented in Figure A. 2 as ϵ .

shift_fore

Vertical shift (in metres) of the forward centre fuselage water line compared to the aft fuselage water line (see Figure A. 3). It can be negative, which means that the forward fuselage is lower than the after fuselage.

fraction_fore

Forward centre-fuselage length divided by centre-fuselage length (see Figure A. 3).

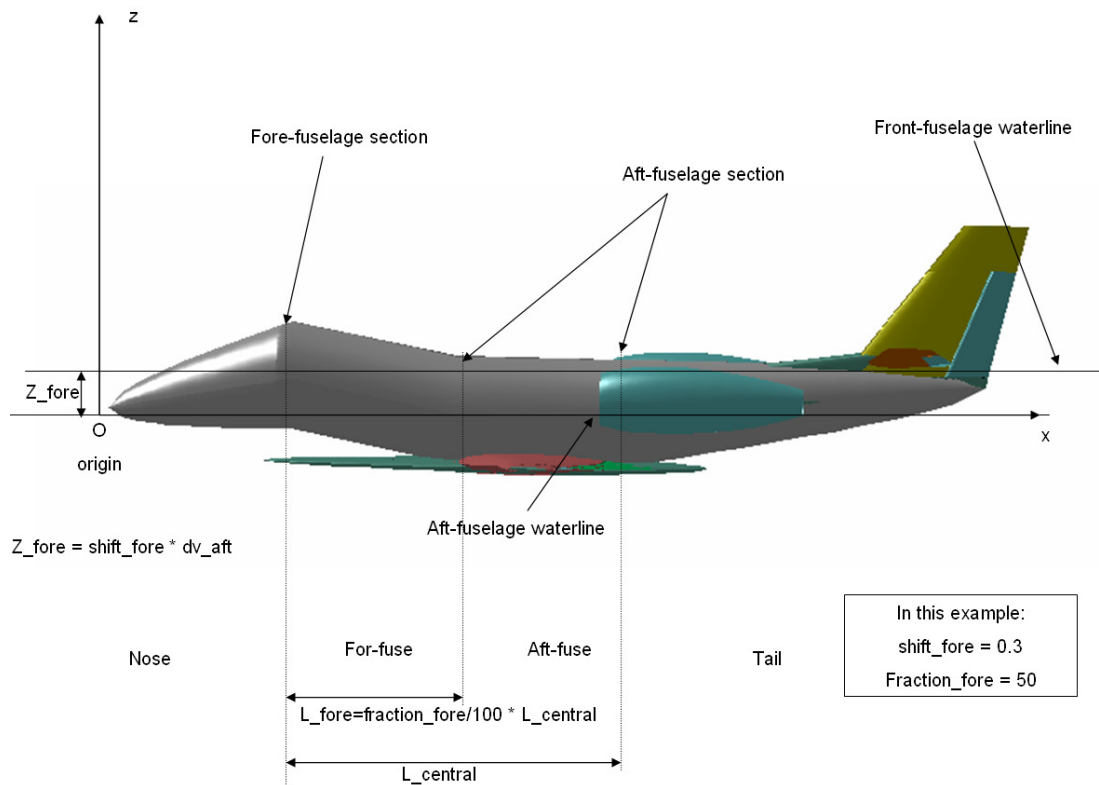


Figure A. 3. Illustration of some fuselage parameters.

Total_fuselage_length

Total fuselage length, in metres.

Aftfuse_X_sect_vertical_diameter

Vertical diameter (in metres) of the last cross-section of the centre fuselage. It is represented in Figure A. 1 as d_v .

Aftfuse_Xs_distortion_coefficient

Distortion coefficient of the last cross-section of the centre fuselage. It is represented in Figure A. 1 as ξ_x .

Aftfuse_X_sect_horizontal_diameter

Horizontal diameter (in metres) of the first cross-section of the centre fuselage. It is represented in Figure A. 1 as d_h .

omega_tail

Angle (in degrees) of the body rear face in the x-z plane. It can be negative.

phi_tail

Up-sweep angle (in degrees) originating from the body rear extremity to the fuselage centre-section vertical midpoint. It can be negative. Notice that negative values indicate down-sweep, and 'omega_tail' should be negative too.

epsilon_tail

Non-dimensional parameter used to define the aft fuselage length to diameter ratio.

Wing

The wing can have two kinks at the most (therefore it is divided in three different sections – inboard, midboard and outboard section, each of which can have different sweep angles and dihedral angles). Flaps, slats and ailerons can be defined. Some unconventional configurations are allowed.

configuration

This parameter is a selector for the wing configuration.

0=conventional configuration

1=oblique wing

2=left semi-wing only

-2=right semi-wing only

placement

Distance between the lowest cross-section point and the root chord leading edge divided by 'Aftfuse_X_sect_vertical_diameter' (see Fuselage parameters definition). It must be ranged between 0 and 1.

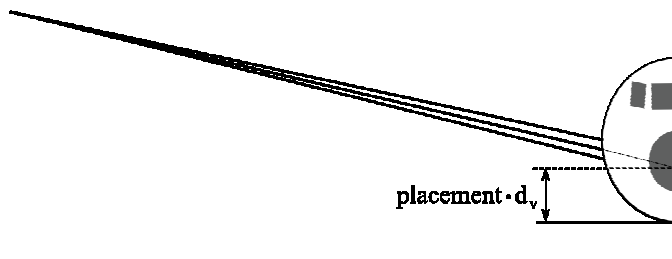


Figure A. 4. Front view of an aircraft. Definition of the wing placement.

apex_locale

Distance measured in the x-axis between the nose and the leading edge of the root chord, divided by the total fuselage length. Considering Figure A. 5, the apex locale is defined as:

$$apex_locale = \frac{x_{LE,ROOT}}{fuselage_length}$$

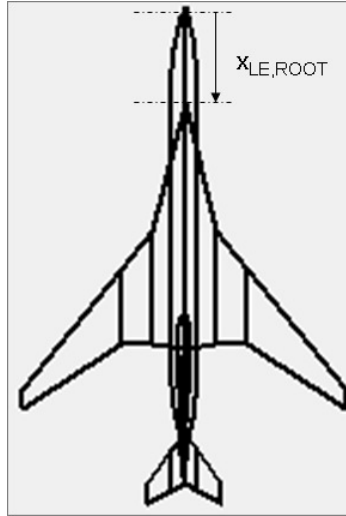


Figure A. 5. Wing apex locale definition.

area

Wing planform area, in square metres. It includes the wing area which is covered by the fuselage.

AR

Wing aspect ratio. If a value for 'Span' is provided, 'AR' should be set to zero and it will be automatically computed. It is calculated as:

$$AR = \frac{b^2}{S}$$

Where b is the wing span and S is the wing area.

Span

Wing span, in metres. If a value for 'AR' is provided, 'Span' should be set to zero and it will be automatically computed.

spanwise_kink1 & spanwise_kink2

Spanwise distance from the plane of symmetry ($y=0$) to kink 1 and kink 2, respectively, divided by the wing half span.

These two parameters are represented in Figure A. 6 as s_1 and s_2 , respectively.

taper_kink1, taper_kink2 & taper_tip

Chord at kink1, kink2 or tip, respectively, divided by root chord.

root_incidence, kink1_incidence, kink2_incidence & tip_incidence

Rotation angle (in degrees) around the leading edge of the airfoil located at the root, at kink1, at kink2 or at the tip, respectively.

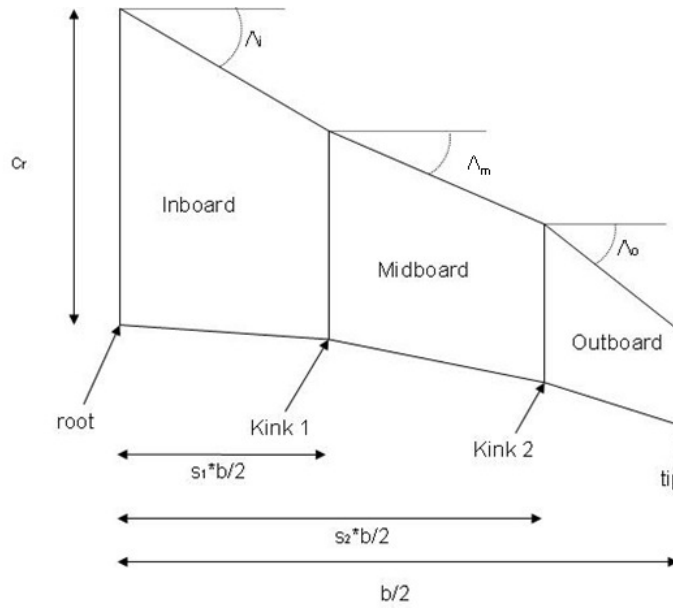


Figure A. 6. Wing planform geometry.

quarter_chord_sweep_inboard/midboard/outboard

Sweep angle (in degrees) of the quarter-chord line in inboard/midboard/outboard. They should be set to zero if LE_sweep_inboard/midboard/outboard values are provided and they will be automatically computed.

LE_sweep_inboard/midboard/outboard

Sweep angle (in degrees) of the leading edge line in inboard/midboard/outboard. They should be set to zero if quarter_chord_sweep_inboard/midboard/outboard values are provided and they will be automatically computed.

These parameters are represented in Figure A. 6 as Λ_i , Λ_m and Λ_o , respectively.

dihedral_inboard/midboard/outboard

Dihedral angle (in degrees) of inboard/midboard/outboard.

thickness_root/kink1/kink2/tip

Maximum thickness of the airfoil at the root, kink1, kink2 or tip, respectively, divided by the local chord.

winglet

Span

Winglet span divided by the wing tip chord. It must be positive (i.e. winglet just extends upwards).

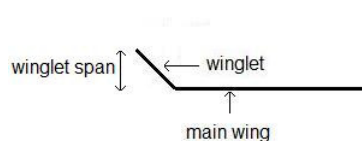


Figure A. 7. Winglet span.

taper_ratio

Winglet tip chord divided by winglet root chord.

LE_Sweep

Sweep angle (in degrees) of the winglet leading edge line.

Cant_angle

Cant angle (in degrees) of the winglet. It can be either positive or negative. The positive sign convention is shown in Figure A. 8.

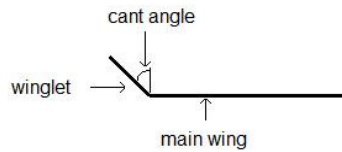


Figure A. 8. Winglet cant angle.

root_incidence

Rotation angle (in degrees) around the leading edge of the airfoil located at the winglet root.

tip_incidence

Rotation angle (in degrees) around the leading edge of the airfoil located at the winglet tip.

aileron**chord**

Aileron chord divided by the wing local chord.

Span

Aileron span divided by $(1-s_2)*b/2$ (see Figure A. 6).

position

The ailerons are always positioned in the outboard wing. This parameter is a selector for determining the position of the ailerons.

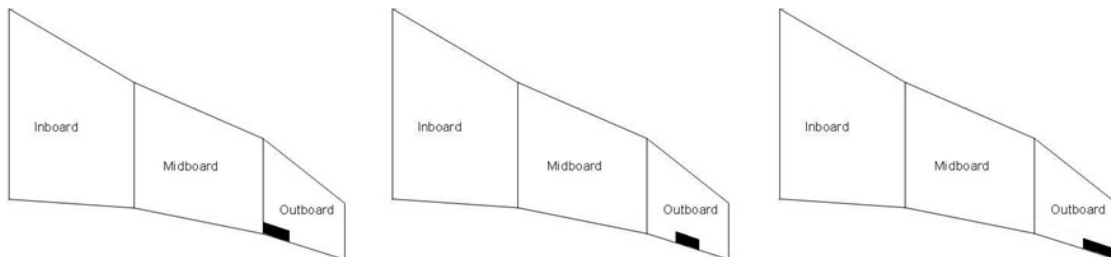


Figure A. 9. Aileron position=0 (left), position=1 (centre) or position=else (right).

flap

Flaps extend from plane of symmetry to kink 2.

root_chord

Flap root chord divided by wing root chord. Must be ranged between 0 and 1.

kink1_chord

Flap chord at kink 1 divided by wing chord at kink 1. Must be ranged between 0 and 1.

kink2_chord

Flap chord at kink 2 divided by wing chord at kink 2. Must be ranged between 0 and 1.

slat**chord**

Slat chord divided by wing local chord.

root_position

Spanwise distance between the plane of symmetry and the position where the slat begins, divided by the inboard semi-span. This parameter is represented in Figure A. 10 as p_1 , and must be ranged between 0 and 1.

tip_position

Spanwise distance between kink 2 and the position where the slat ends, divided by the outboard semi-span. This parameter is represented in Figure A. 10 as p_2 , and must be ranged between 0 and 1.

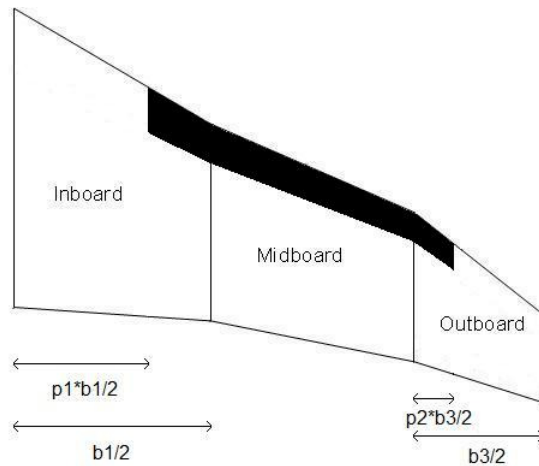


Figure A. 10. Slat geometry.

airfoil

Name of the airfoil. The airfoil must be included as a DAT file in the airfoil library (AMB/airfoil). In the XML file, it is defined by its name, followed by the extension “.dat”. For example:

```
<root_airfoil idx="1" type="char" size="11">N64A206.dat</root_airfoil>
```

Since the airfoil is defined as a string, the length of this string must be specified in the XML file. In the example above, the number 11 refers to the 11 characters in the string ‘N64A206.dat’.

Fairing

There is a propensity in the aircraft industry to incorporate conformal fuel tanks, i.e. more amorphous-looking tanks defined by tracing the wing-fuselage fairing geometry rather than installation of a series of box-like cells. For this reason, a relatively accurate geometric description of the fairing volume is required.

The wing-fuselage fairing is defined as a three segment body: a fore super-ellipsoid, a cylindrical midsection and an aft super-ellipsoid. The most general equation for a super-ellipsoid is:

$$\frac{(x - x_0)^{n_x}}{a^{n_x}} + \frac{(y - y_0)^{n_y}}{b^{n_y}} + \frac{(z - z_0)^{n_z}}{c^{n_z}} = 1$$

The super-ellipsoids generated in the fairing geometry have a common y and z exponent, henceforth simply designated as “n”. Besides, both the fore and aft super-ellipsoids share “nx” and “n” exponents.

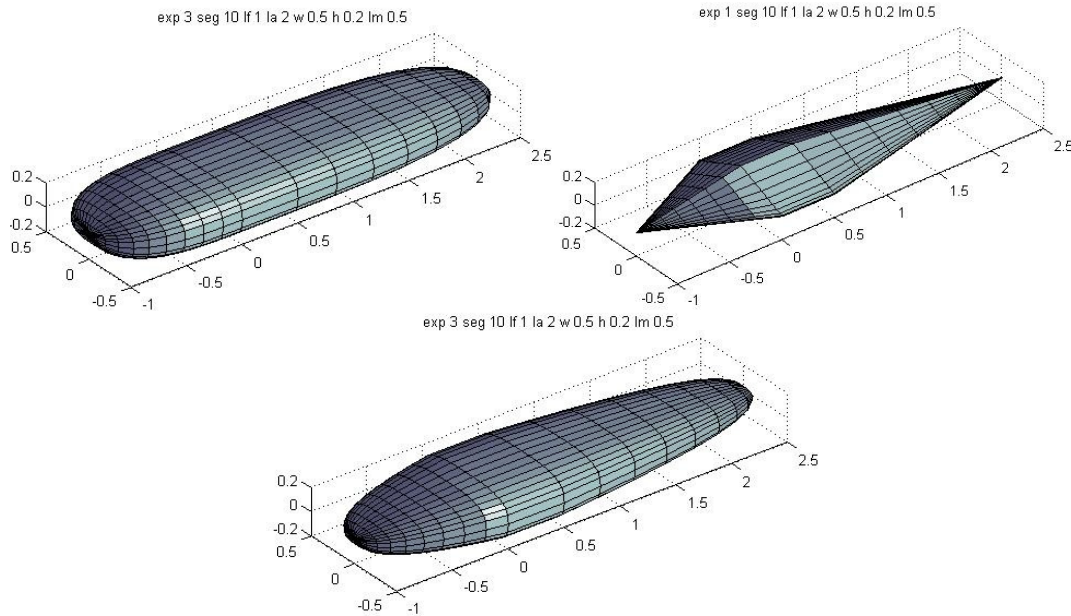


Figure A. 11. Super-ellipsoids. n=nx=3 (above, left), n=nx=1 (above, right) and n=3, nx=1 (below).

Attention is drawn to some particular cases:

1. n, nx ≥ 1. The body is convex (smooth if n, nx > 1 and sharp (polyhedral) if n=nx=1).
2. n=nx=2. This is the classic ellipsoid.
3. n=2, nx=1. This is a paraboloid.

Fore_length

Fore super-ellipsoid x-semi axis.

Aft_length

Aft super-ellipsoid x-semi axis.

Mid_length

Cylindrical midsection longitude.

Width

Fore and aft super-ellipsoid y-axis.

Height

Fore and aft super-ellipsoid z-axis.

n_exp

y and z exponent in the super-ellipsoid equation.

nx_exp

x exponent in the super-ellipsoid equation.

Horizontal tail

The horizontal tail geometric definition is similar to that of the wing, except that just one kink can be defined now. Most of the parameters have are the equivalent to those that have been previously defined for the wing.

empennage_layout

0: horizontal tail (HT) position independent from vertical tail (VT).

0<empennage_layout≤1: Cruciform tail (or T-tail if empennage_layout=1). The parameter represents the vertical distance from the VT root chord to the leading edge of the HT root chord, divided by the VT span. The leading edge of the HT root chord is positioned at 10% of the VT local chord.

area

Horizontal tail planform area, in square metres.

AR

Horizontal tail aspect ratio. If a value for 'Span' is provided, 'AR' should be set to zero and it will be automatically computed.

Span

Horizontal tail span, in metres. If a value for 'AR' is provided, 'Span' should be set to zero and it will be automatically computed.

spanwise_kink

Spanwise distance from the plane of symmetry ($y=0$) to kink, divided by the horizontal tail semi-span.

taper_kink

Chord at kink divided by root chord.

taper_tip

Tip chord divided by root chord.

root/kink/tip_incidence

Rotation angle (in degrees) around the leading edge of the airfoil located at the root, at the kink or at the tip, respectively.

quarter_chord_sweep_inboard/outboard

Sweep angle (in degrees) of the quarter-chord line in inboard/outboard. They should be set to zero if LE_sweep_inboard/outboard values are provided and they will be automatically computed.

LE_sweep_inboard/outboard

Sweep angle (in degrees) of the leading edge line in inboard/outboard. They should be set to zero if quarter_chord_sweep_inboard/outboard values are provided and they will be automatically computed.

dihedral_inboard/outboard

Dihedral angle (in degrees) of inboard/outboard.

vertical_locale

Vertical distance from the Fuselage Reference Plane (see Figure A. 2) to the leading edge of the horizontal tail root chord, divided by 'Aftfuse_X_sect_vertical_diameter' (see Fuselage parameters). It need not be defined if 'empennage_layout' is set to a value other than zero.

apex_locale

Distance measured in the x-axis from the nose to the leading edge of the horizontal tail root chord, divided by the total fuselage length. It need not be defined if 'empennage_layout' is set to a value other than zero.

thickness_root/kink/tip

Maximum thickness of the airfoil at the root, kink or tip, respectively, divided by the local chord.

Elevator

chord

Elevator chord divided by horizontal tail local chord.

Span

Elevator span divided by horizontal tail span.

airfoil

Name of the airfoil. The airfoil must be included as a DAT file in the airfoil library (AMB/airfoil). In the XML file, it is defined by its name, followed by the extension ".dat". For example:

```
<root_airfoil idx="1" type="char" size="11">N64A206.dat</root_airfoil>
```

Since the airfoil is defined as a string, the length of this string must be specified in the XML file. In the example above, the number 11 refers to the 11 characters in the string 'N64A206.dat'.

Vertical tail

area

Vertical tail planform area, in square metres.

AR

Vertical tail aspect ratio. If a value for 'Span' is provided, 'AR' should be set to zero and it will be automatically computed.

Span

Horizontal tail span, in metres. If a value for 'AR' is provided, 'Span' should be set to zero and it will be automatically computed.

spanwise_kink

Distance from the root chord to the kink position, divided by the vertical tail span.

taper_kink

Chord at kink divided by root chord.

taper_tip

Tip chord divided by root chord.

quarter_chord_sweep_inboard/outboard

Sweep angle (in degrees) of the quarter-chord line in inboard/outboard. They should be set to zero if LE_sweep_inboard/outboard values are provided and they will be automatically computed.

LE_sweep_inboard/outboard

Sweep angle (in degrees) of the leading edge line in inboard/outboard. They should be set to zero if quarter_chord_sweep_inboard/outboard values are provided and they will be automatically computed.

vertical_locale

Vertical distance from the Fuselage Reference Plane (see Figure A. 2) to the leading edge of the vertical tail root chord, divided by 'Aftfuse_X_sect_vertical_diameter' (see Fuselage parameters).

apex_locale

Distance measured in the x-axis from the nose to the leading edge of the vertical tail root chord, divided by the total fuselage length.

thickness_root/kink/tip

Maximum thickness of the airfoil at the root, kink or tip, respectively, divided by the local chord.

dihedral_inboard/outboard

Dihedral angle (in degrees) of inboard/outboard.

root/kink/tip_incidence

Rotation angle (in degrees) around the leading edge of the airfoil located at the root, at the kink or at the tip, respectively.

Rudder**chord**

Rudder chord divided by the vertical tail local chord.

Span

Rudder span divided by the vertical tail span.

airfoil

Name of the airfoil. The airfoil must be included as a DAT file in the airfoil library (AMB/airfoil). In the XML file, it is defined by its name, followed by the extension “.dat”. For example:

```
<root_airfoil idx="1" type="char" size="11">N64A206.dat</root_airfoil>
```

Since the airfoil is defined as a string, the length of this string must be specified in the XML file. In the example above, the number 11 refers to the 11 characters in the string ‘N64A206.dat’.

Ventral fin

The ventral fin has a series of parameters similar to those of the wing. Only one kink can be defined, thus the ventral fin is divided in two sections (inboard and outboard).

chord_fraction_at_midfuse

Ventral fin chord at the centre-fuselage line ($y=0$), divided by the total fuselage length.

Span

Ventral fin span divided by the main wing (i.e. Wing1) span.

spanwise_kink

Spanwise position of the kink divided by the ventral fin semi-span.

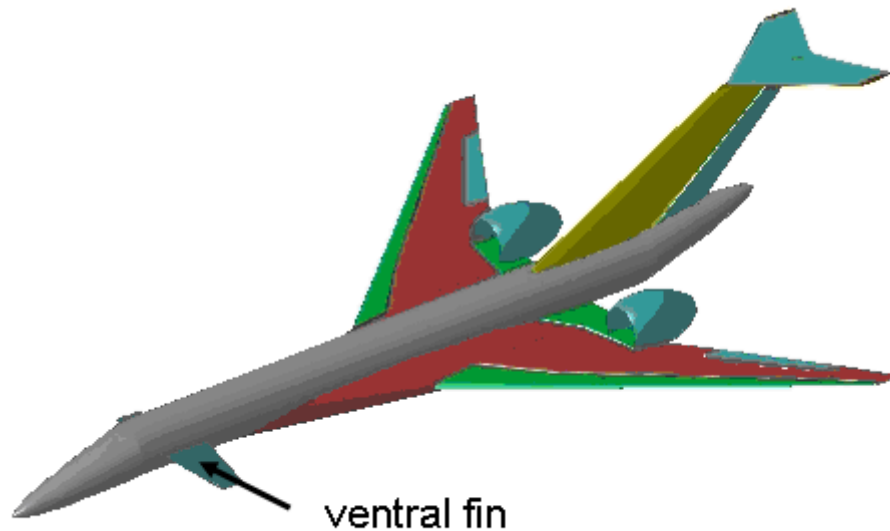


Figure A. 12. Example of an airplane with a ventral fin.

taper_kink

Chord at kink divided by root chord.

taper_tip

Chord at tip divided by root chord.

LE_sweep_inboard

Sweep angle (in degrees) of the leading edge line in the inboard section.

LE_sweep_outboard

Sweep angle (in degrees) of the leading edge line in the outboard section.

cant_inbord

Cant angle (in degrees) of the inboard section.

cant_outboard

Cant angle (in degrees) of the outboard section.

X_locale

Distance measured in the x-axis between the nose and the leading edge of the ventral fin root chord, divided by the total fuselage length.

Z_locale

Vertical location of the dorsal fin, divided by 'Aftfuse_X_sect_vertical_diameter' (see Fuselage parameters description).

Engines

Number_of_engines

Number of engines.

Layout_and_config

- 0 = slung in vicinity of the wing
- 1 = on-wing nacelle
- 2 = on-wing integrated with undercarriage
- 3 = aft-fuselage
- 4 = Straight duct
- 5 = S-duct

Propulsion_type

- 0 = turbofan
- 1 = turboprop tractor
- 2 = turboprop pusher
- 3 = propfan

Y_locale

Spanwise position of engines divided by half span.

X_locale

Longitudinal engine position, divided by the total fuselage length. Its value is only taken into account if 'Layout_and_config' is greater than two.

Z_locale

Vertical engine position, divided by 'Aftfuse_X_sect_vertical_diameter' (see Fuselage parameters). Its value is only taken into account if 'Layout_and_config' is greater than two.

toe_in

Nacelle tow-in angle, in degrees (see Figure A. 13). A negative value can be provided for tow-out angle (nacelle pointing outwards). The point around which rotation occurs is on the centreline in the front plane of the nacelle (centre symmetry of the front section).

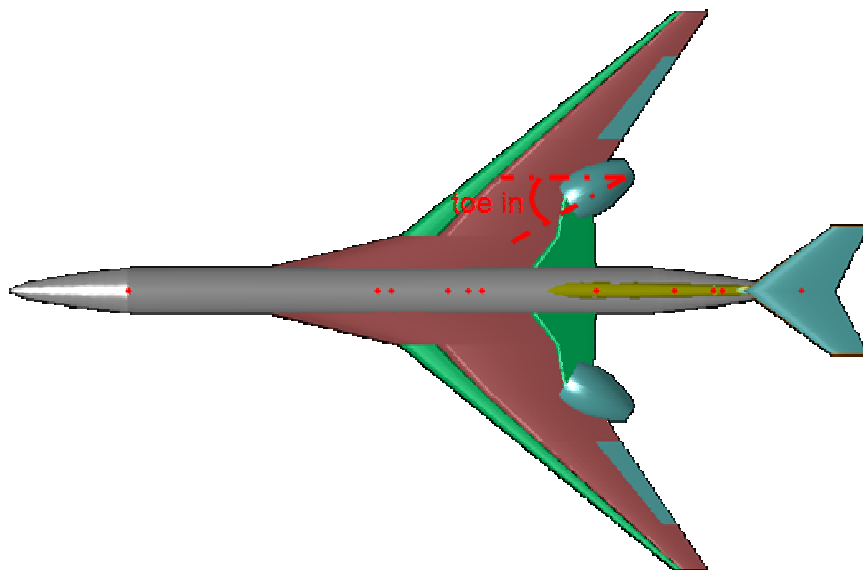


Figure A. 13. Nacelle tow-in angle.

pitch

Nacelle pitch angle, in degrees (see Figure A. 14). If positive, the nacelle is pointing upwards. The rotation point is the same as in the 'toe_in' parameter.

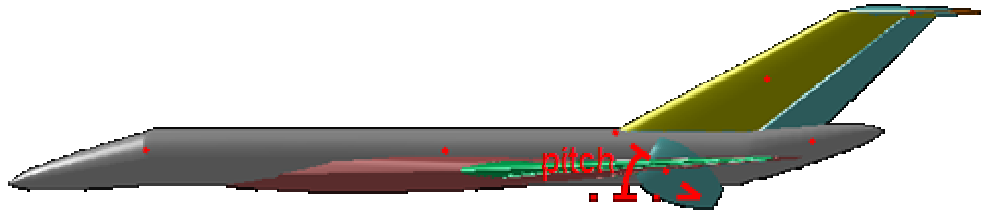


Figure A. 14. Nacelle pitch angle.

Nacelle_body_type

0 = short-ducted nacelle

1 = long-ducted nacelle

It will be automatically set to 1 if 'Propulsion_type' > 0.

fineness_ratio

Nacelle length divided by nacelle maximum diameter.

d_max

Nacelle maximum diameter, in metres. It will be automatically estimated if set to zero.

Propeller_diameter

Propeller diameter, in metres. It will be automatically estimated if set to zero (if the engine is a propeller).

Max_thrust

Maximum static thrust of one engine, in kN.

Bypass_ratio_to_emulate

Engine by-pass ratio.

Thrust_reverser_effectiveness

Reverse thrust divided by the maximum static thrust. A universally applicable estimate of $T_{\text{reverse}} / T_{\text{max}} = 0.30$ can be chosen for simplicity.

Thrust_to_weight_ratio

Thrust to weight ratio.

Fuel

Fore_wing_spar_loc_root

Fore_wing_spar_loc_kik1

Fore_wing_spar_loc_kin2

Fore_wing_spar_loc_tip
Aux_wing_spar_loc_root
Aft_wing_spar_loc_root
Aft_wing_spar_loc_kin1
Aft_wing_spar_loc_kin2
Aft_wing_spar_loc_tip

Wing_fuel_tank_cutout_opt

This parameter specifies the presence or absence of a structural cut-out in the wing tank volume due to the presence of a power-plant. An example of a cut-out is shown in Figure A. 15, taken from Isikveren's thesis [4].

0 = continuous wing fuel tank
1 = discontinuous wing fuel tank

Outboard_fuel_tank_span

Wing tank maximum span divided by wing semi span. It is set to 0.70 by default.

Unusable_fuel_option

Weight (in kilograms) of any trapped fuel that cannot for all intensive purposes be used for any operational performance. If set to zero, it will be automatically computed as 0.02 MFW (Maximum Fuel Weight). If it were under 30 kg, it will be automatically set to 30 kg.

Assumed_fuel_density

Fuel density, divided by reference water density (taken to be 1000 kg/ m³). If set to zero, it is automatically taken to be 0.802 by default.

Centre_tank_portion_used

Percentage of the span-wise distance from the plane of symmetry (y=0) to the fuselage-wing juncture which is used as centre fuel tank width in the wing. If equal to 100, the whole width of the fuselage-wing juncture is used as a centre tank.

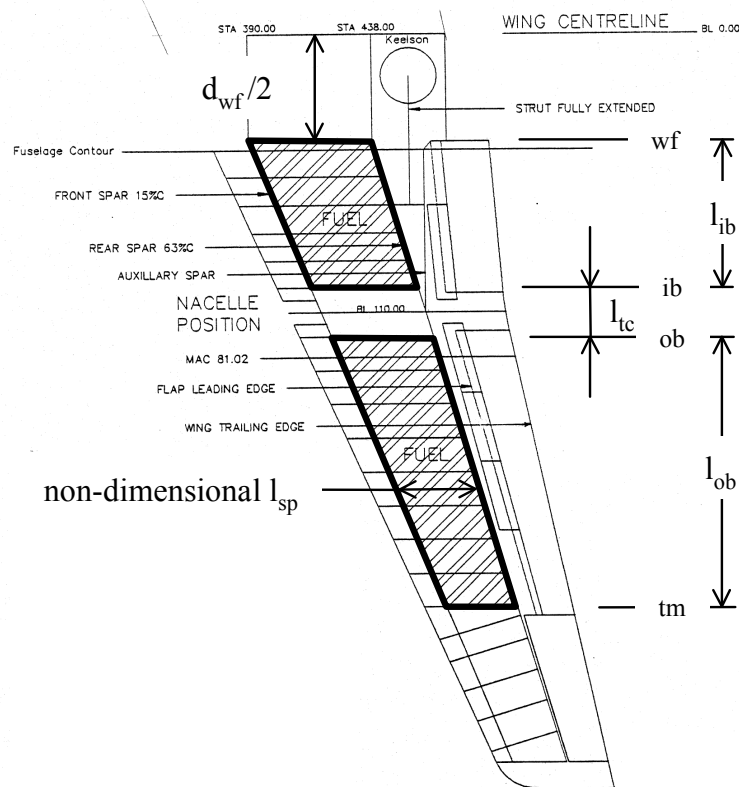


Figure A. 15. Example of wing fuel tank discontinuity.

Fore_fairing_tank_length & Aft_fairing_tank_length

The 'Fore_fairing_tank_length' is the fore part of the fairing which hosts the fuel tank, divided by the fairing 'Forward_chord_fraction'*(Wing_root_chord)/100

The 'Aft_fairing_tank_length' is the aft part of the fairing which does hosts the fuel tank, divided by the fairing 'Aft_chord_fraction'*(Wing_root_chord)/100

Aft_fuse_bladder_length

Length, in metres, of aft fuselage fuel tank.

Incr_weight_for_wing_tanks

In kilograms.

Increment_for_centre_tank

In kilograms

Increment_for_aux_tanks

In kilograms

Cabin

The cabin is modelled by the removal of a circular segment from the fuselage lower portion, as shown in Figure A. 16. The cross-section is assumed to be uniform.

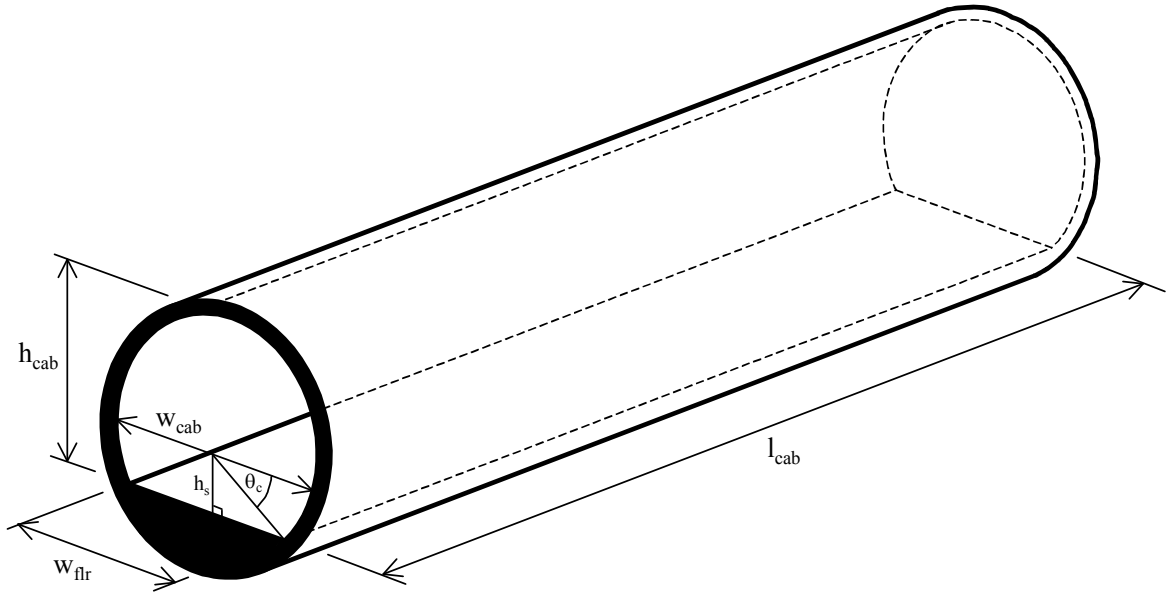


Figure A. 16. Primary working parameters required in estimating the cabin volume of both circular and ovoid cross-sections.

Cabin_length_to_aft_cab

Total cabin length, in metres. It is represented in Figure A. 16 as l_{cab} .

Cabin_max_internal_height

Maximum cabin height, in metres. It is represented in Figure A. 16 as h_{cab} .

Cabin_max_internal_width

Maximum cabin width, in metres. It is represented in Figure A. 16 as w_{cab} .

Cabin_floor_width

Cabin floor width, in metres. It is represented in Figure A. 16 as w_{flr} .

Cabin_volume

Cabin volume, in cubic metres. If it were set to zero, it will be automatically computed used the approximate formula:

$$V_{cab} = \frac{l_{cab}}{4} \left[w_{cab} (\pi h_{cab} + \theta_c w_{cab}) + h_s (2w_{flr} - \pi w_{cab}) \right]$$

Where

$$h_s \cong \frac{1}{2} \sqrt{w_{cab}^2 - w_{flr}^2}$$

and

$$\theta_c = \tan^{-1} \frac{2h_s}{w_{flr}}$$

Passenger_accomodation

Number of passengers.

Seats_abreast_in_fuselage

Number of seats per row.

Seat_pitch

Distance between rows, in metres.

Maximum_cabin_altitude

Maximum altitude allowed inside the cabin, in metres.

Cabin_attendant_number

Number of cabin attendants.

Flight_crew_number

Number of crew members.

Baggage**installation_type**

This is a parameter used for estimating other parameters that are unknown. If equal to zero, it means that the baggage is located in the aft. If other than zero, the baggage is located under the cabin floor.

gross_volume

Baggage gross volume, in cubic metres. If set to -1, CEASIOM automatically estimates both the baggage volume and the baggage length (even if the latter is set to a value other than zero). If set to 0, it is automatically estimated, as long as 'Baggage_combined_length' is greater than zero.

Baggage_combined_length

Baggage hold length, in metres. If set to zero, it is automatically estimated, as long as 'gross_volume' is greater than zero or -1.

Baggage_apex_per_fuselgt

Baggage distance (measured in the x-axis, from the aircraft nose) divided by the total fuselage length.

Miscellaneous**Design_classification**

It is a parameter that identifies the type of aircraft design. This is used in several estimations throughout CEASIOM.

<2: commercial transportation

=2: small business jet

>2: large business jet

Target_operating_ceiling

Target operating ceiling, in flight level (1 FL = 100 ft). Were it set to zero, it is automatically estimated by CEASIOM taking into account the design classification.

Spoiler_effectivity

Spoiler effectiveness, in percentage.

Undercarriage_layout

If it is greater than one, it introduces an additional correction due to an on-wing nacelle-undercarriage integration.

Weights & balance

Ramp_increment

Amount of fuel (in kilograms) consumed during taxiing and other ground operations prior to take-off.

Weight_cont_allow_perc_of_MEW

Maximum payload-MEW contingency allowance. Experience shows that the operational empty weight of an airplane increases about 5% from preliminary design to detailed design and flight testing. Hence, an inflated value of the maximum payload is standard practice. This is modelled by CEASIOM with this parameter. It is expressed in percentage of Green Manufacturer's Empty Weight.

Manufacturer_weights_tolerance

Weight tolerance, in kilograms, that is taken into account when calculating Green Manufacturer's Empty Weight.