



## **ESDU TECHNICAL MEMORANDUM**

### **Effects of rear-mounted engine nacelles on sidewash at fin**

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## THE PREPARATION OF THIS TECHNICAL MEMORANDUM

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## EFFECTS OF REAR-MOUNTED ENGINE NACELLES ON SIDEWASH AT FIN

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## EFFECTS OF REAR-MOUNTED ENGINE NACELLES ON SIDEWASH AT FIN

### 1. NOTATION

|                                 |                                                                                                                                                                                              | <i>SI</i>        | <i>British</i>    |
|---------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|-------------------|
| $c_{rootF}$                     | fin root chord, chordwise distance between (extrapolated) swept leading and trailing edges of fin at height where fin half-chord sweep line intersects rear-body centre-line, see Sketch 2.1 | m                | ft                |
| $d_B$                           | maximum body diameter                                                                                                                                                                        | m                | ft                |
| $V$                             | velocity of undisturbed tunnel-stream, see Sketch 2.2                                                                                                                                        | $\text{ms}^{-1}$ | $\text{fts}^{-1}$ |
| $x_{exh}$                       | longitudinal position of engine exhaust, measured positive behind leading edge of fin root chord                                                                                             | m                | ft                |
| $z_{CLn}$                       | vertical position of engine nacelle centre-line, measured positive above parallel-body centre-line                                                                                           | m                | ft                |
| $\alpha$                        | aircraft angle-of-attack                                                                                                                                                                     | degree           | degree            |
| $\beta$                         | sideslip angle, see Sketch 2.2                                                                                                                                                               | rad              | rad               |
| $\delta_f$                      | flap angle                                                                                                                                                                                   | degree           | degree            |
| $\sigma$                        | sidewash angle, see Sketch 2.2                                                                                                                                                               | rad              | rad               |
| $\Delta \frac{d\sigma}{d\beta}$ | effect of rear-mounted engine nacelles on ratio of sidewash angle to sideslip angle, see Figure 1                                                                                            |                  |                   |