

Index

- access, 14, 15, 17, 44, 83, 125, 127
- aerobatic aircraft, 35
- aerodynamic prediction, 213
- aerofoil, 21, 62, 217–20
- afterburner, 40
- agricultural aircraft, 31, 33
- aileron, 96
- airbrake, 97
- air-conditioning, 18, 75
- aircraft cost
 - acquisition cost, 37, 109
 - direct operating cost, 24, 25, 115
 - indirect operating cost, 24, 115
 - life cycle cost, 37, 116
- aircraft data, 183–95
- aircraft design books, 129–35
- aircraft design data source, 1
- aircraft project problems, 163–73
- airworthiness, 4, 24, 71
- aisle, 14, 228
- aluminium alloy, 56
- angle of attack, 20, 39, 217
- approach speed, 217
- aspect ratio, 20, 21, 23
- ATE, 127
- atmospheric properties, 182
- auto-gyro, 54
- auto-pilot, 95, 96
- auxiliary power unit, 18, 73
- available seat miles, 7
- avionic system, 13, 89, 237
-
- BITE, 125
- bleed air, 73, 75
- bomb, 100
- braced wing, 28
- brake, 18, 97
- Breguet range, 215
- business aircraft, 28–30
- bypass engine, 65
-
- CAD, 141
- camber, 21
- canard/foreplane, 23, 39, 44, 98
- carbon fibre, 30, 57, 58
-
- cargo, 14, 27, 230
- ceiling, 253
- centre of gravity, 44, 70, 85
- centre of pressure, 61
- chord, 19, 20
- civil aircraft, 19, 24
- civil cargo aircraft, 31, 32, 175
- climb, 37, 214
- cockpit, 223, 228
- communication system, 89
- commuter aircraft, 28
- composite, 44
- conceptual design, 4, 5, 11, 136, 149, 153
- container, 31, 230
- control linkage, 98
- control surface, 96–8
- conversion table, 180
- cooling, 18, 44, 64, 75
- corrosion, 55, 57
- Cranfield aircraft design projects
 - A1 aerobatic aircraft, 35
 - A–82 short-range jet transport aircraft, 15
 - A–85 short-range transport aircraft, 64
 - A–88 STOL airliner, 10
 - A–90 short-haul 500 seat airliner, 153, 243
 - A–94 600 passenger long range airliner, 162
 - E–92 executive jet aircraft, 30
 - S–83 supersonic Naval V/STOL fighter, 37
 - S–87 close air support strike aircraft, 12
 - S–95 ASTOVL, 177
- cruise performance, 215, 248
-
- decision-making process, 151
- deep stall, 156
- defect, 119, 121
- delay rate, 158, 256
- delta planform, 23, 42
- design cruising speed, 15
- design process, 2, 4, 5
- detail design, 4, 140
- directional control, 51
- door, 14, 15, 18
- double-bubble fuselage, 154, 156
- drag coefficient, 21
- drag polar, 213

- drag, 19, 20
- ECM, 41
- economy, 24
- ejector seat, 83
- electric power system, 77
- elevator, 96
- emergency exit, 83
- empirical database, 10
- engine failure, 80, 246
- engine location
 - fuselage-buried, 68
 - fuselage-mounted, 71
 - wing-mounted, 71
- engine, 15, 18, 24, 63
- environmental control system, 75
- equivalent air speed, 183
- equivalent single wheel load, 86
- exhaust, 44, 70
- FAR, 15, 24
- fault tree analysis, 121
- feeder-liner, 28
- field performance, 213–17
- fighter, 37
 - all weather fighter, 40
 - bomber, 41
 - interceptor aircraft, 37
- fin, 23, 43
- flap, 21, 22, 26, 97
- flight control system, 96
- flight segment, 15
- floor, 49, 62
- flutter, 60
- FMA/FMEA, 121
- forward-swept wing, 39, 171
- freighter, 31
- fuel consumption, 15, 63, 64
- fuel tank, 62, 80, 81
- furnishing, 82
- fuselage cross-section, 27, 31, 32, 48
- fuselage, 24, 26, 27, 28, 44, 48, 62
- galley, 14, 230
- general arrangement, 11, 153
- geometric wing chord, 20
- global positioning by satellite, 93
- gross weight, 21
- ground attack aircraft, 45
- gun, 100
- gust load alleviation, 61, 100
- helicopter, 51, 52
- horizontal stabilizer, 23, 98
- hydraulic system, 18, 78, 80
- ice protection system, 75
- incidence angle, 20
- insurance, 24
- intake, 43, 69, 70
- interior design, 14, 223
- JAR, 24
- jet driven aircraft, 22
- laminar flow, 30
- landing distance, 216
- landing gear, 18, 56
 - data, 222
 - installation, 84
 - layout, 86
 - retraction, 88
- leading edge device, 21, 23, 26, 43, 75
- lift coefficient, 20, 22
- lift curve slope, 21, 23
- lift, 20, 50
- lift/drag ratio, 20, 21
- light aircraft, 35
- load factor, 13, 96
- load-carrying structure, 58
- longitudinal stability and control, 23, 39
- long-range aircraft, 26
- Mach drag rise, 21, 22, 23
- Mach number, 20, 26, 64–70, 183
- magnesium alloy, 57
- main gear, 85–87
- maintainability, 17, 99, 118, 255
- maintenance, 123–28
- manoeuvrability, 37, 97
- manoeuvre, 39, 40, 100, 215
- market survey, 7
- mass estimate, 149, 158
- mass-balancing, 23
- material, 55
- micro-light aircraft, 35
- military aircraft type, 37
- military cargo aircraft, 48
- military trainer aircraft, 46
- missed approach, 247
- missile, 103–107, 238
- mission radius, 12
- MTBF, 121
- narrow-body aircraft, 26, 184–86
- naval fighter, 40
- navigation, 18, 91
- noise, 15, 27, 53, 65
- nomenclature, 179
- nose gear, 18, 84, 87
- oxygen system, 75
- parametric design, 243–54
- passenger aircraft, 24
- payload range diagram, 11, 158
- payload, 15, 26
- pitch up, 23
- pitching moment, 21
- plastic, 57
- powerplant, 24
 - data, 196–212
 - installation, 43, 68

- preliminary design, 4, 5, 140
- pressure cabin, 62
- pressurization, 75
- propeller driven aircraft, 21
- propeller, 64, 68
- propulsion, 63
- propulsive efficiency, 69
- pylon, 56
- radar cross-section, 41, 42
- radar system, 94
- range, 215
- reconnaissance aircraft, 47
- reference, 258
- regional aircraft, 28, 190–2
- relaxed static stability, 99
- reliability, 17, 37, 118–23, 255
- requirement, 4, 7, 9, 11, 14
- rocket, 67, 103
- roll, 23, 98
- rotorcraft, 50
- rudder, 96
- runway, 15, 40, 86
- S/TOVL, 53, 117
- safety installation, 83
- safety, 24
- seat, 7, 8, 14, 82, 83, 228
- seat/range capability, 9
- secondary power system, 73
- short-range aircraft, 26
- sonic boom, 27, 168
- span, 19, 20
- specification, 4, 7, 9, 11, 12, 13
- spoiler, 97
- stability and control, 98
- stall, 21, 39
- stealth, 41–4
- steel, 56
- stiffness, 23, 55–8
- stringer, 61, 62
- structure, 55, 59
- strut, 58
- supercritical aerofoil, 26
- survivability, 45, 47
- sweep, 20, 22, 23, 26, 60, 171
- sweepback wing, 22, 60
- swept wing, 19, 23
- taileron, 98
- tailplane, 23, 98
- take-off distance, 213
- taper ratio, 20, 23
- test equipment, 125
- thickness/chord ratio, 21, 59, 60
- thrust, 18, 19
- thrust/weight ratio, 21, 37, 38, 40
- tilt-rotor aircraft, 53
- titanium, 50, 56, 57
- toilet/lavatory, 14, 230
- trailing edge device, 21, 26, 97
- trim tab, 96
- T-tail, 156
- turbofan engine, 28, 40, 65
- turbojet engine, 27, 65, 66
- turboprop engine, 28, 64
- twin-fuselage, 175
- twist, 60
- tyre, 86, 223–5
- undercarriage, 49, 62, 80
- V/STOL aircraft, 37
- vertical stabilizer, 23, 43
- vortex, 43, 49
- weapon bay, 44
- weapon, 13, 100, 237–42
- wide-body aircraft, 31, 187–9
- wing
 - geometry, 19, 20
 - planform, 23, 42
 - load, 59
- wing design, 22
- wing gross area, 20, 23
- wing loading, 21, 22, 23, 37, 38
- wing position, 43, 44, 49, 53
- wing-box, 61
- yaw, 23