

Index

Numerics

- 2-D maps, 266–267
- 3-D Buildings layer (Google Earth), 279
- 3-D button (TopoFusion), 260
- 3-D maps
 - creating, 344
 - Terrain Navigator, 266–267
 - TopoFusion, 260–261
- 3-D version (OziExplorer), 287
- 3-D view (Google Earth), 276–277
- 3DEM (standalone software), 18
- 7.5 minute topographic maps, 24, 350
- 911 emergency call, 132

• A •

- accessories
 - altimeter, 70
 - electronic compass, 69
 - image viewers, 70, 119
 - MP3 players, 70
 - satellite radio receivers, 70
 - selecting, 90
 - software, 69
- accuracy of GPS receivers. *See also* errors
 - automotive GPS receivers, 124
 - cost and, 90
 - enhancing, 65–66
 - future improvements, 70–71
 - overview, 58–59
- Accutracking (cellphone-based tracking services), 147
- activities, matching GPS receivers with, 93–95
- address
 - book (automotive GPS receiver), 117
 - finding (Street Atlas USA), 243–245
 - geocoding, 230, 314
 - searches (street map Web sites), 316, 321
 - searches (TerraServer-USA), 330
- Adobe Photoshop (graphics program), 290
- Advanced searches (Street Atlas USA), 245
- Aerial Express (aerial photograph company), 47
- aerial photographs
 - changing resolution of, 332
 - geotagging, 150, 152
 - quality and resolution, 324
 - Street Atlas USA, 238
 - TerraServer-USA, 329, 332–333
 - TopoFusion, 263
- aeronautical charts
 - described, 27–28
 - Maptech MapServer, 334
 - symbols for, 42
 - types of, 28
- A-GPS (assisted GPS) cellphones, 132–133
- A-GPS chips, 132–133, 146
- AirPhotoUSA (aerial photograph company), 47
- AIS (Automatic Identification System), 150
- alarms (GPS receivers), 63
- almanac data, 56
- altimeter, 70
- ancestors, finding, 109
- Anderson, Howard (author), 291
- antennas
 - automotive GPS receivers, 125
 - external, 67
 - internal, 66
 - patch, 66–67, 104
 - quadrifilar helix (quad helix), 67, 104
 - reradiating, 67
- art, creating with tracks, 110
- assisted GPS (A-GPS) cellphones, 132–133
- astronomy program (Google Sky), 277
- athletes' handheld GPS receivers, 92–93
- atlas, 26
- atlas software, road, 18–19
- atomic clock, 54
- Autodesk (software company), 20

automatic cropping, 306
 Automatic Identification System (AIS), 150
 automotive GPS receivers. *See also* GPS receivers
 accuracy of, 124
 address book, 117
 broadcasting over the radio, 116
 connecting to computer, 119
 cost of, 124
 entertainment features, 118–119
 handheld GPS receiver used as, 89
 homework assignment, 129–130
 in-dash, 122–123
 mounting options, 125–127
 POIs (Points of Interest), 116–117
 portable, 121–122
 preferences, 118
 on the road, 127–128
 routing directions, 114–116
 with satellite radio receivers, 70
 screens, 117–118
 selecting, 123–125
 street maps, 114
 subscription services, 119–120
 theft prevention, 130
 trip log, 117
 updating maps and firmware, 128–129
 USB ports and memory cards, 119
 using, 125–130
 voice recognition feature, 120
 wireless connectively, 119
 AutoRoute (street mapping program), 82
 autorouting (PDA mapping software), 142
 AutoStitch (stitching software), 290
 aviation. *See also* aeronautical charts
 flight simulator (Google Earth), 275
 GPS receiver information, 95

• B •

Back Roads Explorer (topographic mapping software), 185, 268
 backpacking essentials, 160
 barometric pressure, 70
 basemap, 64
 battery charger, 99
 batteries
 alternatives to, 90
 battery drain, 99

comparisons, 97–99
 conserving, 83
 cost of, 99
 for GPS data loggers, 151
 GPS receiver cards using up, 141
 GPS receivers setting for, 107
 life gauge, 100
 NiMH (nickel metal-hydride), 98–100
 for PDA (Personal Digital Assistant), 137
 saver mode, 101
 selecting a receiver and, 90
 spares, carrying, 90, 100
 for waterproof GPS receiver, 359
 Web sites, 99
 Battleship Grid System, 30
 baud rate, 195–196, 203
 Bell, John (*Cockpit GPS*), 95
 Benchmark hunting (Web site), 178
 bitmap (.bmp) file format
 described, 310
 memory needed for, 290
 saving scanned map as, 289
 saving Web page map as, 303
 blog sites
 boating, 356
 Free Geography Tool, 344
 Google Earth, 271
 Google Maps Mania, 324
 GPS, 342
 MapQuest, 323
 Pano, 344
 BlueChart g2 (nautical charts), 214
 BlueChart (nautical charts), 214
 Bluetooth (wireless technology)
 cellphone and GPS, 133
 connection, 62
 described, 119
 future uses for, 71
 GPS receivers, 191
 interfacing PDA (Personal Digital Assistant) with GPS receiver, 141–142
 boating. *See also* nautical charts
 blog sites, 356
 boating-specific wikipedias, 357
 cruising routes, creating your own, 357
 Fishing Hot Spots Pro (mapping software), 219
 GPS coordinates reported as degrees and decimal minutes, 351

- GPS receiver water safety concerns, 358–359
 - hydrography (surface water measurements), 43
 - Inland Lakes (maps of fishing areas), 214
 - Mad Mariner (subscription-based Web site), 355
 - marine chart plotters, 355–356
 - marine charts, 26–27
 - marine electronics forums, 357
 - marine GPS and chart plotter manufacturers, 355–356
 - marine radios, 153–154
 - navigation software, 35, 352–355
 - radioing the Coast Guard, 356
 - tide and current software, free, 360
 - vessel trackers, 149–150
 - Borders and Labels layer (Google Earth), 279
 - Boston Whalers forum (Continuous Wave), 357
 - Braktron (manufacturer), 127
 - BrickHouse Security (GPS tracker supplier), 146
 - Broadcom (company), 62
 - Brown, Allan (*Web Cartography*), 312
 - BSB charts, 352
 - built-in maps, 63–64
 - bundled maps, 18–20
 - business and service searches (street map Web site), 316
 - Buxley's Geocaching Waypoint (Web site), 177
- C •
- cables, interface, 139, 190–192
 - cache. *See* geocaching
 - C/A-code (Coarse Acquisition), 55, 58
 - calibrating a map. *See also* coordinates; smart map
 - checking your work, 297
 - choosing calibration points, 292–293
 - creating a smart map, 290–291
 - with OziExplorer software, 291–292
 - setting calibration points, 294–296
 - California Bureau of Land Management, 36
 - campground locations (Street Atlas USA), 243
 - campgrounds, 243
 - Canada
 - creating maps of, 334–337
 - Toporama topographic maps, 334
 - car navigation system. *See* automotive GPS receivers
 - carrying case
 - for GPS receiver, 107, 142
 - for PDA (Personal Digital Assistant), 137
 - cartography, 12
 - CDs and DVDs
 - computer drives, 185–186
 - copying map data from CD/DVD to hard drive, 184
 - emulator software, 184
 - with GPS receiver map software and data, 209
 - writing (burning), 185
 - cellphone
 - assisted GPS (A-GPS) and, 132–133
 - Bluetooth cellphone and GPS, 133
 - cellphone-based GPS trackers, 146–147
 - dedicated GPS unit versus, 135
 - as GPS receiver, 131–132
 - Internet-enabled, 133
 - location-based services (LBS) for, 134–135
 - non-GPS navigation, 133
 - Census Bureau, U.S., 41–43
 - Centering (Street Atlas USA), 241
 - cGPSmapper (free maps), 213
 - channels (GPS receiver), 57
 - Character Map program, 309–311
 - Childs, John (*Digital Terrain Modeling Journal*), 344
 - chip technology advances, 62
 - chipset
 - described, 62
 - of expensive receivers, 90
 - cigarette lighter adapters, 100, 192
 - citation (map), 28
 - Citi Navigator (mapping software), 214
 - Clipboard, 302, 304
 - Coarse Acquisition (C/A-code), 55, 58
 - Coast Guard
 - contacting by radio, 356
 - DGPS signals, 66
 - DSC distress calls monitored by, 154
 - Cockpit GPS (Bell), 95

- collar (white space), 28, 290
- color
 - display screen, 62, 91
 - editing digital maps and, 307–308
 - overhead photographs, 329
 - printing maps in, 346
 - for scanning maps, 289
- COM ports, 194–196, 203, 205
- coming home (practice exercise), 108
- commercial DGPS (differential GPS)
 - services, 66
- commercial map data, 16
- commercial maps. *See also* GPS
 - manufacturer software
 - navigation software, 354–355
 - topographic map Web sites, 337–338
- commercial transportation GPS receiver
 - models, 57
- communication ports (computer), 188
- Communicator (utility program), 215
- compass
 - electronic, 69
 - handheld, magnetic, 69
 - learning to use, 74
 - waypoint, 81
- Compass Rose, 28, 241
- computer hardware. *See also* interfacing
 - GPS receiver with computer
 - CD and DVD drives, 185–186
 - communication ports, 188
 - graphics card, 186
 - hard drives, 184–185
 - Internet connection, 188
 - monitors, 186
 - need for, 15
 - printer, 186–187
 - processor requirements, 182–183
 - second internal or external hard drive, 185
 - storage capacity needs, 183–185
- Consolidated Space Operations Center (CSOC), 55
- consumer mapping software, 14–15
- consumer model GPS receivers, 57
- contact paper, 348
- Continuous Wave (Boston Whalers forum), 357
- contour interval, 24
- contour lines, 24
- Control Panel feature (Street Atlas USA), 239
- coordinate systems
 - GPS receivers using, 75
 - letter-and-number, 31
 - Maidenhead Locator System*, 37
 - overview, 30–31
 - specialized, 37, 75
 - Web sites, 38
- Coordinated Universal Time (UTC), 106
- coordinates. *See also* gazetteers; latitude and longitude; UTM (Universal Transverse Mercator); waypoints
 - converting, 75, 223–235
 - described, 28
 - GeoTrans program, 234–235
 - latitude and longitude, 31–34, 75
 - obtaining, 75, 225
 - online conversion utilities, 235
 - outside the USA, locating, 233
 - Township and Range, 35–38
 - UPS receiver settings, 106
- copyright information, 305
- Corel Paint Shop Pro (graphics program), 290
- Corrections button (Street Atlas USA), 244
- creating digital maps. *See also* editing
 - digital maps
 - calibrating the map, 290–296
 - checking your work, 297
 - My Maps feature (Google Maps), 324
 - saving as bitmap (.bmp), 289
 - scanning a paper map, 289–290
 - stitching and saving, 290
 - XMap Pro software for, 222–223
- cropping a digital map, 306–307
- CSOC (Consolidated Space Operations Center), 55
- current location (waypoint), 78
- customized maps
 - creating with OziExplorer, 285
 - Street Atlas USA, 238
 - street map Web sites lacking, 319
 - street navigation software features, 320
 - TerraServer-USA, 333–334

• D •

- The Dalles, Oregon
 planimetric map, 25
 topographic map, 24–25
- Dash Express (car navigation system), 71
- Dash Navigation (wireless company), 119
- data bits (COM port), 195–196
- data layers (Google Earth), 277–280
- data loggers, GPS, 150–152
- date and time (waypoint creation), 77
- datum
 default setting for GPS receivers, 107
 defined, 75
 importance of, 78
 matching map datum with GPS receiver datum, 77
 mixing, 30
 overview, 29–30
 setting GPS display format for, 76–77
- decimal degrees, 33, 76
- The Degree of Confluence Project (Web site), 178
- degrees and decimal minutes, 33, 76, 351
- degrees, minutes, and seconds, 32–34, 76
- DeLorme (manufacturer). *See also* Street Atlas USA (mapping software)
 about, 221
 downloadable maps, 222
 Earthmate GPS receiver, 62–63, 200, 250–251
 handheld GPS receivers of, 88–89
 mapping software, 221–223
 mouse GPS receiver of, 139, 221
 NetLink, 221–222
 Topo USA, 264–265
 Web site, 89, 223
 XMap Pro software, 222–223
- Deluo (manufacturer)
 GPS receiver cards, 141
 mouse GPS receiver vendor, 139
- DEM (Digital Elevation Model), 44–45
- DeMers, Mike (*GIS For Dummies*), 20
- Department of Defense (DoD), 234
- Department of Homeland Security, 37
- DePriest, Dale (writer), 145
- Descartes, René (mathematician), 31
- desktop mapping guidance, Web site, 344
- DGPS (differential GPS), 66
- differential GPS (DGPS), 66
- Digital Elevation Model (DEM), 44–45
- Digital Globe (satellite imagery provider), 48
- Digital Grove (Web site), 344
- Digital Line Graph (DLG) data, 43–44
- digital map data. *See also* vector maps
 Digital Line Graph (DLG) data, 43–44
 Digital Orthophoto Quadrangle (DOQ), 46–47
 Digital Raster Graphics (DRG) data, 45–46, 292
 elevation data, 44–45
 international, 42
 NAVTEQ and TeleAtlas, 320
 providers, 41
 satellite data, 47–48
 TIGER (Topologically Integrated Geographic Encoding and Referencing), 41–43
- digital maps. *See also* aeronautical charts;
 digital map data; nautical charts
 advantages/disadvantages, 12, 15
 built-in, 63–64
 cartographer's terms, 28
 datum displayed on, 29–30, 75
 described, 1, 11
 land maps, 24–26
 map projections, figuring out, 29
 paper maps versus, 208
 planimetric, 25–26
 saving on computer, 302–305
 scale of, 38–40
 smart map, 12–13, 286, 290–291
 software bundled with, 18–20
 static, 12
 types of, 23–24
- Digital Orthophoto Quadrangle (DOQ), 46–47
- Digital Raster Graphics (DRG) data, 45–46, 292
- Digital Select Calling (DSC) radios, 153–154
- Digital Terrain Modeling Journal* (Childs), 344
- Dillon Falls, Oregon
 latitude and longitude, 34
 Township and Range coordinates, 38
 UTM coordinates, 35
- Dilution of Precision (DOP), 104
- directional arrow (waypoint), 81

- directions, getting (Street Atlas USA), 248
 - Discovery Motorcoach Owners Association (Web site), 243
 - display screen
 - automotive GPS receivers, 117–118
 - brightness, 118
 - cleaning smudges from, 118
 - color, 62, 91
 - handheld GPS receivers, 64, 90–91
 - map display, 81, 90
 - monochrome, 62, 96
 - no screen, 62–63
 - PDA (Personal Digital Assistant), 136
 - pixel resolutions for, 63
 - scratches, preventing, 107
 - setting the format, 76–77
 - size and readability, 64, 90, 118
 - touch, 91, 117
 - distance
 - measuring (Google Earth), 282–283
 - practice exercise, 108–109
 - rulers on map showing, 297
 - DjVu (digital document format), 46
 - DLG (Digital Line Graph) data, 43–44
 - DoD (Department of Defense), 234
 - dog tracking system (Garmin Astro Dog), 148
 - do-it-yourself maps, 213, 285
 - DOP (Dilution of Precision), 104
 - Doppler shift principle, 52, 56
 - DOQ (Digital Orthophoto Quadrangle), 46–47
 - Double Data Rate (DDR) memory chips, 183
 - dpi (dots per inch), 289
 - Dragging (Street Atlas USA), 241
 - DrawPlus 4 (graphics program), 306
 - DRG (Digital Raster Graphics) data, 45–46, 292
 - driving information (street map Web sites), 317
 - DSC (Digital Select Calling) radios, 153–154
 - DSC distress calls, 154
 - DVDs and CDs
 - computer drives, 185–186
 - copying map data from CD/DVD to hard drive, 184
 - emulator software, 184
 - with GPS receiver map software and data, 209
 - writing (burning), 185
- E •
- EarthCache (Web site), 178
 - Earthmate GPS receiver, 62–63, 200, 250–251
 - EarthNC Plus (nautical chart overlay), 358
 - EarthNC Raster (nautical chart overlay), 358
 - EasyGPS (utility program), 201–202
 - editing digital maps. *See also* creating digital maps; saving digital maps
 - colors and fonts, 307–308
 - copyrights, 305
 - creating maps for the Web, 312
 - cropping, 306–307
 - file format, selecting, 310–311
 - free graphics programs for, 306
 - last-minute changes, 290
 - opening a file, 305–306
 - symbols, adding, 308–310
 - editor software, 17
 - electronic compass, 69
 - Electronic Navigational Charts (ENCs), 352–354
 - elevation data, 44–45
 - Elevation (GNIS data), 226
 - elevation profiles, charting (TopoFusion), 261–262
 - Ellison, Ben (magazine writer), 356
 - emergency call, 911, 132
 - emergency distress devices, 149
 - ENCs (Electronic Navigational Charts), 352–354
 - entertainment features (automotive GPS receivers), 118–119
 - EPE (Estimated Position Error), 104, 166
 - ephemeris/ephemerides, 55, 61
 - equator, 31
 - Equipped to Survive (Web site), 149

errors. *See also* accuracy of GPS receivers
 Estimated Position Error (EPE), 104, 166
 not matching map datum with GPS
 receiver datum, 77
 sources of GPS errors, 61
 in street maps, 317

ESRI (Environmental Systems Research Institute), 20

Estimated Position Error (EPE), 104, 166

etiquette, geocaching, 176

Europe, creating maps of, 334–337

EVE (graphics program), 306

EXIF (Exchangeable Image File Format), 152

external controls, 91

external storage
 manufacturer data cards, 68
 memory cards, 68
 selecting a receiver and, 90

eye altitude, 273

● **F** ●

FAA (Federal Aviation Administration), 28, 41, 65

Family Radio Service (FRS), 153

Federal Aviation Administration (FAA), 28, 41, 65

file format
 bitmap (.bmp), 289–290, 303, 310
 choosing, 310–311
 GeoTIFF, 13, 223, 290
 GIF, 302–303, 311
 Google Earth, 281–282
 GPX, 282, 335
 JPG, 289–290, 302–303, 311
 KML (Keyhole Markup Language), 281
 KMZ, 281
 Map file (.map), 291–292
 MrSID, 46, 223
 PNG, 290, 302, 311

Find tab (Street Atlas USA), 243–245

firmware (software)
 defined, 203
 updating for automotive GPS receivers, 128–129
 updating for GPS receiver, 203–205

Fisher Space Pen, 347

Fishing Hot Spots Pro (mapping software), 219

flight simulator (Google Earth), 275

flow control (COM port), 195–196

FM frequency, finding, 116

fonts
 editing digital maps, 307–308
 using a symbol from, 309

Forestpal.com, 344

Free Geography Tool (blog), 344

FreedomMaps (software), 219

FRS (Family Radio Service), 153

FUGAWI
 Global Navigator, 144, 298
 navigation software, 354

Furuno (navigation software), 354

future of GPS, 70–71

● **G** ●

G7ToWin (utility program), 201–202

Galileo GPS program, 71

Gallery layer (Google Earth), 279

games (automotive GPS receiver), 119

Garmin (manufacturer)
 about, 212
 Astro Dog (pet tracking system), 148
 automotive GPS receivers of, 123
 FRS radios, 153
 handheld GPS receivers of, 88–89
 map products, 214–215
 MapSource Map Viewer (Web site), 215
 MapSource (software), 212–213, 215
 memory card charts, 356
 Mobile PC (mapping software), 252
 mouse GPS receiver, 139
 sports GPS receiver, 92
 uploading programs to receiver, 64
 utility software, 215–217
 Web site, 89, 212, 252

Garmin Mobile (location-based service), 134

gazetteers. *See also* coordinates
 defined, 26, 225
 Global Gazetteer, 233
 GNIS (Geographic Names Information System), 226–229
 GNS (GEONet Name Server), 229–233
 World Gazetteer, 233

- genealogy, 109
- geocaching
 - basic gear needed for, 158–160
 - best time of day to place, 105
 - cache location, 158
 - cellphone, 159
 - clothes and footwear, 159
 - daypack, 159
 - digital camera, 159
 - DNF (Did Not Find), 168, 170
 - etiquette, 176
 - extreme, 175
 - finding a cache, 163–169
 - flashlight, 159
 - food and water, 159
 - geocaching alias, 158
 - GPS receiver for, 158
 - hiding a cache, 170–177
 - hints, encoded, 167
 - history of, 155–156
 - Internet resources, 176–178
 - items needed for, 157–160
 - leaving something in the cache (swags), 158–159
 - lingo, 169–170
 - location for placing a cache, 172–173
 - logbook, 168, 173–174
 - maintaining the cache, 175–176
 - map and compass, 158
 - microcache, 167
 - safety-related items, 159
 - sample cache, 157
 - selecting a cache to look for, 160–163
 - selecting a container, 171
 - stocking the cache, 173–174
 - submitting the cache, 174
 - treasures, 168, 174
 - walking stick/trekking pole, 159
- Geocaching For Dummies* (Wiley Publishing), 155
- Geocaching.com, 156, 160, 171–172, 174, 177–178, 342
- geocoding (geotagging)
 - address, 230, 314
 - aerial photographs, 150, 152
 - described, 110, 152, 230
 - services, Web-based, 230
 - street addresses, 230, 314
- Geodashing (Web site), 178
- Geographer's Craft Web site, 38
- Geographic Information System (GIS)
 - software
 - commercial, 20
 - consumer mapping programs versus, 14–15
 - cost of, 15
 - described, 14
 - states, counties and cities (divisions), 41
 - Web sites, 15, 20
- Geographic Names Information System (GNIS)
 - basic search for a feature, 226–228
 - described, 226
 - Feature Name link, 228
 - naming a land feature, 229
 - search page, 226
 - Web site, 226
- Geographic Web layer (Google Earth), 279
- GEONet Name Server (GNS)
 - advanced searches, 231–232
 - basic search, performing, 230–231
 - described, 229–230
 - search page, 231
 - user interface, 233
 - Web site, 229
- georeferenced (registered) map, 18, 223, 288, 292. *See also* calibrating a map
- geotagging (geocoding)
 - address, 230, 314
 - aerial photographs, 150, 152
 - described, 110, 152, 230
 - services, Web-based, 230
 - street addresses, 230, 314
- GeoTIFF file format, 13, 223, 290
- GeoTrans (coordinate converter software), 234–235
- getting started with a handheld GPS
 - receiver, 107–110. *See also* handheld GPS receivers
- GIF file format, 302–303, 311
- GIMP (graphics program), 306
- GIS For Dummies* (DeMers), 20

- GIS (Geographic Information System)
 - software
 - commercial, 20
 - consumer mapping programs versus, 14–15
 - cost of, 15
 - described, 14
 - states, counties and cities (divisions), 41
 - Web sites, 15, 20
- GIS Lounge (Web site), 20
- Global Awareness layer (Google Earth), 279
- Global Gazetteer (Web site), 233
- Global Pet Finder (pet tracking system), 148
- Global Positioning System (GPS). *See also* GPS receivers
 - described, 51
 - future improvements, 70–71
 - ground stations, 55–56
 - history of, 52
 - monopoly, 71
 - radio signals, 55
 - satellites, 53–54
 - Web sites, ten great, 341–344
- GlobalSat (manufacturer), 141
- GLONASS (Global Orbiting Navigation Satellite System), 71
- GNIS (Geographic Names Information System)
 - basic search for a feature, 226–228
 - described, 226
 - Feature Name link, 226
 - naming a land feature, 229
 - search page, 226
 - Web site, 226
- GNS (GEONet Name Server)
 - advanced searches, 231–232
 - basic search, performing, 230–231
 - described, 229–230
 - search page, 231
 - user interface, 233
 - Web site, 229
- Google Earth Blog, 271
- Google Earth Plus, 271
- Google Earth Pro, 271
- Google Earth (virtual globe program)
 - color overhead photos from, 329
 - commercial versions, 271
 - data layers, 277–280
 - date of satellite photo, 274
 - distances, measuring, 282–283
 - dragging, 274
 - file formats, 281–282
 - finding places, 274–276
 - flight simulator, 275
 - Fly To tab, 274
 - forums, 281
 - free version, 271
 - fuzzy/blurred out images, 276
 - GPS receiver interfacing with, 271
 - Keyboard arrows, 274
 - layers, turning on and off, 280
 - Mouse scroll wheel, 274
 - moving around, 274
 - nautical chart overlays for, 358
 - navigation controls, 272
 - overview, 20, 270–271
 - Panorama layers, 278
 - placemarks, adding, 280–282
 - Places of Interest layer, 278–279
 - Ruler tool, 282
 - satellite image resolution, 273
 - satellite images, not real time, 271
 - Scale Legend, 282
 - shadows, showing, 274
 - Smoots measurement type, 282
 - 3-D view, 276–277
 - user community, 281
 - user guide, online, 282
 - View menu, 282
 - View orientation navigation control, 274
 - Web site, 271
 - Wikipedia layer, 278
 - zooming in and out, 272–274
- Google Maps Mania (blog), 324
- Google Maps Mobile (Web site), 133
- Google Maps (street map Web site), 21, 324
- Google Ocean (oceanography program), 277
- Google Ride Finder, 324
- Google Sky (astronomy program), 277
- Google Street View, 324
- Google Transit, 324
- Gookin, Dan (*PCs For Dummies*), 194
- GooPS (Web site), 271
- GPS Babel (utility program), 202
- GPS chip, 145
- GPS data loggers, 150–152
- GPS Data Manager (utility software), 220

- GPS Drawing (Web site), 178
- GPS (Global Positioning System). *See also*
 - GPS receivers
 - described, 51
 - future improvements, 70–71
 - ground stations, 55–56
 - history of, 52
 - monopoly, 71
 - radio signals, 55
 - satellites, 53–54
 - Web sites, ten great, 341–344
 - GPS manufacturer software. *See also* software
 - compatibility issues, 208
 - DeLorme software, 221–223
 - downloading waypoints, routes, tracks
 - from GPS receiver, 209
 - features, 209
 - Garmin, 212–217
 - loading maps to GPS receiver, 210–212
 - Lowrance, 219–220
 - Magellan, 217–218
 - obtaining GPS maps, 209–210
 - overview, 207–208
 - POIs (Points of Interest), viewing, 209
 - reviews Web site, 208
 - rules for, 208
 - software and map piracy, 212
 - storing maps, 208
 - updating maps, 211
 - uploadable map, 64
 - uploading maps to GPS receiver, 209
 - uploading waypoints, routes, and tracks
 - to GPS receiver, 209
 - GPS receiver cards, 140–141
 - GPS receivers. *See also* automotive GPS receivers; handheld GPS receivers; interfacing GPS receiver with computer
 - accessory hardware, 69–70
 - accessory software, 69
 - accuracy of, 58–59, 61, 65–66
 - alarms, 63
 - antennas, 66–67
 - built-in maps, 63–64
 - cellphone as, 131–133
 - channels, 57
 - chipset, 62
 - commercial transportation models, 57
 - consumer models, 57
 - data exchanged between, 86
 - datum format, setting, 76–77
 - display, 62–63
 - errors, source of, 61
 - external storage, 68
 - firmware, uploading and updating, 203–205
 - information provided by, 59–60
 - internal storage, 67–68
 - knowing how to use, 96
 - language setting, 107
 - loading maps to, 210–212
 - mapping capabilities, 92
 - mapping models, 57, 81, 90
 - marine chart plotters, 355–356
 - memory needs, 90
 - metric system used by, 34
 - MOB (Man Overboard) function, 79
 - overview, 1–2, 61
 - paper maps used in conjunction with, 74–75
 - PDA (Personal Digital Assistant)
 - interfacing with, 138–142
 - satellite data received by, 56
 - sports GPS receiver, 92
 - survey models, 57
 - U.S. military/government models, 57
 - user interfaces, 68, 91
 - water safety concerns, 358–359
 - waterproof carrying case for, 142
 - waterproof GPS receivers, 95
 - waypoints, routes, and tracks,
 - uploading, 209
 - waypoints, setting, 77–81
 - Web site resources, 145
 - wrist, 92–93
 - GPS trackers
 - cellphone-based, 146–147
 - cost of, 146–147, 149
 - dedicated, 146
 - described, 145
 - for people, 146–147
 - for pets, 148–149
 - for vehicles and vessels, 149–150
 - GPS TrackMaker (utility program), 202
 - GPS Tuner (Pocket PC mapping program), 144
 - GPS Utility (utility program), 202

- GPS Visualizer (topographic map Web site), 334–337
- GPSTabel utility (software), 86
- GPSInformation.net, 341
- GPSLodge.com, 342
- GPStmapper, 64
- GPSNavX (manufacturer), 354
- GpsPasSion (Web site), 145
- GPSreview.net, 342
- GPSTracklog.typepad.com, 342
- GPSy (utility program), 202
- GPX file format, 282, 335
- GPX (*GPS Exchange*) software, 86
- gpxchange.com, 335
- GPXtoUSR (utility software), 220
- Graphical Locator (gazetteer/coordinate utility converter), 233
- graphics card (computer), 186
- graphics programs
- Adobe Photoshop, 290
 - Corel Paint Shop Pro, 290
 - DrawPlus 4, 306
 - free, 306
 - Microsoft Paint, 290, 306
 - OpenOffice-Draw, 306
 - Paint accessory program, 305
 - Paint.NET, 306
- Greenwich meridian (prime meridian), 106
- grids
- Battleship Grid System, 30
 - Military Grid Reference System (MGRS), 37
 - overlay on map, 297
 - overlay grids and rulers, free, 31
 - proprietary, 37
 - United States National Grid (USNG), 37
- ground stations, 55–56
- guides
- Google Earth, 282
 - quick-start, 96
 - Street Atlas USA, 239
 - The Thomas Guides* (map books), 37
 - TopoFusion, 263
 - Web Style Guide: Basic Design Principles for Creating Web Sites* (Lynch and Horton), 312
 - Gustafson, D. L. (Graphical Locator creator), 233
- H •
- Haicom (manufacturer)
- GPS receiver cards, 141
 - mouse GPS receiver from, 139
- ham radios, 153
- handheld GPS receivers. *See also* GPS receivers; interfacing GPS receiver with computer
- accessories, 90
 - accuracy of, 90
 - for athletes, 92–93
 - as automotive navigation system, 89
 - battery basics, 97–99
 - battery life gauges, 100
 - battery saver mode, 101
 - cigarette lighter adapters for, 100
 - computer interface, 91
 - cost of, 89–90
 - display screen, 90–91
 - external controls, 91
 - firmware, uploading and updating, 203–205
 - glitches in new models, 91
 - indoor use, 109
 - initializing, 102–105
 - interfacing PDA (Personal Digital Assistant) with, 138–139
 - learning to use, 95–97
 - map, with or without, 92
 - matching your activities with, 93–95
 - memory for, 90
 - mounting options, 91
 - new models, 91, 95–96
 - reviews, online, 95
 - screen size, 64
 - selecting, 88–95
 - settings, changing, 105–107
 - simple exercises for, 107–110
 - simulators, 109–111
 - solar power for, 100–101
 - upgrades for, 96
 - USB-compatible, 196–197
 - user interface, 68
 - user manual, 89, 96–97, 105
 - water safety for, 95, 358–359
 - weight and size, 91

hard drive (computer), 184–185
 heads-up display (waypoint), 81
 heart-rate monitors, 92
 help file (Street Atlas USA), 239
 help information, online street maps, 322
 Hey, What's That? (topographic map Web site), 336
 history
 geocaching, 155–156
 Global Positioning System (GPS), 52
 Holux (manufacturer), 139, 141
 Horton, Sarah (*Web Style Guide: Basic Design Principles for Creating Web Sites*), 312
 how far, how fast? (practice exercise), 108–109
 The Hull Truth (boating forum), 357
 hydrography (surface water measurements), 43

• I •

icon or symbol (waypoint), 77
 IFR (Instrument Flight Rules) Enroute, 28
 iGage (manufacturer), 347
 image viewer, 70, 119
 in-dash navigators (automotive GPS receivers), 122–123
 Info tab (Street Atlas USA), 242
 initializing your receiver, 102–105
 Inland Lakes (maps of fishing areas), 214
 interfacing GPS receiver with computer.
 See also computer hardware; GPS receivers; handheld GPS receivers
 cables for, 191–192
 communication protocols, 193, 203
 memory cards, 190–191, 198–200
 overview, 189–190
 process for, 190–191
 selecting a GPS receiver and, 91
 serial ports, 193–196
 software for, 200–201
 troubleshooting, 202–203
 types of data transferred, 190
 uploading/updating GPS receiver firmware, 203–205
 USB ports, 196–197
 utility programs, 201–202

interfacing PDA with GPS receiver
 Bluetooth GPS receivers, 141–142
 GPS receiver cards, 140–141
 handheld GPS receiver, 138–139
 mouse GPS receiver, 139–140
 PDA mapping software, 142–145
 International Date Line, 31
 international maps, 319
 Internet resources. *See* Web sites
 ionosphere conditions, 61
 IrfanView (standalone viewer), 46

• J •

James, Peter (marine electrician), 356
 Jefferson, Thomas (U.S. President), 36
 Jeppesen (flight-planning software company), 28
 JPG file format, 289–290, 302–303, 311

• K •

KML (Keyhole Markup Language) file format, 281
 KMZ (file format), 281
 known location (waypoint), 78
 Kraak, Menno-Jan (*Web Cartography*), 312

• L •

La Pine, Oregon, 293–295
 LakeMaster Pro (software), 219
 lamination, 348
 land maps
 planimetric, 25–26
 topographic, 24–26
 landmarks. *See* waypoints
 language setting (GPS receivers), 107
 latitude and longitude. *See also*
 coordinates; geocoding (geotagging)
 conversion utilities, 235
 converting coordinates, 33
 defined, 31
 GPS display formats, 32–34, 76–77
 locating, 225, 233
 storing on digital photos, 152
 written as decimal degrees, 33, 76

- written as degrees and decimal minutes, 33, 76, 351
 - written as degrees, minutes, and seconds, 32–34, 76
 - layers of data (Google Earth), 277–280
 - leg (route), 81
 - legend (map), 28
 - lingo for geocaching, 169–170
 - Live Search Maps (street map Web site), 325–326
 - LizardTech (company), 46
 - location coordinates. *See also* gazetteers; latitude and longitude; UTM (Universal Transverse Mercator); waypoints
 - converting, 75, 223–235
 - described, 28
 - GeoTrans program, 234–235
 - latitude and longitude, 31–34, 75
 - obtaining, 75, 225
 - online conversion utilities, 235
 - outside the USA, locating, 233
 - Township and Range, 35–38
 - UPS receiver settings, 106
 - location-based services (LBS), 134–135
 - logbook
 - geocaching, 168, 173–174
 - GPS data loggers, 150–152
 - tracks/trails, 83–84
 - trip log, 117
 - LORAN (Long Range Aid to Navigation), 52
 - lossless compression algorithm, 46
 - Lowrance (manufacturer)
 - about, 219
 - DSC radios, handheld, 154
 - GPS utility programs, 220
 - iFINDER and SD memory card, 198
 - mapping software, 219–220
 - marine chart plotters, 355
 - receiver simulators of, 110–111
 - receivers of, 88–89
 - Web site, 89, 110–111
 - Lynch, Patrick (*Web Style Guide: Basic Design Principles for Creating Web Sites*), 312
- M •
- Mad Mariner (subscription-based Web site), 355
 - Magellan (manufacturer)
 - about, 217
 - automotive GPS receivers of, 123
 - do-it-yourself maps, 218
 - handheld GPS receivers of, 88–89
 - map products, 218
 - National Geographic TOPO!, 19, 218, 267–268
 - VantagePoint, 217
 - Web site, 89, 217
 - Magellan Triton GPS receiver, 218
 - magnetic compass, 166
 - magnetic declination, 25–26
 - magnetic north versus true north, 25
 - mAh (milliampere-hours), 99
 - Maidenhead Locator System* (coordinate system), 37
 - Main Map (Street Atlas USA), 239
 - manufacturer mapping programs. *See* GPS manufacturer software
 - Map and Compass for Firefighters* (NFES 2554), 74
 - Map Content and Design for the Web* (Canadian government), 312
 - Map file (.map), 291–292
 - Map Legend (Street Atlas USA), 242
 - Map Maker *Gratis* (desktop mapping program), 305
 - Map Reading and Land Navigation* (FM 3-25.26), 74
 - Map Seal*, 348
 - MapCard (commercial map Web site), 338
 - MapCreate (software), 219–220
 - MapInfo (GIS software company), 20
 - MapMaker (desktop mapping program), 305
 - mapped area, 28, 348–349
 - mapping software. *See also specific software*
 - with bundled maps, 18–20
 - consumer programs, 14–15
 - GIS (Geographic Information System), 14–15
 - piracy, 212
 - standalone programs, 16–18
 - 3DEN (mapping software), 18

- mapping/resource model GPS receivers, 57
- MapQuest Find Me (cellphone-based tracking services), 147
- MapQuest (street map Web site), 322–323
- MapSelect (Web site), 220
- maps.google.com (Web-hosted mapping service), 21
- MapSource (software), 212–213, 215
- MapSource U.S. TOPO 24K (mapping software), 215
- MapSource U.S. TOPO (mapping software), 214–215
- Mapsymbols.com, 309
- Maptech (manufacturer)
 - MapServer, 334
 - navigation software, 354
 - Pocket Navigator, 144, 267
 - Terrain Navigator, 19, 266–267
 - Terrain Navigator Pro, 267
- Mapwel (free maps), 213
- marine chart plotters, 355–356
- marine charts. *See* nautical charts
- marine radios, 153–154
- marks. *See* waypoints
- mash-up, 324
- master ground station, 55
- mat mounts, 127
- maximum number of track points (GPS data loggers), 151
- memory card reader, 199
- memory cards
 - automotive GPS receivers using, 119
 - chart plotters use charts preloaded on, 356
 - GPS receiver using, 90, 190–191, 198–200
 - maps preinstalled on, 209–210
 - microSD, 198–199
 - MultiMediaCard (MMC), 68
 - PDA (Personal Digital Assistant) with, 136, 140
 - storage capacity, 68
 - transferring GPS data with, 190
 - Web sites, 68
- meridians and baselines (Township and Range coordinate system), 36
- metric system, 34
- MetroGuide (mapping software), 214
- MGRS (Military Grid Reference System), 37
- microcache, 167
- Microsoft. *See also* Windows (Microsoft)
 - Live Search Maps, 325–326
 - Paint graphics program, 290, 306
 - Streets & Trips, 251–252
 - Virtual Earth, 283, 325
 - Web site, 252
- Military Grid Reference System (MGRS), 37
- milliampere-hours (mAh), 99
- mini-laptop interface (Street Atlas USA), 238
- Minnesota LakeMaster (fishing maps), 214
- Mio (manufacturer), 123–124
- Moagu (free maps), 213
- MOB (Man Overboard) function, 79
- Mobile Mapquest, 323
- monitor
 - computer, 186
 - heart rate, 92
- monopoly on GPS technology, 71
- Montana State Library Web site, 33, 75
- More layer (Google Earth), 279
- Morris, Scott (TopoFusion designer), 253
- Motion Based Web site, 92
- Mount Si, Washington, 330–331
- Mount St. Helens, Washington, 17
- mounting options
 - automotive GPS receivers, 125–127
 - handheld GPS receivers, 91
- mouse GPS receivers
 - described, 138
 - display screen, 62
 - interfacing PDA (Personal Digital Assistant) with, 139–140
 - vendors, 139
- moving around (Street Atlas USA), 241
- moving-map software (OziExplorer), 286, 288
- MP3 players, 70, 119
- MrSID (Multi-Resolution Seamless Image Database), 46, 223
- MultiMediaCard (MMC), memory card, 68
- MWSnap (screen capture program), 304, 305
- MyTopo (commercial map Web site), 338

• **N** •

- NACO (National Aeronautical Charting Office), 28, 41
- NAD 27 (North American Datum of 1927), 77
- naming a land feature, 229
- National Aeronautical Charting Office (NACO), 28, 41
- National Elevation Dataset (NED), 44
- National Geographic
Back Roads Explorer, 185, 268
TOPO! mapping software, 19, 218, 267–268
waterproof paper from, 347
- National Geospatial-Intelligence Agency (NGA), 41, 48
- National Oceanic and Atmospheric Administration (NOAA), 26, 41, 352
- nautical charts. *See also* boating;
navigation software
described, 26–27
downloading free, 352
Maptech MapServer, 334
marine chart plotters, 355–356
overlays for Google Earth, 358
Pocket Navigator, 267
Raster Navigation Charts (RNCs), 352
symbols for, 42
- NauticPath (software), 219–220
- Navicache.com, 177
- Navigadget.com, 342
- navigation software. *See also* boating;
nautical charts
commercial, 354–355
described, 35
free, 353–354
reviews Web site, 355
- Navigon (receiver manufacturer), 123–124
- Navionics products, 220
- Navizon location program for Apple iPhone, 133
- Navonics (memory card charts companies), 356
- NAVSTAR Global Positioning System, 52, 54, 58
- NAVTEQ (Navigation Technologies), 41, 129, 320
- neatline (map), 28
- NED (National Elevation Dataset), 44
- NetLink, 221–222
- Newman, Des (OziExplorer creator), 285
- newsgroup, 99, 341–342, 357
- NGA (National Geospatial-Intelligence Agency), 41, 48
- NiMH (nickel metal-hydride) batteries, 98–100. *See also* batteries
- 911 emergency call, 132
- NMEA 1973 standard protocol, 193
- NMEA (National Marine Electronics Association) protocol, 193
- NOAA (National Oceanic and Atmospheric Administration), 26, 41, 352
- Nobeltec (navigation software), 354
- North American Datum of 1927 (NAD 27), 77
- north, magnetic versus true, 25
- Northern Hemisphere, 31
- nRoute (utility program), 216
- Nuclear DETonation (NUDET) sensors, 54

• **O** •

- oceanography software (Google Ocean), 277
- Octave controls (Street Atlas USA), 240–241
- Olympic National Park, Washington State, 255–256
- opacity, 336
- Open Street Map project (free maps), 213
- opening a file, 305–306
- OpenOffice-Draw (graphics program), 306
- orienteering, 74
- OtterBox carrying case, 142
- overhead views, 314. *See also* aerial photographs; satellite
- overlay grids, 31
- Overview Map feature (Street Atlas USA), 239

- OziExplorer (standalone mapping software)
 - calibrating a map with, 288, 291–292
 - customizing, 285
 - demo map, 286
 - described, 18, 285
 - features of, 285–288
 - FUGAWI Global Navigator versus, 298
 - Grid Line Setup, 297
 - interfacing with GPS receivers, 285
 - language support, 286
 - map formats used by, 286
 - OziExplorerCE, 288
 - paper maps, scanning and loading, 287–298
 - for PDA (Personal Digital Assistant), 288
 - for Pocket PC, 144
 - real-time tracking (moving map), 286, 288
 - registration fee, 287
 - shareware version, 285, 287
 - smart map created with, 286
 - for street and road navigation, 287
 - 3-D version, 287
 - trial version, 287
 - troubleshooting tips, 287
 - Web site, 287
 - World War I trench discovery, role in, 291
 - Yahoo! Group, 287
- *p* ●
 - Paint accessory program (graphics program), 305
 - Paint (graphics program), 290, 306
 - Paint.NET (graphics program), 306
 - Pano (blog site), 344
 - Panoramio layers (Google Earth), 278
 - Panoramio (photo-sharing Web site), 278
 - paper maps. *See also* digital maps; printing maps
 - as backup to GPS receiver, 74–75
 - contact paper, 348
 - described, 11
 - general information/park visitors, 296
 - GPS manufacturer maps versus, 208
 - laminating, 348
 - learning to use, 74
 - overlay grids, 31
 - raster maps (scanned paper maps), 43, 208, 210
 - scanning and loading, 287–298
 - size considerations for printing, 345–346
 - waterproof, 346–348
 - parity (COM port), 195–196
 - patch antenna, 66–67, 104
 - PC Card (PCMCIA card), 140
 - PC interface cables, 192
 - PC street-navigation programs. *See* street navigation software
 - PCMCIA card (PC Card), 140
 - P-code (Precision), 55
 - PCs For Dummies* (Gookin), 194
 - PDA (Personal Digital Assistant)
 - advantages, 136–137
 - autorouting, 142
 - batteries for, 137
 - disadvantages, 137–138
 - interfacing with GPS receiver, 138–142
 - location-based services (LBS), 134–135
 - mapping software for, 142–145
 - memory cards, 136, 140
 - OziExplorerCE for, 288
 - Pocket PC PDA, 142–143
 - screens, 136
 - waterproof carrying case for, 137
 - Web site resources, 145
 - pencil or pen, 347
 - people trackers, 146–147
 - Persian Gulf War, 58
 - pet tracking systems, 148–149
 - Pharos (manufacturer)
 - GPS receiver cards, 141
 - mouse GPS receiver of, 139
 - Pingrey, Paul (forester), 344
 - piracy, 212
 - pixel resolutions (display screen), 63
 - placemarks (Google Earth), 280–282
 - Places of Interest layer (Google Earth), 278, 279
 - planimetric digital maps, 25–26
 - plasma, 61
 - Plus edition (Street Atlas USA), 239

- PNG file format, 290, 302, 311
 Pocket GPS World (Web site), 145
 Pocket Navigator (topographic mapping program), 144, 267
 Pocket PC PDAs, 142–143
 Pocket TOPO! (Pocket PC mapping program), 144
 pocket-size automotive GPS unit (pocket navigators), 121–122
 POI Loader (utility program), 216
 POIs (Points of Interest)
 automotive GPS receivers, 116–117
 GPS manufacturer software, viewing, 209
 PDA (Personal Digital Assistant) mapping software, 142
 Street Atlas USA, 238, 242–243
 street map Web sites limitations, 319
 Polar (manufacturer), 92
 Port Angeles, Washington (map), 21
 portable automotive GPS receiver (portable navigator), 121–122
 Power Monkey (solar power products), 100
 power sources. *See also* batteries
 choosing, 151
 solar power, 100–101
 Precision (P-code), 55
 Precision Positioning Service (PPS), 55
 preferences (automotive GPS receiver), 118
 prime meridian, 31
 Print tab (Street Atlas USA), 250
 printer (computer), 186–187, 347
 printing and saving directions (Street Atlas USA), 248–250
 printing maps. *See also* paper maps
 in color, 346
 cost of, 350
 map area for, 28, 348–349
 oriented with north at the top, 349
 page orientation, 349
 paper for, 345–346
 with the scale, 346
 street map Web sites, 317
 with UTM grid, 346
 waterproof paper for, 346–348
 projections, 29
 proprietary grids, 37
 proprietary protocols, 193
 Ptolemy (scholar), 31
- **Q** •
- quad helix (quadrifilar helix) antenna, 67, 104
 quad sheets (topographic map), 24
 Quarters (Township and Range coordinate system), 38
 question mark button (Street Atlas USA), 242
 QuickSearch (Street Atlas USA), 243, 245
 quick-start guide, 96
- **R** •
- Radar searches (Street Atlas USA), 245
 radio
 broadcasting over automotive GPS receivers, 116
 Coarse Acquisition (C/A-code), 55, 58
 Digital Select Calling (DSC), 153–154
 FRS (Family Radio Service), 153
 ham radios, 153
 marine, 153–154
 Precision (P-code), 55
 satellite receivers, 70
 satellite transmitter, 54
 spoof/false signals, 55
 U.S. Coast Guard, contacting, 356
 RAM (SDRAM) memory, 183
 Ranges (Township and Range coordinate system), 36
 raster maps (scanned paper maps)
 described, 43
 displaying on GPS receiver, 210
 level of detail in, 208
 Raster Navigation Charts (RNCs), 352
 Raymarine (navigation software), 354
 real-time tracking (PDA mapping software), 143
 real-time traffic conditions, 317
 rec.boat.electronics (newsgroup), 357

- receivers, GPS. *See also* automotive GPS receivers; handheld GPS receivers; interfacing GPS receiver with computer
- accessory hardware, 69–70
 - accessory software, 69
 - accuracy of, 58–59, 61, 65–66
 - alarms, 63
 - antennas, 66–67
 - built-in maps, 63–64
 - cellphone as, 131–133
 - channels, 57
 - chipset, 62
 - commercial transportation models, 57
 - data exchanged between, 86
 - datum format, setting, 76–77
 - display, 62–63
 - errors, source of, 61
 - external storage, 68
 - firmware, uploading and updating, 203–205
 - information provided by, 59–60
 - internal storage, 67–68
 - knowing how to use, 96
 - language setting, 107
 - loading maps to, 210–212
 - mapping capabilities, 92
 - mapping models, 57, 81, 90
 - marine chart plotters, 355–356
 - memory needs, 90
 - metric system used by, 34
 - MOB (Man Overboard) function, 79
 - overview, 1–2, 61
 - paper maps used in conjunction with, 74–75
 - PDA (Personal Digital Assistant)
 - interfacing with, 138–142
 - satellite data received by, 56
 - sports GPS receiver, 92
 - survey models, 57
 - U.S. military/government models, 57
 - user interfaces, 68, 91
 - water safety concerns, 358–359
 - waterproof carrying case for, 142
 - waterproof GPS receivers, 95
 - waypoints, routes, and tracks,
 - uploading, 209
 - waypoints, setting, 77–81
 - Web site resources, 145
 - wrist, 92–93
- Reegemy (stitching software), 290
- registered (georeferenced) map, 18, 223, 288, 292. *See also* calibrating a map
- representative fraction to describe scale, 39
- reradiating antenna, 67
- resolution, for satellite data, 47
- Ripped Sheets (manufacturer), 347
- Rite in the Rain (manufacturer), 347
- RNCs (Raster Navigation Charts), 352
- road atlas software, 18–19
- road maps. *See* street map Web sites; street navigation software
- Roads layer (Google Earth), 279
- RoamEO Pet Tracker (pet tracking system), 148
- Rose Point Navigation Systems, 354
- routeable roads (Street Atlas USA), 238
- route. *See also* tracks/trails; waypoints
 - activating, 82
 - autoroute versus, 82
 - choosing not to use, 84
 - creating, 82–83
 - creating (Street Atlas USA), 246–247
 - creating (street map Web sites), 317, 319
 - described, 60, 81–82
 - directions, 114–116, 317
 - downloading and uploading, 85
 - printing (Street Atlas USA), 249
 - standards lacking for, 86
 - text-to-speech directions, 116
 - voice prompts, 115
- S ●
- San Francisco Bay, California, marine chart, 26–27
- Sans serif font, 308
- satellite. *See also* aerial photographs; Google Earth (virtual globe program)
 - coverage errors, 61
 - date photo was taken, 274
 - Estimated Position Error (EPE), 104

- fuzzy/blurred-out images, 276
- Google Earth images, 271
- GPS receiver acquiring, 102–104
- GPS using, 53–54
- image resolution in Google Earth, 273
- life span of, 54
- multiple, 56
- radio receivers, 70
- signal strength, 103–104
- spy, 48
- tracking positions of, 55
- satellite data
 - almanac data, 56
 - described, 47–48
 - ephemeris data, 56
 - high-resolution imagery, 283, 325
 - received by GPS receivers, 56
- satellite status page (GPS receiver), 103
- saving digital maps. *See also* editing digital maps; printing maps
 - overview, 301
 - Print Screen key, 302–303
 - Save Picture As command, 302
 - screen capture programs, 303–305
- scale
 - described, 28
 - large-scale map, 39
 - measuring, 38–40
 - small-scale map, 39
- scanning a map, 289–290. *See also* raster maps (scanned paper maps)
- Schneider, Adam (program writer), 334
- sci.geo.satellite-nav newsgroup, 341–342
- screen capture programs, 303–305
- screens, display
 - automotive GPS receivers, 117–118
 - brightness, 118
 - cleaning smudges, 118
 - color, 62, 91
 - handheld GPS receivers, 64, 90–91
 - map display, 81, 90
 - monochrome, 62, 96
 - no screen, 62–63
 - PDA (Personal Digital Assistant), 136
 - pixel resolutions for, 63
 - scratches, preventing, 107
 - setting the format, 76–77
 - size and readability, 64, 90, 118
 - touch, 91, 117
- SeaClear (navigation software), 353
- sealers, coating paper with, 348
- search and rescue, 149
- Seattle, Washington (aeronautical chart), 27
- Sections (Township and Range coordinate system), 37
- Secure Digital (SD and microSD), memory card, 68
- Selective Availability (SA), 58
- serial cables, 191–192
- serial number (automotive GPS receiver), 130
- serial ports
 - COM ports, 194–196
 - overview, 193–194
 - USB ports replacing, 197
- 7.5 minute topographic map, 24, 350
- Shuttle Radar Topography Mission (SRTM), 44
- simulators
 - for handheld GPS receivers, 110–111
 - practice exercise, 109
- SiRF Technology Holdings (company), 62
- smart map
 - creating, 286, 290–291
 - described, 12–13
- Smoots measurement, 282
- Snagit (screen capture program), 305
- software. *See also* GPS manufacturer software; mapping software; street navigation software; *specific software*
 - accessory, 69
 - AutoRoute, 82
 - bundled maps with, 18–20
 - cost of, 143
 - editors, 17
 - firmware, 128–129, 203–205
 - free or shareware, 17
 - marine navigation, 354–355
 - overview, 1, 13, 16
 - Planning, 104–105
 - standalone programs, 16–18
- solar activity, 54

- solar power, 100–101
- Solio (solar power products), 100–101
- Southern Hemisphere, 31
- Spanner (utility program), 216
- spatial or geospatial data, storing, 12–13
- speaker volume, 118
- speech synthesizers, 116
- speed, time, distance (practice exercise), 108–109
- spoof/false radio signals, 55
- sports activities, GPS receivers
 - recommendations, 93–95
- Sports Tracker application, 133
- SPOT Messenger (emergency distress device), 149
- Sputnik (Russian satellite), 52
- spy satellites, 48
- SRTM (Shuttle Radar Topography Mission), 44
- standalone mapping software. *See also*
 - OziExplorer (standalone mapping software)
 - overview, 16–18
 - 3DEM, 18
 - USAPhotoMaps, 18, 333–334
 - Standard Horizon (manufacturer), 154
 - Standard Positioning Service (SPS), 55
 - State Plane Coordinate System, 57
 - static digital map, 12
 - Stealth Pet Tracker (pet tracking system), 149
 - stitching a map, 290
 - StitchMaps (stitching software), 290
 - stop bits (COM port), 195–196
 - storing/saving
 - digital maps, 302–305
 - spatial or geospatial data, 12–13
 - waypoints, 77–80
 - street address
 - automotive GPS receiver, 117
 - finding (Street Atlas USA), 243–245
 - geocoding, 230, 314
 - searches (street map Web sites), 316, 321
 - searches (TerraServer-USA), 330
 - Street Atlas USA (mapping software). *See also* street navigation software
 - address, finding, 243–245
 - Advanced searches, 245
 - aerial photos, 238
 - Arrow keys, 241
 - campground locations, 243
 - Centering, 241
 - Compass Rose, 241
 - Control Panel feature, 239
 - Corrections button, 244
 - customizable maps, 238
 - directions, getting, 248
 - Dragging, 241
 - Earthmate GPS receiver used with, 250–251
 - Find tab, 243–244, 245
 - Info tab, 242
 - Main Map, 239
 - Map Legend, 242
 - maps bundled with, 19
 - mini-laptop interface, 238
 - moving around in, 241
 - navigating, 239–243
 - Octave controls, 240–241
 - Overview Map feature, 239
 - Plus edition, 239
 - POIs (Points of Interest), 238, 242–243
 - Print tab, 250
 - printing and saving directions, 248–250
 - question mark button, 242
 - QuickSearch, 243, 245
 - Radar searches, 245
 - routable roads, 238
 - route, creating, 246–247
 - route, printing, 249
 - Tab functions/options, 239
 - Travel Package, 249–250
 - user guide and help file, 239
 - user interface, 239–240
 - voice support, 238
 - Web-hosted versus, 318–320
 - zooming in and out, 240–241
 - street map Web sites
 - accuracy of, 317
 - address searches, 316, 321

- advantages of, 318–319
 - advertisements on, 319
 - automotive GPS receivers, 114
 - business and service searches, 316
 - disadvantages, 319
 - driving information, 317
 - free, 213
 - Google Maps, 21, 324
 - help link, online, 322
 - hybrid view, 314–315
 - lack of GPS compatibility, 319
 - Live Search Maps, 325–326
 - map data sources, 320
 - map display, 314–316, 320–321
 - MapQuest, 322–323
 - most popular, 314
 - moving around on, 322
 - overview, 313–314, 320–322
 - POIs (Points of Interest), 319
 - printing, 317
 - route creation, 317, 319
 - route directions, 317, 321–322
 - street views, 316
 - terrain maps, 316
 - trip-planning features, 319
 - type of map (Satellite, Terrain, or Aerial), 322
 - user interface, 320–322
 - Web-hosted street maps versus, 320
 - Yahoo! Maps, 324–325
 - zooming in and out, 321
 - street navigation software. *See also* Street Atlas USA (mapping software)
 - Garm Mobile PC, 252
 - Microsoft Streets & Trips, 251–252
 - POIs (Points of Interest), 319
 - street map Web sites versus, 318–320
 - upgrades for, 251
 - Street View layer (Google Earth), 279
 - street views (street map Web site), 316
 - Streets & Trips (software), 251–252
 - subscription services
 - automotive GPS receivers, 119–120
 - commercial maps, 337–338
 - suction cup mount, 126
 - Super Video Graphics Array (SVGA) card, 186
 - survey-grade GPS receivers, 57, 59
 - Suunto (manufacturer), 92
 - swopnet.com, 232
 - symbols
 - adding to maps, 308–310
 - deciphering, 40–42
 - inserting/moving, 309
 - Web sites, 42
- 7 •
- Tab functions/options (Street Atlas USA), 239
 - TB (terabyte) of space, 329
 - Tele Atlas (digital map data provider), 41, 129, 320
 - telephone. *See* cellphone
 - TeleType GPS (PDA mapping program), 145
 - Ten Essentials of backpacking, 160
 - terabyte (TB) of space, 329
 - Terminal Area Charts, 28
 - TerraCaching.com, 177
 - terrain elevation (TopoFusion), 260–263
 - Terrain layer (Google Earth), 279
 - terrain maps (street map Web sites), 316
 - terrain modeling, Web site, 344
 - Terrain Navigator Pro (topographic mapping software), 267
 - Terrain Navigator (topographic mapping software), 19, 266–267
 - TerraServer-USA (topographic mapping Web site)
 - address searches, 330
 - Advanced Find icon, 330
 - aerial photos, 329, 332–333
 - coordinate grids, displaying, 332
 - customizing and saving topographic maps, 333–334
 - displaying maps, 329–330
 - Download command, 332
 - E-mail command, 332
 - geographic searches, 330
 - Go button, 330
 - home page, 330
 - limitations of, 333–334
 - map scale, changing, 331–332
 - map size, changing, 331

- TerraServer-USA (*continued*)
 - moving around, 331
 - Order photo command, 333
 - plus and minus buttons, 331
 - Print command, 332
 - saving maps as graphics files, 333
 - Web site, 21, 329
 - zoom feature, 329, 331–332
- text-to-speech routing directions, 116
- theft prevention, GPS receiver, 130
- The Thomas Guides* (map books), 37
- 3-D Buildings layer (Google Earth), 279
- 3-D button (TopoFusion), 260
- 3-D maps
 - creating, 344
 - Terrain Navigator, 266–267
 - TopoFusion, 260–261
- 3-D version (OziExplorer), 287
- 3-D view (Google Earth), 276–277
- 3DEM (standalone mapping software), 18
- tick marks, 30
- tide and current software, free, 360
- TIGER (Topologically Integrated Geographic Encoding and Referencing) data, 41–43
- TIKI (manufacturer), 354
- time
 - Coordinated Universal Time (UTC), 106
 - GPS receiver settings, 106
 - zone, 106
- Timex (manufacturer), 92
- timing errors, 61
- title (map), 28
- TomTom (manufacturer), 123
- TOPO! (National Geographic mapping software), 19, 218, 267–268
- Topo USA (topographic map software), 264–265
- TopoFusion (mapping software). *See also* topographic mapping software
 - arrow keys, 257
 - Basic and Pro version, 254
 - Changing the scale feature, 258
 - Climbing Analysis, 262
 - Combo type map, 263
 - community forums, 263
 - cost of, 254
 - described, 221, 253–254
 - Download DEM Date, 262
 - Draw Track tool, 259, 262
 - elevation profiles, charting, 261–262
 - finding places, 255–256
 - Image Process, 263
 - map size, changing, 258
 - map type, changing, 256–257
 - maps and aerial photos, blending, 263
 - maps, displaying, 255–256, 260–261
 - Mark Waypoint tool, 258–259
 - moving around in a map, 257
 - Pan tool, 257, 261
 - planning a trip with, 258–260
 - Profile tool, 261–262
 - terrain elevation, 260–263
 - 3-D button, 260
 - 3-D map, displaying, 260–261
 - topographic mapping software, 253
 - user guide, 263
 - Web site, 20, 254, 263
 - Zooming feature, 258
- TopoGrafix (GPS and map software company), 86
- topographic map Web sites. *See also* topographic mapping software; topographic maps
 - advantages of, 327–328
 - aeronautical charts, 334
 - Canada, 334
 - commercial maps, 337–338
 - disadvantages, 328
 - GPS Visualizer, 334–337
 - Hey, What's That?, 336
 - MapCard, 338
 - mapping programs versus, 328
 - Maptech MapServer, 334
 - MyTopo, 338
 - nautical charts, 334
 - TerraServer-USA, 329–334
 - Toporama, 334
 - TopoZone, 338

- topographic mapping software. *See also*
TopoFusion (mapping software)
customer reviews, 264
defined, 16
Delorme Topo USA, 264–265
demos, 264
Maptech Terrain Navigator, 19, 266–267
National Geographic Back Roads
Explorer, 185, 268
National Geographic TOPO!, 19, 218,
267–268
PDA (Personal Digital Assistant), 143
topographic map Web site versus, 328
topographic maps. *See also* topographic
map Web sites; topographic mapping
software
described, 24–26
limitations of, 158
symbols for, 42
USGS (United States Geological Survey),
24, 338, 350
Topologically Integrated Geographic
Encoding and Referencing (TIGER),
41–43
Toporama (topographic maps of Canada),
334
TopoZone (street map Web site), 21, 338
touch screen, 91, 117
Township and Range coordinate system.
See also coordinates
described, 35–36
meridians and baselines, 36
Quarters, 38
Ranges, 36
Sections, 37
Townships, 36, 235
track point recording interval (GPS data
loggers), 151
tracking devices, GPS
cellphone-based, 146–147
cost of, 146–147, 149
dedicated, 146
described, 145
for people, 146–147
for pets, 148–149
for vehicles and vessels, 149–150
tracks/trails. *See also* route; waypoints
creating, 83–84
creating art with, 110
described, 83
downloading and uploading, 85
exchanging, 335
log of, 83–84
maps versus, 92
standards lacking for, 86
storing/saving, 60, 84–85, 151
waypoints versus, 83
traffic conditions, real-time, 317
Traffic layer (Google Earth), 279
trailguru.com, 232
Training Center (utility program), 216
Travel Bug (TB), 170–171
Travel Package (Street Atlas USA),
249–250
travel time (waypoint), 81
travelbygps.com, 232
Trimble Navigation (receiver
manufacturer), 57, 104–105
Trip and Waypoint Manager (mapping
software), 215
trip log, 117
trip-planning, 319
troposphere conditions, 61
TV broadcasts, 119
2-D maps, 266–267
- U •
- United States Geological Survey (USGS)
digital map data from, 41
naming a land feature, 229
scale from topographic map, 39
7.5 minute topographic map, 24, 350
topographic map symbols, 40
topographic maps of, 24, 338
Web site, 41, 46
United States National Grid (USNG), 37
units of measure (UPS receiver settings),
106
Universal Serial BUs (USB) cable, 250

- Universal Transverse Mercator (UTM).
 - See also* coordinates
 - conversion utilities, 235
 - converting to, 75
 - finding coordinates for, 225
 - plotting locations with, 34–35
 - printing maps with, 346
 - zone map for the world, 35
 - unlock codes, 212
 - updating maps
 - automotive GPS receivers, 128–129
 - GPS manufacturer software, 211
 - U.S. Army Corps of Engineers (Web site), 352
 - U.S. Board on Geographic Names, 229
 - U.S. Bureau of Land Management, 172
 - U.S. Coast Guard
 - contacting by radio, 356
 - DGPS signals, 66
 - DSC distress calls monitored by, 154
 - U.S. military, 52, 57
 - U.S. National Geodetic Survey (Web site), 235
 - U.S. National Park Service, 172
 - USAPhotoMaps (standalone mapping software), 18, 333–334
 - USB cable, 191–192
 - USB connector, 188
 - USB ports
 - automotive GPS receivers, 119
 - USB serial port adapter, 197
 - virtual serial ports, 196–197
 - USB serial port adapter, 191, 197
 - user guide
 - Google Earth, 282
 - quick-start, 96
 - Street Atlas USA, 239
 - TopoFusion, 263
 - user interface
 - automotive GPS receivers, 124
 - GNS (GEONet Name Server), 233
 - GPS receivers, 68, 91
 - language selection, 107
 - Street Atlas USA (software), 239–240
 - of topographic map software and, 264
 - user manuals, 105, 107
 - for handheld GPS receiver, 89, 96–97
 - USGS (United States Geological Survey)
 - digital map data from, 41
 - naming a land feature, 229
 - scale from topographic map, 39
 - 7.5 minute topographic map, 24, 350
 - topographic map symbols, 40
 - topographic maps of, 24, 338, 350
 - Web site, 41, 46
 - USNG (United States National Grid), 37
 - UTC (Coordinated Universal Time), 106
 - utility software
 - coordinate conversion, 235
 - described, 200
 - Garmin's programs, 215–217
 - Lowrance, 220
 - UTM (Universal Transverse Mercator).
 - See also* coordinates
 - conversion utilities, 235
 - converting to, 75
 - finding coordinates for, 225
 - plotting locations with, 34–35
 - printing maps with, 346
 - zone map for the world, 35
- U •
- VantagePoint (mapping software), 217
 - variation (nautical term), 25
 - vector maps
 - described, 43
 - Electronic Navigational Charts (ENCs), 352
 - GPS receivers using, 208
 - Topo USA, 264
 - zooming level, 210
 - vehicle and vessel trackers, 149–150
 - velcro mount, 126–127
 - VFR (Visual Flight Rules), 28
 - Virtual Earth, Microsoft, 283, 325
 - voice
 - prompts, 115, 143
 - recognition, 120
 - support, 238
 - Voyageur dry bag, 358–359

• W •

- WAAS (Wide Area Augmentation System), 65, 158
- walking stick/trekking pole, 159
- waterproof
- carrying case, 142
 - GPS receivers, 95, 358–359
 - paper, 346–347
 - PDA carrying case, 137
 - plain paper, 348
- wayhoo.com (waypoint information), 232
- Waymarking (Web site), 178
- waypoints. *See also* coordinates; route; tracks/trails
- defined, 60, 77, 232
 - downloading and uploading, 85, 209
 - exchanging, 335
 - maps versus, 92
 - obtaining, 232
 - saving/storing, 60, 77–80
 - setting for GPS receivers, 77–81
 - standards lacking for, 86
 - tracks/trails versus, 83
 - waypoint list, using, 80–81
 - Web sites, 232
- weather
- barometric pressure indicating, 70
 - effect on GPS signals, 59
 - information software, 354
- Weather layer (Google Earth), 279
- Web Cartography* (Kraak and Brown), 312
- Web road maps. *See* street map Web sites
- Web sites
- backpacking.com, 160
 - Census Bureau, 41
 - coordinate conversion utilities, 235
 - coordinate systems, 38
 - creating maps for the Web, 312
 - datum, 29
 - DGPS (differential GPS), 66
 - Federal Aviation Administration (FAA), 41
 - FM frequency, finding, 116
 - free maps, 213, 343–344
 - Garmin, 252
 - geocaching resources, 176–178
 - geocaching.com, 156, 160
 - geocoding services, 230
 - Geographer's Craft Web site, 38
 - GEONet Name Server (GNS), 229
 - GIS Lounge, 20
 - GIS programs, free, 15
 - GIS software, 20
 - Global Gazetteer, 233
 - Google Earth, 271
 - Google Earth forums, 281
 - Google Maps, 324
 - GPS receiver reviews, 95
 - Graphical Locator, 233
 - Live Search Maps, 325
 - magnetic declination, 25
 - map tools, 31
 - MapQuest, 322
 - Mapsymbols, 309
 - marine chart plotters, 355–356
 - memory cards, 68
 - Microsoft, 252
 - Montana State Library, 33, 75
 - mouse GPS receiver vendors, 139
 - National Aeronautical Charting Office (NACO), 28
 - National Geospatial-Intelligence Agency (NGA), 41
 - National Oceanic and Atmospheric Administration (NOAA), 26, 41
 - Navigation Technologies (NAVTEQ), 41
 - OziExplorer, 287
 - Panoramio, 278
 - paper maps, 74
 - projections, 29
 - satellite imagery, 48
 - screen capture programs, 305
 - sports GPS data, 92
 - standalone map software, 18
 - symbols for maps, 42
 - Tele Atlas, 41
 - Terrain Navigator, 19
 - TerraServer-USA, 21, 329
 - TIGER data, 41
 - United States Geological Survey (USGS), 41, 46

- Web sites (*continued*)
- U.S. Army Corps of Engineers, 352
 - utility programs, 202
 - waypoints, 232
 - Wikipedia, 357
 - wireless technology, 71
- Web Style Guide: Basic Design Principles for Creating Web Sites* (Lynch and Horton), 312
- Web-hosted mapping services, 20–21. *See also* street map Web sites; topographic map Web sites
- WebUpdater (utility program), 217
- Weekend Explorer 3D (topographic mapping software), 268
- weight and size (handheld GPS receiver), 91
- WGS 84 (World Geodetic System 1984), 76–77
- Whereigo (Web site), 178
- Wherify (cellphone-based tracking services), 147
- Wide Area Augmentation System (WAAS), 65, 158
- Wikipedia layer (Google Earth), 278
- Wikipedia (online encyclopedia), 357
- Windows (Microsoft). *See also* Microsoft
- assigning a COM port number, 194
 - GeoTrans program, 234–235
 - support Web site, 194
 - using USB serial port adapters, 197
 - Windows Device Manager, 194–195
 - wireless technology, 71
 - World Gazetteer (Web site), 233
 - World War I, trench discovery, 291
 - WorldMap (mapping software), 214
 - wrist GPS receiver, 92–93
- X •
- XImage (utility program), 202, 212, 217
 - XMap Pro software, 222–223
- Y •
- Yahoo! Group (OziExplorer), 287
 - Yahoo! Maps (street map Web site), 324–325
- Z •
- ZIP code, 37
 - zone map for the world (UTM), 35
 - zoom feature
 - Google Earth, 272–274
 - Street Atlas USA, 240–241
 - street map Web sites, 321
 - TerraServer-USA, 329, 331–332
 - TopoFusion, 258