Endnotes

1 For a persuasive argument that India did not begin to weaponize its nuclear capabilities concertedly until the late 1980s, after it had exhausted other non-nuclear approaches to safeguarding its security, see Andrew B. Kennedy, “India’s Nuclear Odyssey: Implicit Umbrellas, Diplomatic Disappointments, and the Bomb,” International Security, vol. 36, no. 2 (Fall 2011), pp. 120–153.


11 Cohen, India: Emerging Power, 54. See also Perkovich, India’s Nuclear Bomb, p. 16.

12 For a Website dedicated to President Kalam, to commemorate his technological contributions to India, see http://www.abdulkalam.com/index.jsp.


19 Tanham and Agmon, The Indian Air Force, p. 15.

21 Timothy D. Hoyt, Military Industry and Regional Defense Policy: India, Iraq, and Israel (Routledge: September 2006), 88. Citation references earlier manuscript.


26 Hoyt, Military Industry and Regional Defense Policy, p. 89. Citation references earlier manuscript.

27 Hoyt, Military Industry and Regional Defense Policy, p. 90. Citation references earlier manuscript.


30 Tanham and Agmon, The Indian Air Force, p. 23.

31 Frankel, India’s Political Economy, p. 393.

32 Gupta, Building an Arsenal, p. 33.

33 Frankel, India’s Political Economy, p. 470.

34 Gupta, Building an Arsenal, p. 41.

35 Frankel, India’s Political Economy, p. 470.


37 Gupta, Building an Arsenal, p. 67.

38 For an analysis of the tests and their significance for regional security, see Andrew C. Winner and Toshi Yoshihara, Nuclear Stability in South Asia (Cambridge, Massachusetts: Institute for Foreign Policy Analysis, 2001).

39 Frankel, India’s Political Economy, p. 718. For a history of India’s nuclear weapons development, see Raj Chengappa, Weapons of Peace: The Secret Story of India’s Quest to be a Nuclear Power (New Delhi: Harper Collins, 2000).

40 Gupta, Building an Arsenal, p. 68.


44 For an argument that India relied on “implicit umbrellas” from the superpowers that reduced its need for a retaliatory capability until the late-1980s, see Kennedy, “India’s Nuclear Odyssey,” pp. 140–144.
45 Perkovich, 'India’s Nuclear Bomb', p. 295.


48 For Bhabha’s emphasis on the importance of “an adequate delivery system,” see Perkovich, 'India’s Nuclear Bomb', p. 60. According to Andrew B. Kennedy, Nehru did not need to be convinced that India needed this capability. Bhabha tried to convince him to actually begin developing nuclear explosives and failed. Email interview with author, 26 July 2012.


50 Perkovich, 'India’s Nuclear Bomb', pp. 121–124, 129, 148, 158.

51 Perkovich, 'India’s Nuclear Bomb', pp. 123, 141.

52 Perkovich, 'India’s Nuclear Bomb', p. 244.

53 Hoyt, Military Industry and Regional Defense Policy, p. 125. Citation references earlier manuscript.

54 Gupta, Building an Arsenal, p. 57.


56 Hoyt, Military Industry and Regional Defense Policy, p. 125. Citation references earlier manuscript.

57 Gupta, Building an Arsenal, p. 75.

58 Thomas, “India’s Nuclear and Missile Programs,” India’s Nuclear Security, p. 111.

59 Hoyt, Military Industry and Regional Defense Policy, p. 123. Citation references earlier manuscript.


61 Tellis, India’s Emerging Nuclear Posture, p. 556; Thomas, “India’s Nuclear and Missile Programs,” India’s Nuclear Security, p. 111.

64 Perkovich, India’s Nuclear Bomb, p. 245.
66 Hoyt, Military Industry and Regional Defense Policy, p. 124. Citation references earlier manuscript.
67 Perkovich, India’s Nuclear Bomb, p. 301.
70 Thomas, “India’s Nuclear and Missile Programs, India’s Nuclear Security, p. 115.
74 Harvey, The Japanese and Indian Space Programmes, p. 133.
75 Harvey, The Japanese and Indian Space Programmes, p. 128.
77 Perkovich, India’s Nuclear Bomb, p. 245.
78 Harvey, The Japanese and Indian Space Programmes, pp. 129–130.
80 Perkovich, India’s Nuclear Bomb, p. 154.
81 Perkovich, India’s Nuclear Bomb, p. 154.
82 Perkovich, India’s Nuclear Bomb, p. 151.
83 Perkovich, India’s Nuclear Bomb, p. 9.
84 Harvey, The Japanese and Indian Space Programmes, pp. 133–34.


89 Harvey, The Japanese and Indian Space Programmes, p. 145.


94 Hoyt, Military Industry and Regional Defense Policy, p. 140. Citation references earlier manuscript.

95 Harvey, The Japanese and Indian Space Programmes, p. 136.


97 Collins, Evaluating the Military Potential of a Developing Nation’s Space Program, p. 12.

98 Gupta, Building an Arsenal, p. 66.

99 Perkovich, India’s Nuclear Bomb, p. 328.

100 Founded in 1987, the Missile Technology Control Regime (MTCR) is a voluntary arrangement in which 33 members and four unilateral adherents promise to restrict the export of missile systems and technology. MTCR regulations place specific emphasis on missiles capable of sending a payload of at least 500 kilograms a distance of 300 kilometers or more. For more information, see the U.S. State Department Bureau of Nonproliferation’s 23 December 2003 “Missile Technology Control Regime (MTCR)” fact sheet, www.state.gov/gov/nea/rls/fs27514.htm.


102 Hoyt, Military Industry and Regional Defense Policy, p. 113. Citation references earlier manuscript.


105 Harvey, The Japanese and Indian Space Programmes, p. 155.


109 Harvey, The Japanese and Indian Space Programmes, p. 158.

110 Harvey, The Japanese and Indian Space Programmes, p. 159.
It should be noted that Oceansat 1 relied on a German ocean color monitor and may not have been advanced as China’s Haiyang 1. Harvey, *The Japanese and Indian Space Programmes*, p. 161.


Tellis, *India’s Emerging Nuclear Posture*, p. 252.


Tellis, *India’s Emerging Nuclear Posture*, p. 46.


Tellis, *India’s Emerging Nuclear Posture*, p. 582.

Thomas, “India’s Nuclear and Missile Programs,” *India’s Nuclear Security*, p. 109.

For additional information on IRS satellite coverage limitations, which are a product of satellite revisit times, see Mistry, “Technology for Defense Development,” *India’s Nuclear Security*, p. 212.
130 Mistry, “The Geostrategic Implications of India’s Space Program,” Asian Survey, pp. 1038–1039; Tellis, India’s Emerging Nuclear Posture, pp. 219. ISRO has built, launched, and maintained a series of Earth observation satellites know as Indian Remote Sensing satellites (IRS).

131 Thomas, “Arms Procurement in India,” Military Capacity and the Risk of War, p. 120.

132 Frankel, India’s Political Economy, p. 76.


134 Tanham and Agmon, The Indian Air Force, p. 74.

135 Hoyt, Military Industry and Regional Defense Policy, p. 89. Citation references earlier manuscript.

136 Hoyt, Military Industry and Regional Defense Policy, p. 93. Citation references earlier manuscript.

137 Hoyt, Military Industry and Regional Defense Policy, p. 102. Citation references earlier manuscript.

138 Hoyt, Military Industry and Regional Defense Policy, p. 161. Citation references earlier manuscript.

139 Hoyt, Military Industry and Regional Defense Policy, p. 103. Citation references earlier manuscript.


144 Tanham and Agmon, The Indian Air Force, pp. xv, 61.

145 Tanham and Agmon, The Indian Air Force, p. 21; Gupta, Building an Arsenal, p. 48.

146 Gupta, Building an Arsenal, p. 34.

147 Hoyt, Military Industry and Regional Defense Policy, p. 95. Citation references earlier manuscript.


149 Thomas, “Arms Procurement in India,” Military Capacity and the Risk of War, p. 121.

150 Tanham and Agmon, The Indian Air Force, p. 75.

151 Gupta, Building an Arsenal, p. 57.


153 Hoyt, Military Industry and Regional Defense Policy, p. 82. Citation references earlier manuscript.


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155 Gupta, Building an Arsenal, pp. 49–50.
156 Cohen, India: Emerging Power, p. 100.
159 Hoyt, Military Industry and Regional Defense Policy, p. 163. Citation references earlier manuscript.
160 Hoyt, Military Industry and Regional Defense Policy, p. 560. Citation references earlier manuscript.
162 Tanham and Agmon, The Indian Air Force, p. 84.
163 Tanham and Agmon, The Indian Air Force, p. 79.
165 Hoyt, Military Industry and Regional Defense Policy, p. 559. Citation references earlier manuscript.
170 Thomas, “Arms Procurement in India” Military Capacity and the Risk of War, p. 115.
171 Thomas, “Arms Procurement in India” Military Capacity and the Risk of War, p. 119.
172 Hoyt, Military Industry and Regional Defense Policy, p. 163. Citation references earlier manuscript.
175 Cohen, India: Emerging Power, p. 100.
176 Hoyt, Military Industry and Regional Defense Policy, p. 167. Citation references earlier manuscript. For further discussion of lack of overhaul capabilities, see Tanham and Agmon, The Indian Air Force, p. 70.
178 Cohen, India: Emerging Power, p. 56.
The actual technology flow, however, may be the reverse of what Pawar envisioned. McCarthy, “India: Emerging Missile Power,” The International Missile Bazaar, p. 215.

Hoyt, Military Industry and Regional Defense Policy, p. 164. Citation references earlier manuscript.


Hoyt, Military Industry and Regional Defense Policy, p. 165. Citation references earlier manuscript.


Tellis, India’s Emerging Nuclear Posture, pp. 96–97.


For a detailed discussion of India’s organizational deficiencies, see Singh, “India,” Arms Procurement Decision Making, pp. 69–82.

See, for example, Tanham and Agmon, The Indian Air Force, xvi; Perkovich, India’s Nuclear Bomb, p. 218.

Perkovich, India’s Nuclear Bomb, p. 296.

Singh, “India,” Arms Procurement Decision Making, p. 73.

Cohen, India: Emerging Power, p. 68.

Cohen, India: Emerging Power, p. 70.

Singh, “India,” Arms Procurement Decision Making, p. 77. For further discussion of corruption in aircraft procurement, see Tanham and Agmon, The Indian Air Force, p. 62.

Caste-based divides have also been noted between India’s nuclear scientists (primarily Brahmin) and the military. Singh, “India,” Arms Procurement Decision Making, p. 78.

Frankel, India’s Political Economy, p. 774.


For indications of the poverty and underdevelopment that continues to plague India, see Hari Kumar, “Deadly Fire Exposes Old Perils Lurking in New India,” New York Times (13 April 2006); Somini Sengupta, “In India, Maoist Guerrillas Wade ‘People’s War,’” New York Times (13 April 2006).

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