

Index

A

Abbey, George W.S., 76
Ad Astra Rocket Company, 184
Advanced Life Support Research, 191
Aerojet Rocketdyne, 185
Aldrin, B., 5, 42, 43, 45–54, 56–58,
60, 62–67, 69, 78, 79
Alzheimer's disease, 96
Antares rocket built by Orbital
Sciences, 164
Apollo, viii, 16, 42, 57, 65, 73, 74, 76,
78, 92, 93, 109, 114, 125,
126, 128–137, 139–143,
145–152, 156, 157, 163,
165–169
Apollo 1, 125, 126, 166
Apollo Command and Service Module,
129, 137
Asteroid Redirect Mission (ARM), 9,
58, 62, 77
Astrobotic Technology Inc., 79

B

Battiston, R., 188
Blue Origin, 24, 33, 34
Boeing Co., 6

Boeing CST-100, 33, 36, 161
Bolden, C., 5, 37, 76, 161
Branson, Sir Richard., 37, 175, 176
Bush, George W., 76, 150

C

Cardiovascular Effects, 95
CERN (the European Organization for
Nuclear Research), 188
Chaffee, R., 166
Challenger, x, 150, 152, 163, 166,
168–174
Chang'e spacecraft, 17
China, 2, 10, 12, 17–20, 22, 23, 73,
77, 78, 99, 101, 104
Cold War, 3, 73, 78, 115, 123–125,
149, 151, 157
Columbia, x, 142, 148, 158, 163, 166,
172, 173
Columbia Accident Investigation Board
(CAIB), 174, 175
Commercial Crew Development
(CCDev), 7
Commercial Crew Program (CCP), 9,
31–37
Communism, 1, 124

Constellation Moon, 76
Cuban Missile Crisis, 125, 166

D

Defense Advanced Research Projects
Agency (DARPA), 152, 182
Department of Defense, 4, 117, 139, 150
Douglas Aircraft Company's Project
RAND (Research and
Development), 116
Dream Chaser, 29–31, 33, 34, 36

E

Eisenhower, 118, 121–123, 180
Enhanced Power Technology,
189–190
Environmental Control and Life
Support System, 193
European Space Agency (ESA), 2, 12,
21, 22, 31, 33, 50, 73,
146–148, 155
European Space Radiation
Superconducting Shield
(SR2S) project, 188
Exploration Research and Technology
Program, 191

F

Faget, M., 140–142
Falcon 9, 27, 28, 34, 38, 49, 62, 66,
177
Father of modern rocketry, 109, 111
Fletcher, J., 132

G

Gagarin, Y., 25, 96, 119, 120, 124, 125
Game Changing Development (GCD)
program, 189, 190
Gemini, 38, 113, 125, 135–137, 140

Geosynchronous, vii, 28, 65, 66, 184
Gerstenmaier, W., 183
G forces, 171
Glenn, J., x, 5, 124, 164
Goddard, R., 109–111
Google Lunar X Prize, 37
Gravity, 98
Griffin, M., 150
Grissom, G., 166
Gröttrup, H., 116, 117
Grunsfeld, J., 194

H

Habitat Technology, 186–188
Hohmann transfer, 55, 56
Hubble Space Telescope, 149

I

In-situ resource utilization, 192
International Geophysical Year (IGY),
92, 117–120
International Space Station (ISS), vii, 2,
3, 6, 7, 16, 18, 20, 23, 26, 31,
32, 35, 36, 38, 46, 49, 54, 59,
62, 66, 76, 86, 88, 108, 128,
139, 143, 145, 148, 153–161,
173, 175, 191

Interstellar, 180

Ion Propulsion, 183–185
Ionizing effects, 94
ISS. *See* International Space Station
(ISS)

J

Jamison, Dr. M., 182
Japan Aerospace Exploration Agency
(JAXA), 33, 73
Johnson, L., 125, 128, 136
Joint Space Operations Center
(JspOC), 100, 101, 103

K

Kennedy, John F., 1, 107, 123, 124,
127, 128, 130, 132, 166
Kessler syndrome, 105
Khrushchev, N., 121, 122, 124
Korolev, S., 116–120, 123
Kraft, C.C., 140

L

Laika, 121
Laurel Kaye, 68
Life Support System (LSS), 32, 64, 193
Liquid-fueled rocket, 109–111, 118
Lotz, Dr. J., 88
Low-Density Supersonic Decelerator
(LDSD), 61
Luna, 122
Lunar CATALYST Initiative, 79

M

Magnetic net—for space debris, 104
Manned Orbiting Laboratory (MOL),
135–137
Mariner spacecraft, 51
Mars, 2, 4–7, 17–19, 21, 24, 26, 37,
39, 41–69, 71–74, 76–78, 88,
93–96, 106, 108, 110, 119,
130–133, 135, 137, 150, 156,
159, 164, 177, 180, 181, 184,
186–190, 192–194
Mars One, 46, 48, 49, 54, 62–69
Mars Science Laboratory (Curiosity),
43, 44
Marshall Space Center, 93, 114, 133,
135, 148
The Martian, 18, 45, 180, 190, 194
Martian atmosphere, 43, 56
Martin, L., 33, 48, 98, 101, 187
Masten Space Systems Inc., 79
McAuliffe, C., 169

Mercury, 85, 113, 123–125, 140
Meteor bumper, 103
Microgravity, 30, 83–88, 96, 106, 143,
145, 147, 150, 154, 182
Moon Express Inc., 79
Morton-Thiokol, 169
Muscle atrophy, 86, 87, 95
Musk, E., 24, 26, 28, 37, 49–50, 176,
177

N

NASA Authorization Act, 5
NASA Evolutionary Xenon Thruster
(NEXT) ion thruster, 185
NASA's Mars reconnaissance Orbiter,
193
National Advisory Committee for
Aeronautics (NACA), 122
National Aeronautics and Space
Administration (NASA), vii,
viii, x, xi, 2–9, 12, 13, 15–18,
20, 26, 27, 29–36, 39, 42–44,
46–65, 68, 69, 71, 73, 74,
76–79, 86, 88, 90–94, 98–100,
102, 103, 105, 108, 111, 114,
120, 122, 123, 125, 127–130,
132–142, 144–150, 152, 153,
155–161, 164, 166–171,
173–177, 180–191, 193, 194
National Research Council (NRC), 73
NextSTEP habitat projects, 186
Nixon, R., 123, 128, 130, 132

O

Oberth, H., 109
Opportunity spacecraft, 32, 51, 117,
148
Orbital ATK, 30, 32, 36
Orbital Sciences, 14, 33, 62, 161
O-ring, 166, 169

- Orion Multi-Purpose Crew Vehicle,
94, 160
- Orion spacecraft, 53, 56, 59, 187
- Othman, M., 105
- P**
- Paragon Space Development Corp.*, 34
- Peenemünde, 112, 113, 116, 126
- President Clinton, 156
- President George H.W. Bush, 156
- President George W. Bush, 76
- President John F. Kennedy, 1, 107,
123, 127, 130, 166
- President Kennedy, 166
- President Reagan, 155
- R**
- Radiation, 39, 45, 47, 54, 57, 64, 83,
89–97, 122, 145, 182, 188,
189, 192
- Radiation Protection Technology, 188
- Rare Earth elements (scandium,
lanthanum, cerium), 72
- RD-180, 13–15
- Rover spacecraft, 17, 38, 43–45, 47
- Rutan, B., 25, 37, 175
- S**
- Sabatier, P., 193
- Sabatier system, 193
- Saturn V rocket, 59, 60, 65, 93, 114,
125, 126, 128, 134, 137, 166
- Shepard, A., 85, 124
- Shielding, 64, 93–95
- Sierra Nevada Corporation (SNC),
29–31
- Single-stage-to-orbit (SSTO) vehicle,
152
- Skycrane maneuver, 56
- Skylab, 128, 129, 131, 135–139, 145,
147
- Smart-1, 73
- Smith, M., 163
- Solar array development, 190
- Solar arrays, 158, 189, 190
- Solar Sails, 185–186
- Sonia Van Meter, 67
- Space Act Agreements (SAA), 32
- Space debris, 3, 18, 84, 97, 98,
101–105
- Space doctrine, 132
- Space Exploration Initiative (SEI), 74,
156
- Space Exploration Technologies
Corporation (SpaceX), 6, 17,
24, 26–30, 32, 34, 36, 49, 62,
64, 67, 161, 164, 176–177
- Space Fence, 101, 102
- Space Launch System (SLS), 5–7, 9,
53, 56–60, 62, 64–67, 94
- Space race, vii, viii, 1–3, 14, 17, 24, 76,
109, 112, 115, 123–126, 128,
129, 150, 151, 156, 157
- Space shuttle, vii, viii, 2, 3, 6, 16, 26,
27, 29–32, 49, 58–60, 66, 76,
91, 100, 103, 127–129,
131–133, 136–155, 157–160,
163, 165, 166, 169, 171–173,
175–177
- Space Station, vii, 74, 131, 137
- Space station Freedom, 156
- Space Task Force, 130
- Space Task Group, 130, 140, 146, 154
- Space Treaty of 1967, 104, 122
- Spacelab, 145–148, 155
- SpaceX Dragon, 27, 36, 38
- SpaceX Dragon V2, 161
- SpaceX Falcon, 28, 65, 66
- SpaceX FH lift rocket, 65
- Spirit spacecraft, 51
- Sputnik, 3, 50, 97, 113, 119–121, 126

Star Clipper, 141
 Supersonic Inflatable Aerodynamic
 Decelerator (SIAD), 61

T

Tate, L., 190
 Thermal Protection System (TPS), ix,
 172
 Tsiolkovsky, K., 109

U

United Launch Alliance (ULA), 14, 33

V

V-2 rocket, 109
 Vacuum, vii, 72, 81–83, 110, 142, 145,
 167
 Van Allen Belts, 89–92
 Van Allen, J., 92
 Vandenberg Air Force Base, 101, 151
 Vanguard rocket, 120–123
 Vasimr engine, 184
 Viking probe, 51
 Virgin Galactic's SpaceShipTwo, 164

Von Braun, W., 14, 93, 112–116, 118,
 119, 122, 126, 129, 130,
 133–135
 Vostok spacecraft, 123

W

Whalley, Dana, 101
 Wheeler, Dr. R., 190–192
 Whipple shields, 103
 Whipple, Fred, 103
 White, Ed, 166
 WhiteKnightTwo, 176

X

X-30, 152
 XPRIZE, 37

Y

100 Year Starship (100YSS), 182

Z

Zipper effect, 173
 Zubrin, R., 48–49