NUCLEAR- AND MISSILE-RELATED TRADE AND DEVELOPMENTS FOR SELECTED COUNTRIES, JULY-OCTOBER 1998

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The material in this overview is drawn from selected abstracts that appear in the Center for Nonproliferation Studies' nuclear and missile databases. Transactions of nuclear and missile technologies, parts, and materials are listed according to the recipient country. Other developments are listed according to the country where the event or development took place.

ASIA

CHINA

Nuclear

Japanese police searched more than 20 locations related to Hitachi Electronics Ltd. for possible connections to the suspected illegal export of high-tech equipment to China. It is believed that the equipment could be used by China to improve its nuclear weapons. The searches were conducted to determine whether Hitachi cooperated with Tokyo-based Ryokosha Co. employees in exporting unauthorized instruments to China. Police reported that 18 instruments worth ¥231 million were exported to Harbin, a city in northeastern China, via South Korea in December 1996.

Daily Yomiuri, [Online] http://www.yomiuri.co.jp, 8 August 1998.

The European Commission (EC) has sought a formal mandate from the European Council to negotiate a nuclear cooperation agreement with China. The aim of the agreement would be to facilitate nuclear commerce between China and Europe. It is believed that the EC will also seek to convince China "to enlarge China's offer to the [International Atomic Energy Agency (IAEA)] under its voluntary safeguards agreement and put specific Chinese facilities under IAEA safeguards, as well as to submit an expanded declaration of its nuclear activities to the IAEA," as a part of its Model Additional Protocol. The negotiations will not cover nuclear accident liability because China is not a member of the Vienna International Liability Convention.

Mark Hibbs, *Nucleonics Week*, 24 September 1998, p. 3.

Missile

It remains unclear whether China acquired classified information from a commercial Loral Space & Communications satellite that crashed in February 1996 after being launched in China. It is possible that China retrieved two encryption devices from the wreckage "compromising US communication codes." The other possibility is that the codes and devices were destroyed in the crash. The encryption chips were two among more than 1,000 chips built into 100 circuit boards used in the satellite. The chips were indistinguishable from the others so the Chinese had no way of knowing which chips held the encryption codes. According to industry officials, only Loral employees in California would have been able to tell the chips apart by comparing company records with code numbers on the half-melted hardware. A Clinton administration official was quoted as saying that the National Security Agency did not think the missing chips were a major concern. He also raised the point that if the Chinese wanted the encryption chips, they would have taken all the chips, since all the chips looked alike. According to US officials present when the satellite crashed, the "Chinese had not taken anything because they were too busy dealing with the emergency, and had made no apparent effort to pick up any of the circuit boards."

John Mintz, *Washington Post*, 8 July 1998, p. 24.
Eric Schmitt, *New York Times*, 9 July 1998, p. 1.

According to a US Air Force classified intelligence report, it is possible that US technology could aid China in developing a multiple warhead deployment capability. In 1996, the Chinese developed an upper-stage booster called a "smart dispenser," for the Long March 2C/SD rocket. China built this as part of a Motorola contract to be able to

conduct double satellite launches "needed for a new global telephone network." The US Air Force intelligence center conducted a study to determine whether "the satellite dispenser could be adapted by the Chinese for a first-generation, three-warhead 'post-boost vehicle' for the CSS-4 and other intercontinental ballistic missiles (ICBMs)." The intelligence center did not find any evidence that China was taking steps to use the dispenser for warheads. If it did, however, the system would be less accurate than comparable Russian and US systems. A computer simulation suggested that a Chinese strategic missile fitted with the satellite dispenser could fire three separate warheads at intervals over several seconds after the booster rocket burned out. Motorola says it had no role in the development of the smart dispenser. However, it did provide technical data to make it compatible with Motorola satellites. Motorola also said that the US Department of Defense cleared all information given to the Chinese.

Bill Gertz, *Washington Times*, 14 July 1998, p. 1.

China has lobbied the UN Conference on Disarmament (CD) in Geneva to establish a negotiating committee to prevent a "Star Wars" arms race in outer space. China's ambassador to the CD, Li Changhe, has said that by turning outer space into a base for weapons, regional and global strategic stability would be undermined, a new arms race would begin, and international peace and security would be threatened. According to US Ambassador Robert Grey, the United States does not believe there is an arms race in outer space and therefore sees no reason to form a committee on it. The United States was the only country at the Geneva talks opposed to forming a negotiating committee.

Washington Post, 14 August 1998, p. 18A.

China's Foreign Ministry spokesperson, Mr. Zhu Bangzao, warned Japan and the United States against developing a missile defense system "to counter future threats from North Korea." He said that, "[Japan and the United States] should exercise restraint and refrain from doing anything that may cause tensions in the region and spark a new arms race in the region."

Indian Express, [Online] http//www.indian-express.com, 23 September 1998.

INDIA

Nuclear

Senior Indian officials reported that India does not have a command and control doctrine for its nuclear weapons. Indian Defence Minister George Fernandes reported that India's National Security Council (NSC) would determine India's nuclear doctrine. However, the NSC has not yet been established.

Dinesh Kumar, *Times of India*, [Online] http://www.timesofindia.com, 2 July 1998.

The UK Foreign Office reported that it would tighten sanctions on the export of nuclear-related materials to India and Pakistan in response to the nuclear tests both countries conducted in May 1998. The Foreign Office said that "export licenses would be denied for items that could assist the two countries' nuclear programs and close scrutiny would be given to other military items." The Foreign Office also said that Indian and Pakistani citizens would be denied access to British nuclear plants.

BBC News, [Online] http://www.news.bbc.co.uk, 10 July 1998.

On 9 July 1998, the US Senate approved the Farm Export Relief Bill. The bill exempted food exports from sanctions the United States imposed on India and Pakistan following their nuclear tests. Senator Trent Lott said that if the bill was not implemented, US wheat farmers would lose approximately $37 million in revenue in 1998. Senator Richard Lugar said that "food should not be a weapon of foreign policy."

Eric Schmitt, *New York Times*, [Online] http://www.nytimes.com, 10 July 1998.

India's director of the Nuclear Power Corporation, Dr. Y.S.R. Prasad, and Russia's general director of Atomstroiexport, Viktor Kozlov, signed a project report contract for Kudankulam on 20 July 1998. Under the contract, India's Kudankulam nuclear power station will receive two 1,000 MW light water reactors from Russia. Russia is expected to take seven years to install the first nuclear reactor.

Vladimir Radyuhin, *The Hindu*, [Online] http://www.webpage.com/hindu, 21 July 1998.

Official Indian sources said in late July 1998 that in the wake of India's recent nuclear tests, India is concentrating on completing its nuclear-powered submarine (SSN) program known as the Advanced Technology Vessel (ATV). The ATV project has been under way since the 1970s and a boat is expected to be commissioned in 2007 or 2008. The submarine will be used to launch nuclear-armed missiles. The ATV will also play a role in surveillance and deterrence operations off the coast of China. The ATV project is based on the Russian *Charlie-I* class cruise missile submarine. Indian Navy officials close to the project say that the problem until now has been miniaturizing the nuclear reactor.

Rahul Bedi, *Jane's Defence Weekly*, 22 July 1998, p. 26.

On 4 August 1998, Indian Prime Minister Atal Behari Vajpayee announced the three elements of India's new "evolving nuclear doctrine." First, India will maintain a "minimum but credible nuclear deterrent." Vajpayee said that India requires no further nuclear testing to maintain the credibility of its nuclear deterrent. Second, India will never use nuclear weapons against non-nuclear states, nor will it be the first to use nuclear weapons against nuclear states. Lastly, India is committed to all non-discriminatory arms control and disarmament agreements.

Times of India, [Online] http://www.timesofindia.com, 4 August 1998. *Indian Express*, [Online] http://www.indian-express.com, 5 August 1998.

Unidentified sources reported that the US Department of Commerce is investigating allegations that Themis, a California-based computer company, illegally sold microprocessor chips to India. The sources said that Themis sold the chips to India's Advanced Numerical Research Analysis Group, which is affiliated with India's Defence Research and Development Organization (DRDO). The chips were legally shipped without US Department of Commerce approval. However, the sale would be illegal if the chips

were installed in Indian supercomputers used in nuclear weapons development or testing.

Indian Express, [Online] http://www.indian-express.com, 17 August 1998.

Following the US-Russian summit in early September 1998, reports suggested the Russian government had agreed to stop all defense cooperation with India, including nuclear and conventional arms transfers. Both the United States and Russia agreed to work together to persuade India and Pakistan to reverse their arms race, and to expand US-Russian communication. Indian Defense Minister George Fernandes said he has "no doubt" that Russia will stand by India and "not succumb to US pressure." Fernandes said Clinton's comment that Russian assistance to India could cause a war between the nuclear superpowers implied "a belief that Asian people cannot be trusted with nuclear weapons." On 11 September 1998, however, the US embassy in India released a statement denying that the United States had asked Russia to stop all military cooperation with India. The US embassy statement said that no US official "has asked any country to suspend its military relationship with either India or Pakistan." Embassy sources said, however, that several countries had unilaterally decided to cut military ties with India and Pakistan in an attempt to push them "to move in the direction favored by the international community." Embassy sources said that during the summit meetings, Clinton and Yeltsin agreed only to renew their "commitment to persuade India and Pakistan to reverse their arms race." When asked whether Clinton wanted Russia to stop military cooperation with India, embassy sources said, "there was no such discussion."

Shaheen Sehbai, *Dawn*, [Online] http://www.dawn.com, 3 September 1998. Dinesh Kumar, *Times of India*, [Online] http://www.timesofindia.com, 3 September 1998; *Indian Express*, 3 September 1998, [Online] http://www.indian-express.com. *The Hindu*, [Online] http://www.hinduonline.com, 11 September 1998. *Indian Express*, [Online] http://www.indian-express.com, 11 September 1998.

Construction has begun on a 500 MW pressurized heavy water reactor (PHWR) at India's Tarapur nuclear power station. Two 500 MW reactors are planned for Tarapur.

UI News Briefing-98.37, 9-15 September 1998.

Director of the Indira Gandhi Centre for Atomic Research (IGCAR) P. Rodriguez said that construction of a prototype fast breeder reactor at Kalpakkam will begin in 2001 and the reactor will be operational in 2008. The reactor is being built through collaboration between the public sector and related industries. Rodriguez said that fast breeder reactors will be commissioned to meet the estimated demand for electricity in 2020.

Indian Express, 14 September 1998; in FBIS-TAC-98-257, 14 September 1998.

Indian defense officials and nuclear scientists rejected the findings of a study by US seismological experts stating that India and Pakistan had exaggerated the number and yield of their nuclear tests in May 1998. The DRDO stood by its original statement that India conducted five nuclear tests over two days with a combined yield of approximately 60 kt. An official at India's Bhabha Atomic Research Center said that the US equipment must not have been sensitive enough to detect the sub-kiloton explosions.

The Nation (Lahore), 17 September 1998.

Indian Prime Minister Atal Behari Vajpayee spoke before the UN General Assembly in New York on 24 September 1998. In his first international address since India's 11 May and 13 May 1998 nuclear tests, he defended India's nuclear position. He highlighted four main topics: the declaration that India is now a nuclear weapons state, its determination to pursue nuclear restraint, its readiness to cooperate with the global nuclear order, and its commitment to the goal of nuclear disarmament.

C. Raja Mohan, *The Hindu*, [Online] http://www.hinduonline.com, 22 September 1998.

On 28 September 1998, the US Senate and House of Representatives reached an agreement on the so-called Brownback amendment to allow President Bill Clinton to waive sanctions against Pakistan and India for one year. Although the amendment would provide the authority to waive sanctions, US Department of State officials said that several concessions would be required of India and Pakistan before sanctions would be lifted. Among the issues discussed were signing the Comprehensive Test Ban Treaty (CTBT), establishment of a regime dealing with nuclear weapons and delivery systems, creation of an export control system, and a moratorium on the production of fissile material.

Shaheen Sehbai, *Dawn*, [Online] http://www.dawn.com, 29 September 1998.

Missile

Russian General Alexander Luzan offered to sell India an anti-ballistic missile system (ABM) that would be capable of countering an attack from Pakistan's Ghauri medium-range ballistic missile. The ABM system would be based on technology from the SA-12 Giant and the "Antey-2500" mobile missile systems. Luzan said that the ABM system would be able to intercept a "football size warhead with 98 percent accuracy."

Indian Express, [Online] http://www.indian-express.com, 2 July 1998.

US Assistant Secretary of State Karl Inderfurth reported that, as of 15 July 1998, the United States was no longer asking India or Pakistan to stop testing or building its ballistic missiles. Instead, the United States asked both countries to refrain from deploying their ballistic missiles. US Senator Charles Robb said that "we must be realistic about what we are asking the two countries to do."

Indian Express, [Online] http://www.indian-express.com, 15 July 1998.

India's minister of state for external affairs, Vasundhara Raje, said that US sanctions imposed after India conducted its nuclear tests would not affect its ongoing satellite and space launch vehicle projects. Raje said that a cooperative agreement was made between NASA and the National Oceanographic and Atmospheric Administration of the United States and the Department of Space and Department of Science and Technology of India for cooperation in the areas of earth and atmospheric sciences.

Indian Express, [Online] http://www.indian-express.com, 15 July 1998.

On 3 August 1998, India successfully test-ramjet missile at the interim test range at Chanipur. The missile is capable of striking multiple targets within a 25 km radius.

The Hindu, [Online] http://www.webpage.com/hindu, 4 August 1998.

Defence Minister George Fernandes said on 11 August 1998 that India had begun developing a longer-range version of the Agni intermediate-range ballistic missile. The new missile would have an estimated range of 2,500 km, which is 1,000 km greater than the old version. It would also be capable of carrying a nuclear warhead. Fernandes said that the upgraded Agni would use technologies that were developed indigenously by Indian engineers. He reported that sanctions imposed by the United States after India conducted its nuclear tests in May 1998 would not affect its missile program.

Inquisit, [Online] http://www.inquisit.com, 11 August 1998. *Indian Express*, [Online] http://www.indian-express.com, 12 August 1998.

Pakistan's Foreign Ministry, protesting India's 2 September 1998 test-firing of the Akash surface-to-air missile, warned that such a missile program could "provoke a new arms race in South Asia."

Indian Express, [Online] http://www.indian-express.com, 3 September 1998.

On 24 September 1998 the Indian Space Research Organization (ISRO) acknowledged the delivery of a cryogenic booster from Russia, which the ISRO will use to develop its own heavy geostationary space launch vehicle (GSLV). This was the first of seven such boosters Russia is to deliver to India. Russia flew the booster to Chinnai, Madras Province, from which it will be delivered to the Shriharikota space center. There the booster will be joined with other stages of the GSLV. The ISRO is planning to conduct its first launch in mid-1999. The booster is designed to carry satellites weighing up to 5,000 lbs into a geostationary orbit. The static tests for India's first cryogenic rocket engine will begin by February 1999. It is expected to be ready for use by 2002.

Leonid Kotov, ITAR-TASS, 24 September 1998; in FBIS-SOV-98-268, 25 September 1998.

The ISRO launched a Rohini sounding rocket on 28 September 1998. The rocket was one of three sounding rockets launched since 19 April 1998 to study the "equatorial ionosphere." The rocket was developed by German and other European laboratories and had a 127 kg payload. The Indian Remote Sensing Satellite (IRS-ID), launched 29 September 1997, has completed one year of operation.

Times of India, [Online] http://www.timesofindia.com, 30 September 1998.

Indian Chief of Naval Operations Admiral Vishnu Bhagwat on 2 October 1998 stated the importance of a submarine-based, second-strike nuclear capability for India's new command-and-control doctrine. In addition, Bhagwat said that the Indian Navy would rely on information technology and information warfare in order to meet the demands of the 21st century. Bhagwat said that India's strategic interests cover the "entire Indian Ocean up to West Asia including the Persian Gulf, the Red Sea and the western littorals, the Pacific up to the South China Sea."

The Hindu, 2 October 1998; in FBIS-TAC-98-275, 2 October 1998.

JAPAN

Nuclear

An early conclusion is expected for an agreement between Japan and Euratom that would redefine Japan's bilateral atomic power agreements with Europe. Electric power companies in Japan are writing a proposal that would allow Japan to reprocess 7,100 tons of spent uranium fuel with France's KOJEM Co. and Britain's Nuclear Fuel Company. The proposal requires that: (1) plutonium and enriched uranium recovered in reprocessing be processed into Pluthermal mixed-oxide (MOX) fuel and then re-enriched, and (2) materials be transferred and reprocessed in facilities in Belgium, the Netherlands, France, and the United Kingdom. Japan already has bilateral security agreements with France and the United Kingdom, and is beginning negotiations with Belgium and the Netherlands. It also exchanged documents with Euratom in February 1997 guaranteeing the peaceful use of MOX processing in Belgium.

Japan Atomic Energy Industrial Newsletter, 16 July 1998, p. 1.

Missile

On 20 September 1998, the United States and Japan agreed to conduct joint research on a ballistic missile defense system to protect Japan from attack. Both the United States and Japan have conducted previous studies of missile defense systems, and will now combine their research and development efforts. According to US Secretary of Defense William Cohen, "this is the best way to protect both the United States and Japan." The joint agreement follows North Korea's failed attempt on 31 August 1998 to launch a satellite into orbit.

USA Today, [Online] http://www.usatoday.com, 20 September 1998.

According to the director of Japan's Science and Technology Agency (STA), Yutaka Takeyama, the STA intends to begin reviews and research on developing a multipurpose observation satellite. The detection of a missile launched at Japan would be the project's main focus, he said. In addition, Takeyama said that the project will be based on a 1969 Diet resolution, "which limits the development and use of outer space to peaceful purposes."

Kagaku Kogyo Nippo (Tokyo), 9 September 1998; in FBIS-EAS-98-265, 22 September 1998.

KAZAKHSTAN

Nuclear

Kazakhstani Prime Minister Nurlan Balgimbayev said at a press conference in Almaty on 4 August 1998 that the creation of a joint venture between Kazatomprom and the Russian company TVEL would be "a good decision, as technologically uranium production in Kazakhstan is indissolubly linked with Russia." Balgimbayev also said that Kazakhstan should seek uranium sales markets in countries with Soviet-made nuclear reactors, particularly in Eastern Europe and Ukraine.

Interfax-Kazakhstan, 4 August 1998; in FBIS-SOV-98-218.

KYRGYZSTAN

Nuclear

At a meeting in Bishkek, Kyrgyzstan, on 9-10 July 1998, experts from the foreign ministries of the five Central Asian states—

Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan, and Uzbekistan—met with their counterparts from the five nuclear weapon states and the United Nations to discuss ongoing efforts to establish a Central Asian Nuclear-Weapon-Free Zone (CANWFZ). The Central Asian delegates jointly presented a document containing the "basic elements" of a draft treaty on the establishment of the CANWFZ and received comments and recommendations on the document from their US, Russian, British, French, Chinese, and UN colleagues. In a communiqué issued after the meeting, the Central Asian states noted "some progress" had been made in drafting the treaty creating the zone and pledged to continue consultations with the nuclear weapon states and the United Nations as negotiations on the treaty continue.

Communiqué of the Consultative Meeting of Experts of the Central Asian Countries, the Nuclear-Weapon States and the United Nations (5+5+UN), Bishkek, Kyrgyzstan, 9-10 July 1998.

NORTH KOREA

Nuclear

North Korea has threatened to restart its nuclear weapons program. It has accused the United States of breaching commitments it made under the 1994 Agreed Framework. North Korea recently began maintenance work on the plutonium plant it shut down when the 1994 Agreed Framework was signed. US officials believe that North Korea has the technological capability to restart its nuclear program.

Thomas W. Lippman, *Washington Post*, 6 July 1998, p. 1.

The chairman of the US Senate Energy and Natural Resources Committee, Senator Frank Murkowski, has ordered the General Accounting Office (GAO) to investigate the 1994 Agreed Framework and make its report to Congress. An earlier GAO report found that there were "significant gaps" in the inspection program imposed on North Korea after the signing of the agreement. According to the report, North Korea has refused numerous requests for information regarding the whereabouts of nuclear components, which North Korea planned to install in the two reactors that were shut down in accordance with the agreement. The GAO report found many monitoring problems that affected the International Atomic Energy Agency's (IAEA) "ability to ensure that North Korea is complying fully with certain aspects of the nuclear freeze." North Korea has not allowed the IAEA to install monitoring devices on the nuclear waste tanks. The tanks are connected to "a complex and inaccessible piping system that, if operating, would permit the waste to be removed and/or altered." The report warns that the tanks may have been tampered with since the 1994 agreement and that North Korea may have "secretly removed some of the nuclear waste in an effort to hide evidence of earlier diversions of plutonium." North Korea has admitted to holding a total of 90 grams of plutonium, but US intelligence agencies believe that the stockpile developed before 1994 actually contains several kilograms, enough for two bombs. The GAO report stated there is no way to know "how much bomb-grade plutonium the North Koreans have diverted to their weapons program." Murkowski said that the GAO report "made clear that the 1994 nuclear-freeze agreement between North Korea and the United States was folly." The Clinton administration is hopeful that North Korea might be prevented from building nuclear weapons.

Philip Shenon, *New York Times*, [Online] http://www.nytimes.com, 15 July 1998.

Australia's Foreign Minister Alexander Downer has said that the Australian government will contribute US$1.2 million to the Korean Peninsula Energy Development Organization (KEDO). Since 1995, Australia has donated US$6.6 million to KEDO for its heavy fuel oil program.

Northeast Asia Peace and Security Network, [Online] http://www.nautilus.org, 24 July 1998.

US intelligence agencies have evidence of what they believe to be North Korea's effort to resume its nuclear weapons program. Spy satellites have photographed the construction of a huge, secret underground complex 25 miles northeast of Yongbyon. Some 15,000 workers are constructing the new facility in a mountainside. While the exact nature of the construction is not known, US intelligence has concluded that the facility is intended to be either a nuclear reactor or a nuclear processing plant. If it is intended to be a nuclear facility, US intelligence officials estimate that it will take two to six years to complete, depending upon the amount of foreign assistance received. White House and Pentagon officials are concerned that the complex may be North Korea's effort to end the four-year-old Agreed Framework with the United States. South Korean officials, however, have downplayed US intelligence reports of the complex. They are concerned it might undermine South Korean President Kim Dae Jung's "sunshine policy," which is aimed at reopening aid and communication ties with North Korea. Given the recent intelligence findings, however, it is unlikely that Congress will authorize funds for heavy fuel oil shipments to North Korea. In the absence of funding for shipments, North Korea would have an excuse to disregard the Agreed Framework and expel IAEA inspectors from Yongbyon. North Korea has already prohibited inspectors from examining sites other than Yongbyon.

David E. Sanger, *New York Times*, 17 August 1998, p. 1. Dana Priest, *Washington Post*, 26 August 1998, p. 16.

On 10 September 1998, the US Clinton administration announced a package of agreements for North Korea "aimed at defusing tensions on the Korean peninsula and restarting stalled diplomatic initiatives." According to the US State Department, US negotiators have demanded that a suspected underground nuclear weapons development site in North Korea be opened to international inspectors. This is a "non-negotiable condition for further US compliance" with the 1994 framework agreement.

Thomas W. Lippman, *Washington Post*, 11 September 1998, p. 25.

On 28 September 1998, a US government source said that North Korea had resumed packing of spent nuclear fuel rods in containers, which had been suspended since April 1998.

Inquisit, [Online] http://www.inquisit.com, 29 September 1998.

North Korea has threatened to restart its nuclear weapons program if the United States cuts fuel and food aid to the country.

According to a North Korean Foreign Ministry spokesman, the United States has not fulfilled its portion of the 1994 Agreed Framework, in which it promised to supply two light water reactors, heavy oil, and improve bilateral ties. Construction of the reactors has not gone beyond the groundbreaking ceremony. Heavy oil shipments have not been delivered on schedule, and only a few sanctions against North Korea have been lifted.

South China Morning Post, [Online] http://www.scmp.com, 15 October 1998.

Missile

On 31 August 1998, North Korea conducted the first flight test of its two-stage intermediate-range Taepo-dong-1 missile. It was the longest flight of any North Korean missile test, and was the first firing of a ballistic missile since the May 1993 Nodong-1 test. The Taepo-dong-1 was launched from the Hwadaegun Missile Test Facility on the east coast of North Korea. The first stage of the missile separated soon after lift-off, landing in international waters approximately 300 km from the launch site. The second stage continued east over the Japanese island of Honshu and landed in the Pacific Ocean. The total flight distance was estimated to be 1,380 km. On 4 September 1998, North Korea announced that the purpose of the launch of the two-stage rocket was to place a satellite in orbit, not to test a missile. The Korean Central News Agency said that the North Koreans had succeeded in "launching the first artificial satellite aboard a multistage rocket into orbit," and that it was "transmitting the melody of the immortal revolutionary hymns," at 27 MHZ. The satellite is said to carry sounding instruments, which "will contribute to promoting scientific research for peaceful use of outer space."

On 15 September 1998, the United States confirmed that North Korea tried, and failed, to place a satellite in orbit during the 31 August launch. US intelligence agencies tracked debris from the launch nearly 4,000 miles into the Pacific Ocean. According to one US official, the satellite broke into several pieces just seconds before reaching orbit, indicating that a warhead "could potentially have gone that far. Pentagon spokesman Kenneth Bacon said that the solid-fueled three-stage missile has an estimated range of 2,408 to 3,720 miles. The discovery of North Korea's satellite program has come as a complete surprise to US intelligence agencies. According to the Central Intelligence Agency, North Korea's effort to build the satellite was not "something that was widely reported." North Korea did, however, make a statement in the early 1990s that it was seeking a space launch and satellite capability. The announcement came shortly after South Korea launched a satellite into orbit. Until the launch, the US intelligence community believed that North Korea only had the technological capability for a single-stage missile.

Joseph S. Bermudez, *Jane's Defence Weekly*, 9 September 1998, p. 26. Nicholas D. Kristof, *New York Times*, [Online] http://www.nytimes.com, 5 September 1998. *Washington Post*, 15 September 1998, p. A13. Bill Gertz, *Washington Times*, 16 September 1998, p. 1.

Anonymous US government sources said an Iranian team attended North Korea's Taepodong missile launch on 31 August 1998. The US sources said they had evidence indicating that the Iranian team had probably been in North Korea since 20 August 1998. The Iranian embassy in Japan released a statement on 8 September 1998 denying the presence of an Iranian delegation at the missile launch.

AFP, 8 September 1998; in FBIS-EAS-98-250, 7 September 1998.

On 1 October 1998, US officials led by Assistant Secretary of State Robert Einhorn held missile-related talks with North Korea. Discussion focused on North Korea's production and export of Scud missiles and missile-related technology and equipment. US officials warned North Korea that additional missile launches or exports could invite negative consequences. North Korea rejected a US demand to stop testing and exporting ballistic missiles. The United States offered North Korea improved relations if it "restrained its missile tests and exports." According to US sources, North Korea has asked the United States for an annual compensation of $500 million in return for not exporting missile technology.

Pacific Stars and Stripes, 2 October 1998, p. 4. *Chicago Tribune*, 4 October 1998. James Hackett, *Washington Times*, 18 September 1998.

PAKISTAN

Nuclear

Pakistan's Foreign Secretary Shamshad Ahmed said that Pakistan had re-evaluated its position on the Comprehensive Test Ban Treaty (CTBT) and the Fissile Material Cut-Off Treaty (FMCT). Ahmed said that Pakistan believes that both treaties became obsolete after India conducted its nuclear tests on 11 May 1998. Ahmed also said that Pakistan's position would "depend on an objective assessment of India's nuclear and ballistic capabilities and future orientation." In addition, Ahmed said that Pakistan's nuclear detonations were only an "expression of self-defense." Unlike India, said Ahmed, Pakistan has shown "no desire in acquiring a formal nuclear status."

Dawn, [Online] http//dawn.com, 1 July 1998.

Dr. Iftikhar Chaudhry Khan, a Pakistani who claimed to be a nuclear scientist, applied for political asylum in the United States on 1 July 1998. Khan said that he had information regarding Pakistan's nuclear program that included details of China's and Iran's assistance in the tests. Khan said he defected from Pakistan because Pakistan was considering a first-strike nuclear attack against India. Pakistani officials said that Pakistan does not discuss its political agenda with scientists or Khan, who they say was "a low-level engineer and did not have access to such information." Pakistanis residing in New York said that Khan was merely trying to secure a green card, and "the Americans are so gullible that they believe him."

Masood Haider, *Dawn*, [Online] http://www.dawn.com, 2 July 1998.

According to an unnamed source, US officials believe that Pakistan is producing weapons-grade plutonium at the Khusab nuclear reactor. US officials are also allegedly concerned that Pakistan may be pro-

ducing weapons-grade highly enriched uranium.

Nucleonics Week, 16 July 1998, p. 2.

According to Pakistani industry officials, centrifuges are being produced at the Pakistan Steel Mills, and they have been used in uranium enrichment for the past several months. The Pakistan Steel Mills operate under the Kahuta Laboratories. The Mills are producing 40,000 tons of "different types of chemical [sic] and special steel," including low-carbon maraging steel, which has applications for Pakistan's defense industries and nuclear program. Dr. Abdul Qadeer Khan, head of the Kahuta Research Laboratories, explained the importance of the Mills, stating that Pakistan cannot import such materials due to international sanctions.

Pakistan Link, [Online] http://www.pakistanlink.com, 19 August 1998.

Pakistani Prime Minister Nawaz Sharif announced on 21 August 1998 that the Chashma Nuclear Power Project, Pakistan's second nuclear power plant, would begin producing electricity in 1999. The plant has a production capacity of 300 MW and has been built with help from China. Sharif said that completing the Chashma project "may enable Pakistan to have prototype plants for other nuclear programs."

A.R. Kamal, *Islamabad Radio* (Pakistan Network), 23 August 1998; in FBIS-NES-98-235, 23 August 1998. *Pakistan Link*, 25 August 1998, [Online] http://www.pakistanlink.com.

On 25 August 1998, Pakistani Foreign Secretary Shamshad Ahmad said that Pakistan would consider signing the Comprehensive Test Ban Treaty if economic sanctions were lifted. He did not comment on Pakistan's earlier view that it would not sign the CTBT until India had done so, but said that Pakistan would not sign the nuclear Non-Proliferation Treaty. Ahmad said that Pakistan has "established a strategic balance vis-a-vis India and attained a minimum deterrent capability." He said that once Pakistani officials felt that the atmosphere of "coercion" to sign the CTBT was gone and "its national interests were fully safeguarded," Pakistan would make a decision about signing it.

Nasir Malick, *Dawn*, [Online] http://www.dawn.com, 26 August 1998.

Missile

Al-Akhbar, a Pakistani newspaper, reported on 19 July 1998 that Pakistan had "manufactured" a new intermediate-range ballistic missile named Abdali. The missile has an estimated range of 3,500 km. *Al-Akhbar* said that the Abdali's "laboratory tests had been successful and that the missile could be tested at anytime in open air."

CDISS, [Online] http://www.cdiss.org, 19 July 1998.

Pakistani scientist Dr. Samar Mubarakmand, director of Pakistan's Atomic Energy Commission, said that Pakistan is able to test-fire the Shaheen-1 at any time. The Shaheen-1 is a medium-range surface-to-surface ballistic missile with an estimated range of 750 km. Mubarakmand said that "we can conduct the first test-fire of the Shaheen missile at any time, but it depends on the decision of the government to carry out the test."

Pakistani Link Headlines, [Online] http://www.pakistanlink.com, 9 August 1998.

US cruise missile attacks on Afghanistan conducted on 20 August 1998 revealed that US Tomahawk missiles can fly undetected through Pakistani airspace. Pakistani scientists are rethinking their claims that Pakistan has an impenetrable defense system safeguarding its nuclear installations. Pakistan's top nuclear scientist, Dr. Abdul Qadeer Khan, said that "Pakistan has no capability to counter these missiles because the Tomahawk missile flies so low that Pakistani radars are unable to detect it." Pakistani Prime Minister Nawaz Sharif chaired a meeting on 23 August 1998 that discussed US attacks on Afghanistan and Sudan and the "overall preparedness of the country's armed forces, safeguarding its nuclear installations."

Pakistan Link, [Online] http://www.pakistanlink.com, 23 August 1998.

An unexploded US Tomahawk cruise missile was found on 22 August 1998 in Pakistan. Pakistani officials said that the missile was found approximately 10 km from Kharam, near the site where Pakistan conducted its nuclear tests in May. Previous reports made on 22 August 1998 by the Pakistani Foreign Office claimed that a US cruise missile exploded in Pakistan, killing six people. The Pakistani government later retracted the statement on the grounds that it was based on erroneous information.

Saleem Shahid, *Dawn*, [Online] http://www.dawn.com, 24 August 1998.

A US official reported that US Air Force General Joseph Ralston, vice chairman of the Joint Chiefs of Staff, was in Pakistan on 20 August 1998. Ralston was there to make sure that Pakistan did not mistake the US cruise missile strike against Afghanistan for a pre-emptive attack by India. In addition, the official said that Pakistan's air defenses were unable to detect the US strike.

The Nation (Lahore), [Online] http://www.nation.com.pk, 25 August 1998.

Pakistani Ambassador Ahmed Kamal filed a complaint with the UN Security Council on 24 August 1998, saying that the United States had violated Pakistan's airspace. Kamal said that the violation occurred when US cruise missiles struck a terrorist camp in Afghanistan on 20 August 1998.

Betsy Pisik, *Washington Times*, [Online] http://www.washtimes.com, 25 August 1998.

Pakistani security sources said that Pakistani scientists were examining various components of the US Tomahawk cruise missile that was found unexploded on 21 August 1998. The scientists are studying the guidance system, onboard computer, and propulsion system. An unidentified Pakistani official said that the find was a "jackpot" and included the Global Positioning System and other technological improvements made to the Tomahawks since the 1991 Gulf War. However, Retired US Lt. Gen. Thomas G. McInerney expressed doubt about the significance of the Pakistani find. He said that "when a cruise missile crashes it's like dropping a Waterford crystal glass. They are very fragile and are not designed to bounce." In addition, McInerney said that what did not break on impact would probably have

been burned by the missile's fuel, which would ignite on impact.

Kamran Khan, *Washington Post*, [Online] http://www.washingtonpost.com, 28 August 1998.

Official unnamed Pakistani sources said that Pakistan discovered a second unexploded US Tomahawk cruise missile. The missile, one of several targeted at a terrorist camp in Afghanistan on 20 August 1998, was discovered in the Hoshab sub-district of the Mekran coastal area off the Arabian Sea. The other US cruise missile was found in the Kharan district of Baluchistan province on 21 August 1998.

Indian Express, [Online] http://www.indian-express.com, 31 August 1998.

A senior Pakistani official said that Pakistan has given the two unexploded US Tomahawk cruise missiles to "its scientific organizations which are working on different missile programs, including a cruise missile project." Experts from the Pakistan Army Bomb Disposal Unit have destroyed the warheads attached to the missiles. US Naval officials are not sure what technical advantage the US missiles can give Pakistan and said Pakistan probably does not possess the technical or manufacturing expertise needed to successfully reverse-engineer them. According to a Foreign Office spokesman, US authorities have made no attempt to examine the missiles.

Umer Farooq, *The Nation* (Lahore), [Online] http://www.nation.com.pk, 4 September 1998.

According to US intelligence officials, in June 1998 North Korea delivered warhead canisters for the Ghauri medium-range ballistic missile and other various weapons materials to Pakistan. A 29 July 1998 US congressional commission report on missile threats said that the Ghauri is a version of the North Korean Nodong medium-range ballistic missile. The report's authors said that "we believe Pakistan has acquired production facilities for this missile as well."

Bill Gertz, *Washington Times*, 14 September 1998, p. 3.

SOUTH KOREA

Nuclear

On 28 August 1998, South Korean Prime Minister Kim Jong Pil announced that at one time South Korea had tried to develop nuclear weapons, but since then has chosen "a nuclear-free path." The statement confirmed "widely circulated accounts by aides of former President Park Chung Hee that [South Korea] had come close to developing a nuclear bomb in the late 1970s." The project did not go through because of the assassination of the president in 1979.

BTOnline, [Online] http://www.business-times.asia1.com, 29 August 1998.

Missile

South Korea has decided to develop a 300-km-range ballistic missile to deter North Korea. It has lobbied the United States to alter the 1979 US-South Korean agreement that limits South Korean missiles to a maximum range of 180 km. Although both the United States and South Korea have agreed in principle to amend the agreement, no formal decision has been reached.

John Larkin, *South China Morning Post*, [Online] http://www.scmp.com, 12 August 1998.

South Korea's defense minister, Chun Yong Taek, has announced plans to purchase an air defense system by the year 2000. The US Patriot system and the Russian S-300 will compete in the South Korean market. There are likely to be two Russian competitors, the S-300V and the S-300PMU. Whereas a Patriot-based system is estimated to cost $1 billion, an S-300 system would cost half as much. It has been speculated that South Korea's military will opt for the Russian S-300. South Korea apparently has close contacts with the system's manufacturer, Antey. The Russian system is more sophisticated than any other system that is likely to be on the market until the year 2003.

Aleksandr Yegorov, *Kommersant Daily*, 18 September 1998.

TAIWAN

Missile

On 3 August 1998, Taiwan announced that it had successfully carried out a preliminary test of a locally developed anti-ballistic missile. The test was held in mid-July at the Chiu Peng testing ground in southern Pintung county. It had been delayed since June so as not to anger China during President Bill Clinton's state visit. A report stated that the missile flew at four times the speed of sound and successfully hit its target. However, no other details have been released. The anti-ballistic missile is a modified version of Taiwan's Sky Bow-2 anti-aircraft missile.

South China Morning Post, [Online] http://www.scmp.com, 4 August 1998.

Taiwan has completed deployment of Patriot Advanced Capability Level 2 (PAC-2) surface-to-air missiles around Taipei. The PAC-2 missile is an upgraded version of the Patriot missile used in the 1990-91 Gulf War. In 1993, the United States sold 200 Patriot missiles to Taiwan. Patriot missiles are also deployed around Hsintein, Nankang, and Linkou. Taiwan is working to develop its own anti-ballistic missile weaponry, which will require an estimated five years to complete.

Hong Kong Standard China, [Online] http://www.hkstandard.com, 25 August 1998.

Minister of National Defense Chian Chungling has said that Taiwan is interested in joining the US Theater Missile Defense (TMD) project; however, it is in "no hurry to decide whether or not to join it." Citing TMD's huge development cost and its imperfect performance to date, he said that Taiwan will not join the program before studying it comprehensively.

Central News Agency (Taiwan), 22 September 1998; in FBIS-CHI-98-265, 22 September 1998.

EUROPE

CYPRUS

Missile

On 11 September 1998, Cypriot Defense Minister Ioannis Omirou briefed a parliamentary committee on the possible purchase of Russian-built SA-15 Gauntlet surface-to-air missiles (SAM), if an agreement to purchase additional Italian-built Aspide Mk 1 SAM missiles cannot be concluded. According to Cyprus Broadcasting Corporation, the government of Cyprus seeks to deploy either the 18-km-range Aspide or 12-km-range

SA-15 system on the island to guard against a possible attack by Turkey during deployment of Russian-built S-300PMU-1 SAMs on Cyprus.

Jean Christou, Reuters, 11 September 1998. Cyprus Broadcasting Corporation Radio Network (Nicosia), 11 September 1998; in FBIS-WEU-98-254, 11 September 1998.

GEORGIA

Nuclear

Dr. William C. Potter reported that the 2 kg of highly enriched uranium (HEU) stored at the I.N. Vekua Physics and Technology Institute in Sukhumi, Georgia has disappeared. A physical inventory conducted in 1992 at the institute identified approximately 2 kg of HEU stored there; officials at the Institute of Nuclear Physics in Tbilisi, Georgia have said that the material is 90 percent enriched HEU. Sukhumi is located in Abkhazia, a breakaway region of Georgia not currently under the control of the Georgian government. At the request of the Georgian government, the IAEA and the Russian Ministry of Atomic Energy (Minatom) attempted to conduct an inventory at the site, but failed because of the ongoing political instability in the region. According to Potter, a Minatom team gained access to the facility in December 1997. The team found the facility abandoned and no HEU at the site. It remains unclear when the HEU was diverted or where it is currently located.

William C. Potter, "A U.S. NGO Perspective on US-Russian MPC&A Cooperation," 39th Annual Meeting of the Institute for Nuclear Materials Management, Naples, Florida, 26-27 July 1998.

Deputy Head of the National Center for Radiation Safety of the Georgian Ministry of Environmental Protection Soso Kakushadze stated that radioactive material discovered buried near a Ministry of Road Construction building in Tbilisi was enriched uranium. The Georgian Ministry of State Security is investigating the situation.

Tbilisi Prime News, 31 October 1998; in FBIS-TEN-98-306.

GREECE

Missile

On 22 September 1998, the US Department of Defense (DOD) announced the sale of 81 Army Tactical Missile System (ATACMS) guided missiles and launching assemblies to Greece. The ATACMS are part of a $306 million deal to supply Greece with military equipment that also includes 200 AGM-65G Maverick missiles, 200 GBU-24 A/B bomb kits, missile launchers, and support equipment. According to the DOD, the proposed sale will not "adversely effect either the military balance in the region or US efforts to encourage a negotiated settlement of the Cyprus question."

DefenseLINK, [Online] http://www. defenselink.mil, 22 September 1998.

RUSSIA

Nuclear

On 16 July 1998, the State Duma adopted a resolution recommending that the Russian government suspend its agreement with Germany to supply highly enriched uranium for the Munich-2 research reactor. The agreement, signed by the Ministry of Atomic Energy on behalf of the Russian government, gives Germany the right to re-export the uranium to other countries. The resolution was initiated by the Duma's Committee on Defense Conversion and Knowledge-Based Industries. Committee Deputy Chairman Aleksandr Pomorov said the agreement allows for the possibility of selling weapons-grade uranium to other countries "for unknown purposes." Two hundred and forty-nine deputies supported the resolution, with one vote against.

Interfax, 16 July 1998; in FBIS-SOV-98-197.

According to Yevgeniy Ignatenko, director of the state agency Rosenergoatom, Russia plans to construct 16 new nuclear reactors by the year 2010. International lenders are being solicited to help finance the project, the estimated cost of which is about $18 billion. By the year 2010, nine existing reactors will be decommissioned and the number of operating reactors will rise from 29 to 36. Eight new power plants would come into operation, and the proportion of Russia's electricity that is derived from nuclear power would increase from 12.8 percent to about 14.7 percent. However, ITAR-TASS reported that only seven new reactors are to be built by 2010.

David Johnson's Russia List, No. 2297, 4 August 1998. *David Johnson's Russia List*, No. 2304, 10 August 1998.

On 2 September 1998, Russian President Boris Yeltsin and US President Bill Clinton signed the "Joint Statement of Principles For Management and Disposition of Plutonium Designated as No Longer Required for Defense Purposes," providing for the extraction of 50 metric tons of weapons-grade plutonium by each country from dismantled nuclear warheads. Pledging that the plutonium would never again be used in nuclear weapons, the countries plan to use it as fuel for nuclear reactors or mix it with radioactive waste (rendering it unusable) and place it in long-term storage. According to Viktor Mikhailov, Russia's first deputy minister of atomic energy, it will take 15 to 20 years to process the 100 metric tons of plutonium, but he feels that this is "the most promising and rational approach" to dealing with weapons-grade plutonium. Russia plans to produce fuel from its 50 metric tons of plutonium, while the United States will produce fuel from 43 metric tons and bury the remaining seven metric tons as an experiment. Russia is cooperating with several other countries in the development of new technology to use plutonium in the production of mixed-oxide (MOX) fuel suitable for different types of reactors. Meanwhile, Igor Forofontov, coordinator of Greenpeace Russia, spoke out against the joint decision. He noted that Russia is not ready for the safe use of plutonium. As of 2 September 1998, Russian reactors have produced an average of two and a half metric tons of plutonium per year, while only 150 kg can be burned annually as fuel.

Veronika Romanenkova, ITAR-TASS, 2 September 1998; in FBIS-SOV-98-245. Interfax, 2 September 1998.

On 5 September 1998, a group of five servicemen stationed at the Novaya Zemlya Central Test Site seized firearms and took hostages while on duty there. The five men all served in Unit 707510, which is responsible for nuclear safety in the Russian armed forces and were captured by the Russian

Federal Security Service (FSB). Regional Security Chief Sergey Poskrebetyev stated that the men had no access to nuclear weapons. The servicemen have been charged with several crimes, including murder and terrorism.

Interfax, 5 September 1998; in FBIS FTS19980905001919, 5 September 1998. ITAR-TASS, 5 September 1998; in FBIS FTS19980905002459, 5 September 1998.

On 11 September 1998, a Russian sailor serving on a *Bars* or *Akula*-class nuclear attack submarine commandeered a rifle and killed eight crew members. The sailor then barricaded himself in the submarine's torpedo room where he committed suicide after threatening to blow up the ship. The submarine, part of the Russian Navy's Northern Fleet, is capable of carrying nuclear-armed torpedoes although none were aboard at the time of the incident. The submarine's nuclear reactor was not in operation when the incident occurred.

Aleksandr Konovalov, RIA Novosti, 11 September 1998; in FBIS FTS19980911000228, 11 September 1998. ITAR-TASS, 11 September 1998; in FBIS FTS19980911000505, 11 September 1998.

The lead-cooled fast reactor (LCFR) being developed at Institute of Power Equipment (NIKIET) has been approved by Minister of Atomic Energy Yevgeniy Adamov for construction at Beloyarsk; the project is called BREST-300. The reactor has been praised for its use of a mixed uranium/plutonium nitride fuel and a reprocessing method that would partially "clean" fission products from the irradiated fuel without separating plutonium from uranium. More than 40 years ago, Russia started the development of LCFRs for submarine propulsion. Eight submarines used this type of reactor, and although one was destroyed in a fire, the accident demonstrated the effective isolation of the radioactive core offered by solidified lead coolant.

Nuclear News, September 1998, pp. 23-24. *East European Energy Report*, August 1998, p. 35; in NB98.37-17, UI News Briefing, [Online] http://www.uilondon.org/nb/nbindex.htm, 9-15 September 1998.

On 20 September 1998, Sergeant Vitaliy Pryakhin, a member of Unit 3446, which guards Russia's Mayak Production Association nuclear facility, shot and killed two guards and injured one more before fleeing with a submachine gun.

German Galkin and Dmitry Zobkov, *Kommersant-Daily*, 23 September 1998; in Universal Database of Russian Newspapers, [Online] http://news.eastview.com. Vladislav Pisanov, *Trud* (Moscow), 13 October 1998; in Universal Database of Russian Newspapers, [Online] http://news.eastview.com.

According to a 21 September 1998 report in *NuclearFuel*, Czech and German authorities have traced highly enriched uranium (HEU) seized in Landshut, Germany in July 1994 and Prague, Czech Republic in December 1994 back to the Mayak Production Association in Ozersk, Russia (formerly known as Chelyabinsk-65). European officials close to the investigation of these cases said that the seizure in Landshut was the result of a "sting" operation conducted by the Bavarian State Criminal Investigation Agency. German agents posing as buyers arrested suspects in Landshut with 0.8 grams of the material. Subsequently, Czech authorities acting on a local tip arrested additional suspects in Prague, including a former Czech nuclear physicist, with 2.7 kg of the material. According to this report, the material seized in both instances came from the same source, and questioning of the suspects arrested in Prague led to the conclusion that the HEU had been stolen from the Mayak facility and then sold to smugglers who hoped to sell it in Europe. Police authorities were also told by unidentified sources during their investigation that the HEU seized in Prague and Landshut was only a "portion" of a larger stock of HEU allegedly stolen from Mayak. During 1995, Czech police seized a 0.4 gram sample of the same material in Prague, and also recovered 20 grams of it in the southern Czech city of Ceske Budejovice. However, no more of the HEU has turned up or been offered for sale in the last four years. Czech officials interviewed for the report expressed continuing concern about "this apparently missing HEU since a ring of bandits was involved in stealing it and at least one nuclear expert was involved in trying to sell it."

Mark Hibbs, *NuclearFuel*, 21 September 1998.

Nikolay Redin, deputy head of the Security of Information, Nuclear Materials, and Facilities Department of the Russian Ministry of Atomic Energy (Minatom), told a Moscow press conference on 28 October 1998 that in the past three years there have been no cases involving the theft of nuclear materials in Russia. Redin defined the terms "nuclear materials" as including only "materials with enrichment levels above 80-90 percent, which are suitable for use in nuclear weapons." Redin also pointed out that from 1992-1995 there had been 30 incidents in Russia involving the theft of nuclear materials and radioactive isotopes. Redin attributed the drop in cases of radioactive materials theft to international efforts to improve nuclear materials protection, control, and accounting (MPC&A) in Russia. Redin cited the work of the Russian Methodological and Training Center (RMTC), which trains Russian and NIS specialists in the theory and practice of MPC&A, as playing an important role in reducing theft of nuclear materials. The RMTC was established in 1995 with assistance from the US Department of Energy and the European Union.

Interfax, 28 October 1998.

Missile

Russia's Raduga design bureau in Dubna, Moscow Oblast, reportedly used income from sales of its 3M80 Moskit [NATO designation SS-N-22 'Sunburn'] supersonic anti-ship missiles to develop two new missiles now being offered to the Russian Navy. The first is the AS-X-19 Koala, developed as a joint-service weapon capable of speeds up to Mach 5. The second is a proposed hypersonic missile with a maximum speed of Mach 14. Raduga is also offering an upgrade for the Moskit that, according to Raduga general designer Igor Seleznev, will improve combat efficiency by 1.7 times. Raduga's proposed upgrade to the existing Moskit missile would add extra fuel, extending the range by 50 km to a maximum of 200 km and giving the missile a maximum speed of Mach 3. Raduga will also improve the warhead and likely make changes to the missile's seeker. Russia's Progress plant at Arsenyev, Primorskiy Kray, where the Moskit is made, is scheduled to deliver the first batch of the Moskit-E missiles to China

in 2000 and the second in 2002. This order may be the only order keeping Russia's Progress production plant open. Due to cutbacks in Russia's military spending, Progress has been forced to rely on exports. It received permission on 31 December 1997 to export spare parts and maintenance services for its products. The Moskit-E will be installed on two *Sovremenny*-class missile destroyers that Russia is building for China. This sale is the first export contract for Moskit missiles since 1982, when they entered service with the Russian Navy.

Piotr Butowski, *Jane's Missiles & Rockets*, September 1998, pp. 11-12. Piotr Butowski, *Jane's Defence Industry Report*, July 1998, p. 2.

UKRAINE

Nuclear

Under the START I treaty, Ukraine is dismantling its 46 SS-24 ballistic missiles, the most modern strategic missiles of the Soviet era. Ten of the missiles had been destroyed by the end of September 1998. Ukraine plans to dismantle the remaining SS-24 missiles by December 2001. The program is being implemented with financial aid from the United States, while Germany is providing financing for some missile silo destruction.

UNIAN, 1 October 1998; in Lexis-Nexis, [Online] http://web.lexis-nexis.comuniverse. STB TV, 17 August 1998; in Lexis-Nexis, [Online] http://web.lexis-nexis.comuniverse. *The Ukrainian Weekly*, 13 September 1998. UNIAN, 22 September 1998; in Lexis-Nexis, [Online] http://web.lexis-nexis.com/universe.

MIDDLE EAST AND AFRICA

ALGERIA

Nuclear

According to a confidential July 1998 report by the Cesid, Spain's intelligence agency, Algeria is proceeding with a nuclear program that exceeds the civilian needs of the country, and within two years will be capable of producing military-grade plutonium. The Cesid report noted that Algerian nuclear facilities are subject to International Atomic Energy Agency (IAEA) safeguards, and hence estimated that only a few grams of plutonium could be diverted for military purposes without being detected by the IAEA. Nevertheless, the Cesid report concluded that, by the year 2000, Algeria could initiate a military nuclear program if its government made a political decision to do so. Algerian Foreign Ministry spokesman Abdelaziz Sebaa characterized news accounts of the report as "malicious and sensational" and said that Algeria's nuclear program was dedicated to peaceful purposes.

M. Gonzalez and J.M. Larraya, *El País*, [Online] http://www.elpais.es, 23 August 1998. *Washington Post*, 24 August 1998, p. 15. AFP, 24 August 1998.

Missile

Algeria has become the third country to import Russian X-35 subsonic anti-ship missiles for its navy. The navies of Vietnam and India have also bought the X-35 missile. X-35 is Russia's export designation for the Kh-35 [NATO designation SS-N-25 'Switchblade']. Russia will deliver the X-35 missiles to Algeria as part of Uran compact missile systems. Russia will also supply the Algerian navy with onshore equipment to service the X-35 missiles. The Zvezda-Strela State Scientific Production Center in Korolev, Moscow Oblast, which has bordered on bankruptcy the past few years, designed the X-35 missiles.

Nikolay Novichkov, ITAR-TASS, 22 July 1998; in FBIS-SOV-98-203, 22 July 1998. "SS-N-25/AS-20 'Kayak'/SSC-6 (Kh-35 Uran/3K-60 Bal)," *Jane's Strategic Weapon Systems*, Issue 25, 1998.

IRAN

Nuclear

In protest of Iran's nuclear program, the US House of Representatives voted to cut US funding for the International Atomic Energy Agency (IAEA) by an amount equal to the assistance the IAEA is providing Iran for the construction of its Bushehr nuclear power plant. The United States believes that the Bushehr project could help Iran's nuclear weapons program.

BBC News, [Online] http://news.bbc.co.uk, 4 August 1998.

The Iranian government approved a $140 million budget for the first phase of the Russian-supplied Bushehr Nuclear Power Station on 12 October 1998. The first phase will consist of the construction of two 1,000 MW light water reactors. Construction of Bushehr will be supervised by Iran's Atomic Energy Agency, with Russian assistance. No completion date for the project was given; however, Russia has promised Iranian officials that it will finish the project "at the earliest possible time."

Tehran Times, 13 October 1998, pp. 1, 5; in FBIS-NES-98-295, 22 October 1998.

Missile

A CIA report released 21 July 1998 says that China continued to sell missile technology, advanced conventional arms, and unconventional arms to Pakistan and Iran in 1997. The report contrasts with the Clinton administration's assessment that China is "curbing dangerous weapons proliferation." The report's findings point out that Russia, China, and North Korea supplied missile-related goods and technology to Iran. According to the report, Iran is "using these goods and technologies to achieve its goal of becoming self-sufficient in the production of medium-range missiles." China has also provided Iran with chemical warfare material to supplement its stockpiles including bombs and artillery shells.

Bill Gertz, *Washington Times*, 22 July 1998, p. 1.

A senior Iranian official said that, on 22 July 1998, Iran successfully test-fired the Shahab-3, a medium-range ballistic missile. The official said that the Shahab-3 has an estimated range of 800 miles and is capable of striking Israel and Saudi Arabia. US intelligence analysts reported that the Shahab-3 is based on North Korean technology. The analysts also said that the Iranians have to purchase missile technology from Russia, China, and North Korea because Iran does not have the ability to produce missiles indigenously.

Tim Weiner, *New York Times*, [Online] http://www.nytimes.com, 23 July 1998.

Both US and Israeli officials agreed that Iran's Shahab-3 ballistic missile test conducted on 22 July 1998 was unsuccessful. US officials said that the missile failed to complete its flight path and fell short of its

target. Pentagon officials reported that the test was conducted approximately 100 miles south of Tehran. The White House "criticized" North Korea for selling missile technology to Iran. US experts identified the Shahab-3 as a variant of North Korea's Nodong missile.

CNN, [Online] http://www.cnn.com, 23 July 1998.

According to Israeli analyst Ze'ev Schiff, a re-examination of the technical data on Iran's 22 July 1998 Shahab-3 ballistic missile test has led US and other officials to conclude that the test launch was a success despite the missile's explosion during flight. Schiff believes that the successful test of the missile's first stage means that Iran will soon have ballistic missiles capable of striking Israel and other Middle Eastern countries. Schiff also says that Iran is likely to conduct further missile tests, and that Israel should be particularly concerned about the type of warhead developed for the Shahab-3.

Ha'aretz (Tel Aviv), 29 July 1998, p. B1; in FBIS-TAC-98-216, 4 August 1998.

On 1 August 1998, Israeli Defense Minister Yitzhak Mordechai warned that Iran's programs to develop long-range missiles and weapons of mass destruction pose a long-term threat to Israel, and that the country is "obliged to do everything possible to minimize the damage and the potential capabilities of Iran." Israeli officials have repeatedly charged that the Shahab-3 has been developed with Russian assistance, and will be operational within a year unless Russian aid is stopped. Israeli officials are urging Russia and the United States to take punitive action against five Russian firms identified by the Israeli government as providing assistance to Iran's missile programs. According to the list presented to Russian officials by Knesset member Ephraim Sneh on 27 July 1998, the Russian Space Agency, Rosvoorouzhenie, the Bauman State University of Technology, Central Aerohydrodynamic Institute, and the Kuznetsov Design Bureau are providing assistance to Iran's missile programs. The US State Department said that it had no information to validate the Israeli claims, but noted that the five firms do appear on a State Department list of 21 firms suspected of providing ballistic missile assistance to Iran.

Jewish Telegraphic Agency, [Online] http://www.jta.org, 2 August 1998. Barbara Opall-Rome, *Defense News*, 3-9 August 1998, p. 10.

Iranian General Mohammad Bagher Qalibaf, head of the Islamic Revolutionary Guards Corps' air wing, provided details about the Shahab-3 medium-range ballistic missile tested on 22 July 1998. The missile is 53 feet (16 meters) in length and can travel at an estimated speed of 4,300 mph. The Shahab-3 is capable of carrying a 2,000 lb warhead to an altitude of 155 miles above sea level. In addition, Qalibaf said that "the final test of every weapon is in a real war situation but, given its warhead and size, the Shahab-3 is a very accurate weapon." He added that Iranian engineers developed the missile's guidance system. Iranian President Mohammad Khatami said on 1 August 1998 that Iran would continue to strengthen its armed forces "regardless of international concern."

CNN, [Online] http://www.cnn.com, 2 August 1998.

An Asian diplomat reported on 4 August 1998 that Iran would obtain technology to manufacture a multipurpose satellite under a cooperative agreement with five Asian countries. Representatives from China, Mongolia, Pakistan, South Korea, and Thailand met on 3 August 1998 in Tehran to discuss "technical and financial terms for the satellite project." The satellite would cost an estimated $20 million and is intended to be launched in 2001.

Eric Kulisch, *Defense News*, 10-16 August 1998.

A senior Israeli intelligence officer told Knesset members on 8 September 1998 that even if Russian missile assistance to the country is ended, Iran would still be able to complete development of its 1,300-km-range Shahab-3 ballistic missile. According to the officer, a halt in Russian aid to Iran's ballistic missile programs would not be enough to stop the development of the Shahab-3, although it could hinder development of the 2,000-km-range Shahab-4 missile.

Arieh O'Sullivan, *Jerusalem Post*, [Online] http://www.jpost.com, 9 September 1998.

IRAQ

Nuclear

In a report to the UN Security Council on 27 July 1998, the International Atomic Energy Agency (IAEA) said it found no evidence of an Iraqi nuclear program. However, the IAEA says that since Iraq has failed to account for key nuclear equipment and technology, the possibility still exists that Iraq may have "hidden the necessary expertise and material for future use." The report stated that "effective, ongoing monitoring and verification in Iraq...must be comprehensive and rigorous and, as a result, is intrusive."

Barbara Crossette and Judith Miller, *New York Times*, [Online] http://www.nytimes.com, 28 July 1998.

Iraqi scientist Khidhir Abdul Abas Hamza, who defected to the United States in 1994, publicly described the inner working of Iraq's nuclear program. Hamza said Iraqi President Saddam Hussein personally supervised the nuclear weapons program since its inception in 1971. He said that Iraq had completed all the research and development necessary for an atomic bomb and was nearly finished with construction of a bomb using uranium from civilian reactors [sic: probably means plutonium]. Allied bombing during the 1990-91 Gulf War halted Iraq's efforts. However, Iraq could have produced a bomb "in several months," Hamza said.

Fort Worth Star-Telegram, 15 August 1998.

Air Commodore Jasjit Singh, director of India's Institute for Defense Studies and Analyses, told French journalists on 30 August 1998 that India had repeatedly turned down requests from Iraq and Libya for the purchase of Indian nuclear weapons technology. Singh said that Iraq had made "urgent requests" over the years to get nuclear technology, for which they were willing to pay a high price in hard currency. He said that India denied the requests, not out of in-

ternational obligation, "but because we think that this [selling nuclear weapons technology] is the wrong thing to do."

The Nation (Lahore), [Online] http://www.nation.com.pk, 31 August 1998.

During a meeting at the Washington Institute for Near East Policy, former UN Special Commission in Iraq (UNSCOM) weapons inspector Scott Ritter revealed several UNSCOM discoveries related to Iraq's weapons of mass destruction program. According to Ritter, Iraq is hiding three nuclear bombs, which are technically complete, but lack fissionable material. Ritter said that the inspection team knew where the bombs were hidden, but no order was ever given to conduct a surprise inspection of the site. Ritter said that the team also had information on the method used to conceal weapons, the transportation system used to move them, and the personnel guarding them. He said that the UN Security Council and the Clinton administration had blocked the way of the inspectors just as they were to uncover Iraq's nuclear capabilities. UNSCOM inspectors claim that Iraq has retained between five and 12 Al Hussein ballistic missiles and parts for another 25 missiles. Iraq still refuses to give details about its missile program to inspectors.

Ze'ev Schiff, *Ha'aretz* (Tel Aviv), [Online] http://www3.haaretz.co.il, 9 September 1998. Christopher Walker, *The Times* (London), [Online] http://www.the-times.co.uk, 10 September 1998.

Karl-Heinz Schaab, a German engineer, turned himself in to German police on 24 September 1998, upon his return to Germany. He was under an international arrest warrant for allegedly selling centrifuge designs for uranium enrichment to Iraq for $1.1 million.

AFP, 24 September 1998; in FBIS-WEU-98-267, 24 September 1998. *Washington Post*, 26 September 1998, p. A16.

US officials said on 29 September 1998 that former UNSCOM arms inspector Scott Ritter twice reported that he had credible intelligence that Iraq built "three or four implosion devices." These devices, according to Ritter, lacked only the uranium cores to create 20 kt nuclear weapons. Ritter testified before Senate and House committees on 5 September and 15 September 1998. US policymakers did not regard the testimony as credible as they "had never received such a report." However, evidence emerging the week of 28 September 1998 to 2 October 1998 shows that Ritter had spoken with members of the CIA in 1996 and passed the information on in writing to an interagency weapons inspectors group in May 1997. Ritter said three Iraqi defectors gave him the information.

Barton Gellman, *Washington Post*, [Online] http://www.washingtonpost.com, 30 September 1998.

Missile

Iraqi President Saddam Hussein on 5 August 1998 ended all cooperation with UN weapons inspectors. An Iraqi government statement said that there would be no further cooperation with the UN Special Commission, or the IAEA until the following demands were met:

(1) The transfer of UNSCOM from New York to either Vienna or Geneva. This transfer would "keep UNSCOM away from US influence."

(2) The dissolution of the current UNSCOM leadership and its reestablishment with equal representation from each of the five permanent Security Council members.

(3) The rotation of the UNSCOM chairmanship among the permanent members of the Security Council.

(4) Iraq's appointment as an "observer" on the commission.

(5) Recognition that Iraq has complied with all Security Council resolutions.

Washington Times, [Online] http://www.washtimes.com, 6 August 1998.

UN officials reported on 12 August 1998 that Iraq was preventing all UN weapons inspections. Iraq announced that UN inspectors would not be allowed to act on any violation that they discover. In statements to the UN Security Council, UNSCOM Executive Chairman Richard Butler and IAEA Director General Mohammed el-Baradei said that "Iraq's refusal to cooperate with active inspections was already weakening what they called ongoing monitoring and verification."

Barbara Crossette, *New York Times*, [Online] http://www.nytimes.com, 13 August 1998.

On 17 August 1998, the UN Security Council prepared a "low-keyed" response to Iraq's refusal to cooperate with UN inspectors. The response made no threats of military action against Iraq if it continued to defy inspectors. An unnamed representative of one of the five permanent Security Council members said, "what is the alternative? We have no volunteers for military action. Not a single one." Diplomats said that the Security Council met on 13 August 1998 to consider the standoff. The United States and Britain called for an "immediate and firm reply" unlike Russia, which called for a "delay."

Paul Lewis, *New York Times*, [Online] http://www.nytimes.com, 17 August 1998.

The UN Security Council unanimously voted on 20 August 1998 to renew economic sanctions against Iraq. Danilo Turk, Slovenia's representative and August's council president, said that "the council had found Iraq's behavior totally unacceptable and that Iraq had not met conditions for altering the sanctions." The United States would reportedly like Secretary General Kofi Annan to become more involved in the current impasse, because Iraq's decision to discontinue cooperation with arms inspectors breaks the agreement he negotiated with Iraq in February 1998. However, Annan's representatives said he fears that more involvement would compromise his independence by making him seem "an instrument of US foreign policy." Instead, Annan recommended that the council hold a "comprehensive review" of the sanctions it has imposed on Iraq.

Paul Lewis, *New York Times*, [Online] http://www.nytimes.com, 21 August 1998.

Iraqi UN Ambassador Nizar Hamdoon asked the UN Security Council for an investigation into alleged links between UNSCOM inspectors and the United States and Israel. He told reporters that the work of UNSCOM was heavily influenced by the US agenda. Hamdoon's request follows allegations brought by American UN weapons inspector Scott Ritter's letter of resignation, which accused the United States and United Nations of failing to deal firmly with Iraq. According to Iraqi Deputy Prime

Minister Tariq Aziz, Hamdoon's letter accused UNSCOM of being "a tool of the United States to spy against Iraq." It also named Ritter as a spy for the United States and Israel and claimed that he resigned because he was linked with Israeli and US intelligence agencies.

CNN, [Online] http://www.cnn.com, 1 September 1998.

An unidentified US arms inspector working for UNSCOM was sent home on 8 October 1998 for "using a private camera in violation of UNSCOM rules at an inspection site." In a similar incident on 21 October 1998, Iraqi General Hussam Mohammad Amin accused a Chilean UNSCOM helicopter crewman of using his own camera to take photos of "sensitive equipment." Amin said, "some inspectors use their function in the Special Commission to serve some intelligence services."

Times of India, [Online] http://www.timesofindia.com, 23 October 1998.

According to a *Sunday Times* article, a UN Security Council report stated that Swiss and French tests on fragments of Iraqi missiles found a "degradation agent" which could be VX, Sarin, or Soman. The US, Swiss, and French tests all found traces of detergent used to wash the missile fragments.

James Bone, *The Times* (London), [Online] http://www.Sunday-times.co.uk, 27 October 1998. Youssef M. Ibrahim, *New York Times*, 27 October 1998.

ISRAEL

Nuclear

In June 1998, Israeli government sources and parliamentarians revealed that Israel was formally reviewing its policy of nuclear ambiguity, with several agencies—including the defense and foreign ministries and the office of Prime Minister Benjamin Netanyahu—participating in the review. David Ivry, former commander of the Israeli Air Force and director general of the Ministry of Defense, is heading the review, which will include an analysis of political, operational, and budgetary issues associated with Israel's nuclear deterrent strategy. The Defense and Foreign Affairs Committee of the Knesset also plans to hold a series of closed hearings on Israel's nuclear policy.

Steve Rodan, *Defense News*, 29 June-5 July 1998, p. 3. Barbara Opal-Rome, *Defense News*, 14-20 September 1998, p. 6. Amnon Barzilai, *Ha'aretz* (Tel Aviv), [Online] http://www.haaretz.co.il/eng, 25 August 1998.

In July 1998, the London-based newsletter *Foreign Report* said the Israeli Defense Ministry was pressing government officials to authorize a policy to allow Israel to retaliate with nuclear weapons, in the event that it suffers a nuclear first-strike attack. *Foreign Report* stated that Israel could develop a sea-based, assured second-strike capability using three *Dolphin*-class diesel-electric submarines that Germany recently provided to Israel. The submarines, which are to be deployed in 1999, could provide the basis for a submarine-launched nuclear cruise missile force.

Douglas Davis, *Jerusalem Post*, 6 August 1998, p. 3. Martin Sieff, *Washington Times*, 1 July 1998, p. 1.

In a 13 July 1998 press conference in Jordan, former Israeli Prime Minister Shimon Peres publicly admitted for the first time that Israel possessed nuclear weapon capabilities. Peres stated that Israel "built a nuclear option not in order to have a Hiroshima but an Oslo."

Israel Wire, [Online] http://www.israelwire.com, July 14, 1998.

According to an affidavit filed with Israel's High Court by Rafael Cohen, director of population administration at Israel's Ministry of the Interior, Israeli citizen Gregory Luchansky "is involved in trading radioactive materials" and his firm is providing "the wherewithal to build nuclear missiles for North Korea and Iran." Cohen's affidavit was filed in response to a petition by Luchansky against Israeli Interior Minister Eli Suissa, who refused to extend Luchansky's passport and attempted to revoke his citizenship.

Shmuel Dekalo, *Globes* (Tel Aviv), [Online] http://www.globes.co.il, 6 August 1998.

On 11 August 1998, Israel agreed to allow the United Nations Conference on Disarmament (CD) in Geneva to form a negotiating committee for a fissile material cut-off treaty (FMCT). Israel had previously been the only country of the 61-member CD that had not consented to negotiations. However, Prime Minister Benjamin Netanyahu said that Israel still has "fundamental problems" with an FMCT and that Israeli support for the committee "does not indicate we are taking a position on the treaty and its contents." *Ha'aretz* reported that Israel demanded that the United States provide firm assurance that international inspectors would not monitor Israel's nuclear facilities as part of an FMCT.

Liat Collins, *Jerusalem Post*, [Online] http://www.jpost.co.il, 12 August 1998. Israel Government Press Office, [Online] http://www.pmo.gov.il/english/gpo/press-releases/110898/110898-2.html, 11 August 1998. Akiva Eldar, *Ha'aretz* (Tel Aviv), [Online] http://www3.haaretz.co.il, 7 August 1998. David Makovsky, *Ha'aretz* (Tel Aviv), [Online] http://www3.haaretz.co.il, 9 August 1998.

In a 1998 public survey by the National Security and Public Opinion Project of the Jaffee Center for Strategic Studies, 92 percent of Israelis surveyed agreed that Israel should develop nuclear weapons, an increase from 78 percent in 1987. Two-thirds of those surveyed agreed that Israel should keep its nuclear weapons secret "if they existed," a decrease from 71 percent in 1993 and 78 percent in 1987. Furthermore, 80 percent said they would support Israel's use of nuclear weapons under certain conditions, a notable increase from 36 percent in 1986. Of respondents who said they would support Israel's use of nuclear weapons, 99 percent believe that Israel would be justified in using nuclear weapons in response to a nuclear attack, while 86 percent support their use in response to a chemical or biological weapon attack. Of respondents supporting the use of nuclear weapons by Israel, forty-five percent said their use would be justified to avoid defeat in a conventional war, 21 percent said their use would be justified if the Golan Heights were taken from Israel, and 12 percent supported the use of nuclear weapons in the place of Israel's conventional forces.

Asher Arian, *Strategic Assessment*, [Online] http://www.tau.ac.il/~jcssjb/vinep3.html, October 1998.

Missile

Israel is developing a variant of Rafael's Popeye air-to-ground cruise missile called the Popeye Turbo. The missile will have a range of more than 200 miles and is expected

to be operational by the year 2002. It will be air-launched and will reportedly be armed with a unitary conventional warhead.

Robert Wall, *Aviation Week and Space Technology*, 27 July 1998, pp. 24-25. Brian Bender, *Jane's Defence Weekly*, 22 July 1998, pp. 20-22.

On 14 September 1998, Israel conducted a test of the US-Israeli Arrow anti-missile system at the Israel Air Force test range at Palmachim. During the test, the Arrow system was used to detect, track, and destroy a simulated target. Israeli and US officials witnessed the test, which was the first to involve the Arrow's missile, radar, and fire control systems in the same exercise. Iran's 22 July 1998 test launch of its 1,300-km-range Shahab-3 ballistic missile is believed to have been a major impetus driving the decision to test the system. In the Arrow test, Elta's Green Pine fire-control radar detected the simulated launch of the enemy target, tracked its flight, and relayed the data to Tadiran's Citron Tree intercept management system. The Citron Tree system then ordered the Arrow launcher to fire a missile to intercept the target. The Arrow missile warhead was activated and it intercepted the simulated target 97 seconds after launch. Mordechai described the test as "a great success" and said, "we are supposed to be carrying out another test shortly...The next test will include the firing of a rocket and it shall be a missile hitting a missile. The Arrow missile will shoot down a real missile. Thus we will be able to say we have an operational system." The plan is for the Arrow system to become partially operational in 1999, with the first of three batteries fully operational in 2000. Executives with Israel Aircraft Industries (IAI), the prime contractor for the Arrow project, said that the successful test proved their assertion that the failure of the August 1997 Arrow test was caused by a minor problem. The Arrow system test of 14 September 1998 completed IAI's $500 million contracts for the project with the US Department of Defense. With the terms of the contracts fulfilled, management of the Arrow program shifts exclusively to IAI and the Israeli Ministry of Defense.

Amnon Barzilai, *Ha'aretz* (Tel Aviv), [Online] http://www3.haaretz.co.il/eng/, 15 September 1998. Steve Rodan and Arieh O'Sullivan, *Jerusalem Post*, [Online] http://www.jpost.com, 15 September 1998. Dror Marom, *Globes* (Tel Aviv), [Online] http://www.globes.co.il, 17 September 1998.

SOUTH AFRICA

Nuclear

South Africa's Atomic Energy Corporation (AEC) announced that it is seeking bids for purchase of its "redundant nuclear fuel fabrication equipment," including that used in manufacturing fuel pellets and fuel assemblies for pressurized water reactors. In mid-1999, South Africa's conversion facilities will close, and some equipment from the gas-to-powder conversion facility may also be sold. The AEC stated that equipment would be sold only to nations that are signatories to the nuclear Non-Proliferation Treaty (NPT), and that any sales would be subject to South African export controls.

Atomic Energy Corporation, [Online] http://www.aec.co.za, 17 August 1998.

SYRIA

Nuclear

According to the Press Service of Russia's Atomic Energy Ministry, Russia and Syria are expected to sign an intergovernmental accord on cooperation in the peaceful uses of nuclear energy. Joint projects to be launched after the agreement is signed include the construction of a nuclear research center and nuclear reactors in Syria, as well as the training of Syrian scientists at Russian institutions. The nuclear research center will house a 25 MW "basin-type" light water reactor. Syrian experts will train for two years at the Moscow Physical Engineering Institute. Syria and Russia reached the agreement following negotiations from 27 June-4 July 1998. The Russian company AO Tekhsnabexport will act as the executive agent for the Ministry of Atomic Energy.

ITAR-TASS (Moscow), 6 July 1998. Oleg Lebedev, *Ria* (Moscow), 6 July 1998; in FBIS-SOV-98-188, 7 July 1998.

TURKEY

Nuclear

Posing as potential buyers, Turkish police seized 4.5 kg of unprocessed uranium and 6 grams of plutonium from a group trying to sell the materials for $1 million. Police arrested eight suspects: three Kazakhs, one Azerbaijani, and four Turks. The Istanbul Finance and Customs Department declared that the uranium originated in Russia. The nuclear material was delivered to the Nuclear Research and Training Center of the Kucukcekmece Turkish Atomic Energy Institute in Istanbul, which will assess its precise origin. This is the first known case in which weapons-usable nuclear material has been seized by Turkish authorities.

Anatolia (Ankara), 7 September 1998; in FBIS-TAC-98-250, 7 September 1998. *Post Soviet Nuclear & Defense Monitor*, 16 September 1998, p. 6.

Missile

In response to Cyprus's purchase of Russian S-300PMU-1 surface-to-air missiles, Turkey sought to expedite delivery of 72 Army Tactical Missile Systems (ATACMS) that it ordered from the United States in 1996. Turkish defense officials said in July 1998 that Turkish armed forces had recently received 42 of the 150-km-range ballistic missiles. The ATACMS are to be deployed near border areas to meet threats from Cyprus, Iran, Iraq, and Syria.

Metehan Demir, *Hurriyet* (Ankara), 1 July 1998, p. 3; in FBIS-WEU-98-182, 1 July 1998.

SOUTH AMERICA

BRAZIL

Nuclear

On 13 July 1998, Brazilian President Fernando Henrique Cardoso signed the instruments of ratification for the Treaty on the Non-Proliferation of Nuclear Weapons (NPT) and the Comprehensive Test Ban Treaty (CTBT) in the presence of UN Secretary General Kofi Annan. Cardoso called upon the international community to outline a program of complete nuclear disarmament. The NPT was sent to the Brazilian Congress on 20 June 1997, and the CTBT was sent in August 1997. Congress approved both treaties on 2 July 1998.

Agencia Estado, 13 July 1998. James Rocha, *Jornal do Brasil*, 11 July 1998. Ministry of Foreign Relations, [Online] http://www.mre.gov.br, 13 July 1998.

According to Nuclear Industries of Brazil (INB) President Roberto Nogueira da Franca, the agreement for INB's purchase of "thousands" of ultracentrifuges from the Brazilian Navy should be complete by the end of 1998. Renovations at the INB facility in Resende should be complete by September 1998, and the first cascade of the first module of uranium enrichment ultracentrifuges will be installed in the facility at the end of 1999. INB also intends to install some equipment that it acquired through Brazil's agreement with West Germany to develop a jet-nozzle enrichment process. INB should begin producing low-enriched uranium for use in Brazil's nuclear power plants by the end of 1999. INB's uranium enrichment project seeks to provide an installed capacity of 16,000 separative work units (SWU) after four years and 100,000 SWU after eight years. According to Franca, within ten years INB expects to cease purchasing enriched uranium from the European consortium Urenco.

Daniela Caride, *Gazeta Mercantil* (Sao Paulo), 18 August, 1998, p. A4; in FBIS-LAT-98-232, 20 August 1998. Daniela Caride, *Gazeta Mercantil* (Sao Paulo), 17 August 1998, p. A9; FBIS-LAT-98-232, 20 August 1998.

WORLD

At the 12th Non-Aligned Movement (NAM) summit in Durban, South Africa, NAM heads of state called for an international conference on nuclear disarmament to be held in 1999. A NAM leaders' statement said that conference participants would have to agree to a specific schedule "to prohibit the development, production, acquisition, testing, stockpiling, transfer, use and threat of use of nuclear weapons, and to provide for their destruction." They called for a committee to commence negotiations in 1998 on a "phased elimination program" for nuclear weapons, and urged the nuclear weapon states to begin and conclude negotiations on legally-binding security assurances to all non-nuclear weapon states.

SAPA, [Online] http://www.anc.org.za/, 3 September 1998.

During an international conference on the safety of radiation sources and the security of radioactive material held in Dijon, France, an anonymous senior official from the European Commission (EC) told *Nucleonics Week* that European customs and law enforcement officials have encountered several cases involving very small quantities of plutonium and highly enriched uranium (HEU) since 1994, when the last cases involving the seizure of significant quantities of these materials were reported in Germany and the Czech Republic. Officials from the International Atomic Energy Agency (IAEA) and Interpol said they did not have any information that would confirm this report. All three organizations maintain databases that track nuclear smuggling incidents. According to information contained in the nuclear trafficking database maintained by the Directorate General of the EC for Environment, Nuclear Safety, and Civil Protection (DG-11), since 1994, small quantities of HEU and plutonium have turned up in Austria, Finland, Germany, Greece, and Italy. The unclassified nuclear trafficking database maintained by the IAEA, by contrast, records only one case involving either HEU or plutonium in Europe since 1994: the seizure of four Pu-239 sources at Koenigsbrueck in the eastern German state of Saxony in May 1996. One senior German official contacted by *Nucleonics Week* categorically denied that any HEU or plutonium had been seized in Germany since 1994. The EC official insisted, however, that while no quantities of plutonium or HEU larger than one gram have been found in Germany since 1994, several cases have resulted in the seizure of smaller amounts of these materials. Other German officials also indicated that some cases involving small amounts of plutonium and HEU have occurred since 1994. An anonymous European intelligence official told *Nucleonics Week* that he had seen German reports that specified that "small amounts" of weapons-usable material had been recovered on German soil, and that two cases involving materials found in or near the cities of Dresden and Bremen were under investigation. The EC official indicated that weapons-quality nuclear material had also been seized in Finland. However, officials from the Finnish nuclear safety authority STUK said they knew nothing of any such discovery. Interpol officials also said that they were not aware of any seizures of nuclear materials in Finland.

Mark Hibbs, *Nucleonics Week*, 17 September 1998.