Index

A
absorption, 37–40, 47, 141
adaptive optics, 60–61
Advanced Camera for Surveys (ACS), 87, 90
Aerojet, 192
agriculture, 17, 134–135, 153
air order of battle (AOB), 3–5
airborne, 1, 8, 18, 122, 144, 201, 234, 248–255
Airborne Hyperspectral Imager (AHI), 196, 198
Airy disk, 67, 90
aperture, 64–67, 208–209
astronaut photography, 1, 100
atmospheric absorption, 57–60, 141, 175
atmospheric compensation, 132–133
atmospheric scattering, 58–59, 132, 134
atmospheric turbulence, 60, 61
AVIRIS, 75, 134, 139–142
azimuthal antenna pattern, 210–211

B
bandgap, 69, 71–72, 130
bathymetry, 134, 257–259
beam pattern, 208, 216, 269
blackbody radiation, 40–42
Blue Marble, 3
Bohr atom, 37–40, 265–268
brightness temperature, 182, 189–191

C
Cardinal effect, 220–221
Cassegrain, 83–84, 92
C-band radar, 222, 227, 239
central force problem, 103
centripetal force, 105
channel plate intensifier, 37
chirp, 207
circular motion, 104–105
cohere detection (CCD), 236–237
corner reflectors, 221–222
Corona, 49–57, 74–75, 273–278
correlation, 160–161
COSTAR, 85–86, 90–91
covariance, 160–161, 166
cross track, 75–77
Cuba, 152

D
Defense Meteorological Satellite Program (DMSP), 9, 35, 94, 96
Defense Support Program (DSP), 192–194
Degree of Linear Polarization (DOLP), 146–147
desert soil penetration, 218–219, 228–229
dielectric coefficient, 217–218, 229, 268–269
diffraction, 65–67, 88
digital elevation model, 238, 243, 262–263, 256

Downloaded From: https://www.spiedigitallibrary.org/ebooks/ on 04 May 2019
Terms of Use: https://www.spiedigitallibrary.org/terms-of-use
digital number (DN), 154–158
Disaster Management Constellation (DMC), 15–17, 153
dispersion, 122–123
Dolon air base, 5
Doppler, 213, 233–234
dynamic range, 92, 94, 96, 131–132, 156–158

E
Earth Resources Technology Satellite (ERTS-1), 123–124
electronic order of battle (EOB), 3, 5–6
elements of recognition, 149–154
association, 154
height, 150
pattern, 152–153
shadow, 150
shape, 149
site, 154
size, 149
texture, 152
time, 154
tone, 151
emissivity, 174–175
energy, 31–35, 38–39, 70–72
Enhanced Thematic Mapper (ETM), 13–15, 124, 127–131
Earth Resources Observation Satellite (EROS), 9, 100
European Radar Satellite (ERS), 7–8, 233–234, 236
exposure time, 65, 96–98, 100

F
f/#, 64
faint-object camera (FOC), 86, 90
filters, 121,162–163
framing system, 74–76, 126
frequency modulation, 213
Fresnel relations, 45–46
FTHSI, 144

G
Gambit, 5–6, 50–51
geometric resolution, 89–90
geostationary/geosynchronous orbit (GEO), 105, 108, 113–114, 283
Gnanalingam, Suntharalingam, 207
Geostationary Operational Environmental Satellite (GOES), 11–13, 187–192
Galactic Radiation and Background (GRAB) Satellite, 50
gravity, 103–105

H
Hasselblad, 63
Hen House radar, 6
High-earth orbit (HEO), 114–115
histogram, 156–160
Hubble Space Telescope, 64, 69, 81–91
human vision, 120–121
hydrogen atom, 38–39, 119, 265
hypercube, 141
Hyperion, 143

I
IKONOS, 18, 77–78, 91–100
image intensifier, 37
imaging radar, 201–222
inclination, 53, 108–110, 113–115
indium antimonide (InSb), 70–72
infrared, 11–15, 119, 171–199
interferometry, 225, 234, 238
interferometric SAR (IFSAR), 150, 234–238
internal waves, 229–230
interpretation keys (See elements of recognition)
IR ledge, 119, 121, 142–144

K
Kepler’s laws, 105–108
kernel, 163–164
<table>
<thead>
<tr>
<th>Term</th>
<th>Pages</th>
</tr>
</thead>
<tbody>
<tr>
<td>Keyhole</td>
<td>51</td>
</tr>
<tr>
<td>kinetic temperature</td>
<td>180</td>
</tr>
<tr>
<td>KH-4, 51–53, 63–64</td>
<td></td>
</tr>
<tr>
<td>Kodak, 51, 74, 97–98, 121–122</td>
<td></td>
</tr>
<tr>
<td>Ku-band radar, 217, 234, 235</td>
<td></td>
</tr>
<tr>
<td>Landsat, 13–17, 75, 119, 123–133</td>
<td></td>
</tr>
<tr>
<td>Landsat 8, 123–124, 132–133</td>
<td></td>
</tr>
<tr>
<td>L-band radar, 217, 221–223, 226–230</td>
<td></td>
</tr>
<tr>
<td>lasers, 247–252</td>
<td></td>
</tr>
<tr>
<td>laser profile, 248–249, 253, 256–258</td>
<td></td>
</tr>
<tr>
<td>LiDAR, 18, 32, 247–260, 263–264</td>
<td></td>
</tr>
<tr>
<td>LiDAR range equation, 252</td>
<td></td>
</tr>
<tr>
<td>low-earth orbit (LEO), 12, 13, 91, 108–111</td>
<td></td>
</tr>
<tr>
<td>medium-earth orbit (MEO), 112, 115</td>
<td></td>
</tr>
<tr>
<td>mercury cadmium telluride (HgCdTe), 70–75</td>
<td></td>
</tr>
<tr>
<td>Planck’s law, 41, 172</td>
<td></td>
</tr>
<tr>
<td>photomultiplier tube, 9, 35–36</td>
<td></td>
</tr>
<tr>
<td>pinhole, 64–65</td>
<td></td>
</tr>
<tr>
<td>Planck’s law, 41, 172</td>
<td></td>
</tr>
<tr>
<td>polarization, 23, 29–31, 145–147</td>
<td></td>
</tr>
<tr>
<td>photomultiplier tube, 9, 35–36</td>
<td></td>
</tr>
<tr>
<td>prism, 122–123</td>
<td></td>
</tr>
<tr>
<td>pushbroom, 76–77, 121</td>
<td></td>
</tr>
<tr>
<td>Quickbird, 77–78, 91–94</td>
<td></td>
</tr>
<tr>
<td>MODTRAN, 57–60</td>
<td></td>
</tr>
<tr>
<td>Molniya orbit (HEO), 109, 114–115</td>
<td></td>
</tr>
<tr>
<td>Multiple Imaging</td>
<td></td>
</tr>
<tr>
<td>Spectroradiometer (MISR), 46–47</td>
<td></td>
</tr>
<tr>
<td>multi-pulse in air (MPIA), 254–255</td>
<td></td>
</tr>
<tr>
<td>multivariate statistics, 159–162</td>
<td></td>
</tr>
<tr>
<td>Mys Shmidta, 53–54</td>
<td></td>
</tr>
<tr>
<td>Radar, 6, 201–223</td>
<td></td>
</tr>
<tr>
<td>radar azimuthal resolution, 207–209, 213</td>
<td></td>
</tr>
<tr>
<td>radar cross section, 214–215</td>
<td></td>
</tr>
<tr>
<td>radar range resolution, 204–207</td>
<td></td>
</tr>
<tr>
<td>RADARSAT, 20, 22, 230–232</td>
<td></td>
</tr>
<tr>
<td>radiometry, 175–179</td>
<td></td>
</tr>
<tr>
<td>range antenna pattern, 210–211</td>
<td></td>
</tr>
<tr>
<td>Rayleigh criteria, 65–69</td>
<td></td>
</tr>
<tr>
<td>Rayleigh scattering, 31, 58–59</td>
<td></td>
</tr>
<tr>
<td>red edge, 119</td>
<td></td>
</tr>
<tr>
<td>Normalized Difference Vegetation Index (NDVI), 136–138</td>
<td></td>
</tr>
<tr>
<td>NPOES (NPP), 95, 99</td>
<td></td>
</tr>
<tr>
<td>oil slicks, 229–230</td>
<td></td>
</tr>
<tr>
<td>Operational Land Imager (OLI), 132–133</td>
<td></td>
</tr>
<tr>
<td>Optech, 20, 254, 258</td>
<td></td>
</tr>
<tr>
<td>orbital elements, 108–109</td>
<td></td>
</tr>
<tr>
<td>orbital period, 105–108</td>
<td></td>
</tr>
<tr>
<td>order of battle (OOB), 2–3</td>
<td></td>
</tr>
<tr>
<td>Pentagon, 53, 55, 149–150</td>
<td></td>
</tr>
<tr>
<td>photoelectric effect, 27, 31, 33–35</td>
<td></td>
</tr>
<tr>
<td>photomultiplier tube, 9, 35–36</td>
<td></td>
</tr>
<tr>
<td>pinhole, 64–65</td>
<td></td>
</tr>
<tr>
<td>Planck’s law, 41, 172</td>
<td></td>
</tr>
<tr>
<td>polarization, 23, 29–31, 145–147</td>
<td></td>
</tr>
<tr>
<td>photomultiplier tube, 9, 35–36</td>
<td></td>
</tr>
<tr>
<td>prism, 122–123</td>
<td></td>
</tr>
<tr>
<td>pushbroom, 76–77, 121</td>
<td></td>
</tr>
<tr>
<td>Quickbird, 77–78, 91–94</td>
<td></td>
</tr>
</tbody>
</table>
Index

reflectance/reflection, 45–47, 119, 135–137, 141–142
Ritchey–Chretien Cassegrain, 83, 127

S
Sandia National Laboratories, 234–235
Sary Shagan, 6
scattering, 46–47
scatter plots, 138–139, 147, 159–161
SEBASS, 195–196
Severodvinsk, 54–56, 98–99
ship detection, 229, 230–232
ship wakes, 184–185, 232–234
Shuttle Imaging Radar (SIR), 218, 222, 226–228
Shuttle Radar Topographic Mapping (SRTM) Mission, 240–244
single pulse in air (SPIA), 255
Sirius, 115–116
Snell’s law, 45
soil penetration, 219, 228–229
solar spectrum, 43
space order of battle (SOB), 6–8
spectral angle, 138–139, 147–148
spectral response, 130, 132, 134, 188–189
SPOT, 8, 69, 92, 119
Sputnik, 49
South Atlantic anomaly, 91
statistics, 155–163
Stefan–Boltzmann, 42, 172–174
Sternglass formula, 36
Stokes vectors, 145–147
Suomi NPP, 9–10, 95, 99
Svalbard, 78, 99, 111
Surrey Satellite Technology, Ltd. (SSTL), 15–18
synthetic aperture radar (SAR), 20, 212–214

T
TerraSAR-X, 20, 23–24, 232–233, 244
Thematic Mapper (TM), 127, 131
thermal crossover, 182–183
thermal inertia, 171, 181–182, 260
Thermal Infrared Sensor (TIRS), 132–133
thin lens equation, 62
time-delay integration (TDI), 96, 98
TIROS, 185–186
Tournachon, Gaspard-Félix (Nadar), 1
Tracking and Data Relay Satellite System (TDRSS), 77, 113, 279–280
transmission, 57, 60, 132–133
turbulence, 57, 60–61

U
univariate statistics, 156

V
VIIRS, 9–10, 95–96, 98–99

W
wakes, 185, 233
Washington Monument, 53, 55, 150–151
wave equation, 28
weather satellites, 11, 113, 185–187
wide-field/planetary camera (WF/PC), 90
Wien’s displacement law, 42, 174
whiskbroom, 76–77, 126–128
Worldview, 7, 18–19, 77, 134–137, 147–148

X
X-band radar, 205–206, 240
Richard C. Olsen received his degrees at the University of Southern California (B.S.) and the University of California at San Diego (M.S., Ph.D.). His graduate work and early career involved space plasma physics, with a particular emphasis on satellite charging behavior, and the control of satellite charging. At the Naval Postgraduate School, he moved into the field of remote sensing, working with both optical and radar systems (spectral imaging systems in particular). He teaches courses in remote sensing and classified military systems, and he works on developing new methods of exploiting both civil and military systems for terrain classification and target detection. His most recent interests involve using LiDAR and other approaches to build 3D models of the world. He has directed the thesis efforts of over 150 graduate students, approximately 100 of whom studied remote sensing.