

Index

A

ACARS 41

- bands and frequencies 45
- cockpit display 41
- message format 43
- messages 43
- OOOI 42
- system 42

ADF (Automatic Direction Finder) 81

- broadcast stations 85
- coastal effect 86
- compass card, fixed 81
- control-display, airline 84
- digital ADF receiver 85
- display, EFIS 86
- loop 82
- NDB station 83
- night effect 86
- quadrantal error 86
- receiver, airline LRU 84
- receiver, analog 82
- RMI (Radio Magnetic Indicator) 82
- sense 82
- system diagram 83

Aircraft earth station 35

Airways, lighted 11

altitude reporting: mode C 100

Antenna Installation 239

- ADF 246
- airline antenna locations 243
- altitude 244
- antenna types 240, 244
- antennas for light aircraft 242
- base station, mobile 252
- bonding 248
 - to airframe 249
- coaxial cable 250
- combination antenna 253
- connectors 251
- couplers 251
- doubler plate 247
- duplexers 251
- gaskets 250
- GPS antennas 251
- HF (high frequency) 245
- hidden structure 246
- high-performance antennas 239
- hostile environment 241
- location 245
- mark and drill 248
- mounting 249
- selecting an antenna 243
- spec sheet, how to read 241
- typical antennas 239
- VOR blade 245

ARINC 183

- structures 183

Aviation Bands and Frequencies 230

- control and display 236
- frequency assignments 237
- future bands 234
- ground wave transmission 238
- hertz to gigahertz 234
- high frequencies 233
- Higher bands 232
- L-band 234
- line-of-sight 235
- microwave 235
- Radio frequencies (RF) 230
- radio signal 230
- skipping through ionosphere 233
- vhf band 234

Avionics

- definition of 1

Avionics master switch 173

B

Barany chair 7

Beam steering unit (BSU) 35

Bell, Alexander Graham 9

Blind flying

- first flight 2

C

Calibration 264

Cell Phones 33

Channels

- splitting 16

Clear air turbulence (CAT) 136

CNS: Communication, Navigation, Surveillance 4

Cockpit Voice and Flight Data Recorders 129

- cable assembly 133
- cockpit area mike 130, 131
- CVR basics 129
- CVR channels 130
- Flight data recorder 133
 - parameters 135
 - solid state 134
- flight data recorders 131
- inertial switch 130
- interconnect, CVR 132
- LRU: line replaceable unit 130
- tape drive 132
- temperature test 130
- underwater locating device 131
 - tester 132

Connectors 199

- Amphenol 206
- application 201
- crimp tool 206
- crimping 202
- d-subminiature 206
- heat gun 207
- how to identify contacts 201
- Molex 206
- radio frequency 200
- reading pin connections 199
- releasing pins 207

- safety wiring 208
- solder cups 206
- soldering 202
- trends 202
- typical 200

Cooling 186

D

DME (Distance Measuring Equipment) 88

- airborne system diagram 91
- chanelling 88, 90
- EFIS display 90
- ground speed 88
- ground station 91
- jitter 89, 90
- obtaining distance 89
- pulse spacing 92
- reply frequencies 92
- scanning and agile 89
- slant range 89
- X and Y channels 92

E

EFIS: electronic flight instrument system 120

- Airbus A-320 127
- architecture 124
- electromechanical to EFIS 122
- flight deck 120
- glass cockpit 120
- MFD: multifunction display 125
- on B-747-400 126
- pictorial display 121
- replacing old instruments 121
- three-screen 123

Electrical Systems 168

- 115 volt system 170
- 28 volt DC 170
- AC and DC power 168
- APU (Auxiliary Power Unit) 170
- battery charge, percentage 168
- circuit breakers 173
 - recessed button 176
- DC system 169
- fuses 176
- ram air turbine (RATS) 172
- switches 172
 - avionics master 173
 - illighted pushbutton 175
 - pushbutton 174
 - switch guards 175
 - types 173

Electrostatic discharge 185

ELT 50

ELT (Emergency Locator Transmitter)

- 406 MHz ELT 51
- 406 system 53
- components 52
- controls and connections 54
- Cospas-Sarsat satellites 51, 55
- direction of flight 50
- dongle 54

- fleet operation 54
- ground stations 51
- Leosars, Geosars 52
- registration 53, 55

ELT (Emergency Locator Transmitter) 266
test in aircraft 266

G

Galileo 118

Glideslope 73

GPS/Satnav (Satellite Navigation) 108
clock 110
constellation 109
EGNOS 116
frequencies 110
Galileo 118
GNSS 111
LAAS: local area augmentation system 116
ground station 117
launch vehicle 109
LNAV-RNAV 116
LPV 116
multimode receiver 117
position finding 112
PPS: precise positioning service 112
PRN code 112
propagation corrections 112
RAIM: receiver autonomous integrity monitoring 117
SA: selective availability 111
satellite signal 113
satellite, typical 108
SBAS 116
second civil frequency 116
segments 114
space segment 109
SPS: standard positioning service 112
WAAS: wide area augmentation system 114
system 115

Ground earth station 34

H

Hertz, Heinrich 9

HF (High Frequency)
antenna coupler 27
antenna mounting 27
control panel 26
control-display 23
datalink 25, 26
LRU (line replaceable unit) 25
SSB (single sideband) 24
system diagram 24
transceiver 26

HSI (Horiz. Situation Indicator) 64

I

ILS (Instrument Landing System) 67
90 Hz, 150 Hz audio tones 71
approach lighting system 69
categories 68

Category I 69
Category II 69
Category III 69
compass locator 72
components 68
decision height 68
glideslope 70
glideslope indications 72
glideslope, pictorial 72
glideslope receiver 73
glideslope station 73
localizer 70
localizer array 70
localizer indications 71
marker beacon 72
marker beacon ground station 74
marker beacon receiver 74
RVR (Runway Visual Range) 68
system; pictorial view 68

Inmarsat Aero System 31

Instrument panel

first 2

interference 85

L

Lightning detection 140

Lindbergh, Charles 2

Low frequencies 232

M

Marconi, G 6

Marker beacon receiver 74

MLS: Microwave Landing System 76

- azimuth beam, diagram 77
- elevation antenna 78
- elevation beam 78
- multimode receiver 79
- space shuttle 76
- time reference scanning beam 79
- transmitting azimuth signal 77

Morse, Samuel 9

Mounting avionics 178

- airline mounting 191
- ARINC structures 183
- ATR case sizes (ARINC 404) 184
- avionics bay, corporate jet 182
- Case sizes, MCU (ARINC) 183
- cooling 186
 - airline 187
 - fans 187
- cutting holes 180
- electrostatic discharge 185
- indexing pins 193
- instruments 195
- instruments, airline 197
- integrated modular avionics (IMA) 194

- locking radios in racks 188
- locking systems, airline 192
- new or old installation 179
- panel-mounted radios 188
- rack, equipment cabinet 193
- radio stack 181

- releasing radio 188
- remote-mounting, corporate 190
- round instruments 196
- structures 181
- tray 190
- tray preparation 189

Multimode receiver 117

N

NDB (Non-Directional Beacon) 83

P

Panel labels and abbreviations 254

- abbreviations 256
- engraving 254
- preprinted 254
- silk screen 254
- tape 254
- terms on labels 254

Planning the Installation 154

- :"steam gauges" 155
- 4-inch EFIS 155
- basic T instrument layout 157
- connectors and pin numbers 162
- EFIS, turbine aircraft 158
- flat panel 159
- grounds 164
- installation drawings 161
- instruments and radios 156
- manuals and diagrams 161
- navcom connections, typical 166
- non-certified airplanes 154
- pin assignments 163
- schematic symbols 163
- schematics 162
- STC: Supplemental Type Certificate 154
- TC: Type Certificate 154
- type of flying 155
- typical avionics equipment 160
- viewing angle 165
- wiring diagram, reading 163

R

Radar Altimeter 104

- altitude trips 107
- antennas 105
- carrier wave 106
- components 105
- decision height 105
- display 104
- display, analog 107
- gear warning 107
- operation 106

Radio management system 21

RAIM: receiver autonomous integrity monitoring 117

RMI (Radio Magnetic Indicator) 64, 82

S

Satcom (Satellite Communications)

- aircraft earth station 30, 35
- antennas 30

- conformal 31, 37
- high gain 30, 31, 36
- intermediate gain 33
- low gain 30
- beam steering unit (BSU) 35
- data system 38
- ground earth station 29, 34
- Inmarsat 29
- Inmarsat Aero System 39
- radio frequency unit 35
- satellite data unit (SDU) 35
- space segment 32

Selcal

- airborne system 48
- codes 47, 48
- controller 46
- decoder 46
- ground network 47

silk screen 254

Sperry, Elmer 7

SSB (single sideband) 24

Swift64 33

T

TCAS (Traffic Alert Collision Avoidance System) 147

- basic operation 148
- components 151
- coordinating climb and descent 150
- directional interrogation 151
- non-TCAS airplanes 152
- RA: Resolution Advisory 150, 152
- Symbols on radar display 148
- TA: Threat Advisory 150, 152
- tau 149
- TCAS I, TCAS II 150
- TCAS III 152
- voice warnings 152
- whisper-shout 151

Terminals 219

- block 219
- ring 219

Test and Troubleshooting 261

- ADF antenna 262
- air data test set 265
- antennas 263
 - doubler 263
 - rf wattmeter 264
- audio quality 263
- automatic test station 265
- autopilot 264
 - cable tension 264
 - porpoising 264
- checklist 274
- coaxial cable 263
- com transceiver 264
 - no receive 264
 - no transmit 265
 - squelch 264
- enclosures 270
- fault detection device 271
- glideslope 269
- glideslope receiver 266

- ILS (Cat III) tester 267
- in-flight interference 263
- lightning strike 266
- loading software 267
 - dataloader 268
- navcom ramp tester 272
- P (precipitation) static 273
 - static wicks 273
- Portable maintenance aid 272
- reporting trouble 261
- RF signal generator 266
- selective call 262
- servo 263
- switchology 262
- TCAS ramp test 261
- technical terms 261
- transponder 267
- VOR checkpoint 268
- VOR receiver 268
 - course bends 269
- VOR test facility (VOT) 268
- VSWR 263
- wiring and connectors 270

Transponder 94

- aircraft address 98
- ATCRBS and Mode S 95
- code selection 101
- control-display 94
- control-display (airline) 98
- ID code 101
- interrogator, ground 95
- LRU (line replaceable unit) 98
- mode A interrogation 99
- mode C interrogation 99
- mode S 96
- mode S: all call 102
- mode S: interrogations and replies 102
- mode S: selective address 102
- panel-mounted 96
- reserved codes 101
- squawk 94
- System diagram 97

Turn and Bank 8

V

VDR: VHF Data Radio 16

VHF Com 16

- acceptable radios 17
- basic connections 18
- control panel 20
- line replaceable unit 20
- radio management system 21
- splitting channels 21
- system diagram 19

VOR 57

- course indicator 63
- coverage 58
- HSI (Horizontal Situation Indicator) 64
- Nav control-display 65
- navigation 63
- principles 59

- receiver diagram 62
- reference and variable phase 61
- RMI (Radio Magnetic Indicator) 64
- service volume 58
- signal components 59
- signal structure 60
- VOR-DME station 57

W

Weather detection 136

- clear air turbulence 136
- datalink 141, 145
- lightning detection 140
- sensors 138
- Stormscope 141, 143
- weather radar
 - color coding display 137
 - control panel 140
 - radome 142
 - receiver-transmitter 139
 - system components 139
 - thunderstorms 138, 139
- windshear 143
 - computer 144

Weather radar 137

- antenna 141

Wind shear 143

Wiring the Airplane 210

- Adel clamp 222
- bending coaxial cable 228
- chafing and abrasion 224
- clamping 223, 226
- conduit 225
- corrosive chemicals 225
- ducts 225
- electromagnetic interference 222
- grounding 227
- Harnessing 222
- high grade wire 213
- high risk area 211
- high temperature 225
- intervals 220
- lacing 223
- length 216
- marking 220
- methods 221
- moisture 225
- nicked and broken wires 217
- precut 217
- PVC 212
- selecting 213
- service loops 229
- splicing 217
 - knife 218
 - location of splices 218
- stranded vs. solid 216
- stripping 216
- SWAMP area 210
- tie wraps (cable ties) 223
- wire and cable types 215

Wright Brothers 1, 6