

South Africa Missile Chronology

[2007-1990](#) | [1989-1981](#) | [1980-1969](#) | [1968-1950](#)

Last update: April 2005

**As of May 28, 2009, this chronology is no longer being updated.
For current developments, please see the South Africa Missile Overview.**

This annotated chronology is based on the data sources that follow each entry. Public sources often provide conflicting information on classified military programs. In some cases we are unable to resolve these discrepancies, in others we have deliberately refrained from doing so to highlight the potential influence of false or misleading information as it appeared over time. In many cases, we are unable to independently verify claims. Hence in reviewing this chronology, readers should take into account the credibility of the sources employed here.

Inclusion in this chronology does not necessarily indicate that a particular development is of direct or indirect proliferation significance. Some entries provide international or domestic context for technological development and national policymaking. Moreover, some entries may refer to developments with positive consequences for nonproliferation

2007-1990

26 April 2007

The state-owned arms manufacturer Denel Group has signed a 1 billion rand (143 million U.S. dollars) deal with Brazil to co-develop a new generation missile. The missile will be the next-generation A-Darter, and air-to-air missile designed to meet future challenges of air combat fighters. The partnership will bring "much needed skills, training and technology transfer to the country." Furthermore, future export contracts of another 2 billion rand are expected in the next 15 years.

— "S. Africa, Brazil sign missile deal," *People's Daily Online*, 26 April 2007, english.people.com.cn.

December 1999

Denel Group (Pty) seeks a joint venture partner to develop an air-launched stand off cruise missile, designated Torgos. The weapon allegedly evolved from the Raptor series of glide bombs. The technology and conceptual framework is based on MUPSOW (Multi-Purpose Stand off weapon) advanced technology program. [Note: Glide bombs can be used for attacks on conventional buildings, air-defense weapons, aircraft, or radar sites. Over the past 40 years, glide bombs have undergone numerous modifications and one of the most recent models, the GBU-15, was operational during the 1990-91 Persian Gulf War.]

— "South Africa Seeks a Partner to Develop Cruise Missile," *Jane's Missiles & Rockets*, Air-to-Surface Section, Vol. 3, No. 12, 1 December 1999; "Glide Bombs Modified to Hit Through Clouds," [undated], www.aeronautics.ru.

30 March 1999

South Africa ratifies the Comprehensive Test Ban Treaty (CTBT).

— Preparatory Commission for the Comprehensive Nuclear-Test Ban Treaty Organization, "State Information: South Africa," [undated], www.ctbto.org.

Related content is available on the website for the Nuclear Threat Initiative, www.nti.org.



7 February 1997

ARMSCOR (Armaments Corporation of South Africa) pleads "no contest" in US District Court in Philadelphia, PA, to charges of violating the US arms embargo against South Africa during the apartheid era. The firm is charged with working with the Philadelphia firm ISC to smuggle restricted commodities and technology made in the United States to South Africa between 1978 and 1989. Armscor and a subsidiary are fined \$1 million and \$500,000, respectively.

— "South African Firms Fined for 1980s Arms Smuggling," *Washington Post*, 28 February 1997, www.lexis-nexis.com.

1997

Denel, ARMSCOR's (Armaments Corporation of South Africa) engineering arm, negotiates to revive the curtailed space program by courting international partners. Denel officials report that they are in the closing stage of a joint venture deal with a major international satellite group that wants to use Denel's aerospace facility.

— "South Africa-New Life for Local Space Programme," *Cape Business News*, September 1997, www.cbn.co.za.

24 September 1996

South Africa signs the Comprehensive Test Ban Treaty (CTBT). South Africa is one of 44 countries that must ratify the CTBT for it to take legal force, and South Africa will host five monitoring stations established to verify the treaty.

— Preparatory Commission for the Comprehensive Nuclear-Test Ban Treaty Organization, [undated], "State Information: South Africa," www.ctbto.org; "Status of the 44 States Whose Ratification Is Required for the Treaty to Enter Into Force (Article XIV)," www.ctbto.org.

May 1996

A South African government white paper declares "South Africa does not now, and will not in the future, have aggressive intentions towards any state. It is not confronted by an immediate conventional military threat, and does not anticipate external military aggression in the short- to medium-term (+/- 5 years)."

— Government of South Africa, "Defence in a Democracy: White Paper on National Defence for the Republic of South Africa," May 1996, www.gov.za.

13 September 1995

South Africa is accepted as a member of the Missile Technology Control Regime (MTCR).

— SA Communication Service, "South Africa Becomes a Member of the Missile Technology Control Regime (MTCR)," 14 September 1995, www.polity.org.za.

July 1995

According to Overberg test range division general manager Jan Malan, the test facility is now focusing on the support of aircraft and tactical missile test programs, with a particular concentration on "longer range systems."

— "Secret Range Conducts Stealth, Foreign Tests," *Aviation Week & Space Technology*, 3 July 1995, pp. 5.

30 June 1995

The South African government signals its intentions to adhere to Missile Technology Control Regime (MTCR) export

Related content is available on the website for the Nuclear Threat Initiative, www.nti.org.



guidelines and to terminate South Africa's space launch program.

— Ministry of Foreign Affairs, "South Africa Becomes a Member of the MTCR," 14 September 1995, www.lexis-nexis.com.

November 1994

The US Department of State commits \$500,000 to assist the government of South Africa in the destruction of the buildings at the Rooi-Els rocket motor static facility. The funds are to be used for the complete removal of structures.

— US Department of State, Nonproliferation and Disarmament Fund, "Destruction of Rooi-Els Rocket Motor Test Facility," 16 November 1994, www.ndf.org.

4 October 1994

South Africa and the United States sign a bilateral agreement by which South Africa terminates its missile development program and pledges to adhere to the export guidelines of the Missile Technology Control Regime (MTCR). The agreement includes provisions that allow South Africa to import temporary space-launch vehicles for satellite launches, when it is agreed that such activities will not contribute to missile proliferation.

— US State Department, "U.S., South Africa Sign Missile Non-Proliferation Pact," 4 October 1994, Federation of American Scientists, www.fas.org.

13 May 1994

South African Government Notice No. R88, issued by the Department of Defence, introduces licensing requirements for all items that fall within the limits of the Missile Technology Control Regime (MTCR).

— Peter Batchelor and Susan Willett, *Disarmament and Defence: Industrial Adjustment in South Africa* (New York: Oxford University Press, 1998), p. 126.

29 March 1994

The South African Supreme Court grants an injunction preventing scientists from making disclosures about their involvement with South Africa's nuclear and missile programs. The order is granted to ARMSCOR (Armaments Corporation of South Africa) after 16 South African nuclear scientists threaten to go public with weapons secrets in an attempt to win a \$1 million in unemployment benefits. The court acts after ARMSCOR testifies that revelations from the scientists could jeopardize negotiations with the US for South Africa's admission to the Missile Technology Control Regime (MTCR). [Note: This interdiction could also indicate that South Africa seeks to cover up its nuclear- and missile-related activities, and that allowing the scientists to go public would reveal the full extent of foreign cooperation with these programs.]

— David Beresford, "Nuclear Cover-Up Confirmed," *Guardian* (London), 30 March 1994, www.lexis-nexis.com; Roy E. Horton III, "Out of (South) Africa: Pretoria's Nuclear Weapons Experience," USAF Institute for National Security Studies, Occasional Paper #27, www.usafa.af.mil.

January 1994

The US State Department provides financial support to the government of South Africa for the destruction of two critical components of their Missile Technology Control Regime (MTCR) Category I ballistic missile delivery systems.

Related content is available on the website for the Nuclear Threat Initiative, www.nti.org.



This involves the destruction of rocket motor casting pits at the Somchen production facility by cutting out steel components and sealing the pits with concrete.

— US Department of State, Nonproliferation and Disarmament Fund, "Destruction of Rooi-Els Rocket Motor Test Facility," 1 January 1994, www.ndf.org.

1994

A spokesman representing 16 South African scientists claims that between 1989 and 1992, 200 South Africans secretly visited Israel and worked on a missile program.

— "Nuclear Scientists Threaten to Reveal Secret Arms Program: Blackmail Admitted," *Sunday Times* (Johannesburg), 27 March 1994, lexis-nexis.com.

16 August 1993

South Africa proclaims the Act on the Control of Non-Proliferation of Weapons of Mass Destruction. The legislation creates the South African Council for the Non-Proliferation (NPC) of Weapons of Mass Destruction, which is charged with export control authority for all nuclear dual-use items. The Act makes any involvement by South African citizens in the development of nuclear, biological, chemical weapons, or ballistic missile systems to deliver such weapons, a criminal offense.

— Waldo Stumpf, "South Africa: Nuclear Technology and Non-Proliferation," *Security Dialogue*, 1993, 24(4), p. 458.

30 June 1993

Under US pressure, South Africa agrees to refrain from manufacturing long-range missiles and to dismantle its capability to produce large space rockets. In return, South Africa is given access to military and high-tech markets of the industrialized nations. The RSA-3 and RSA-4 space launch vehicle (SLV) programs are cancelled. Prime contractor Houwteq dismantles its existing RSA rocket components and retrieves and sequesters technical data from its subcontractors. Propellant manufacturer Somchem eliminates RSA solid propellants and rocket casings that remain in stock. Denel fills in its large engine casting pits at Somerset West and demolishes its large-scale X-ray inspection equipment. The Hangklip static motor test facility at Rooi Els is converted into a nature reserve.

South African President F.W. de Klerk issues a statement announcing South Africa's termination of its SLV program, the result of an investigation into the commercial viability of the South African commercial space industry by Denel. Foreign Minister Roelof Botha refuses to divulge the total amount spent on the project and claims that Denel's missile test site at Hangklip could be offered to foreign weapons manufacturers. Foreign Minister Pik Botha states that the decision has been made for commercial reasons. However, "Western diplomats" say heavy pressure from the United States was the deciding factor. Washington does not want the technology to fall under the control of a future African National Congress (ANC) government. A Western diplomatic source says, "The bottom line is that the ANC has historically maintained close friendships with countries such as Libya, Cuba, and various Islamic revolutionary and fundamentalist Middle East states...[t]hese are regarded by Washington as unstable sponsors of terrorism who must not get access to South African missile technology." The envoys says South Africa was only about 12 months away from perfecting a rocket capable of propelling nuclear, chemical, or biological warheads more than 1,200 miles.

— Permanent Mission of South Africa to the United Nations, "Space Industry in South Africa," 30 June 1993;

Related content is available on the website for the Nuclear Threat Initiative, www.nti.org.



"South Africa abandons Independent Program," Reuters, 30 June 1993; "South Africa to abandon missile launching programme," Agence France Presse, 30 June 1993, www.lexis-nexis.com; *Encyclopedia Astronautica*, "Overberg," [undated], www.astronautix.com; "Pretoria Gives Up Nukes and Missiles," *Risk Report*, January 1996, www.lexis-nexis.com; Fred Bridgland, "S Africa Scraps Missile Plan After US Pressure," *Daily Telegraph*, 1 July 1993, www.lexis-nexis.com.

Phase IV: Legacies of SLV and Missile Programs, 1993-present

10 April 1993

A report published in *Jane's Defense Weekly* details the pressure that South Africa was under from the United States and Israel to ensure that its nuclear capacity and its space program did not fall into the hands of an African National Congress (ANC) government. [Note: The pressure stems from fear that the ANC would share technology with countries such as Libya, Cuba, and various Islamic revolutionary and fundamentalist Middle East states, which were traditionally supporters of the ANC.]

— Heitman Romer, "South Africa Built 6 Nuclear Weapons," *Jane's Defense Weekly*, 10 April 1993, www.lexis-nexis.com, p. 14.

28 March 1993

The *Sunday Times* (London) reports that South Africa reached a \$2 billion secret deal with China in the 1980s for access to China's long-range missile technology, allowing it "to develop the capability of launching ballistic nuclear weapons." According to South African military sources involved in negotiating the accord, the purpose was to have the ability to hit targets more than 2,000km from Pretoria, such as Luanda, the Angolan capital. South Africa also sought its own satellite to monitor movement of Cuban and other hostile forces in southern Africa. The accord was scrapped in 1989 after President de Klerk came to power. South African Consul-General in Hong Kong, Michael Farr, denies the report saying, "At no time did South Africa acquire nuclear weapons technology or materials from another country, nor has it provided any to any other country or cooperated with another country in this regard."

— Richard Ellis, "Secret Deal with China Extended Range of Nuclear Firepower," *Sunday Times*, 28 March 1993, www.lexis-nexis.com; "S. Africa Denies Secret Missile Deal With Peking," Central News Agency (Taiwan), 5 April 1993, www.lexis-nexis.com.

March 1993

Following President F.W. de Klerk's public acknowledgment of South Africa's nuclear weapons program, Waldo Stumpf, Chief Executive Officer of the Atomic Energy Commission (AEC), admits that the government did not reveal its nuclear arsenal earlier because it feared that doing so could have led to confrontational inspections similar to those occurring in Iraq. He further claims that the bombs were dismantled starting in February 1992.

— Davis Albright, "South Africa and the Affordable Bomb," *Bulletin of the Atomic Scientists*, July/August 1994, www.thebulletin.org.

24 March 1993

In a speech before the South African parliament, President F.W. de Klerk announces that South Africa had a nuclear weapons program from "as early as 1974" until 1990, during which time it constructed six of seven

Related content is available on the website for the Nuclear Threat Initiative, www.nti.org.



planned nuclear devices. According to De Klerk, the devices constituted a deterrent and South Africa never intended to use them offensively. South Africa's strategy was that "if the situation in southern Africa were to deteriorate seriously," the government would confidentially indicate its deterrent capability to one or more of the major powers—such as the United States—in order to persuade them to intervene. De Klerk states that all of South Africa's fissile nuclear material has been accounted for, and all hardware and design information has been destroyed. De Klerk declares that South Africa has never conducted "a clandestine nuclear test," nor has it obtained nuclear weapons materials or technology from another country. He further notes that in the late 1980s, South Africa was ready to test a medium-range missile capable of launching satellites. [Note: However, President de Klerk does not admit to any link between the nuclear and missile programs.]

— "Speech by President de Klerk to Joint Session of Parliament on 24 March 1993 Regarding the Nuclear Non-Proliferation Treaty and South Africa's Nuclear Capability," in Kenneth Mokoena, ed., *South Africa and the United States: The Declassified History* (New York: The New Press, 1993), pp. 170-176; F.W. de Klerk, *The Last Trek--A New Beginning* (New York: St. Martin's Press, 1999), pp. 66, 273.

19 March 1993

The US State Department expresses concern regarding the South African missile program, and urges South African officials to reconsider their commercial space industry program and the sale of South African missile technology to countries that have nuclear weapons but lack missile technology.

— Greg Myers, "South Africa's Rockets Now Come Under Scrutiny," AP, 26 March 1993, www.lexis-nexis.com; SABC TV 1 Network (Johannesburg), "Waldo Stumpf, Pik Botha Interviewed," cited in *Nonproliferation Issues*, 29 March 1993, pp. 5-8.

January-February 1993

An article in the Russian newspaper Rossiiskaya Gazetta denies Western press reports alleging that Russia would like to sell South Africa SS-20 missiles, which are due for destruction under the Soviet-American Intermediate-Range Nuclear Forces (INF) Treaty. The African National Congress (ANC) is critical of the offer and alleges that attempts are being made to arrange formal talks between Denel and the Russian space agency on the agreement for the delivery of Russian SS-20 intermediate-range missiles. The proposal allegedly includes the possible launch from the area of Murmansk or temporary launch facilities in South Africa.

— Seri Demidov, "SS-20 and SS-25 Missiles Will Not Fly to South Africa but Moscow is Prepared to Cooperate with Various Nations on the Space Market," *Russian Press Digest*, 11 February 1993, www.lexis-nexis.com.

1993

A classified US General Accounting Office (GAO) report concludes that the United States should "heighten" its concern over the possible misuse of Arrow anti-ballistic missile technology by Israel. The Arrow project is largely funded by the United States. The GAO study cites recent US government reports that conclude that Israel may still be selling weapons technology to unidentified third countries. [Note: The unnamed countries are most likely China and South Africa.] The report also cites US concerns about possible diversion of Arrow technology to Israel's ballistic missile programs. When questioned about the concerns raised in the report, Israeli officials in Tel Aviv and Washington say that in the past year they have given US authorities "appropriate guarantees" that sensitive US technology would not be misused. Former Israeli Defense Minister Moshe Arens, a strong advocate of the Arrow

Related content is available on the website for the Nuclear Threat Initiative, www.nti.org.



program, states that the concerns raised in the GAO report were baseless and that the allegations are being made "to muddy the waters of the US-Israel relationship."

— Edward T. Pound and David Makovsky, "A Missile Under Fire," *U.S. News & World Report*, 28 July 1993, www.lexis-nexis.com.

December 1992

The Russian Scientific and Technological Center reportedly offers to launch nine South African satellites into space, using a redundant SS-20 missile. The deal is made public by South Africa's Foundation representative and the chief Russian designer of the SS-20 missile.

— Brian Pottinger and C. Perkins, "Russian Offers To Launch Satellites Considered," *Sunday Times* (Johannesburg), 27 December 1992.

24 November 1992

The South African government announces that it intends to promulgate a bill prohibiting development of weapons of mass destruction in South Africa. An inter-departmental level committee is appointed to draft the bill, which is expected to be deliberated in parliament in 1993.

— "Restricting Weapons of Mass Destruction Planned," *Engineering News* (Johannesburg), 24 October 1992, cited in *Proliferation Issues*, 24 November 1992, p. 3.

12 October 1992

South Africa marks the beginning of "Space Week" with a successful test-firing of a solid-fuel launch system manufactured by Somchem. South African Public Enterprises Minister Dawie de Villiers remarks that there is international interest in cooperation with South Africa's space program although he does not mention specific firms or countries. The divisional general manager for Somchem, Jakob Dekker, reports that the motor has a 50-ton static thrust and a "500kg payload."

— "Somchem's Rocket Launcher, Test Described," *Star* (Johannesburg), 16 October 1992, p. 11, cited in *Proliferation Issues*, 18 December 1992, p. 1; "Foreign Interest in South African Space Project," Reuters, 12 October 1992, cited in Executive News Service, 13 October 1992.

October 1992

An unnamed official in the Taiwan Defense Ministry alleges that China is interested in purchasing missile guidance technology from South Africa. The source reports that South Africa has already sold China parts for long-range artillery.

— "S. Africa Said to Sell China Arms Technology," *Washington Times*, 27 October 1992, p. A2.

28 September 1992

South Africa's newly privatized arms and aerospace corporation expresses its interest in targeting Asian markets for exports of its military equipment. However, Denel's marketing director Ferdi Stark states that Denel would not sell any equipment prohibited by the Missile Technology Control Regime (MTCR).

— "South Africa Industry Targets Asia," *Defense News*, 29 September 1992, pp. 1, 34.

Related content is available on the website for the Nuclear Threat Initiative, www.nti.org.



27 August 1992

The US Commerce Department's Bureau of Export Administration and the US State Department's Bureau of Politico-Military Affairs announce the resolution of a controversy between the two offices over export licensing requirements to overseas entities under which the State Department has imposed sanctions for missile proliferation. The State Department is given the authority to impose sanctions on missile proliferations under the National Defense Authorization Act of 1990 against non-Missile Technology Control Regime (MTCR) countries that export goods and technology. The US State Department exercises this authority to level sanctions on five separate occasions against 11 entities in South Africa, as well as China, India, Iran, North Korea, Pakistan, Russia, Syria, and India.

— "BXA Negotiates Missile Controls with State," *Export Control News*, 27 August 1992, pp. 17-18.

August 1992

The South African press corps is invited by Somchem to observe the firing of a rocket motor at the controversial Hangklip test range off False Bay scheduled to take place on 10 October 1992. The test is expected to last 50 seconds and forms part of a continuing viability study of opening South Africa to the international commercial space industry.

— "Press to View Rocket Motor Test at Hangklip," *SAPA (Johannesburg)*, October 1992, cited in *Proliferation Issues*, p. 3.

16 June 1992

The US Bureau of Export Administration announces a list of destinations that require a validated export license when an exporter knows that the items will be used in the "design, development, or production of missiles." Twenty-one countries are on the list, including every country in the Middle East and South Africa. The list specifically mentions South Africa's surface-to-surface missile project and space launch vehicle (SLV). [Note: In an early draft, the list also explicitly mentioned Israel's Jericho II missile, but lobbying on the part of Israel leads to the removal of the specific reference from the 1992 list.]

— *Federal Register*, Vol. 57, 16 June 1992, p. 26773; Gary Milhollin and Gerard White, "Why Are U.S. Firms Still Able to Aid the Mideast Missile Race?," *Washington Post*, 16 August 1992, www.lexis-nexis.com.

22 April 1992

A report by the US State Department's Office of Inspector General recommends that export of military technology to Israel be subject to end-use restrictions. In response, Israel indicates that it will try to find non-US substitutes for components of Israeli weapons and technology with export potential. The report further cites a "major recipient of US weapons and technology" for illegal re-exportation of US anti-tank missile military technology to South Africa. [Note: This formulation is used to imply that Israel is the country supplying South Africa with the weapons technology.]

— "Israel Snubs USA in Weapons Export Row," *Flight International*, 22 April 1992, p. 5.

April 1992

US State Department Inspector General Sherman M. Funk charges in a report that Israel has engaged in a "systematic and growing pattern" of reselling sensitive US technology to other countries in violation of US law, and

Related content is available on the website for the Nuclear Threat Initiative, www.nti.org.



attempted to conceal the illegal exports. The report also notes that the State Department's Bureau of Politico-Military Affairs failed to notify Congress or senior department officials despite "significant" evidence of illegal violations. The report said the practice began in 1983 and was curbed only after the investigation began.

— David Hoffman, "U.S. Says Israel Resells Technology; State Department Inspector General Reports on Alleged Violations," *Washington Post*, 2 April 1992, www.lexis-nexis.com.

April 1992

The South African cabinet decides to commercialize ARMSCOR (Armaments Corporation of South Africa) and establish the Denel group of defense companies. Advena becomes a division of Denel, and subsequently focuses on electronic design and manufacture for medical equipment, powder metallurgy for components and military programs, and pyrotechnical engineering. In total, Denel takes over 23 of 26 ARMSCOR subsidiaries.

— Mark Hibbs, "South Africa's Secret Nuclear Program: The Dismantling," *Nuclear Fuel*, 24 May 1993, p. 12; David Albright, "A Curious Conversion," *Bulletin of the Atomic Scientists*, June 1993, bullatomsci.org.

15 March 1992

In an interview, (Reserve) Major General Yehoshu'a Sagi, chairman of the Subcommittee on Arms Sales of the Knesset Foreign Affairs and Defense Committee, denies that Israel illegally transferred Arrow technology to South Africa or Patriot technology to China.

— "Arms Sales Subcommittee Chairman," *IDF Radio (Tel Aviv)*, 15 March 1992, cited in *Proliferation Issues*, 26 March 1993, pp. 35-37.

3 March 1992

US Ambassador to South Africa William Swing meets with South African Ambassador to the United States Harry Schwartz and ARMSCOR (Armaments Corporation of South Africa) representatives to pressure South Africa to scale down its missile manufacturing capacity.

— "Regime, Armscor, U.S. Discuss Arms Sales," *Saturday Star (Johannesburg)*, 15 February 1992, cited in *Proliferation Issues*, 3 March 1993, p. 1; Gary Mulhollin and Gerard White, "Why Are U.S. Firms Still Able to Aid the Mideast Missile Race?" *Washington Post*, 16 August 1992, www.lexis-nexis.com.

February 1992

South African security sources complain that the United States is pressuring South Africa to abandon its satellite launch program because it could be converted to a missile program. The sources further state that the United States extended its embargo against South Africa, which began in 1990 in order to force Israel to halt arms cooperation with South Africa.

— "Security Sources Cited on U.S. Plans," *Cape Times*, 14 February 1992, cited in *FBIS-AFR-92-032*, 18 February 1992.

10 January 1992

South Africa appears on a British Department of Trade list of 33 countries considered as sensitive destinations, due to concern over evidence that exports are used in its ballistic missile and nuclear programs.

Related content is available on the website for the Nuclear Threat Initiative, www.nti.org.



— "Arms Sanctions for Six African States," *Africa Confidential*, 10 January 1992, p. 8, cited in *Proliferation Issues*, 14 February 1992, p. 1.

2 January 1992

Israel publicly announces that it will abide by Missile Technology Control Regime (MTCR) guidelines and will no longer cooperate with South Africa on ballistic missile development.

— "CIA Threat," *Arms Sales Monitor*, 2 January 1992, p. 3.

28 October 1991

US intelligence agencies determine that Israel has exported key ballistic missile components to South Africa; however, President Bush decides against applying any punitive measures toward Israel. His decision is motivated by a concern that sanctions against Israel could undermine its position at the forthcoming Middle East peace conference and further aggravate US-Israeli relations.

— "Bush Waived Retaliation Over Israeli Arms Sales," *Daily Telegraph*, 28 October 1991, www.lexis-nexis.com.

15 October 1991

The United States imposes two-year sanctions against ARMSCOR (Armaments Corporation of South Africa) after the US State Department determines that it has been engaging in "missile proliferation activities." The sanctions mandate a two-year ban on dealings with the corporation, which is to remain in effect even if general sanctions are lifted. The terms of the sanctions stipulate that licenses for the export of "controlled" items to Armscor are to be denied; no US government contracts may be entered into with the corporation; and no ARMSCOR products may be imported. South African Foreign Minister Roelof Botha expresses "regret" over the US decision.

— David Beresford, "US Ban Deals Big Blow to South African Arms Maker: Unspecified Sales of Missiles Cited in Punitive Embargo by Washington," *Guardian* (London), 17 October 1991, www.lexis-nexis.com; "South Africa Regrets New U.S. Arms Sanctions," Xinhua News Agency, 12 October 1991, www.lexis-nexis.com; David Hoffman and R. Jeffrey Smith, "President Waives Sanctions for Israel; S. African Firm Cited in Missile Parts Deal," *Washington Post*, 27 October 1991, www.lexis-nexis.com.

October 1991

Following admission by an ARMSCOR (Armaments Corporation of South Africa) spokesman that the state-run corporation had developed a wide range of ground-to-ground, ground-to-air, air-to-ground, and air-to-air missiles, two South African experts, professors Mike Hough of the University of Pretoria and Garth Mine of Stellenbosch University, claim that South Africa also tested two booster rockets.

— "Experts Say South Africa Has Ballistic Missile Capability," AP, 17 October 1991, www.lexis-nexis.com.

September-October 1991

The Bush administration pressures Israel to impose controls on its export of missile technology. Israel concedes in response to US threats to curtail US Department of Defense contracts with Israeli defense contractors. In return, the United States does not impose sanctions against Israel for violating the Missile Technology Control Regime (MTCR). [Note: The United States is also eager to avoid a confrontation with Israel on the eve of the Middle East peace conference in Madrid.]

Related content is available on the website for the Nuclear Threat Initiative, www.nti.org.



— Jackson Diehl, "Israel, Pressed by U.S., Puts Limits on Its Export of Missile Technology," *Washington Post*, 4 October 1991, www.lexis-nexis.com; Simon Tisdall, "US Plays Down Illegal Israeli Missile Sales," *Guardian* (London), 28 October 1991, www.lexis-nexis.com; Stephen Labaton, "Baker Defends Waiver of Sanctions Against Israel on Missiles," *New York Times*, 28 October 1991, www.lexis-nexis.com.

September 1991

A US Federal Register notice announces sanctions against South Africa for importing ballistic missile technology from Israel. Under US law, the president is required to prohibit US exports of aerospace technology to any foreign entity exporting or importing missile technology in contravention of the Missile Technology Control Regime (MTCR). President Bush, who is unaware of the impending sanctions, receives a personal call from President de Klerk protesting the sanctions. The Bush administration initially settles on a compromise that would allow US sanctions to be lifted if South Africa limited its rocket activities to development of "peaceful space launch vehicles [SLVs]." However, some US officials oppose this idea because of the technical similarities between a SLV and a ballistic missile. A series of high-level meetings between US and South African officials follows in which US officials argue that South Africa's rocket program is not cost effective and will eventually harm the already shrinking economy. South African officials receive a briefing on the economics of SLVs and other private economic market analyses, which is based on a RAND study. Subsequently, the South African government announces that it will stop subsidizing the project and direct those in charge of the project to determine ways to make it profitable. [Note: After a year of attempting to make the program profitable, in 1993 South Africa announces the abandonment of its SLV program.]

— Henry Sokolski, "Ending South Africa's Rocket Program: A Nonproliferation Success," Nonproliferation Policy Education Center, Fall 1993, www.wizard.net; Brian G. Chow, Calvin L. Shipbagh, and Richard H. Buenneke, Jr., "A Comparison of Spin-Offs from Space Launch and Satellite Programs in the Third World Countries," RAND, February 1997.

August 1991

Israel and South Africa conduct joint tests of the Barak naval anti-missile system off the Natal Coast. The Barak 1 missile has four folding clipped-tip delta wings and four folding, moving clipped-tip control fins at the rear. The missile is 2.17m long, has a body diameter of 0.17m, an unfolded wing span of 0.68m, and weighs 98kg. In addition to the control fins, there are thrust deflectors in the boost motor exhaust nozzle to assist in controlling the missile after its vertical launch. The boost-motor section is ejected after the initial boost phase. Guidance is by radar-controlled Command to Line of Sight (CLOS), using Elta STR coherent pulse-Doppler radar, or using an electro-optic tracker in severe ECM conditions. The STR engagement radar operates in the 8 to 40GHz (I/J/K-bands), has elevation coverage of +85 to -25°, and a range of about 20km. The Barak missile warhead weighs 22kg, and is a fragmentation type with an active laser-fusing system that is supported by an altimeter to intercept very low-level targets. The missile has a range of 12km against aircraft targets, and around 5km against sea-skimming anti-ship missiles. A minimum range of 500m is reported. The lightweight system, including radar, fire-control system, and eight missiles in launch canisters, weighs a total of 3,000kg. The fire-control radar can command two separate missiles towards each target, and it is reported that the Barak system can be fully and automatically controlled by the threat evaluation system.

Related content is available on the website for the Nuclear Threat Initiative, www.nti.org.



— Gerald M. Steinberg, "Israel: Case Study for International Missile Trade and Nonproliferation," in William C. Potter and Harlan W. Jenks, eds., *The International Missile Bazaar: The New Suppliers Network* (Boulder, CO: Westview Press, 1994), p. 242; Jane's Strategic Weapon Systems 35, "Defensive Weapons, Israel, Barak," 19 January 2001, online.janes.com.

10 July 1991

US President Bush lifts sanctions imposed by the Comprehensive Anti-Apartheid Act of 1986, although an arms embargo and several other measures remain in effect, along with restraints by some state and local governments in the United States.

— Ann Devroy and Helen Dewar, "Citing S. Africa's 'Transformation,' Bush Ends Most Sanctions," *Washington Post*, 11 July 1991, www.lexis-nexis.com.

10 July 1991

South Africa signs the Treaty on the Non-Proliferation of Nuclear Weapons (NPT). The International Atomic Energy Agency (IAEA) begins inspections of South Africa's nuclear weapon manufacturing facilities to verify the scope and history of the program and its subsequent dismantlement.

— Seth W. Carus, "Israeli Ballistic Missile Developments," Testimony before the Commission to Assess the Ballistic Missile Threat to the United States, 15 July 1998, www.fas.org; Rita M. Byrnes, ed., *South Africa: A Country Study* (Washington, DC: Federal Research Division, Library of Congress, 1997), p. 355.

July 1991

Senior Israeli Ministry of Defense officials state that Israel is following US policy with respect to South Africa, and stress that even if economic sanctions are relaxed, Israel will continue to enforce restrictions on military links.

— Gerald M. Steinberg, "Israel: Case Study for International Missile Trade and Nonproliferation," in William C. Potter and Harlan W. Jenks, eds., *The International Missile Bazaar: The New Suppliers Network* (Boulder, CO: Westview Press, 1994), p. 242.

26 May 1991

The last of 50,000 Cuban troops leave Angola as part of implementation of the Angola-Namibia peace accords.

— Kenneth Mokoena, ed., *South Africa and the United States: The Declassified History* (New York: The New Press, 1993), p. 45; "Troops Home," *Independent* (London), 27 May 1991, www.lexis-nexis.com.

5 May 1991

US intelligence officials report that spy satellites have detected South African preparations for another test-flight of "Israel's Jericho II missile."

— "Probe Begins into 'Illegal Shipments to S Africa'," *Financial Times* (London), 30 May 1991, www.lexis-nexis.com.

May 1991

The US Senate Intelligence Committee launches an investigation into reports that US ballistic missile technology was illegally shipped to South Africa between 1984 and 1988, with the full knowledge of the CIA.

— "Probe Begins into 'Illegal Shipments to S. Africa'," *Financial Times* (London), 30 May 1991, www.lexis-nexis.com.

Related content is available on the website for the Nuclear Threat Initiative, www.nti.org.



Phase III: Increasing US Pressure and the End of the Missile and Satellite Launch Vehicle (SLV) Programs, May 1991-1993

1991

A third test-firing of South Africa's intermediate-range missile is expected, but never occurs.

— John Pike, "Overberg Test Range OTB Arniston South Africa," 29 May 2000, Federation of American Scientists, www.fas.org.

1991

An ABC News-Financial Times investigation alleges that the International Signal and Control Company has exported technology critical for several years to the development of long-range missile development to South Africa. The investigation further alleges that missile technology exported to South Africa was in turn sold to Iraq.

— "Financial Times Sales Report," ABC News Nightline, 23 May 1991, www.lexis-nexis.com.

1991

The African National Congress (ANC) urges the government to fully disclose the extent of South Africa's nuclear program. US officials believe that the South African government is withholding information because it fears that the ANC will interfere with its efforts to sell off its inventory of weapon-grade uranium to the United States. Furthermore, according to a US official, the ANC is bound to view the sale of the weapon-grade stock as a signal that the governments involved in the transactions do not trust a prospective black majority government.

— David Albright and Mark Hibbs, "South Africa: The ANC and the Atom Bomb," Bulletin of the Atomic Scientists, April 1993, www.bullatomsci.org.

1991-1993

The International Atomic Energy Agency (IAEA) learns that South Africa has produced over 200kg of weapons-grade enriched uranium. The high cost of production and the size of the stockpile increase suspicion that South Africa had a bomb program as recently as the mid-to-late 1980s. The IAEA encounters problems in verifying the accuracy of South Africa's nuclear inventory and has found significant discrepancies between the amount of highly enriched material South Africa declared and the IAEA's own estimate. [Note: The IAEA's balance calculations for the Z-plant also reveal an apparent discrepancy. Both discrepancies are due to the material accounting system. In September 1993, The IAEA finds it "reasonable to conclude" that the quantity of HEU that could have been produced by the pilot enrichment plant (the Y-plant) in South Africa are consistent with South Africa's initial report to the IAEA.]

— David Albright and Mark Hibbs, "South Africa: The ANC and the Atom Bomb," Bulletin of the Atomic Scientists, April 1993, www.bullatomsci.org; International Atomic Energy Agency, "Report on the Completeness of the Inventory of South Africa's Nuclear Installations and Material," attachment to Gov/2609, 3 September 1992, pp. 4-5.

December 1990

The UN General Assembly condemns military collaboration between Israel and South Africa and urges the Security Council to take appropriate measures against Israel for violating the mandatory arms embargo against South

Related content is available on the website for the Nuclear Threat Initiative, www.nti.org.



Africa.

— United Nations General Assembly, *Policies of Apartheid South Africa* (New York: UNGA, 1990) www.lexis-nexis.com.

19 November 1990

South Africa admits conducting a second missile test-flight from an operational site in the Judean Hills but insists that the missiles are booster rockets for a peaceful space program.

— John Pike, "Overberg Test Range OTB Arniston South Africa," 29 May 2000, Federation of American Scientists, www.fas.org; William E. Burrows and Robert Windrem, *Critical Mass: The Dangerous Race for Superweapons in a Fragmented World* (New York: Simon & Schuster, 1994), p. 455.

19 September 1990

US Customs officials charge a Dutch national and an accomplice with buying sophisticated parts for guided missiles intended for sale to South Africa. Customs alleges that York, Ltd. shipped isolators and circulators from the United States to Telecom Industries in South Africa. The company does not have a license to order some military items and falsely told US manufacturers that the equipment was destined for the Netherlands. Warrants are issued for Reginald Van Rossum, a Dutch citizen living in Ocean Ridge, Florida, and his secretary, Beverly Barratt. The two operate the West Palm Beach, Florida company, which exports computer equipment. Barratt later pleads guilty to one count of attempting to ship missile guidance equipment to South Africa, in violation of the US embargo. She is sentenced to house arrest and three years probation after she agrees in a plea bargain to testify against Van Rossum, should his case reach court. US customs agents suspect the Dutch national is living in South Africa.

— "2 Charged in South Africa Deal," *Washington Post*, 20 September 1990, www.lexis-nexis.com/universe; Richard Cole, "Customs Stops Missile System Shipments to Pretoria," AP, 19 September 1990, www.lexis-nexis.com; "Florida Secretary Gets House Arrest in Missile Parts Scheme," AP, 1 October 1991, www.lexis-nexis.com.

10 September 1990

In response to a request of resolution 44/113, the UN Department of Disarmament Affairs issues the report South Africa's Nuclear Tipped Ballistic Missile Capability.

— UN Department of Disarmament Affairs, *South Africa's Nuclear Tipped Ballistic Missile Capability* (New York: United Nations, 1991).

16 May 1990

US authorities allege in a Philadelphia court that James Guerin, a former deputy chairman of Ferranti International, a British defense contractor, illegally exported electronic military equipment to South Africa. The sales were part of \$1 billion in phony arms contracts that Guerin and others generated over a 12-year period to defraud shareholders, companies, and lenders.

— "Guerin 'Sold Electronics to Pretoria'," *Financial Times* (London), 17 May 1990, www.lexis-nexis.com.

4 April 1990

Maryanne E. Callaghan, head of LCR Capacitors, a Warwick, Rhode Island computer firm, is convicted by a federal jury of conspiring to ship \$50 million worth of gyroscopes to South Africa, which is in violation of the US Anti-

Related content is available on the website for the Nuclear Threat Initiative, www.nti.org.



Apartheid Act of 1986. Two other defendants in the case, Frank J. Randazzo and Symone Morris Behrman, plead guilty. Defendants Guy Perfezou and George Lester Buckingham Talbor have fled and are believed to be in South Africa.

— "Woman Convicted Under Anti-Apartheid Act," *Washington Post*, 5 April 1990, www.lexis-nexis.com.

3 April 1990

Israel launches the second Shavit satellite launch vehicle (SLV) carrying the Ofeq 2 satellite.

— Jane's Strategic Weapon Systems 33, "Offensive Weapons (Unclassified Projects) - Satellite Launch Vehicles, Israel," 14 February 2000, online.janes.com.

April 1990

Review of the South African defense requirements leads to reduction in defense expenditures.

— William Gutteridge, *South Africa's Defence and Security into the 21st Century* (Aldershot, UK: Dartmouth, 1996), p. 3.

21 March 1990

Namibia gains its independence.

— Laurent C.W. Kaela, *The Question of Namibia* (New York: St. Martin's Press, 1996), p. 125.

1990

A UN Secretary General report asserts that South Africa's experience in developing small tactical missiles has given it the infrastructure, skills, and resources required for the initiation and conduct of a long-range rocket or missile program.

— UN Department of Disarmament Affairs, *South Africa's Nuclear Tipped Ballistic Missile Capability* (New York: United Nations, 1991), p. 51.

Early 1990s

The US government asks the South African government whether it intends to accept the export controls of the Nuclear Suppliers Group (NSG). These controls require any recipient of nuclear commodities to accept full-scope safeguards, and also require exporters to adopt new controls on the supply of "dual-use" items.

— David Albright and Mark Hibbs, "South Africa: The ANC and the Atom Bomb," *Bulletin of the Atomic Scientists*, April 1993, www.bullatomsci.org.

1990-1991

During the Persian Gulf War, the United States urges Israel to limit any retaliation to Iraq's missile attacks to the use of ballistic missiles. According to Israeli sources, Israel rejects the US suggestions because the Jericho II missile is not yet operational. The Jericho II does not become operational until after the Gulf War. [Note: However, Jane's Strategic Weapons reports that the Jericho II entered service in 1989.]

— David Albright, "South Africa's Secret Nuclear Weapons," *Institute for Science and International Security*, May 1994, www.isis-online.org.

Related content is available on the website for the Nuclear Threat Initiative, www.nti.org.



[Back to Top](#)

1989-1981

Late 1980s

ARMSCOR (Armaments Corporation of South Africa) now consists of 12 subsidiary companies and various R&D and test facilities.

— Peter Batchelor and Susan Willett, *Disarmament and Defence: Industrial Adjustment in South Africa* (New York: Oxford University Press, 1998), pp. 32-33.

Late 1980s

Israel allegedly uses the Overberg Test Range on at least three occasions to test-launch the medium-range Jericho II missile.

— William E. Burrows and Robert Windrem, *Critical Mass: The Dangerous Race for Superweapons in a Fragmented World* (New York: Simon & Schuster, 1994), p. 455.

15 December 1989

UN General Assembly Resolution 44/113 notes "with great concern" that "collaboration between Israel and South Africa has resulted in the development by South Africa of a nuclear-tipped missile." The resolution also requests the Secretary-General to report to the General Assembly at its 45th session on the military assistance that South Africa is receiving from Israel, and any other sources in advanced missile technology, as well as supporting technical facilities.

— UN General Assembly, "Implementation of the Declaration on the Denuclearization of Africa," A/RES/44/113, 15 December 1989, www.un.orgdocuments.

December 1989

A CIA report concludes that South Africa is preparing series production of solid-fuel motors that could be used in both ballistic missiles and space launch vehicles.

— US Central Intelligence Agency, Directorate of Intelligence, Africa Report, 8 December 1989, top-secret report partially declassified and released, 7 May 1996, foia.ucia.gov, p. 7.

November 1989

President de Klerk's Expert Committee recommends the termination and complete dismantlement of South Africa's nuclear weapons program. De Klerk agrees and assembles a working group of ARMSCOR (Armaments Corporation of South Africa) and Atomic Energy Commission (AEC) officials to advise him on a timetable for dismantlement and the earliest possible date when South Africa could join the Non-Proliferation Treaty (NPT).

— J.W. de Villiers, Roger Jardine, and Mitchell Reiss, "Why South Africa Gave Up the Bomb," *Foreign Affairs*, November/December 1993, www.lexis-nexis.com.

16 November 1989

The South African government denies any connection with five people indicted in a conspiracy to illegally ship

Related content is available on the website for the Nuclear Threat Initiative, www.nti.org.



missile guidance equipment to ARMSCOR (Armaments Corporation of South Africa). At a news conference, US Attorney Jay Stephens said "the inference to be drawn" is that ARMSCOR "either requested" that the defendants obtain the gyroscopes or that the arms brokers knew ARMSCOR would be an "interested purchaser." However, Patrick Evans, a spokesperson at the South African Embassy in Washington, DC said his country was "well aware" of the US laws and regulations, "particularly in the field of the arms boycott," and would do nothing to circumvent them. He says that "[t]he natural extension of that statement is that there is no one in South Africa or its agencies who is involved in this matter."

— Pete Yost, "South African Government Denies Link with Illegal Arms," AP, 17 November 1989, www.lexis-nexis.com.

15 November 1989

Five people are indicted in a scheme to export gyroscopes to South Africa that could be used in ballistic missiles. US Customs officials seize five gyroscopes manufactured by Northrop Corporation bound for South Africa during a raid on a home in Warwick, Rhode Island. The Customs seizure, part of "Operation Exodus," uncovers a scheme to export an initial order of \$300,000 worth of gyroscopes to South Africa and planned contracts for \$50 million worth of military equipment. The gyroscopes are reportedly intended for anti-tank missiles being developed by South Africa. Two US and three South African citizens are indicted in the scheme, which was to ship the items through an Israeli front company called Kivun Communications and Guidance Systems, Ltd. From Israel the gyroscopes were to be exported to Perfezou Imports & Exports and eventually to ARMSCOR (Armaments Corporation of South Africa). Also mentioned in the indictment is Israel Aircraft Industries, a government-owned company that made initial contact with Northrop about the gyroscopes.

A federal grand jury indicts Frank J. Randazzo (United States); Symone N. Behrmann (South Africa); Maryanne E. Callaghan (United States); Guy Perfezou (South Africa), and Lester George Buckingham Talbot (South Africa) on charges of conspiracy, violation of the Arms Export Control Act, and US anti-apartheid sanctions. Also named as a defendant is Perfezou's company, Perfezou Imports & Exports Ltd, of Maraisburg, South Africa. The defendants tell customs agents that their work was approved by South African government officials. Randazzo and Behrmann later plead guilty to charges in the case and a federal jury finds Callaghan guilty. Perfezou and Talbot are fugitives and believed to be living in South Africa.

— "South Africa's Nuclear Autopsy," *The Risk Report* (2) 1, January-February 1996, pp. 4-5, 10, Wisconsin Project on Nuclear Arms Control, www.wisconsinproject.org; Pete Yost, "Five Charged With Conspiring to Sell South Africa Banned Goods," AP, 16 November 1989, www.lexis-nexis.com; Dan Carmichael, "Indictments in Israel, South Africa Weapons Deal," UPI, 16 November 1989, www.lexis-nexis.com; "Woman Convicted of Conspiracy in South Africa Scheme," UPI, 4 April 1990, www.lexis-nexis.com; "Businessman Pleads Guilty in Export Scheme," AP, 6 January 1990, www.lexis-nexis.com

15 November 1989

During a one-hour secret meeting in Washington, a group of black and Jewish members of Congress extensively question Israeli Prime Minister Yitzhak Shamir about his country's military links and cooperation in missile technology with South Africa. Among the 10 congressmen at the meeting is Ronald Dellums, chairman of the Congressional Black Caucus. Dellums and other black members requested the meeting with Shamir after they are

Related content is available on the website for the Nuclear Threat Initiative, www.nti.org.



briefed by the CIA, DIA, and State Department on cooperation between Israel and South Africa. The representatives reportedly are "not satisfied" with Shamir's answers.

— Seema Sirohi, "South Africa: Congressmen Question Shamir on Military Links," Inter Press Service, 16 November 1989, www.lexis-nexis.com.

15 November 1989

During an Oval Office meeting, US President Bush confronts Israeli Prime Minister Yitzhak Shamir over Israel's alleged military cooperation with South Africa, in what White House officials characterize as an "unusually direct" conversation. Bush's demeanor is also a reflection of US officials' growing frustration with the slow progress of the Middle East peace process.

— Susan Page, "Bush Puts Shamir on Oval Office Carpet," *Newsday*, 16 November 1989, www.lexis-nexis.com.

3 November 1989

Arthur H. Hughes, US Deputy Assistant Secretary of Defense for Near Eastern and South Asian Affairs, sends a memo to the undersecretary of defense for policy concerning Israel-South African missile cooperation. It is subsequently released through the Freedom of Information Act (FOIA), but the entire two-page memo is blacked out.

— Office of Deputy Assistant Secretary of Defense for Near Eastern and South Asian Affairs, "Israel-South African Missile Cooperation," 3 November 1989, Secret memo declassified and partially released [release date unknown], Digital National Security Archive, nsarchive.chadwyck.com.

November 1989

CIA officials tell US representatives and senators in a closed briefing that Israel has been involved in extensive cooperation with South Africa on ballistic missiles in recent years.

— Wolf Blitzer, "No Confirmation of Joint Development of Nuclear Weapons. CIA Says Report of Israel-SA Cooperation Is Partly True," *Jerusalem Post*, 5 November 1989, www.lexis-nexis.com.

November 1989

US Department of Defense officials raise questions about an Israeli request to buy an upgraded version of the IBM 3090 mainframe computer that could simulate the trajectories of ballistic missiles. Although the Pentagon sees the request as an opportunity to acquire information about Israel's civil and military booster research programs, it is concerned by recent reports of South Africa's test-firing of an intermediate-range missile built with Israeli assistance.

— "Pentagon Queries Israeli Missile Computer Purchases," *Flight International*, 4 November 1989, www.lexis-nexis.com.

November 1989

The last South African troops withdraw from Namibia.

— Rita M. Byrnes, ed., *South Africa: A Country Study* (Washington, DC: Federal Research Division, Library of Congress, 1997), p. xxx.

Related content is available on the website for the Nuclear Threat Initiative, www.nti.org.



October 1989

The Bush administration expresses its opposition to proposed mandatory sanctions against companies transferring ballistic missile technology to third world nations. Assistant Secretary of State Richard A. Clark tells a House panel that "no new legislative authority" is necessary and that a bill requiring the president to impose sanctions "could hinder rather than enhance" US ability to combat the problem. Clarke adds that the administration is concerned "that legislation could damage essential international cooperative efforts to deal with [missile] proliferation." Responding to recent reports of South African-Israeli missile cooperation, Clarke warns, "if there is a corporate relationship, or government relationship [between Israel and South Africa on missile development] then this legislation...might mandate that we terminate a variety of programs with Israel."

A bill aimed at imposing sanctions on persons violating Missile Technology Control Regime (MTCR) regulations is subsequently passed by Congress. The Missile Equipment Technology Act of 1989 strengthens existing US export controls on the transfer of missile equipment. It also requires the president to deny issuing export licenses to or ban the importation of products from a foreign person that has exported or imported missile equipment and technology in violation of the MTCR.

— David B. Ottaway, "Bush Aides Say Sanctions Could End Israeli Programs," *Washington Post*, 31 October 1989, www.lexis-nexis.com; US Senate, "Missile Equipment and Technology Control Act of 1989," 19 November 1989, thomas.loc.gov.

October 1989

The Bush administration expresses its opposition to proposed mandatory sanctions against companies transferring ballistic missile technology to third world nations. Assistant Secretary of State Richard A. Clark tells a House panel that "no new legislative authority" is necessary and that a bill requiring the president to impose sanctions "could hinder rather than enhance" US ability to combat the problem. Clarke adds that the administration is concerned "that legislation could damage essential international cooperative efforts to deal with [missile] proliferation." Responding to recent reports of South African-Israeli missile cooperation, Clarke warns, "if there is a corporate relationship, or government relationship [between Israel and South Africa on missile development] then this legislation...might mandate that we terminate a variety of programs with Israel."

28 October 1989

A US State Department spokesman reports that the United States has "no indication" that Israel transferred any US missile technology to South Africa, and refuses to comment on reports that Israel and South Africa collaborated to develop and test intermediate-range missiles. The spokesman further states that the United States is applying "the same guidelines" to Israel as it does to other Third World countries under the 1987 Missile Technology Control Regime (MTCR).

— "State Dept. Sees No Israel-South Africa," *Washington Post*, 28 October 1989, www.lexis-nexis.com.

28 October 1989

US President George Bush warns that any cooperation on nuclear missiles between Israel and South Africa would complicate US-Israeli relations. Israeli Prime Minister Shamir responds by saying those responsible for leaking information to NBC News sought to sabotage US-Israeli relations.

Related content is available on the website for the Nuclear Threat Initiative, www.nti.org.



— Wolf Blitzer, David Makovsky, and Dan Petreanu, "It Would 'Complicate' Jerusalem-Washington Ties. Bush Warns Israel on N-Deal with S. Africa," *Jerusalem Post*, 29 October 1989, www.lexis-nexis.com.

28 October 1989

IBM officials withhold the sale of all mainframe computers to Israel, pending an investigation into the alleged transfer of ballistic missile technology from Israel to South Africa. Although the US Department of Defense backs the sale, IBM cooperates fully with international sanctions against South Africa and fears that Israel would transfer IBM computer technology to South Africa.

— Kenneth Kaplan, "IBM Withholds Computer Despite Pentagon Backing," *Jerusalem Post*, 29 October 1989, www.lexis-nexis.com.

26 October 1989

Israeli Prime Minister Yitzhak Shamir further denies reports that Israel provided missile technology to South Africa. Shamir tells Israel Radio that there is "no truth" to the NBC News report alleging a partnership between Israel and South Africa to develop nuclear missile capability.

— "S. Africa Nuclear Link Denied," *Los Angeles Times*, 26 October 1989, www.lexis-nexis.com.

25 October 1989

NBC News reports that Israel has "secretly given South Africa access" to the "nuclear club." Quoting anonymous intelligence sources, the network says that Israel is in a partnership with Pretoria to produce a missile with a nuclear warhead for South Africa in exchange for enriched uranium and access to a long-range test site. The report identifies ARMSCOR (Armaments Corporation of South Africa) as builder of the missile and Urdan, an Israeli firm outside of Tel Aviv, as the front company responsible for transferring missile technology. Israeli General Hagai Ravev, a former senior adviser to Defense Minister Yitzhak Rabin, allegedly oversees the project from Jerusalem.

In a follow-up report, NBC claims that Israel is also sharing aviation technology with Pretoria and that at least 75 Israeli engineers have gone to South Africa to work on aviation projects. The report also alleges that South Africa is developing a site to construct a long-range missile with Israel, which the CIA designates as IRAH-3.

— Michael R. Gordon, "U.S. Sees Israeli Help in Pretoria's Missile Work," *New York Times*, 27 October 1989, www.lexis-nexis.com; NBC Nightly News, 25 October 1989, transcript of broadcast 25 October 1989, pp. 1-2.

October 1989

US officials publicly accuse Israel of assisting South Africa in developing a medium-range missile. Although Israeli Prime Minister Yitzhak Shamir denies such involvement, the Israeli Defense Ministry issues a statement hinting that some cooperation may be occurring, but only under old contracts. The US State Department confirms that it held discussions with Israel regarding the development of missiles and military cooperation with South Africa. Israeli sources subsequently confirm reports of cooperation with South Africa on a variety of projects including the joint development of a surface-to-surface missile armed with a nuclear warhead. Brigadier General Hagai Regev, an official at the Israeli Embassy in Pretoria, reportedly heads the joint missile development project.

— "State Department Confirms Discussions with Israel on Pretoria Cooperation," *Aerospace Daily*, 27 October

Related content is available on the website for the Nuclear Threat Initiative, www.nti.org.



1989, www.lexis-nexis.com; Michael R. Gordon, "U.S. Sees Israeli Help in Pretoria's Missile Work," *New York Times*, 27 October 1989, www.lexis-nexis.com.

21 September 1989

The London branch of Pennsylvania-based International Signal and Control (ISC) is alleged to have manufactured chemical weapons and sold electronic equipment to South Africa in violation of UN sanctions. The US Defense Department placed a \$1.085 million order for binary nerve gas shell and missile casings with the Marquardt Corporation, ISC's rocket and armaments division, in 1988. The order was allegedly part of the US government's top secret Big-Eye chemical weapon project. Jacq Van Der Heyden, who worked for ESI, (a London marketing operation controlled by ISC, until 1986) confirms that ESI sold ISC products to South Africa and elsewhere but said that the South African sales were "mainly electronic equipment."

— Daniel John, Ben Laurance, and Patrick Donovan, "Chemical Weapon Link to Ferranti Subsidiary," *Guardian* (London), 23 September 1989, www.lexis-nexis.com.

September 1989

On the advice of his senior political aides and advisors, President F.W. de Klerk decides that in order to end South Africa's isolation from the international community, both the political system of apartheid and the nuclear weapons program must be dismantled. De Klerk summons Atomic Energy Commission (AEC) Executive Chairman Wynand de Villiers and Waldo Stumpf to inform them of his intention to terminate the nuclear weapons program and accede to the Non-Proliferation Treaty (NPT). De Klerk asks them to draw up a schedule to implement his directive.

— Adrian Hadland, "SA's Nuclear Delusions Lie in Ruins, But They Still Cost a Fortune," *Independent Online*, 26 January 1998, www.inc.co.za; Waldo Stumpf, "South Africa's Limited Nuclear Deterrent Programme and the Dismantling thereof Prior to South Africa's Accession to the Nuclear Non-Proliferation Treaty," Press Conference, Washington, 23 July 1993.

14 September 1989

Reformist candidate F.W. de Klerk is elected president of South Africa.

— "De Klerk Promises Reforms As Anti-Apartheid Leaders Held," *Guardian* (London), 15 September 1989, www.lexis-nexis.com.

September 1989

Israel conducts a third test of the improved Jericho II. The missile flies nearly 1,300km, putting southern Russia and Iran in range.

— "Israel: How Far Can Its Missiles Fly?" *Risk Report* (1) 5, June 1995, Wisconsin Project on Nuclear Arms Control, www.wisconsinproject.org.

5 July 1989

ARMSCOR (Armaments Corporation of South Africa) announces that it has successfully tested a booster rocket from the Overberg test range outside Cape Town. Although South African sources describe the launch as a booster rocket, outside analysts suggest that it may have been a test-flight of an intermediate-range ballistic missile

Related content is available on the website for the Nuclear Threat Initiative, www.nti.org.



(IRBM). A US (DIA) Special Assessment calls the missile a "probable SRBM [short-range ballistic missile]." US intelligence sources report that the rocket plume of the missile bears a striking resemblance to Israel's Jericho missile. The DIA report notes that if Israel and South Africa are collaborating, a high-level if not senior-level Israeli delegation was probably present for the test. The missile flies 1,620 kilometers southeast toward Prince Edward Island.

— "South African Missile Test," *Jane's Defence Weekly*, 15 July 1989, 59; Michael R. Gordon, "U.S. Sees Israeli Help in Pretoria's Missile Work," *New York Times*, 27 October 1989, www.lexis-nexis.com; US Defense Intelligence Agency, "Special Assessment, South Africa: Missile Activity," 5 July 1989, declassified and partially released, in Kenneth Mokoena, ed., *South Africa and the United States: The Declassified History* (New York: New Press, 1993), pp. 167-168; William E. Burrows and Robert Windrem, *Critical Mass: The Dangerous Race for Superweapons in a Fragmented World* (New York: Simon & Schuster, 1994), pp. 446-448; John Pike, "Overberg Test Range OTB Arniston South Africa," 29 May 2000, www.fas.org.

June 1989

The Washington Times reports that with assistance from Israel, South Africa plans to test launch a new intermediate-range ballistic missile (IRBM). In response, an ARMSCOR (Armaments Corporation of South Africa) spokesman confirms that the company has over the last six years built a missile test range at Overberg and that missiles are being fired to test their performance. At the same time, US Intelligence sources report that South Africa is close to launching a modified version of the Israeli Jericho II IRBM. Reconnaissance satellite images show that the test-launch is likely to be carried out from a facility near Cape Town. The facility is reportedly identical to an Israeli launch site in the Negev Desert. Officials say the new missile has been under development since at least 1987 and will also be used as a booster for launching photo-reconnaissance satellites. A CIA assessment reportedly also suggests that a second test of the more advanced Israeli Shavit (Comet) satellite launch vehicle (SLV), which might be converted to a 3,200km range, is also being prepared at the site.

— "South Africa to Test-launch IRBM," *Jane's Defence Weekly*, 1 July 1989, 1354; Martin Walker, "S Africa 'About to Test Medium-Range Missile'," *Guardian* (London), 21 June 1989, www.lexis-nexis.com; Bill Gertz, "S. Africa on the Brink of Ballistic Missile Test," *Washington Times*, 24 June 1989, pp. A1, A10.

May 1989

The Soviet satellite Kosmos 2019 tracks preparations for an upcoming ballistic missile test launch at Overberg Test Range (Arniston), South Africa.

— William E. Burrows and Robert Windrem, *Critical Mass: The Dangerous Race for Superweapons in a Fragmented World* (New York: Simon & Schuster, 1994), p. 446.

May 1989

ARMSCOR (Armaments Corporation of South Africa) acquires control of Atlas Aircraft Corporation. The organization and its subsidiaries grow rapidly in the late 1960s and early 1970s and include, Somchem a converted factory used for the production of propellants, explosives, rocket-propellant systems, and rockets.

— United States Embassy, South Africa, Office of the Defense Attaché, "ARMSCOR—Overview of South African Armaments Corporation Presented to the Attache Association in Pretoria," 17 May 1989, secret embassy cable declassified and partially released, Digital National Security Archive, nsarchive.chadwyck.com.

Related content is available on the website for the Nuclear Threat Initiative, www.nti.org.



4 April 1989

South African Foreign Minister Pik Botha writes to the UN secretary general, threatening to break the Angola-Namibia peace accords if the fighting continues between South West Africa People's Organization (SWAPO) guerillas and paramilitary police forces.

— Laurent C.W. Kaela, *The Question of Namibia* (New York: St. Martin's Press, 1996), pp. 106-107.

1 April 1989

Implementation of UN Resolution 435 on Namibian independence is due to commence, but is delayed due to fighting between South West Africa People's Organization (SWAPO) and paramilitary police in northern Namibia.

— Laurent C.W. Kaela, *The Question of Namibia* (New York: St. Martin's Press, 1996), pp. 106-107.

February 1989

During a briefing to military attaches assigned to Pretoria, the ARMSCOR (Armaments Corporation of South Africa) manager for client relations states that the future of the company lies in missile development. He also indicates that the company is confident of its ability to produce ground-based equipment for the army.

— United States Embassy, South Africa, Office of the Defense Attaché, "ARMSCOR—Overview of South African Armaments Corporation Presented to the Attache Association in Pretoria," 17 May 1989, classified embassy cable declassified and partially released, Digital National Security Archive, nsarchive.chadwyck.com.

January 1989

The United States reportedly receives a "very reliable" intelligence report that Israel is aiding South Africa's effort to develop an intermediate-range missile. When US Ambassador Thomas Pickering raises the issue with Israeli authorities in Tel Aviv, he is rebuffed and told "it is none of Washington's business."

— David B. Ottaway and R. Jeffrey Smith, "U.S. Knew of Israel-S. Africa Missile Deal," *Washington Post*, 27 October 1989, www.lexis-nexis.com.

1989

South Africa substantially increases its defense budget for 1990. Half of the proposed budget is a secret allocation, which some foreign analysts believe includes funds for ballistic missile development.

— Gavin Bell, "Pretoria Steps Up Secret Buying of Weaponry," *The Times* (London), 20 March 1989, www.lexis-nexis.com.

1989

South Africa possesses six devices in its nuclear arsenal each containing 55kg of highly enriched uranium (HEU), and enough HEU for a seventh device. The devices are stored unassembled with the front and rear portions of the weapons stored in separate vaults. In order to prevent premature detonation, the weapons arm once they reach a certain altitude while on board delivery aircraft.

— David Albright, "South Africa's Secret Nuclear Weapons," *ISIS Report*, May 1994, www.isis-online.org.

1989

According to a DIA assessment, South Africa's regional neighbors who are already threatened by past SADF attacks would be further intimidated by a South African ballistic missile. South African planners consider overwhelming

Related content is available on the website for the Nuclear Threat Initiative, www.nti.org.



military superiority a key factor in limiting Frontline State support to anti-apartheid guerillas, minimizing external pressure for reform and reassuring the white population. The report notes that most of South Africa's neighbors are too poor to purchase a countervailing system.

— US Defense Intelligence Agency, "South Africa: Missile Activity," 5 July 1989, classified intelligence appraisal declassified and partially released, Digital National Security Archive, nsarchive.chadwyck.com.

1989

According to a CIA assessment, the South African missile program would not make sense unless the missile was intended to carry a nuclear warhead. A US official reveals privately that the South African government has resisted disclosure of nuclear activities in part to prevent revelations about its cooperation with Israel.

— David Albright and Mark Hibbs, "South Africa: The ANC and the Atom Bomb," Bulletin of the Atomic Scientists, April 1993, www.bullatomsci.org.

1989

The Israeli Jericho II enters service. The Jericho II reportedly has two solid-propellant stages, a length of 14 meters, a body diameter of 1.56 meters, and a launch weight of 26,000kg. The motors are manufactured by Israel Military Industries, which make the solid-propellant motors for the Shavit satellite launch vehicle (SLV) and later the Arrow ABM system. The first stage's motor burns for 52 seconds and the second stage's for 85 seconds, with boost burn completed at around 105km altitude. An alternative launch weight of 21,935kg is also been reported, with a first stage weight of 10,970kg and a second stage weight of 9,965kg. The payload capability is reported to be around 1,000kg, permitting either nuclear or conventional high explosive (HE) warheads. The warhead separates after the boost phase of flight. The missile has inertial guidance and the re-entry vehicle may also have a radar image correlation system for terminal guidance. Jericho II is reported to be located in underground caves and silos, but it is believed that the missile is also road mobile with a wheeled transporter-erector launcher (TEL), or launch capability from railroad flat trucks. The missile is reported to have a maximum range of 1,500km, but could have a range of around 3,500km with a 1,000kg payload. The TEL vehicle used to launch Jericho II is believed to be 16m long and supported by three vehicles for command and communications, site survey and weather. [Note: The short-range ballistic missile (SRBM) South Africa tests in July 1989 is widely believed to be a version of the Jericho II.]

— Jane's Strategic Weapon Systems 36, "Offensive Weapons, Israel, Jericho I/2 (YA-1/YA-3)," 24 July 2001, online.janes.com.

22 December 1988

The Angola-Namibia peace accords pave the way for South African and Cuban withdrawal from Angola and the independence of Namibia.

— William Gutteridge, *South Africa's Defence and Security into the 21st Century* (Aldershot, UK: Dartmouth, 1996), p. 3.

19 September 1988

Israel's first launch of the Shavit satellite launch vehicle (SLV) places the Ofeq-1 satellite into orbit. Using the orbital parameters of the satellite launched, the US Lawrence Livermore National Laboratory concludes that the Shavit

Related content is available on the website for the Nuclear Threat Initiative, www.nti.org.



SLV could be reconfigured as a ballistic missile capable of delivering a 500kg warhead to a range of 7,500km. Shavit is a three-stage, solid-propellant launcher designed to carry 250kg payloads into low-earth orbit. It has an overall length of 18m, a body diameter of 1.35m and is reported to weigh 23,000kg at launch. Stage 1 is 6.5m long, and has a body diameter of 1.35m. It contains a TAAS Israel Industries Ltd. motor with an unspecified amount of hydroxyl-terminated polybutadiene (HTPB) solid propellant with a reported burn time of one minute. Attitude control is maintained by four air vanes and four jet vanes, which are jettisoned after the vertical launch phase. Stage 2 is 5.3 meters long and has a body diameter of 1.35 meters. Its motor is similar to Stage 1's, but with expansion ratio increased for altitude performance. The Stage 2 motor also has a burn time of one minute. Attitude control in pitch and yaw is maintained by four liquid-injection thrust vector control (LITVC) modules. Stage 3 is 2.1m long with a body diameter of 1.3m and weighs 2,000kg of which 1,800 kg is propellant. The apogee kick motor is a Rafael AUS-51 "Marble" that has a burn time of 92 seconds. Attitude control is by spin stabilization accomplished with Rafael ST-200N thrusters.

— UN Department of Disarmament Affairs, *South Africa's Nuclear Tipped Ballistic Missile Capability* (New York: United Nations, 1991), p. 22; Jane's Strategic Weapons Systems 33, "Offensive Weapons (Unclassified Projects) — Satellite Launch Vehicles, Israel," 14 February 2000, online.janes.com; Seth W. Carus, "Israeli Ballistic Missile Developments," Testimony before the Commission to Assess the Ballistic Missile Threat to the United States, 15 July 1998, www.fas.org; Leonard Spector with Jacqueline Smith, *Nuclear Ambitions* (Boulder, CO: Westview Press, 1990), p. 162.

September 1988

Israel conducts a second flight-test of the modified Jericho II missile.

— "Israel: How Far Can Its Missiles Fly?," *Risk Report* (1) 5, June 1995, Wisconsin Project on Nuclear Arms Control, www.wisconsinproject.org.

May 1988

In Angola, a new southern front stretching 400km is manned by 12,000 Cuban troops armed with two hundred tanks, air defense radars, and five different types of surface-to-air missile (SAM) systems.

— Frank V. Pabian, "South Africa's Nuclear Weapon Program: Lessons for U.S. Nonproliferation Policy," *Nonproliferation Review*, Fall 1995, cns.miis.edu.

March 1988

Cuban and Angolan forces begin a series of advances in southwestern Angola, near the Namibian border.

— Frank V. Pabian, "South Africa's Nuclear Weapon Program: Lessons for U.S. Nonproliferation Policy," *Nonproliferation Review*, Fall 1995, cns.miis.edu.

March 1988

South African Minister for Economic Affairs and Technology announces that the Council for Scientific and Industrial Research has been commissioned to undertake a feasibility study for a "totally South African space program."

— UN Department of Disarmament Affairs, *South Africa's Nuclear Tipped Ballistic Missile Capability* (New York: United Nations, 1991), p. 26.

Related content is available on the website for the Nuclear Threat Initiative, www.nti.org.



1988

South Africa begins building an "airstrip" at Marion Island in the south Atlantic. The facility is believed to be a base for testing ballistic missiles.

— Stephen Milligan, "Washington 'Surprise' at Revelations; South Africa's Nuclear Capability," *Times* (London), 14 August 1988, www.lexis-nexis.com

1988-1990

ARMSCOR (Armaments Corporation of South Africa) further diversifies into conventional military pyrotechnics and missile components such as jet vanes. The challenge is to build an implosion weapon to rigorous specifications while remaining small enough to fit on the end of a missile. [Note: The relatively small missile diameter would have placed a tremendous constraint on ARMSCOR's implosion system.]

— David Albright, "South Africa's Secret Nuclear Weapons," Institute for Science and International Security, May 1994, www.isis-online.org.

1988-1990

Construction begins on the new Advena Central laboratories. The facility is used for the maintenance of seven canon-type nuclear weapons. [Note: The decision to build more facilities is motivated by South Africa's long-term goal to replace the gun-type devices, and conduct nuclear weapons development work on advanced gun-type and implosion-type devices.] The new Advena building contains enough space to load a warhead onto a ballistic missile, and the new storage vaults have space for one reentry body.

— David Albright, "South Africa's Secret Nuclear Weapons," *ISIS Report*, May 1994, www.isis-online.org.

October 1987

Following defeat of the Soviet-backed offensive in Cuito Cuanavale, Angola, Cuba sends an additional 15,000 troops to Angola.

— Frank V. Pabian, "South Africa's Nuclear Weapon Program: Lessons for U.S. Nonproliferation Policy," *Nonproliferation Review*, Fall 1995, cns.miis.edu.

May 1987

Israel tests an improved version of the Jericho II missile. During a test-flight, the missile travels more than 800km.

— "Israel: How Far Can Its Missiles Fly?" *Risk Report* (1) 5, June 1995, Wisconsin Project on Nuclear Arms Control, www.wisconsinproject.org.

March 1987

Following numerous published reports on military ties with South Africa, the Israeli cabinet publicly reiterates its adherence to the UN embargo and extends export limits to include new contracts involving military technology.

— Gerald M. Steinberg, "Israel: Case Study for International Missile Trade and Nonproliferation," in William C. Potter and Harlan W. Jenks, eds., *The International Missile Bazaar: The New Suppliers Network* (Boulder, CO: Westview Press, 1994), p. 242.

1987

Under pressure from the United States and European Community, the Israeli government decides to reduce ties

Related content is available on the website for the Nuclear Threat Initiative, www.nti.org.



with South Africa by not renewing military contracts with Pretoria. Old contracts, however, are still honored.
— "State Department Confirms Discussions with Israel on Pretoria Cooperation," *Aerospace Daily*, 27 October 1989, www.lexis-nexis.com.

1987

The British-based Ferranti company buys International Signal and Control (ISC). [Note: ISC is the Pennsylvania-based firm that supplied missile components to South Africa between 1984-1989.]

— Glenn Frankel, "British Firm Claims It Was Duped by Pa. Arms Maker; Ferranti Alleges Acquired, ISC, Made It Appear It Had Secret Contracts," *Washington Post*, 29 September 1989, www.lexis-nexis.com.

Late 1980s

South Africa begins cooperation with Israel on several missile projects, including a version of Israel's Jericho II ballistic missile.

— Jane's Strategic Weapons Systems 34, "Offensive Weapons, Israel: Jericho I/2 (YA1/YA3)," 19 September 2000, online.janes.com.

December 1986

A US DIA report concludes that ARMSCOR (Armaments Corporation of South Africa) relies on direct acquisition of foreign technology to help support its weapons manufacturing industry.

— Kenneth Mokoena, ed., *South Africa and the United States: The Declassified History* (New York: The New Press, 1993), p. 38; US Defense Intelligence Agency, "South Africa: The Effect of Economic Sanctions on the Defense Industry," December 1986, classified report partially declassified and released, Digital National Security Archive, nsarchive.chadwyck.com.

10 November 1986

The UN General Assembly passes Resolution 41/35, "[s]trongly condemn[ing] once again the policies and practices of apartheid of the racist regime of South Africa, in particular its brutal oppression, repression and genocidal violence against the people of South Africa," and "[r]equests all States that have not yet done so, pending action by the Security Council, urgently to adopt legislative and other comparable measures to ensure the total isolation of South Africa."

— UN General Assembly, "Policies of the Government of South Africa," A/RES/41/35, 10 November 1986, www.un.org.

2 October 1986

The US Senate overrides Reagan's veto of sanctions against South Africa by a vote of 78 to 21.

— Steven V. Roberts, "Senate, 78 to 21, Overrides Reagan's Veto and Imposes Sanctions on South Africa," *New York Times*, 3 October 1986, www.lexis-nexis.com.

27 September 1986

US President Ronald Reagan vetoes H.R. 4868, the Comprehensive Anti-Apartheid Act of 1986, saying it "would seriously impede the prospects for a peaceful end to apartheid and the establishment of a free and open society

Related content is available on the website for the Nuclear Threat Initiative, www.nti.org.



for all in South Africa."

— "Excerpts from Veto Message on Sanctions," *New York Times*, 27 September 1986, lexis-nexis.com/universe.

16 September 1986

The European Community imposes sanctions against South Africa for its apartheid policies. The sanctions ban imports of iron, steel, and gold coins from South Africa, and prohibit new investment in South Africa by European companies.

— Paul Lewis, "Western European Nations Impose Weakened Sanctions on Pretoria," *New York Times*, 17 September 1986, www.lexis-nexis.com.

February 1986

The US State Department declares that Angola and Cuba have agreed to a Cuban troop withdrawal from Angola as part of the terms for a still-unresolved regional settlement.

— Kenneth Mokoena, ed., *South Africa and the United States: The Declassified History* (New York: The New Press, 1993), p. 36.

1986

South Africa completes construction of facilities capable of producing ballistic missile-sized motors at Somerset West.

— US Central Intelligence Agency, Directorate of Intelligence, "Africa Report," 8 December 1989, top-secret report partially declassified and released 7 May 1996, www.foia.ucia.gov, p. 7.

1986

South African President P.W. Botha establishes the secret National Security Management System (NSMS), a network of committees within the high-level State Security Council. The NSMS is dominated by the South African Defence Force (SADF) and constitutes an alternative government/bureaucracy. [Note: The NSMS is a very powerful body and played a significant role in South Africa's strategic planning.]

— Kenneth W. Grundy, *South Africa: Domestic Crisis and Global Challenge* (Boulder, CO: Westview Press, 1991), p. 121.

1986

Israel conducts the first test-firings of the Jericho II missile.

— Jane's Strategic Weapon Systems 36, "Offensive Weapons, Israel, Jericho I/2 (YA-1/YA-3)," 24 July 2001, online.janes.com.

1986

South Africa announces that it will begin implementing the UN plan for Namibian independence under UN Resolution 435 and withdraw South African Defense Force (SADF) troops from Angola by mid-1989. In return, Angola and Cuba agree to an identical timetable for the withdrawal of all Cuban troops.

— Kenneth W. Grundy, *South Africa: Domestic Crisis and Global Challenge* (Boulder, CO: Westview Press, 1991), p. 115.

Related content is available on the website for the Nuclear Threat Initiative, www.nti.org.



August 1985

Australia bans exports to South Africa of weapons and computer equipment that could be used for security purposes.

— Neta C. Crawford and Audie Klotz, eds., *How Sanctions Work: Lessons from South Africa* (New York: St. Martin's Press, 1999), p. 285.

1985

The chairman of ARMSCOR (Armaments Corporation of South Africa) suggests that South Africa requires ballistic missiles with a range of 200km to 300km to compensate for an approaching shortfall of South African Air Force (SAAF) strike aircraft.

— UN Department of Disarmament Affairs, *South Africa's Nuclear Tipped Ballistic Missile Capability* (New York: United Nations, 1991), p. 24.

1985

South Africa begins receiving Jericho I missile technology from Israel.

— William E. Burrows and Robert Windrem, *Critical Mass: The Dangerous Race for Superweapons in a Fragmented World* (New York: Simon & Schuster, 1994), p. 454.

1985

Iraq reportedly provides technical assistance to South Africa for its medium-range and nuclear-capable ballistic missile program.

— Tim Kennedy, "Did U.S. Pressure to Curb Israel Arms Sales Prompt Peace Accord?" Washington Report on Middle East Affairs, November/December 1993, www.washington-report.org, p. 6.

1984-1989

Pennsylvania-based International Signal and Control (ISC) illegally ships more than \$30 million in military equipment to South Africa. The equipment includes telemetry tracking antennae, gyroscopes, and photo-imaging film readers. Some of the equipment reportedly is transferred to Iraq.

— "South Africa's Nuclear Autopsy," Risk Report (2) 1, January-February 1996, Wisconsin Project on Nuclear Arms Control, www.wisconsinproject.org.

October 1984

A secret US CIA National Intelligence Estimate concludes that South Africa has the capacity to produce nuclear arms "on short notice," and that it has stockpiled components for "several test devices or first generation nuclear weapons that use enriched uranium." The estimate says that South Africa could have produced enough fissile material for a first nuclear device by 1979. Furthermore, the estimate states that South Africa may have "leapfrogged the testing phase" to focus on weaponization and delivery of nuclear explosive devices.

— US Central Intelligence Agency, Directorate of Intelligence, "Trends in South Africa's Nuclear Security Policies and Programs," 4 October 1984, top-secret report partially declassified and released on 27 April 1997, www.foia.ucia.gov, pp. 16, 25.

Related content is available on the website for the Nuclear Threat Initiative, www.nti.org.



5 December 1983

UN General Assembly Resolution 38/39 calls on member states to prohibit all military and nuclear cooperation with South Africa, including activities by governments, corporations, and individuals within member states.

— Timothy U. Mozia, "Chronology of Arms Embargoes against South Africa," in George W. Shepherd, Jr., ed., *Effective Sanctions on South Africa: The Cutting Edge of Economic Intervention* (New York: Greenwood Press, 1991), p. 99.

October 1983

The UN Security Council passes Resolution 539, which rejects linking implementation of Resolution 435 on Namibia independence to withdrawal of Cuban troops from Angola.

— Laurent C.W. Kaela, *The Question of Namibia* (New York: St. Martin's Press, 1996), pp. 106-107.

March 1983

The South African government announces that the St. Lucia range will be closed because its proximity to the Mozambican border makes secure tests of long-range weapons difficult. The cabinet subsequently approves construction of a new test site, east of Cape Town.

— UN Department of Disarmament Affairs, *South Africa's Nuclear Tipped Ballistic Missile Capability* (New York: United Nations, 1991), p. 20.

1983

ARMSCOR (Armaments Corporation of South Africa) confiscates 400 square miles on Cape Agulhus in the southern part of South Africa, and installs radars, a landing strip, a missile-assembly plant, a control center, and cylindrical observation towers.

— William E. Burrows and Robert Windrem, *Critical Mass: The Dangerous Race for Superweapons in a Fragmented World* (New York: Simon & Schuster, 1994), p. 454.

9 December 1982

UN General Assembly Resolution 37/69 condemns the actions of multinational corporations that continue to enhance the military and nuclear capabilities of South Africa through collaboration with the regime, and deplores "the attitude of those States, in particular the United States of America and Israel, which have continued and increased their political, economic, and other collaboration with South Africa." The resolution also "[r]equests the International Atomic Energy Agency to refrain from extending to South Africa any facilities which may assist it in its nuclear plans and, in particular, to exclude South Africa from all its technical working groups."

— Timothy U. Mozia, "Chronology of Arms Embargoes against South Africa," in George W. Shepherd, Jr., ed., *Effective Sanctions on South Africa: The Cutting Edge of Economic Intervention* (New York: Greenwood Press, 1991), p. 98; UN General Assembly, "Policies of the Government of South Africa," A/RES/37/69, 9 December 1982, www.un.org.

11 September 1982

During a press conference, the chairman of the board of directors of ARMSCOR (Armaments Corporation of South Africa) states that its G-5 and G-6 SP howitzers are capable of firing 155mm rounds with special nuclear warheads

Related content is available on the website for the Nuclear Threat Initiative, www.nti.org.



developed in the United States, but that they were not intended for this purpose.

— Kenneth Mokoena, ed., *South Africa and the United States: The Declassified History* (New York: The New Press, 1993), p. 31.

April 1982

ARMSCOR (Armaments Corporation of South Africa) produces its first nuclear explosive device. The South African nuclear weapons arsenal increases at the rate of one device approximately every 18 months, until it includes six weapons by the late 1980s. During this period, the older devices are upgraded. However, according to International Atomic Energy Agency (IAEA) specialists, the "first prototype deliverable device" built at the ARMSCOR facility is not completed until December 1982.

— David Albright, "South Africa's Secret Nuclear Weapons," ISIS Report, Institute for Science and International Security, May 1994, www.isis-online.org, p. 10; Waldo Stumpf, "South Africa's Nuclear Weapons Program: From Deterrence to Dismantlement," *Arms Control Today*, 25 December 1995/January 1996, p. 3.

1982

South Africa and Israel cooperate on development of the Skorpioen ship-to-ship-missile, based on the Israeli Gabriel Mk 2 missile. The Mk 2 is 3.42m long with a body diameter of 0.34m and weighs 522kg at launch. Before launch, the missile guidance system is programmed with the target data obtained from its search radar. It is then fired and guided by "two gyro autopilot" and assumes an initial cruise altitude of about 100m. At a range of 7.5km from the launcher, the onboard autopilot commands the missile to descend to 20m altitude using a radio altimeter to maintain height. At a predetermined distance from the target, the semi-active radar is switched on, the target is acquired, and the missile descends to one of its three possible preset attack altitudes for the final approach. The actual set altitude varies between 1m and 3m and depends upon the sea state encountered at the time. Propulsion is by a solid-propellant boost and sustainer motor. The effective missile range is reported to be 35km, with a cruise speed of mach 0.7. The Semi-Armour-Piercing (SAP) warhead weighs 180kg and contains around 75kg of conventional high explosive (HE).

— Signe Landgren, *Embargo Disimplemented: South Africa's Military Industry* (New York: Oxford University Press, 1989), pp. 108-109; Jane's Strategic Weapon Systems 36, "Offensive Weapons, Israel, Gabriel," 24 July 2001, online.janes.com.

1982

In order to effectively maintain its production lines, ARMSCOR (Armaments Corporation of South Africa) produces at a level over the needs of the SADF, and enters the international arms market.

— James P. McWilliams, *Armcor: South Africa's Arms Merchant* (London: Brassey's Ltd, 1989), p. 27.

8 June 1981

A classified CIA report notes that relations "between South Africa and Israel have in recent years expanded to include extensive economic dealings and close political ties—and appear to be strong enough to overcome their inherent drawbacks."

— US Central Intelligence Agency, National Foreign Assessment Center, "Africa Report," Supplement, 8 June 1981, secret report partially declassified and released 7 May 1996, foia.ucia.gov, p. 2.

Related content is available on the website for the Nuclear Threat Initiative, www.nti.org.



6 May 1981

The Organization of Petroleum-Exporting Countries (OPEC) bans the transfer of petroleum to South Africa (OPEC Resolution RE 26/5). It also prohibits sale of oil to parties who could re-export to South Africa and prohibits the loading of any vessel that has broken this embargo.

— Timothy U. Mozia, "Chronology of Economic Embargoes against South Africa," in George W. Shepherd, Jr., ed., *Effective Sanctions on South Africa: The Cutting Edge of Economic Intervention* (New York: Greenwood Press, 1991), p. 124.

18 March 1981

In a televised speech, US President Reagan publicly describes South Africa as a friendly country, a wartime ally, and a country of strategic importance to the free world.

— Kenneth Mokoena, ed., *South Africa and the United States: The Declassified History* (New York: The New Press, 1993), p. 28.

1981

A new facility for the Advena Circle project is commissioned, 15km east of the Pelindaba/Valindaba nuclear complex. ARMSCOR (Armaments Corporation of South Africa) establishes a program at Advena Circle to produce gun-assembled nuclear weapons and their associated air-drop delivery systems. The program also includes studies of implosion and thermonuclear technology and accompanying longer-range ballistic missile delivery systems.

— Frank V. Pabian, "South Africa's Nuclear Weapon Program: Lessons for U.S. Nonproliferation Policy," *Nonproliferation Review*, Fall 1995, cns.miis.edu.

1981

The new administration of US President Ronald Reagan adopts a policy of strategic cooperation with South Africa, in order to pursue its Cold War objective of countering the perceived communist threat in southern Africa.

— Laurent C.W. Kaela, *The Question of Namibia* (New York: St. Martin's Press, 1996), pp. 106-107.

1981

South Africa launches Operation Protea, a conventional invasion of Cunene province in Angola, with more than 10,000 troops. South Africa occupies most of Cunene, including the provincial capital of Ngiva.

— William Minter, *Apartheid's Contras: An Inquiry into the Roots of War in Angola and Mozambique* (Oxford: Zed Books Ltd., 1994), p. 41.

1981-1984

South Africa extends its military frontier beyond Namibia and deep into southern Angola, without any serious challenge by the South West Africa's People's Organization (SWAPO), the Movement for the Popular Liberation of Angola (MPLA), 30,000 Cuban troops, and 3,000 Soviet and East German advisors. During the same period, South Africa strengthens its military grip in Namibia with 25,000 troops based on the border through 1984. [Note: This reflects the growing military build-up in the region and the increasing paranoia of the South African government.]

— Robert Rothen, Henry Bienen, Robert Legworld, and Garvin Maasdrop, *South Africa and its Neighbours: Regional Security and Self Interest* (Lexington, MA: Lexington Books, 1985), p. 62.

Related content is available on the website for the Nuclear Threat Initiative, www.nti.org.



[Back to Top](#)

1980-1969

5 December 1980

Israel, South Africa, and Taiwan are reported to have reached an agreement to start collaboration in the joint production of strategic cruise missiles and small unmanned jets capable of delivering nuclear warheads. US Intelligence sources are aware of the nuclear collaboration and report that South Africa and Taiwan are seeking to keep their cruise missile plans secret. Information on the joint collaboration remains restricted to the national security community.

— "3 Nations to Begin Cruise Missile Project," *Washington Post*, 5 December 1980, www.lexis-nexis.com.

16 June 1980

Gerald Bull and Rodgers Gregory of Space Research Corporation are sentenced to six months in prison for selling artillery equipment to South Africa in violation of the UN arms embargo. [Note: Although Space Research Corporation is a Canadian firm, it straddles the US-Canadian border in Vermont.]

— Kenneth Mokoena, ed., *South Africa and the United States: The Declassified History* (New York: The New Press, 1993), p. 27.

26 March 1980

Founder Gerald Bull and former president Rodgers Gregory of Space Research Corporation plead guilty to charges that they illegally exported arms to South Africa in violation of international embargoes. A US grand jury spends 16 months investigating the munitions company. The two plead guilty to a count charging that they illegally shipped more than 300,000 howitzer shells, two 155mm cannons, and a radar tracking system to South Africa between 1976 and 1978. Prosecutors retain the right to convene another grand jury later, if they find new evidence. The remaining counts filed by the government charge the company with falsifying shipping documents to enable the illicit arms sales to escape detection. Prosecutors contend that Space Research shipped the arms from its compound straddling the Vermont-Quebec border to an island in the West Indies, and subsequently to South Africa.

— "Jury Investigating Arms Sales Disbands," *AP*, 27 March 1980, www.lexis-nexis.com.

1980s

South Africa begins development of a single-stage, intermediate-range ballistic missile (IRBM) consisting of the first stage of the RSA-3. The missile [RSA-1] is designed to strike Cuban military concentrations in Angola from mobile launchers in South African territory. The rocket motor closely follows the design of the first stage of Israeli Jericho II and can deliver a payload of 1,500kg over a range of 1,100km. The RSA-2, which consists of the first and second stages of the RSA-3, is also developed. It extends the range of the RSA-1 to 1,900km.

— *Encyclopedia Astronautica*, "RSA-1," [undated], www.astronautix.com.

Mid to Late 1980s

South Africa initiates work on the RSA-3 satellite launch vehicle (SLV). The RSA-3 begins development as an

Related content is available on the website for the Nuclear Threat Initiative, www.nti.org.



intermediate-range ballistic missile (IRBM) because of the perceived Soviet threat and isolation of South Africa. It is developed with the assistance of Israel and believed to be essentially identical to the Israeli Jericho II missile, but with addition of a third-stage apogee kick motor. Houwteq develops the RSA-3 at Grabouw, 30km east of Cape Town. The OTR is used for test flights. The engine test facility is at Rooi Els. At the peak of development in 1992, 50 to 70 companies in the public and private sector are involved, employing 1300 to 1500 people.

The first and second stages of the RSA-3 use the same rocket motor loaded with nine metric tons of propellant. The first stage uses vanes in the exhaust for steering during the first 16 to 20 seconds of flight (a technical source interviewed by the Center for Nonproliferation Studies states that this flight time is too long and should only be from 2 to 5 seconds), after which the fins at the base of the vehicle provide aerodynamic control. The second stage has a higher expansion nozzle and may be equipped with thrust vector control (TVC) for steering. The second stage has a spin-up bus for the unguided third stage and payload. Total mass of the bus and payload shroud is 583kg. After second stage burnout, the upper stage package enters a 148-second ballistic coast. A sideways trajectory deflection is made and the shroud is jettisoned. The third stage and payload are then spun up, followed by separation of the bus. The spin-stabilized third stage then makes the 4,555 m/s burn to place the payload into orbit. The third stage is similar to a five-metric-ton thrust spherical motor used by the Israelis for their Shavit launch vehicle. [Note: The Shavit SLV is often characterized as a three-stage version of the IRBM with the first two stages of the Shavit being identical to the first stage of Jericho II. However, since the US government removed Israel from a list of "dangerous rocket projects" in 1992, it is "understood" that the two are completely separate designs. Some US officials have stated, however, "the Jericho II is a Shavit minus the upper stage, which is replaced by a warhead."]

The composite payload fairing for the RSA-3 is 4.5m long, 1.3m in diameter, and has a mass of 57kg. Configured as an ICBM, it is estimated that the three-stage version of the RSA-3 could deliver a 340kg warhead on Washington, D.C. or a 400kg warhead on Moscow. However, such lightweight warheads are beyond known South African technology. Therefore, the RSA-3 is most likely a purely space-launch adaptation of the RSA-2 IRBM.

[Note: The RSA-3 and its mobile erector-launcher were in an advanced stage of testing at the time the program was cancelled in 1994. It is not known what happened to the hardware. Warheads of the size and type required for use on the RSA-3 were not in the national inventory, according to South Africa when it signed the NPT in 1991. The RSA-4, was in the design stage.]

Event	Time from launch (sec)	Height (km)	Slant Range (km)	Vehicle Mass (kg)	Velocity (m/s)
Ignition	0.0	0.0	0.0	23,564	0
Separation Stages 1/2	54.9	12.8	8.4	13,349	575
Separation Stages 2/3	140.0	104.3	179.8	2,961	3,225

Related content is available on the website for the Nuclear Threat Initiative, www.nti.org.



Bus maneuver and shroud ejection	172.0	140.0	272.0	0	3,116
Ignition of Apogee Kick Motor	248.0	196.5	489.0	2,378	2,945
Burnout of AKM	342.0	210.0	914.0	0	7,498
Separation of Payload	460.0	212.0	1,806.0	330	7,500

Sources:

Encyclopedia Astronautica, "RSA-3," [undated] www.astronautix.com; "Israel: How Far Can Its Missiles Fly?" Risk Report (1) p. 5, June 1995, Wisconsin Project on Nuclear Arms Control, www.wisconsinproject.org; Gary Milhollin and Gerard White, "Why Are U.S. Firms Still Able to Aid the Mideast Missile Race?" *Washington Post*, 16 August 1992, www.lexis-nexis.com.

15 July 1980

The US panel of scientists assembled by President Carter releases a public report on the double flash detected by the Vela satellite in 1979. The panel concludes that the "signal was probably not from a nuclear explosion," but it does not "rule out the possibility." The CIA, DIA, the Naval Research Laboratory, and Los Alamos National Laboratory contest the panel's conclusions, saying they believe that the data indicates a nuclear explosion.

— David Albright and Corey Gay, "A Flash from the Past," *Bulletin of the Atomic Scientists*, November/December 1997, www.bullatomsci.org; Richard Burt, "Panel Doubts Flash Sighted of Africa Was Atomic," *New York Times*, www.lexis-nexis.com.

Early 1980s

South Africa begins construction of facilities for ballistic missile production, including two facilities for producing solid propellant.

— US Central Intelligence Agency, "Africa Report," (Washington, DC: Directorate of Intelligence, 8 December 1989), top-secret report partially declassified and released, 7 May 1996, www.foia.ucia.gov, p. 7.

1980s

The Overberg Test Range (OTR) is developed by Houwteq as part of South Africa's ballistic missile and space program. It is located near Bredasdorp, 200km east of Cape Town, on the southeastern coast of the Western Cape. The facility has a total area of 43,000 hectares. The launch sites are located on the coast just northeast of Waenhuiskrans, while the launch vehicle and payload assembly facilities are located at an adjacent air base. The OTR site also includes tracking stations, thermal vacuum chambers for equipment testing, insulated hangars for firing tests, computer facilities, and the necessary equipment for integration of low-orbit satellite launch.

— *Encyclopedia Astronautica*, "Overberg," [undated], www.astronautix.com.

1980s

Ari Benashe, an Israeli secret service defector, claims that during the 1980s, ARMSCOR (Armaments Corporation of

Related content is available on the website for the Nuclear Threat Initiative, www.nti.org.



South Africa) "in cooperation with US foreign policy in the Gulf" and with the approval of then Vice President George Bush and endorsement of the CIA, supplied Iraq with artillery and missiles capable of carrying nuclear warheads, and technology necessary to produce nuclear-tipped warheads.

— Ben Menashe Ari, *Profits of War inside the Secret U.S.-Israeli Arms Network* (New York: Sheriden Square Press, 1992); Arthur Gavshon, "Israeli Defector Discloses 'Saddam Gate' Role," *Weekly Mail* (Johannesburg), 16 October 1992, pp. 1-2, cited in *Proliferation Issues*, 28 October 1992, pp. 1-2.

1980s

ARMSCOR's (Armaments Corporation of South Africa) nuclear assembly group places strong emphasis on weapons certification and qualification. A unique feature of ARMSCOR's weapon design is the capability to mate air-deliverable warheads to ballistic missiles. South Africa is able to mount its limited nuclear stockpile on either aircraft or ballistic missiles.

— Roy E. Horton III, "Out of (South) Africa: Pretoria's Nuclear Weapons Experience," USAF Institute for National Security Studies, Occasional Paper #27, [undated], www.usafa.af.mil.

22 September 1979

A US Vela surveillance satellite detects a "brief, intense, double flash of light near the southern tip of Africa." Due to its characteristics, the US officials estimate that the flash could have resulted from the test of a nuclear device with a yield of 2 to 4 kilotons. South Africa emerges "as the prime suspect," but the South African government denies that it has conducted a nuclear test. There are also rumors that Israel conducted a nuclear test, either alone or in conjunction with South Africa. US President Jimmy Carter assembles a panel of non-governmental scientists to determine whether the flash registered by the Vela was the result of a nuclear explosion. [Note: Subsequent information indicates that South Africa did not possess sufficient highly enriched uranium (HEU) to conduct a nuclear weapons test at this time.]

— David Albright and Corey Gay, "A Flash from the Past," *Bulletin of the Atomic Scientists*, November/December 1997, www.bullatomsci.org.

1979

The discovery of a probable nuclear test site in the Kalahari Desert, and the "international uproar" that follows, leads Prime Minister Vorster to "order a halt to further nuclear weapons development." A CIA report concludes that there is no "direct indication of any subsequent activities in the weapons program."

— US Central Intelligence Agency, Directorate of Intelligence, "New Information on South Africa's Nuclear Program and South African-Israeli Nuclear and Military Cooperation," 30 March 1983, top-secret report partially declassified and released 27 April 1997, www.foia.ucia.gov, p. 17.

28 September 1978

Peter W. Botha becomes Prime Minister of South Africa pledging that the ruling National Party "will not bend our knees before Marxism or revolution."

— Kenneth Mokoena, ed., *South Africa and the United States: The Declassified History* (New York: The New Press, 1993), p. 27; "S. Africa Picks Hard-Liner; Botha As New Premier; Botha Expected to Continue Vorster's Racial Policies," *Washington Post*, 28 September 1978, www.lexis-nexis.com.

Related content is available on the website for the Nuclear Threat Initiative, www.nti.org.



20 September 1978

The South African government rejects a UN plan for establishing an independent Namibia.

— Kenneth Mokoena, ed., *South Africa and the United States: The Declassified History* (New York: The New Press, 1993), p. 26; Milton R. Benjamin, "U.N. Appears Ready to Press On With Its Plan for Namibia," *Washington Post*, 22 September 1978, www.lexis-nexis.com.

12 February 1978

The South African foreign minister abruptly leaves proximity talks on Namibian independence and insists that South Africa retain 3,000 troops in Namibia.

— Laurent C.W. Kaela, *The Question of Namibia* (New York: St. Martin's Press, 1996), pp. 106-107.

1978

Kentron Missiles, a subsidiary of ARMSCOR (Armaments Corporation of South Africa), is formed to undertake work in research and development of missile technology.

— Signe Landgren, *Embargo Disimplemented: South Africa's Military Industry* (New York: Oxford University Press, 1989), p. 104.

7 December 1977

Israel announces compliance with UN Security Council Resolution 418, which calls for a mandatory embargo of arms shipments to South Africa.

— Timothy U. Mozia, "Chronology of Arms Embargoes against South Africa," in George W. Shepherd, Jr., ed., *Effective Sanctions on South Africa: The Cutting Edge of Economic Intervention* (New York: Greenwood Press, 1991), p. 103.

4 November 1977

UN Security Council Resolution 418 calls for a mandatory embargo of arms shipments to South Africa.

— Rita M. Byrnes, ed., *South Africa: A Country Study* (Washington, DC: Federal Research Division, Library of Congress, 1997), p. xxix; Timothy U. Mozia, "Chronology of Arms Embargoes against South Africa," in George W. Shepherd, Jr., ed., *Effective Sanctions on South Africa: The Cutting Edge of Economic Intervention* (New York: Greenwood Press, 1991), p. 98.

1977

Israeli Minister of Defense Shimon Peres travels to Iran to sign six secret oil-for-arms agreements, which include missile technology. The deal collapses in 1979 when Ayatollah Khomeini assumes power in Iran. Israel turns to South Africa and offers a similar agreement in return for coal and other goods. Israel requires a new partner if it is to develop its expensive new missiles, and Pretoria considers that its own version of the Jericho I would be considerably more accurate than the Scud, and a potentially lucrative item for ARMSCOR (Armaments Corporation of South Africa) to offer on the world market.

— William E. Burrows and Robert Windrem, *Critical Mass: The Dangerous Race for Superpowers in a Fragmented World* (New York: Schuster & Schuster, 1994), pp. 451-452; Gerald M. Steinberg, "Israel: Case Study for

Related content is available on the website for the Nuclear Threat Initiative, www.nti.org.



International Missile Trade and Nonproliferation," in William C. Potter and Harlan W. Jenks, eds., *The International Missile Bazaar: The New Suppliers Network* (Boulder, CO: Westview Press, 1994), p. 242.

1977

The World Conference for Action against Apartheid urges states and firms to cease all assistance and cooperation enabling South Africa to acquire nuclear technology.

— Neta C. Crawford and Audie Klotz, eds., *How Sanctions Work: Lessons from South Africa* (New York: St. Martin's Press, 1999), p. 284.

1977

Israel exchanges 30 grams of tritium for 50 tons of South African uranium. The tritium is flown in twelve shipments of 2.5 grams each during an 18-month period. [Note: Israeli-South African nuclear cooperation paves the way for future collaboration in ballistic missile development.]

— William E. Burrows and Robert Windrem, *Critical Mass: The Dangerous Race for Superpowers in a Fragmented World* (New York: Schuster & Schuster, 1994), p. 451.

1977-1978

Possible tests of nuclear-related high explosives are conducted at the Kalahari test site. South Africa considers constructing a plutonium-separation facility. The South African enrichment plant at Valindaba begins producing highly enriched uranium (HEU), and the CIA estimates that it has produced sufficient HEU for "several nuclear weapons." A CIA report states that the test site in the Kalahari Desert is intended for nuclear weapons, and that South African scientists expect a yield of 20 kilotons, if they test a nuclear weapon.

— US Central Intelligence Agency, Directorate of Intelligence, "New Information on South Africa's Nuclear Program and South African-Israeli Nuclear and Military Cooperation," 30 March 1983, top-secret report partially declassified and released 27 April 1997, www.foia.ucia.gov, p. 17.

1977-1985

The Atomic Energy Board (AEB) establishes nuclear weapons research and design and production facilities at Pelindaba and develops a nuclear strategy. Under Prime Minister P.W. Botha, the strategy consists of three phases. The first phase entails perpetuating strategic uncertainty regarding South Africa's nuclear capabilities. In a second phase, if threatened by an overwhelming conventional military threat and the West proves unwilling to intervene on its behalf, South Africa would covertly acknowledge the existence of its nuclear weapons to key Western powers. The third phase would consist of publicly acknowledging the existence of its nuclear stockpile, conducting an underground test, or detonating a nuclear explosion on the surface.

— David Albright, "South Africa's Secret Nuclear Weapons," ISIS Report, Institute for Science and International Security, May 1994, www.isis-online.org.

1977

Israel begins development of the Jericho II missile, possibly with funding from Iran. The Israeli designation is reported to be YA-3.

Related content is available on the website for the Nuclear Threat Initiative, www.nti.org.



— Jane's Strategic Weapon Systems 36, "Offensive Weapons, Israel, Jericho I/2 (YA-1/YA-3)," 24 July 2001, online.janes.com.

April 1976

South African Prime Minister John Vorster visits Israel and signs an agreement on scientific, financial, and economic cooperation with Israeli Prime Minister Yitzhak Rabin. The agreement also provides for upgrading diplomatic representation and the visit of Israeli ministers to South Africa.

— Eschel Rhoodie, *The Real Information Scandal* (Pretoria: Orbis, 1983), p. 116.

1976-1987

Soviet Union provides a total of \$4 billion in military assistance to Angola.

— Laurent C.W. Kaela, *The Question of Namibia* (New York: St. Martin's Press, 1996), p. 115.

1976

The South African Air Force (SAAF) employs Buccaneer S MK 50 bombers to practice nuclear weapon delivery techniques. The Buccaneers drop conventional bombs to destroy a decommissioned World War II salvage ship off the coast of Cape Town. The bombers release the conventional bombs three to five miles away from the target, and "then pulled up sharply and veered away." The SAAF describes the exercise as using a "computerized technique to deliver nuclear bombs and escape the effect of the resulting explosions."

— US Central Intelligence Agency, Directorate of Intelligence, "Trends in South Africa's Nuclear Security Policies and Programs," 4 October 1984, top-secret report partially declassified and released 27 April 1997, www.foia.ucia.gov, p. 17.

Mid to Late 1970s

South Africa supplies Israel with steel for its Merkhava battle-tank. In return, Israel gives South Africa the production information for a new type of armor plate.

— James Adams, *The Unnatural Alliance* (London: Quartet Books, 1984), pp. 110-111.

8 November 1975

The government of Portugal announces its withdrawal from Angola.

— Kenneth Mokoena, ed., *South Africa and the United States: The Declassified History* (New York: The New Press, 1993), p. 19.

1975

An official Israeli delegation visiting Pretoria reportedly is told by a South African official: "You are a minority in your region, and so are we. You are surrounded by millions of enemies, and so are we. The Arabs want to throw you into the sea, and the blacks want to throw us out of Africa. You have won in the past, and you will win again, because you have no alternative. The same is true for us." [Note: This encapsulates the sentiment underlying what some call "The Unnatural Alliance" between Israel and South Africa. James Adams authors a book with this title in 1984.]

— Yossi Melman and Dan Raviv, "Has Congress Doomed Israel's Affair With South Africa?," *Washington Post*, 22 February 1987, www.lexis-nexis.com.

Related content is available on the website for the Nuclear Threat Initiative, www.nti.org.



1975

The withdrawal of Portugal from Mozambique and Angola, as well as concerns about the intentions of Warsaw Pact countries, leads the South African government to believe that in the event of a direct threat to its territorial integrity, it would not be able to rely on the international community for assistance. [Note: Portugal was South Africa's strongest ally in the region, and international pressure to abolish apartheid is mounting.]

— William Gutteridge, *South Africa's Defence and Security into the 21st Century* (Aldershot, UK: Dartmouth, 1996), p. 31.

1975

French President Giscard D'Estaing announces that France, South Africa's most important arms supplier, will no longer issue new sales agreements for "long-range or aerial weapons" although it will continue to honor outstanding agreements.

— UN Department of Disarmament Affairs, *South Africa's Nuclear Tipped Ballistic Missile Capability* (New York: United Nations, 1991), p. 45.

February 1974-1976

A US DIA intelligence appraisal reports, "the most significant military transaction between Israel and South Africa is the possible sale of SAAR IV (RESHEF) missile patrol boats complete with Gabriel surface-to-surface missiles." Three boats would be purchased from Israel and three more would be built in South Africa. Israeli Gabriel missiles are reportedly sold to South Africa for use in a new construction program for patrol boats. South Africa also obtains Centurion tanks and components from Israel.

— US Defense Intelligence Agency, "South Africa-Israel Cooperation," 2 July 1976, classified intelligence appraisal declassified and partially released, Digital National Security Archive, nsarchive.chadwyck.com.

1974

Israeli Prime Minister Shimon Peres and South African President John Vorster hold a secret meeting in Geneva. The two reportedly sign an agreement for strategic cooperation between the two countries. The agreement is a mutual defense pact according to which "the two countries would assist each other in wartime by supplying spare parts and ammunition from emergency stocks. Each country agreed that its territory would be used to store all types of weapons for the other country." According to Dieter Gerhardt, a senior commander in the South African Navy who for many years spied for the Soviet Union, under a later clause in the agreement called "Chalet," Israel agreed to arm eight Jericho II missiles with "special warheads" for South Africa.

— "Treasons of Conscience," *Weekly Mail & Guardian*, 11 August 2000, www.sn.apc.org.

1974

South Africa and Israel strengthen military cooperation. Both nations feel isolated and surrounded by implacable enemies and fear that an alliance between Arab and black African States will threaten the survival of both countries.

— William E. Burrows and Robert Windrem, *Critical Mass: The Dangerous Race for Superpowers in a Fragmented World* (New York: Simon & Schuster, 1994), p. 449.

Related content is available on the website for the Nuclear Threat Initiative, www.nti.org.



Late 1973

Following October 1973 War, Israel approaches the United States in an unsuccessful attempt to obtain the Pershing I missile. [Note: The attempt indicates that the Jericho I missile, which has identical range as the Pershing, is not operational.]

— Center for Nonproliferation Studies interview with missile engineer familiar with technical dimensions of South African missile program who wishes to remain anonymous.

Late 1973

Following the October 1973 War, in which South Africa provided Israel with an emergency supply of Mirage fighter parts, Israel upgrades the status of its mission in South Africa to an embassy.

— US Central Intelligence Agency, National Foreign Assessment Center, "Africa Report," Supplement, 8 June 1981, secret report partially declassified and released 7 May 1996, foia.ucia.gov, p. 2.

6 October 1973

Syria and Egypt attack Israel, beginning the October 1973 War. [Note: The war results in all but three black African states (Malawi, Lesotho, and Swaziland) breaking off relations with Israel, eliminating much of the need for Israel to keep its growing relationship with South Africa secret.]

— James Adams, *The Unnatural Alliance* (London: Quartet Books, 1984), pp. 23, 35-36; "Arab-Israeli Wars," [undated], Encyclopedia Britannica Online, search.eb.com.

1973-1977

A US CIA report concludes that research on both a gun-type device, using two modified naval guns, and on the firing system of an implosion device was conducted at the Somerset West explosives installation in South Africa.

— US Central Intelligence Agency, Directorate of Intelligence, "New Information on South Africa's Nuclear Program and South African-Israeli Nuclear and Military Cooperation," 30 March 1983, top-secret report partially declassified and released 27 April 1997, www.foia.ucia.gov, p. 17.

1973-1976

Israeli-South African arms sales and joint trade grow from \$30 to \$100 million within a three-year period. South Africa's Jewish population of 118,000 becomes more vocal in support of Israel's conservative political parties. [Note: Hersh does not indicate the proportional direction of trade.]

— Seymour Hersh, *The Samson Option: Israel's Nuclear Arsenal and American Foreign Policy* (New York: Random House, 1989), p. 265.

1973

The Propulsion Division at Somerset West, a new missile research institute, is established under the National Institute for Defense Research (NIDR) with the task of developing the production process for missiles, warheads, propellants, and propulsion systems.

— Signe Landgren, *Embargo Disimplemented: South Africa's Military Industry* (New York: Oxford University Press, 1989), p. 104.

Related content is available on the website for the Nuclear Threat Initiative, www.nti.org.



1973

According to a 1983 US intelligence report, "[deleted passage] indicates that South Africa formally launch(es) a weapons program in 1973, and scientists are instructed to develop gun-assembly, implosion, and thermonuclear weapons designs."

— US Central Intelligence Agency, Directorate of Intelligence, "Africa Report," 8 December 1989, top secret report partially declassified released 7 May 1996, www.foia.ucia.gov, p. 7.

1972-1975

South Africa provides Israel with depleted uranium and natural uranium rods.

— US Central Intelligence Agency, Directorate of Intelligence, "New Information on South Africa's Nuclear Program and South African-Israeli Nuclear and Military Cooperation," 30 March 1983, top-secret report partially declassified and released 27 April 1997, www.foia.ucia.gov, p. 17.

23 July 1970

The UN Security Council adopts Resolution 282, calling on member states to revoke all licenses and military patents granted to the South African government or to South African companies for the manufacture of arms and ammunition, aircraft and naval craft, or other military vehicles. It also prohibits investment or technical assistance for the manufacture of these items.

— Timothy U. Mozia, "Chronology of Arms Embargoes against South Africa," in *Effective Sanctions on South Africa: The Cutting Edge of Economic Intervention*, George W. Shepherd, Jr., ed. (New York: Greenwood Press, 1991), pp. 97-98.

1970-1971

Israel begins producing a ballistic missile known as the Jericho I, at a rate of three to six missiles per month. The missiles have a 300-mile range with a 1,000-1,500kg payload. [Note: The Jericho I is reportedly ready to enter service in 1971 but never becomes operational.]

— Seth W. Carus, "Israeli Ballistic Missile Developments," Testimony before the Commission to Assess the Ballistic Missile Threat to the United States, 15 July 1998, www.fas.org.

1970

Prime Minister John Vorster informs parliament that nuclear scientists have developed a unique uranium enrichment process involving jet-nozzle enrichment and a sophisticated cascade technique.

— Seymour Hersh, *The Samson Option: Israel's Nuclear Arsenal and American Foreign Policy* (New York: Random House, 1989), p. 266.

1970

The US National Security Council adopts a policy of diplomatic rapprochement toward South Africa, which includes resumption of regular military and intelligence consultation between the two countries. Nuclear cooperation initiated in the 1940s, including US enrichment of South African uranium and technical exchanges, continues uninterrupted.

Related content is available on the website for the Nuclear Threat Initiative, www.nti.org.



— Caleb Rossiter, *The Bureaucratic Struggle for Control of U.S. Foreign Aid: Diplomacy vs. Development in Southern Africa* (Boulder, CO: Westview Press, 1985), p. 48.

Phase II: South Africa-Israel Cooperation Begins, 1968-1989

[Back to Top](#)

1968-1950

1968

The South African Rocket Research Institute (RRI) establishes its first missile test site with the assistance of an "unspecified" European company at St. Lucia in Natal, 240 miles north of Durban and 90 miles from the Mozambican border.

— Signe Landgren, *Embargo Disimplemented: South Africa's Military Industry* (New York: Oxford University Press, 1989), p. 103; UN Department of Disarmament Affairs, *South Africa's Nuclear Tipped Ballistic Missile Capability* (New York: United Nations, 1991), p. 46.

1968

The Armaments Development and Production Act (No. 57) establishes the Armaments Development and Production Corporation (ARMSCOR; later reorganized as Armaments Corporation of South Africa, but still abbreviated as "ARMSCOR") to consolidate and manage public and private arms manufacturing.

— Rita M. Byrnes, ed., *South Africa: A Country Study* (Washington, DC: Federal Research Division, Library of Congress, 1997), p. 351.

January 1968

Israeli politicians form the Israel-South Africa Friendship League to foster business and encourage general relations between the two nations. [Note: Israel is still suffering fallout among African nations after the 1967 war and is eager to improve its tenuous relations with South Africa. Menachem Begin is president of the organization when he becomes prime minister in 1977.]

— James Adams, *The Unnatural Alliance* (London: Quartet Books, 1984), p. 23.

November 1967

The Israeli representative to the United Nations, Joel Barromi, walks out as South Africa's representative prepares to address the United Nations in defense of apartheid. [Note: Although at this time South Africa and Israel are developing greater levels of military cooperation, Israel is still unwilling to overtly support South Africa because of international attitudes and disapproval from the South African Jewish community.]

— James Adams, *The Unnatural Alliance* (London: Quartet Books, 1984), pp. 34-35.

October 1967

The deputy director and chief engineer of Israeli Aircraft Industries (IAI) tours South Africa's Atlas Aircraft Industries and discusses the possibility of joint fighter production.

— James Adams, *The Unnatural Alliance* (London: Quartet Books, 1984), p. 34.

Related content is available on the website for the Nuclear Threat Initiative, www.nti.org.



1967-1968

Impressed by Israel's pre-emptive strikes against Egypt in the Six-Day War, South Africa sends the first of several high-level military missions to Israel to study tactics of the Israeli Defence Force (IDF).

— James Adams, *The Unnatural Alliance* (London: Quartet Books, 1984), p. 33.

1967

Israel uses South African-licensed Mirage aircraft during the Six-Day War.

— James Adams, *The Unnatural Alliance* (London: Quartet Books, 1984), p. 32.

1964

The South African Rocket Research Institute (RRI) is established with responsibility for research and development in the missile field. Its rocket and missile research is facilitated by a cooperation agreement with West German defense industry. Herman Oberth Gesellschaft (an academic organization whose members created a network of approximately 30 private West German firms involved in the rocket industry) and Waffen und Lufttrüstung actively participate in early rocket construction in South Africa.

— Signe Landgren, *Embargo Disimplemented: South Africa's Military Industry* (New York: Oxford University Press, 1989), p. 103.

1964

The state-run Armaments Board is established to purchase arms and maintain quality and cost control in domestic arms production. The Armaments Board is later absorbed into the Armaments Development and Production Corporation (ARMSCOR).

— James Adams, *The Unnatural Alliance* (London: Quartet Books, 1984), pp. 33-34.

1964

South Africa is excluded from the Tokyo Olympics.

— Neta C. Crawford and Audie Klotz, eds., *How Sanctions Work: Lessons from South Africa* (New York: St. Martin's Press, 1999), p. 283.

1964

Britain bars arms exports to South Africa.

— Neta C. Crawford and Audie Klotz eds., *How Sanctions Work: Lessons from South Africa* (New York: St. Martin's Press, 1999), p. 283.

4 December 1963

UN arms embargoes against South Africa are broadened to include sale and shipment of all types of ammunition, arms, military vehicles and equipment, and materials for the manufacture and maintenance of arms and ammunition in South Africa.

— Timothy U. Mozia, "Chronology of Arms Embargoes against South Africa," in *Effective Sanctions on South Africa: The Cutting Edge of Economic Intervention*, ed. George W. Shepherd, Jr. (New York: Greenwood Press, 1991), p. 97.

Related content is available on the website for the Nuclear Threat Initiative, www.nti.org.



7 August 1963

The UN Security Council adopts Resolution 181, a voluntary arms embargo against South Africa.

— Neta C. Crawford and Audie Klotz, eds., *How Sanctions Work: Lessons from South Africa* (New York: St. Martin's Press, 1999), p. 283; Timothy U. Mozia, "Chronology of Arms Embargoes against South Africa," in *Effective Sanctions on South Africa: The Cutting Edge of Economic Intervention*, ed. George W. Shepherd, Jr. (New York: Greenwood Press, 1991), p. 97.

1963

The United States imposes an arms embargo against South Africa in response to its policies of apartheid.

— Neta C. Crawford and Audie Klotz, eds., *How Sanctions Work: Lessons from South Africa* (New York: St. Martin's Press, 1999), p. 283.

June-September 1963

The Kennedy administration debates how to address apartheid in South Africa. Undersecretary of State G. Mennen Williams sends a memo to Secretary of State Dean Rusk recommending that following the Organization of African Unity (OAU) Conference in Addis Ababa, the United States should take more vigorous action against the apartheid regime. He proposes that the administration conduct a review of arms supply policy toward South Africa and examine the possibility of implementing a full embargo against it.

In response, Rusk points out that the president has reminded him that the United States is not the "self-elected gendarmes for the political and social problems of other states." He suggests the United States should not assist South Africa in enforcing its apartheid policy, but should assist them in playing the kind of role they already played in the two world wars. He states that if the United States imposes sanctions against South Africa, they should be part of a larger package that would include sanctions on other countries where different but equally abhorrent situations exist.

Referring to Rusk's memorandum, Undersecretary Williams stresses that the supply of arms to South Africa does vitally affect the direct interests of the United States as well as its moral position. He notes that a complete ban will assist in maintaining a position of influence with African states and help prevent more radical and violent action on the part of these states.

Williams suggests that if no significant action is taken, such as an arms embargo, the United States may lose support on such matters as entry of communist China into the United Nations. Other consequences feared by Williams include the possibility of losing military and scientific facilities in Ethiopia, Libya, Morocco, Nigeria, and Zanzibar, and the loss of communication facilities and vital civil airline and military air transport service (MATS) landing and overflight rights in Africa.

Secretary of Defense Robert McNamara sends a memo to Secretary Rusk, pointing out that the United States is currently operating the Atlantic Missile Range tracking station near Pretoria. Referring to comments made by National Security Adviser McGeorge Bundy that the station has contributed greatly to missile development and other space programs, McNamara stresses that the missile station will continue to be important after 1963, though not vital. He adds that the United States must consider the reaction of NATO allies and the possible divisive

Related content is available on the website for the Nuclear Threat Initiative, www.nti.org.



effect upon the alliance should the United States give support to a strong African UN resolution. He advises that any decisions on the matter be made in consultation with Great Britain, France, and Belgium. McNamara recommends that the United States clearly state its objections to apartheid in South Africa and its objection to the policies of Portugal in its territories. Secretary McNamara wants to avoid a UN vote in favor of economic sanctions, an arms embargo, or expulsion in the cases of Portugal and South Africa.

National Security Adviser McGeorge Bundy sends a memo to President Kennedy outlining his thoughts on how an arms embargo against South Africa would affect the US missile tracking station there. Bundy notes that "while nothing we have there is vital, there is a close relation between the South African missile tracking station and our satellite photography. This station is part of the system of observation of these satellites, and while the program would not be interrupted if we should lose it, prudence would dictate certain additional technical developments to permit effective observation of these satellites..." Bundy concludes by saying, "I myself remain quite favorable to the Black African position, in spite of this possible dollar cost [of a replacement station]."

— G. Mennen Williams, US State Department Memo, "U.S. Policy towards South Africa," 12 June 1963, secret memo declassified and released, in Kenneth Mokoena, ed., *South Africa and the United States: The Declassified History* (New York: The New Press, 1993), pp. 54-55; Dean Rusk, US Department of State Memorandum, [untitled], 15 June 1963, secret memo declassified and released 20 September 1995, *ibid.*, pp. 59-61; G. Mennen Williams, US Department of State Memorandum, "Arms Policy and South Africa," 12 July 1963, secret memo declassified and released, in Kenneth Mokoena, ed., *South Africa and the United States: The Declassified History* (New York: The New Press, 1993), pp. 62-63; Dean Rusk and Robert McNamara, "Sale of Submarines to South Africa," 16 September 1963, confidential memo declassified and released, *ibid.*, pp. 62-63; McGeorge Bundy, [untitled], 23 September 1963, secret memo declassified and released, *ibid.*, p. 70; McGeorge Bundy, "Missile Tracking Station in South Africa," 13 July 1963, secret memo declassified and released, Digital National Security Archive, nsarchive.chadwyck.com.

1963

South Africa provides Israel with 10 tons of uranium.

— US Central Intelligence Agency, Directorate of Intelligence, New Information on South Africa's Nuclear Program and South African-Israeli Nuclear and Military Cooperation, 30 March 1983, top secret report partially declassified and released 27 April 1997, foia.ucia.gov, p. 17.

1963

South Africa's missile development program begins under the direction of the Armaments Production Board. The early development of the program focuses on surface-to-air, air-to-air, and cruise missiles.

— US Central Intelligence Agency, Directorate of Intelligence, Africa Report, 8 December 1989, top secret report partially declassified and released 7 May 1996, foia.ucia.gov, p. 7.

6 November 1962

UN General Assembly Resolution 1761 calls on member states to refrain from exporting any arms and ammunition to South Africa, and calls on the Security Council to impose an arms embargo against South Africa.

— Timothy U. Mozia, "Chronology of Arms Embargoes against South Africa," in *Effective Sanctions on South Africa*:

Related content is available on the website for the Nuclear Threat Initiative, www.nti.org.



The Cutting Edge of Economic Intervention, George W. Shepherd, Jr., ed. (New York: Greenwood Press, 1991), p. 97.

1961

Britain forces South Africa to leave the Commonwealth, largely in response to the Sharpeville Massacre.

— James Adams, *The Unnatural Alliance* (London: Quartet Books, 1984), p. 30.

21 March 1960

South African police open fire on demonstrators protesting against pass laws in Sharpeville and kill more than 60 and wound 186 people. The event becomes known as the "Sharpeville Massacre."

— "Sharpeville," Encyclopedia Britannica Online, [undated], search.eb.com.

1960

A South African military attaché to the United States requests information on US Bullpup missiles and asks if they could be made available to South Africa. The US Navy denies the request, but emphasizes that the United States wishes to help South Africa and proposes a meeting between representatives of both countries to discuss aircraft/missile compatibility.

— Jonathan Moore, Office of the Assistant Secretary of State, "Memorandum for the Director, East and Southern African Affairs," 9 March 1962, secret memo declassified and released, Digital National Security Archive, nsarchive.chadwyck.com.

1960s

Israel licenses the Uzi submachine gun to South Africa. [Note: This marks one of the first steps in Israeli-South African cooperation on arms-related issues.]

— James Adams, *The Unnatural Alliance* (London: Quartet Books, 1984), p. 35.

1954-1967

Israel begins development of guided missiles. During this period, France and Israel collaborate closely on missile development, but the cooperation program ends due to problems with guidance systems. The program is subsequently relocated to Israel. [Note: Over the next 30 years, Israel and South Africa cooperate closely on missile development.]

— Seth W. Carus, "Israeli Ballistic Missile Developments," Testimony before the Commission to Assess the Ballistic Missile Threat to the United States, 15 July 1998, www.fas.org.

1950s

The National Institute for Defence Research (NIDR) is formed. It later becomes part of the Armaments Development and Production Corporation (ARMSCOR).

— James Adams, *The Unnatural Alliance* (London: Quartet Books, 1984), p. 34.

Phase I: International Pressure Builds against Apartheid, 1950-1970

[Back to Top](#)

Related content is available on the website for the Nuclear Threat Initiative, www.nti.org.



Related content is available on the website for the Nuclear Threat Initiative, www.nti.org.



This material is produced independently for NTI by the James Martin Center for Nonproliferation Studies at the Monterey Institute of International Studies and does not necessarily reflect the opinions of and has not been independently verified by NTI or its directors, officers, employees, or agents. Copyright © 2011 by MIIS.