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Aerodynamic centre of wing-fuselage-nacelle combinations: effect of wing-pylon mounted nacelles

**Associated software: ESDUpac A1309
See ESDU 13009**



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THE PREPARATION OF THIS DATA ITEM

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**AERODYNAMIC CENTRE OF WING-FUSELAGE-NACELLE COMBINATIONS:
EFFECT OF WING-PYLON MOUNTED NACELLES**

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AERODYNAMIC CENTRE OF WING-FUSELAGE-NACELLE COMBINATIONS: EFFECT OF WING-PYLON MOUNTED NACELLES

1. NOTATION AND UNITS (see Sketch 1.1)

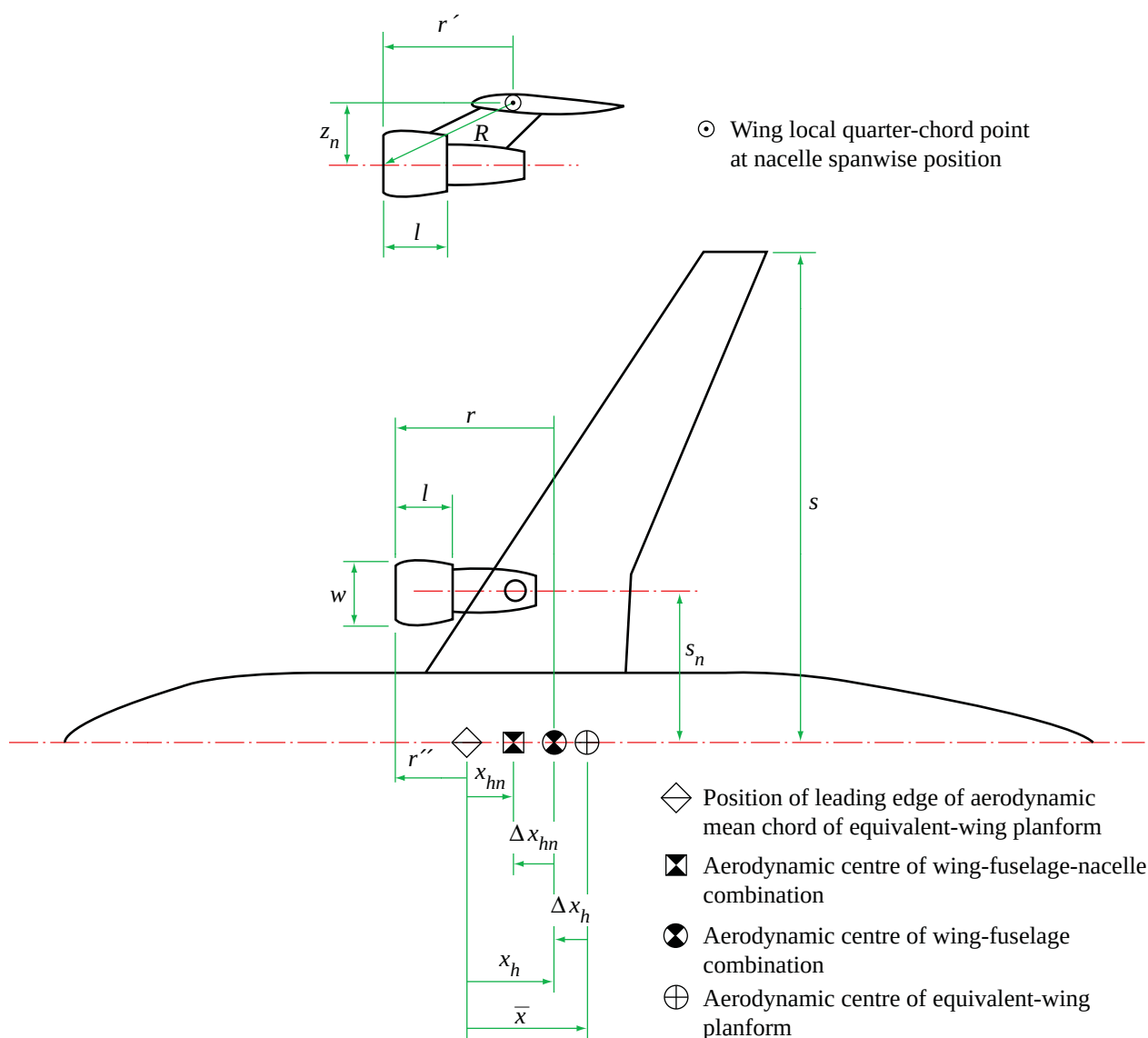
		<i>SI</i>	<i>British</i>
A	aspect ratio of equivalent-wing planform [*]		
a	lift-curve slope of equivalent-wing planform [*]	radian ⁻¹	radian ⁻¹
a_n	lift-curve slope of nacelle, based on area wl	radian ⁻¹	radian ⁻¹
$\bar{c}$	geometric mean chord of equivalent-wing planform [*]	m	ft
$\bar{\bar{c}}$	aerodynamic mean chord of equivalent-wing planform [*]	m	ft
c_{ref}	general reference chord for stability calculations	m	ft
l	length of nacelle forward cowl or overall length of single cowl nacelle	m	ft
M	Mach number		
R	distance of centre of nacelle inlet from wing local quarter-chord point, $(r'^2 + z_n^2)^{1/2}$	m	ft
r	chordwise distance of nacelle lip forward of aerodynamic centre of wing-fuselage combination	m	ft
r'	chordwise distance of nacelle lip forward of wing local quarter-chord point	m	ft
r''	chordwise distance of nacelle lip (or inlet) from leading edge of aerodynamic mean chord of equivalent wing planform, measured positive forward, see Sketch 1.1	m	ft
S	area of equivalent-wing planform [*]	m ²	ft ²
s	wing semi-span	m	ft
s_n	spanwise distance from fuselage centre-line to nacelle centre-line	m	ft
w	maximum spanwise width of nacelle	m	ft
$\bar{x}$	chordwise location of aerodynamic centre of equivalent-wing planform, measured positive aft from leading edge of aerodynamic mean chord of equivalent-wing planform [*]	m	ft
x_h	chordwise location of aerodynamic centre of wing-fuselage combination, measured positive aft from leading edge of aerodynamic mean chord of equivalent-wing planform [*]	m	ft

For footnote refer to end of Notation.

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Δx_h	forward shift in chordwise location of aerodynamic centre due to presence of fuselage*	m	ft
x_{hn}	chordwise location of aerodynamic centre of wing-fuselage-nacelle combination, measured positive aft from leading edge of aerodynamic mean chord of equivalent-wing planform	m	ft
Δx_{hn}	forward shift in chordwise location of aerodynamic centre due to presence of nacelles	m	ft
z_n	distance of centre of nacelle inlet below wing local quarter-chord point	m	ft
Λ_0	leading-edge sweep of equivalent-wing planform*	degree	degree

* See ESDU 76015 for definition of equivalent-wing planform and calculation of x_h and Δx_h .



Sketch 1.1

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