

# NUCLEAR- AND MISSILE-RELATED TRADE AND DEVELOPMENTS FOR SELECTED COUNTRIES, MARCH - JUNE 1999

by Clay Bowen, Erik Jorgensen, Gaurav Kampani, and Fred Wehling

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.

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## ASIA

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### BANGLADESH

#### Nuclear

The Bangladesh Atomic Energy Commission reported in late March 1999 that the Bangladeshi government is considering reviving plans for a small nuclear power plant in Rupper. An agreement for a 60-MW unit was signed with Belgian firms in 1970, but the project fell through when Bangladesh separated from Pakistan. Financing has not yet been negotiated.

*Nucleonics Week*, 25 March 1999, pp. 17-18.

### CHINA

#### Nuclear

According to US officials, China's recent progress in the miniaturization of its nuclear warheads was accelerated by the theft of nuclear secrets from Los Alamos National

Laboratory in New Mexico. The espionage reportedly occurred in the mid-1980s but it was not detected until 1995 when US intelligence analyzed Chinese nuclear tests and found that the technology used was very similar to America's latest nuclear warhead design, the W-88. China has denied the US allegations of nuclear theft and Chinese Foreign Ministry spokesman Zhu Bangzao said that the allegations were groundless and irresponsible.

James Risen and Jeff Gerth, *New York Times*, 6 March 1999, p. A1; Walter Pincus, *Washington Post*, 7 March 1999, p. A19; *Inside China Today* [Online], <<http://www.insidechina.com/>>, 12 March 1999.

A Wisconsin Project on Nuclear Arms Control report, titled "U.S. Exports to China, 1988-1998: Fueling Proliferation," states that since 1988, China has purchased high-technology strategic equipment from the United States worth over \$15 billion. US exports included equipment used in nuclear weapons production, cruise missiles, aircraft radar, and other military goods. Furthermore, "some of [the] dual-use equipment was licensed directly to leading Chinese nuclear, missile,

and military sites—the main vertebrae of China's strategic backbone." According to the report, China spent more than half of the \$15 billion on high-technology equipment such as computers. Most sales occurred in 1993 after President Clinton loosened export rules on computers. The report also states that "several of the Chinese buyers later supplied nuclear, missile, and military equipment to Iran and Pakistan." Some of the sales listed in the Wisconsin Project report are: (1) computer and imaging equipment with potential for uranium prospecting sold to the China National Nuclear Corp.; (2) equipment that could be used to develop powerful anti-aircraft radar sold to the China National Electronics Import-Export Corp.; (3) gear that could be used to develop C-802 and C-801 cruise missiles sold to the China Precision Machinery Import-Export Corp.; and (4) computer equipment sold to the Chinese Academy of Sciences that could be used to develop a fusion nuclear reactor. China also purchased "semiconductor manufacturing equipment, high-speed oscilloscopes (used in nuclear weapons tests), precision machines tools (used in weapons and long-

range missiles), and vibration testing gear (for nuclear weapons and missiles)" from the United States.

Wisconsin Project on Nuclear Arms Control, "U.S. Exports to China 1988-1998: Fueling Proliferation," April 1999.

Western diplomatic officials believe that China may be preparing to decommission some of its older military nuclear processing facilities and designate large amounts of waste material for geological disposal. The Lanzhou uranium plant and the plutonium production complex at Guangyuan in Szechwan Province are reportedly slated for closure. Some Western analysts dispute that China would shut down the Guangyuan facility as it is China's only remaining plutonium production facility, although China has supposedly stockpiled a large amount of weapons-grade plutonium. The decommissioning of the plants was ordered by Chinese Premier Zhu Rongji to force the China National Nuclear Corporation (CNNC) to cut its workforce and carry out structural reorganization. China is building a second, larger uranium enrichment facility utilizing gas centrifuges at Lanzhou with Russian help. This facility will replace an older gaseous diffusion plant at the site. According to Chinese officials, the first enrichment facility at Hanzhong has been completed and is producing low-enriched uranium. The Sino-Russian project originally called for the construction of further centrifuges at Hanzhong, but China relocated them to Lanzhou. The first stage of the Lanzhou project involves the construction of a 500,000 SWU per year plant. A second 500,000 SWU per year plant is to be built later at Lanzhou. Officials said that the plant was transferred to Lanzhou to prevent layoffs, maintain the location as a uranium enrichment site, and conform to Chinese strategy of having multiple, dispersed, strategic nuclear processing locations. When the Lanzhou plants are completed, China will have a gas centrifuge enrichment capacity of 1.5 million SWU per year by 2005.

Mark Hibbs, *NuclearFuel*, 17 May 1999, p. 11.

According to US military sources, China conducted an underground nuclear test on 12 or

13 June 1999. The suspected test was carried out at the Lop Nor test facility, although it is not clear whether the blast produced a nuclear yield. If the test produced a yield, China would be in violation of its announced moratorium on nuclear testing.

Bill Gertz and Rowan Scarborough, *Washington Times*, 18 June 1999, p. A5.

The Russian Atomic Energy Ministry (MINATOM) has approved a proposal that allows the Tvel nuclear group to negotiate a contract with China to design the core of a fast breeder reactor (FBR). The contract will include the possibility of transferring highly enriched uranium and reactor control rods to China. All sales and transfers will be subject to Russian export regulations, and the process will be monitored by MINATOM.

*Nuclear Engineering International*, 22 June 1999, p. 4.

#### Missile

According to a US Department of Defense intelligence report, China is continuing to secretly transfer missile and weapons technologies to Middle Eastern and Asian countries despite promises to stop. The classified report concludes, "the Chinese are proliferating on a consistent basis without technically breaking agreements with the United States," by going through government-owned companies. China is believed to have supplied Iran with specialty steel components for building missiles and telemetry equipment to test them. China is presently training 10 Iranian scientists on inertial guidance techniques. Reportedly, China transferred US-manufactured equipment disguised as cookware to a missile production facility in Pakistan. A separate intelligence report concludes that China has provided North Korea with high-grade steel used for missile frames under the guise of assisting the North Korean space program.

Bill Gertz, *Washington Times* [Online], <<http://www.washtimes.com>>, 15 April 1999.

According to a senior Chinese official, the United States has been warned against selling to Taiwan any military equipment that could enhance the latter's defensive ability against missile attacks. The Chinese official said that if the United States decided to trans-

fer theater missile defense (TMD) technology to Taiwan it would be "considered a hostile act and would certainly lead to serious consequences," and would be the "last straw" in US-China relations. The senior Chinese official said that a TMD system in Taiwan might give it a "false sense of security" providing the motivation to declare independence. Furthermore, China "reserves the right to attack Taiwan if the island declares independence." According to China's Foreign Minister Tang Jiaxuan, any transfer of a TMD system to Taiwan would be an encroachment on China's sovereignty and territorial integrity. Tang also said that China is against any transfer of TMD technology to Japan. Tang suggested that a TMD system would "violate Japan's constitutional pledge to maintain only defensive military capabilities."

John Pomfret, *Washington Post*, 6 March 1999, p. 13; John Pomfret, *Washington Post*, 8 March 1999, p. 13.

On 10 March 1999, a US grand jury indicted a Chinese citizen and a naturalized Canadian on charges of smuggling US missile technology to China. Both individuals, Yao Yi of China and Collin Xu of Canada, and their companies, Lion Photonics of China and Lion Photonics Inc. of Canada, allegedly attempted to smuggle out fiber optic gyroscopes from a Massachusetts firm to China. According to court papers, the Chinese firm said that it would use the gyroscopes on a railroad project. After the first application was rejected by US customs, the manufacturer of the gyroscope received another application for the same device from the Canadian firm. Suspicious, the manufacturer alerted US Customs, who set up a successful sting operation.

*Inside China Today* [Online], <<http://www.insidechina.com>>, 10 March 1999.

China's Foreign Ministry spokesperson Sun Yuxi denied a *Newsweek* magazine allegation that China had seized two US cruise missiles that did not detonate when the United States attacked suspected terrorist bases in Afghanistan in 1998. Sun referred to the allegation as a "groundless fabrication."

*China Times* [Online], <<http://www.chinatimes.com>>, 23 March 1999.

## INDIA

### Nuclear

At the Association of South East Asian Nations (ASEAN) Regional Forum on 3 March 1999, the Indian delegation proposed a multilateral dialogue on disarmament to strengthen global security and confidence-building in the Asia Pacific region. Indian delegates also called for no-first-use commitments by the nuclear powers. The Indian delegation suggested de-targeting and de-alerting all nuclear weapons to reduce their role in the security postures of the nuclear weapon states. The Indian delegates said these steps would lead to the "delegitimization" and the eventual abolition of nuclear weapons.

P.S. Suryanarayana, *The Hindu* [Online], <<http://www.webpage.com/hindu/>>, 4 March 1999.

India has increased its nuclear-related budget by nearly Rs3.5 billion to Rs29.62 billion for fiscal year (FY) 1999. The Nuclear Power Corporation of India will receive Rs12.81 billion to support construction at the Kaiga-1, Kaiga-2, Rajasthan-3, Rajasthan-4, Tarapur-3, and Tarapur-4 nuclear power plants. Approximately Rs1.07 billion was set aside for the Russian-aided Koodankulam project, two VVER-1000 units. Funds were also allocated to improve operations at Tarapur, Rajasthan, and Narora stations. Bhabha Atomic Research Center will receive Rs5.3461 billion in FY99. The Indira Ghandi Center for Atomic Research is allocated Rs1.16 billion in FY99 for the operation of the Fast Breeder Test Reactor and developing materials in support of the fast breeder program.

Neel Patri, *Nucleonics Week*, 11 March 1999, p. 11.

Indian Prime Minister Atal Behari Vajpayee said on 15 March 1999 that India was willing to "resolve all outstanding issues with Pakistan through talks." Vajpayee also said that since both India and Pakistan had nuclear weapons, "they had no option but to live together in peace." He said that nuclear weapons were defensive weapons, stressing that the "balance of terror" maintained during

the Cold War deterred both sides from using nuclear weapons.

*The Hindu* [Online], <<http://www.webpage.com/hindu/>>, 16 March 1999.

The Chief Executive of India's Nuclear Fuel Complex (NFC), C. Ganguly, said that the NFC was ready to enter the global market to export natural uranium oxide fuel assemblies, zirconium alloy coolant tubes, reactor core components, and fuel cladding. Ganguly said that India had "a number of advantages in competing with the United States, France, Russia ... and China." NFC started its integrated fuel fabrication facility in 1972, where zirconium oxide fuel pellets and zirconium alloy clad fuel assemblies for reactor cores were fabricated.

IRNA (Tehran) [Online], <<http://www.irna.com/>>, 24 March 1999.

Indian Defense Minister George Fernandes said during an interview that the Indian government was willing to sign the Comprehensive Test Ban Treaty before the September 1999 deadline. However, he said that signing the treaty would be subject to addressing India's security concerns. Regarding a proposed moratorium on fissile material production, Fernandes said that India would resolve such matters "through formal multilateral talks." In speaking about Indo-Pakistani relations, Fernandes said that "a nuclearized South Asia shouldn't bother either [India or Pakistan]" and that "in a vicarious or conscious way it has made us sit down and talk to each other." He said that Indo-Chinese relations suffered following India's May 1998 nuclear tests and China's subsequent reactions and responses, but that both sides were seeking to restore a dialogue.

Maleeha Lodhi, *The News* (Islamabad), 5 April 1999, in FBIS Document FTS19990405000108, 5 April 1999.

Russia has offered to fund the entire cost of the 2,000-MW Kudankulam nuclear power project through a \$2.6 billion soft credit. The Russian state bank Vnesheconombank has already given India's Nuclear Power Corporation (NPC) a letter of guarantee for completion of the project, which will be executed by NPC and the Russian counterpart, Atomstroyexport. Russian Ambassador to

India Albert S. Chernyshev said that 10 percent of the cost will be taken from the rupee debt and the rest of the credit will be in hard currency. The credit will be repaid over 12 years, after the commissioning of Kundankulam, which will be constructed in two phases, the first of which is scheduled to be completed in seven years and the second in an additional two to three years. Chernyshev said that most of the equipment for the nuclear power project will be supplied from Russia, involving over 200 factories and research establishments, and some equipment will be manufactured in India.

Anoop Saxena, *Indian Express*, 9 April 1999.

According to an Indian military spokesman, the Indian nuclear arsenal should include three components: bombers (Su-30 or Mirage 2000 aircraft), surface-to-surface missiles (SSMs), and submarines. Previously it was presumed that the Indian nuclear force structure would only include bombers and SSMs. The spokesman said that India will have 20-100 nuclear warheads and it will take about 15 years before India can deploy them.

*Union*, 12-18 April 1999, p. 26.

The Indian Department of Atomic Energy is reportedly preparing to build an additional research reactor at the Bhabha Atomic Research Center (BARC) in Trombay. The new research reactor would be similar to the existing 100-MW Dhruva reactor, but appropriate design modifications would be incorporated based on operating experience. BARC scientists expect the new reactor to become operational by 2010. The existence of an additional research reactor would increase India's production capacity of unsafeguarded plutonium.

*Indian Express* [Online], <<http://www.expressindia.com/>>, 27 April 1999.

A spokesman for the Indian External Affairs Ministry on 3 May 1999 refuted reports that India was among those countries posing a threat to the United States by spying in nuclear weapons laboratories. The spokesman said that a recent US report claiming that India posed an "immediate" threat was

“malicious and completely baseless.” The spokesman said that India’s nuclear program was “an excellent example of indigenization.”

*The Hindu* [Online], <<http://www.webpage.com/hindu>>, 4 May 1999.

According to Indian military officials, there was little to no effort to involve the military services in nuclear planning after the 11 May and 13 May 1998 nuclear tests. A senior army official said, “The services have no clue about the installation, utilization, or dynamics of nuclear weapons.”

Rahul Bedi, *Jane’s Defence Weekly*, 5 May 1999, pp. 25-31.

The government of Indian Prime Minister Atal Behari Vajpayee resigned on 17 April 1999, after losing a parliamentary confidence vote. The Vajpayee government had made considerable progress toward signing the Comprehensive Test Ban Treaty (CTBT). In regard to signing the CTBT before the September 1999 deadline, Indian Defense Minister George Fernandes said that the “Parliament is dissolved and therefore nothing is going to happen on that front, certainly not until late October.”

*International Herald Tribune*, 6 May 1999.

On 14 May 1999, officials at the Bhabha Atomic Research Center (BARC) said the nuclear tests at Pokaran on 11 May and 13 May 1998 did not cause any radioactive contamination. “Radiation monitoring of the area is being carried out at regular intervals and it is confirmed that the entire area is totally free of any radioactivity as a result of the tests.” BARC officials added that there have been no established cases of radiation-related sickness in the area.

*Times of India* (Internet Version), 15 May 1999, in FBIS Document FTS1999051500040, 15 May 1999.

On 17 May 1999, Indian High Commissioner G. Parthasarthy told journalists at the Pakistan Institute of International Affairs that a draft agreement for exchange of information about nuclear and missile technology was almost ready for approval by India and Pakistan. Parthasarthy said, “India is not worried about Pakistan’s missile tests because it [Pakistan] has the right to handle its own

affairs. The Indian missile program has other objectives other than being anti-Pakistan.” He said that if the North Atlantic Treaty Organization (NATO) could use nuclear weapons and missiles at the place of their choosing, India too would have an “independent policy.”

*The News* (Islamabad), 18 May 1999, in FBIS Document FTS19990518000801, 18 May 1999.

There have been indications within India’s nuclear establishment that signing the Comprehensive Test Ban Treaty would not weaken India’s nuclear deterrent capability. In early May 1999, head of India’s Atomic Energy Commission (AEC) Rajagopala Chidambaram said the AEC advised the government to declare a moratorium on testing because the 11 May and 13 May 1998 nuclear tests generated a “valuable scientific database on which to base a credible deterrent.” He said the May 1998 designs were “robust” and new ideas and sub-systems had been “tested to perfection.” Chidambaram said the May 1998 tests gave India enough data that simulation tests could be conducted at a “modest” cost if India were to pursue a nuclear program.

Rahul Bedi, *Jane’s Defence Weekly*, 19 May 1999, p. 15.

In late May 1999, analysts said India and Pakistan had taken a “dangerous step closer to conflict” over the skirmishes in Kashmir. Gerald Segal of the International Institute for Strategic Studies said, “This is a definite deterioration. ...This blows a hole in the argument that after the nuclear tests, relations between India and Pakistan were starting to look more stable.” Executive director of the Forum for Strategic and Security Studies Vijai Nair said, “I don’t see this going beyond a skirmish. ...But the Line of Control no longer exists as far as I’m concerned, and there is now technically a war on.” On 28 May, Indian Bharatiya Janata Party (BJP) spokesman K.R. Malkani said that the use of nuclear weapons by India over the Kashmir conflict was “completely out of the question.” He said the attacks were unlikely to stop immediately, but that it was clear that the situation would not escalate. He said, “We would very much like the Pakistani force

to withdraw from this side of the Line of Control.”

*Pakistan Link* [Online], <<http://www.pakistanlink.com>>, 27 May 1999; *Dawn* [Online], <<http://www.dawn.com>>, 29 May 1999.

In early June 1999, independent experts said India and Pakistan were “miles away” from being able to deploy nuclear weapons, “let alone ordering strikes similar to the ones that obliterated Hiroshima and Nagasaki.” Former chairman of the Indian Atomic Energy Commission K. Srinivasan said, “Both [India and Pakistan] have limited capability.” Director of the Institute of Peace and Conflict in New Delhi Padmanabha Chari said there was “nothing to worry about” because neither Pakistan nor India had “an established capability to attack each other with nuclear weapons.”

AFP, 8 June 1999, in FBIS Document FTS19990608000060, 8 June 1999.

On 9 June 1999 the US Senate voted to suspend economic sanctions that were placed on India and Pakistan after their May 1998 nuclear tests. The sanctions will be suspended for five years, after which the Senate measure grants the US president a national interest waiver to renew suspension of the sanctions. The ban on military and nuclear technology sales remains in effect, but the measure allows the president to grant a national security waiver for sales of defense articles and services, foreign military financing, and dual-use technologies not used primarily for missile development or nuclear weapons programs.

AFP, 10 June 1999, in Lexis-Nexis [Online], <<http://web.lexis-nexis.com>>, 10 June 1999.

United States scientists report that India exaggerated the yield of its 11 May 1998 nuclear test by at least 200 percent and perhaps by as much as 500 percent. The Indian Department of Atomic Energy reported that one of the tests was a thermonuclear device called Shakti-1 that had a nuclear yield of 43 KT, and that the other two were fission devices with yields of 12 KT and 0.2 KT. US Department of Energy analysts concluded that India had exaggerated the yield of its 11 May 1998 tests to “support its claim that it had tested an H-bomb.” According to US

officials, analysts said India had probably tried to detonate a two-stage thermonuclear weapon, but that a complete ignition of the fusion energy stage did not occur, resulting in a lower yield than India expected. United States government officials would neither confirm nor deny the report.

*Nucleonics Week*, 10 June 1999, pp. 1, #12-13.

On 9 June 1999, the Group of Eight (G-8) leading industrial countries urged India and Pakistan to sign the Comprehensive Test Ban Treaty. The foreign ministers also demanded an immediate cease-fire in Kashmir and the resumption of peace talks.

AP, 10 June 1999 in Lexis-Nexis [Online], <<http://www.lexis-nexis.com>>, 10 June 1999.

On 18 June 1999, Indian Foreign Minister Jaswant Singh said the fighting in Kashmir was "unlikely to escalate into a full-fledged war with fellow nuclear power Pakistan." He said India had no intention of escalating the conflict. In late June 1999, director of the Indian Institute of Defense Studies and Analysis (IDSA) Air Commodore Jasjit Singh said there was "no risk of even a full-fledged war" between India and Pakistan over Kashmir. He said that a nuclear war remained a "far-fetched possibility."

Krishnan Guruswamy, AP, 18 June 1999, in Lexis-Nexis [Online], <<http://web.lexis-nexis.com>>, 18 June 1999; *Indian Express* [Online], <<http://www.expressindia.com>>, 20 June 1999.

On 30 June 1999, Indian Defense Minister George Fernandes said that Pakistan's threat of making a nuclear strike against India in the event of a fourth India-Pakistan war should not be taken lightly. He said that he hoped international pressure on Pakistan "would deter it from using nuclear weapons in case of a war." On the same day, Indian Prime Minister Atal Behari Vajpayee said that India was prepared to face a nuclear attack from Pakistan. He said that India was "prepared for all eventualities."

*Hindustan Times* [Online], <<http://www.hindustantimes.com>>, 30 June 1999; *Times of India* [Online], <<http://www.timesofindia.com>>, 1 July 1999.

### Missile

Russian Defense Minister Igor Sergeev paid an official visit to India from 19 March

to 23 March 1999. Russian and Indian officials discussed the possible sale of the S-300 anti-missile system to India.

*Hindustan Times*, 23 March 1999, in FBIS Document FTS19990323000032, 23 March 1999.

On 11 April 1999 at 9:47 am, India test-fired its Agni-2 intermediate-range ballistic missile (IRBM) from inner Wheelers Island off the Orissa coast. The Indian Defence Research and Development Organization (DRDO) and Indian Defence Minister George Fernandes claimed that the launch was a success. The missile was launched from a mobile-rail launcher. The missile's flight lasted 11 minutes and covered a distance of 2,000 km before it reached the splashdown point. According to Prime Minister Atal Behari Vajpayee, Pakistan was notified on 9 April 1999 of the decision to launch the Agni-2 and India "remains committed to minimum deterrence, to no first-use of nuclear weapons, and never to use them [nuclear weapons] against a non-nuclear state."

*BBC News* [Online], <<http://news.bbc.co.uk>>, 11 April 1999; *Times of India* [Online], <<http://www.timesofindia.com>>, 12 April 1999; Manvendra Singh, *Indian Express* [Online], <<http://www.expressindia.com>>, 12 April 1999.

After days of international pressure urging restraint following India's 11 April 1999 Agni-2 intermediate-range ballistic missile test, a Foreign Ministry official announced that India would "go ahead with more tests-flights of the Agni-2." The Indian official said, "India will do whatever is required to develop its minimum credible nuclear deterrent," which may mean at least five to six additional tests before the Agni-2 could be deployed.

Pranay Sharma, *The Telegraph* (Calcutta), 13 April 1999; in FBIS Document FTS19990413001276, 13 April 1999. *Indian Express* [Online], <<http://www.expressindia.com>>, 14 April 1999.

Indian External Affairs Minister Jaswant Singh said Pakistan's 14 April 1999 Ghauri-2 ballistic missile launch would not result in an arms race in the region. Singh said that Pakistan informed India of its plans to test launch a missile. However, he said that the missile launch was not good for Indo-Pakistani relations.

*Indian Express* [Online], <<http://www.expressindia.com>>, 14 April 1999.

Indian DRDO head A.P.J. Abdul Kalam said in late May 1999 that India's missile capability is not Pakistan-centric. According to Abdul Kalam, unlike Pakistan's capability, India's missile capability was "indigenous." He said the "import content is less than 10 percent" and that the Agni-2 was "designed to carry a nuclear warhead if required." He said that if the government approves "I would like to neutralize the Missile Technology Control Regime (MTCR) that has tried but failed to throttle our program." He said that India did not support proliferation, but he would like to "devalue missiles by selling the technology to many nations and break their stranglehold."

Raj Chengappa, *India Today International*, 26 April 1999, p. 31.

India's Integrated Guided Missile Development Program (IGMDP) is believed to be developing a 3,700 km-range Agni-3 and a 4,000-5,000 km-range Agni-4. Reports indicated the Agni-3 is based upon merging existing Agni propulsion technology with the Polar Satellite Launch Vehicle (PSLV) developed by the Indian Space Research Organization (ISRO). According to an Indian defense analyst, the diameter of the Agni-2 "would need to be widened from 1 m to 1.8 m to incorporate the PSLV propulsion system." The PSLV solid-fuel rocket propellant has a diameter of 2.8 m; India would therefore have to modify the PSLV technology to the Agni-3 1.8 m specification. The Agni-4 "could be derived from either the successful conversion of the PSLV as an SSM which could itself achieve intercontinental range, or incorporating ISRO's rocket technology from the Geostationary Satellite Launch Vehicle program." A challenge facing India in converting its satellite launch vehicles (SLVs) to intercontinental ballistic missiles (ICBM) would be the development of a re-entry vehicle capable of withstanding the extreme temperatures faced by 3,700 km and 5,000 km-range missiles.

Ben Sheppard, *Jane's International Defence Review*, May 1999, pp. 57-59.

Indian officials reported that the Prithvi-1 and Prithvi-2 surface-to-surface missiles (SSM), which were to be deployed with the Indian Air Force, would be ready for extended se-

rial production after extended trials. The Indian Army's 333 Missile Group, a new artillery regiment based in Scunderabad, had an undeclared number of Prithvi-1s and was India's only missile-equipped service. The army projected a requirement for 75 Prithvi missiles.

Rahul Bedi, *Jane's Defence Weekly*, 5 May 1999, pp. 25-31.

In an interview with the newspaper *Mainichi Shimbun* in early May 1999, Indian Defence Minister George Fernandes said that his government does not "plan to conduct work on creating" the Agni-3 intermediate-range ballistic missile (IRBM) or the Surya intercontinental ballistic missile (ICBM). He said the such "allegations" published in *Jane's Defence Weekly* were "speculative and unfounded." He said the Agni-2 was at the stage where production could begin, but no decision has been made on a production time frame due to security considerations. He denied that India has a program to create a nuclear submarine.

*RIA Novosti*, 11 May 1999.

In an interview with *Defence News*, Indian DRDO scientists said India was launching a comprehensive plan to develop a wide range of modern nuclear missiles. Within two years, India would develop an intercontinental ballistic missile (ICBM), a medium-range naval missile, and medium-range air-to-air missiles. DRDO officials said the Surya ICBM will have a range of 5,000 km. DRDO officials said the Surya will be able to carry a nuclear warhead 2,000 km. DRDO officials said \$50 million will be spent on the Surya. It will be ready for launch by mid-2001. An advanced version will be developed after the test launch of Surya-1. DRDO, the Defense Research and Development Laboratory in Hyderabad, and 90 other scientific and private institutions are involved in the development of the Surya program. DRDO officials said they were extending the range of the Prithvi ballistic missile from 150 km to 350 km. Officials said they were also developing a naval version of the Prithvi, called the Dhanush, with a range of 250 km. The Dhanush will be tested in

late 1999. DRDO will produce 20 Agni ballistic missiles with a range of more than 2,000 km by the end of 2001 at a cost of \$150 million.

Vivek Raghuvanshi, *Defence News*, 24 May 1999, p. 14.

An Indian Defence Ministry spokesman said that India test fired a naval version of its Trishul surface-to-air (SAM) missile at 10:05 GMT from the Dronacharya naval base in Cochin on 26 May 1999. He said the "flight marked a step towards user evaluation and induction of the Trishul system in the navy by the year 2000." He said the Trishul was tested against low-altitude maritime targets and the mission objectives "were fully met."

AFP, 26 May 1999, in Lexis-Nexis [Online], <<http://web.lexis-nexis.com>>, 26 May 1999.

Indian Prime Minister Atal Behari Vajpayee said the 26 May 1999 launch of India's polar satellite launch vehicle (PSLV) was "perfect" and that it was a "proud day for Indian science." Vajpayee said the launch of the PSLV-C2 showed India's mastery of space technology. Indian officials said its space program was only for peaceful purposes. The PSLV-C2 was launched from the space center on an island in the Bay of Bengal.

*Indian Express* [Online], <<http://www.expressindia.com>>, 26 May 1999.

The United States has "reportedly accused" Israel of transferring radar technology from the US-Israeli Arrow anti-missile system to India. Israel claimed the technology was developed before US involvement in the project and therefore did not require approval from the United States to be exported. In September 1998, the head of Israel Aircraft Industries, which is developing the Arrow, declared that the "missile or systems" would be sold "only to countries friendly" to both Israel and the United States.

P.R. Kumaraswamy, *Jane's Intelligence Review*, June 1999, pp. 21-22.

On 14 June 1999, Indian External Affairs Minister Jaswant Singh arrived in China for high-level talks with the Chinese government. India's officials hope the talks will improve political-level ties between China and India and generate a discussion of several issues

including "the clandestine nuclear and missile technology cooperation between China and Pakistan."

*Indian Express* [Online], <<http://www.expressindia.com>>, 14 June 1999.

## INDONESIA

### Nuclear

According to Russian First Deputy Prime Minister Yury Maslyukov, Moscow is considering exporting small floating nuclear power plants to Indonesia.

ITAR-TASS, 15 March 1999, in Inquisit [Online], <<http://www.inquisit.com>>, 15 March 1999.

## JAPAN

### Missile

According to Japan's Chief Cabinet Secretary Hiromu Nonaka, Japan will rely on its own technology to develop the four intelligence satellites that are planned for launch in 2002. He added that developing the satellites domestically would be in the best interest of Japan. Nonaka explained that "[Japan] decided to develop the satellites using Japanese technology because [the] satellites will be launched for the main purpose of gathering necessary data for Japan's national security." In addition, he said that "[Japan] is going to acquire satellite parts and a system on intelligence analysis from the United States and other foreign companies."

*Japan Times* [Online], <<http://www.japantimes.co.jp>>, 1 April 1999; *South China Morning Post* [Online], <<http://www.scmp.com>>, 2 April 1999.

## KAZAKHSTAN

### Nuclear

Director of the Moscow Center of the World Association of Nuclear Operators Farit Tukhvetov said that the BN-350 reactor at Aktau was officially decommissioned on 22 April 1999. According to Tukhvetov, Kazakhstani authorities decided that the reactor was too isolated from technical support and design organizations in Russia.

*Nucleonics Week*, 24 June 1999, p. 16.

## KYRGYZSTAN

### Nuclear

Kyrgyzstani security agents at Manas airport, outside Bishkek, arrested an Uzbek national who was trying to smuggle a capsule of radioactive material onto a flight to the United Arab Emirates, *Vecherniy Bishkek* reported on 14 May 1999. According to the report, the smuggler, identified as Takhir Naizov, was carrying the material in a metal capsule wrapped in rubber in his pocket. Security guards checking passengers boarding the flight became suspicious of Naizov when they noticed he was very pale and appeared nauseated. Upon searching him, they discovered the capsule, 3 cm in diameter and 7 cm in length, marked with the international symbol for radiation hazard. The guards then called on specialists of the Kyrgyzstani State Sanitary Commission to conduct an examination of the capsule. A check of the capsule with a dosimeter indicated that it was emitting fatal doses of radiation at close range. The radiation diminished to near normal background levels at a distance of about 1 meter from the capsule, however, and the background radiation level of the room in which the capsule was being held was also normal. The article reports that "most likely, the capsule holds plutonium." However, the characteristics of the capsule described and the radiation it was emitting make it seem likely that it contains a radioactive isotope stolen from a medical or industrial facility, rather than plutonium. The suspect, Mr. Naizov, told police that he had agreed to carry the capsule to the United Arab Emirates in return for a \$16,000 payment. He had received the capsule at the airport from an unidentified man. Naizov had an accomplice, a Kyrgyzstani citizen, who was also arrested.

Yu. Gruzdov, *Vecherniy Bishkek*, 14 May 1999, p. 1; Timur Isayev, ITAR-TASS, 14 May 1999; AFP, 14 May 1999; AP, 14 May 1999.

## NORTH KOREA

### Nuclear

According to a US Department of Energy intelligence report, North Korea is in the initial stages of developing a uranium enrichment capability, which in six years will be able to produce weapons-grade uranium.

The report indicated that a North Korean firm, Daesong Yushin Trading Co., was trying to purchase "frequency converters" from a Japanese manufacturer. It is believed the converters are the first parts of a "centrifuge cascade." A US secret intelligence assessment indicated that North Korea plans to set up a uranium enrichment capability for nuclear weapons with the assistance of Pakistan.

Bill Gertz, *Washington Times*, 12 March 1999, p. 9; Bill Gertz, *Washington Times*, 11 March 1999, p. 6.

On 16 March 1999, the Democratic People's Republic of Korea (DPRK) and the United States issued a joint press statement saying that both sides had reached an agreement on access to a suspected underground nuclear site at Kumchang-ri. The US Secretary of State Madeleine Albright stated that North Korea will allow: (1) multiple site visits by a US team to the underground site at Kumchang-ri; (2) the first visit in May 1999, with follow-up visits continuing as long as the US concerns about the site remain; and, (3) access to the entire site during each visit. The agreement also states that the United States "has decided to take a step to improve political and economic relations between the two countries." Albright highlighted that the United States did not agree to DPRK demands for "compensation" in return for access to the site. Albright also announced that the DPRK and the US agreed to resume missile talks on 29 March 1999 in Pyongyang. During the meetings held between 27 February-13 March 1999 in New York, the DPRK and the US also reaffirmed their commitment to the Agreed Framework of 21 October 1994 in its entirety and to the principles of their bilateral relations expressed in the US-DPRK Joint Statement of 11 June 1993. DPRK Vice Foreign Minister Kim Gye Gwan and US Special Envoy Charles Kartman led the delegations.

US Department of State, 16 March 1999.

According to International Atomic Energy Agency (IAEA) officials, critical parts of the North Korean 50-MW nuclear reactor have been missing since the first IAEA investigators arrived at the North Korean nuclear center in 1994. The parts are vital to control the

atomic reaction in the reactor's graphite core. Apparently some US State Department officials knew about the missing parts, but neither Congress nor the lead negotiator of the 1994 Agreed Framework, Robert Gallucci, were made privy to that information. Clinton administration officials say they were aware of the missing parts, which can be used in another nuclear reactor. According to US State Department officials, the 1994 Agreed Framework was successful in freezing activity at Yongbyon and Taechon. It is entirely possible that North Korea is still continuing nuclear research at other sites. The officials also said that this research might not even be in violation of the Agreement. According to a nuclear expert, the concern is not that the missing parts are now in a nuclear reactor, but how much plutonium North Korea processed at Yongbyon before the 1994 Agreed Framework. United States State Department spokesperson James Rubin said that the United States had no basis to conclude that North Korea is in violation of the 1994 Agreed Framework. He added that the International Atomic Energy Agency never reported the equipment as missing but said that the parts were unaccounted for. In addition, Rubin said that the unaccounted parts were discussed with Congress on the public record in a General Accounting Office report in 1998.

Stewart Stogel and Ben Barber, *Washington Times*, 24 March 1999, p. 3; James Rubin, "State Department Noon Briefing, March 23, 1999," USIA Transcript, 24 March 1999.

Kim Tok-yong, a member of the South Korean parliament and the Hannara opposition party, has alleged that in addition to Kumchang-ri, North Korea has another underground nuclear complex located between Tongsan-ri and Huiyon-ri in Kusong City in the northwestern part of the country. According to Kim, the complex consists of three facilities located within three kilometers of each other. He has alleged that a reservoir and a small island exist behind the third facility. In addition, plutonium is being produced in the underground nuclear development facility.

*Shukan Post*, 16 April 1999, in FBIS Document FTS19990410000079, 16 April 1999.

On 4 May 1999, the Japanese foreign ministry announced that Japan had signed a contract making \$1 billion available to the Korean Peninsula Energy Development Organization (KEDO). On 30 June 1999, the Japanese House of Councilors approved Japan's scheduled payment of \$1 billion to KEDO for the construction of two light-water nuclear reactors in North Korea.

Gamini Seneviratne and Simon Rippon, *Nuclear News*, June 1999, p. 59; *Kyodo* (Tokyo), 30 June 1999, in FBIS Document 19990630000226, 30 June 1999.

On 14 May 1999, US State Department spokesperson James Rubin said that the United States supplied 90,000 metric tons of heavy fuel oil to North Korea between January and April 1999. Further shipments will continue in May and June 1999, he said. In addition, US President Bill Clinton signed certifications on 4 March 1999 to release \$15 million to the Korean Peninsula Energy Development Organization.

Yonhap (Seoul), 15 May 1999, in FBIS Document FTS19990514001834, 15 May 1999.

On 25 June 1999, US Department of State spokesman James Rubin announced that US inspectors, who visited the suspected nuclear site at Kumchang-ri in North Korea from 18-24 May 1999, found no evidence or indication that the site was being used for nuclear-related activities. The inspectors photographed certain parts of the facility and inspected the underground portions, per the March 1999 agreement that allowed them to visit the site. The site was empty with bare rock walls. The State Department press release said that "the site at Kumchang-ri does not contain a plutonium production reactor or reprocessing plant, either completed or under construction." It added that although the underground facility was unsuitable for a plutonium reprocessing plant or graphite-moderated nuclear reactor, it could be modified in the future. The United States cannot rule out Kumchang-ri's potential utility for nuclear-related activities. The site does not violate the 1994 Agreed Framework because there is no evidence of North Korean nuclear activity at this time. US inspectors will visit the site again

in May 2000 and will examine the feasibility of converting the facility to commercial use.

US Department of State Press Statement, 25 June 1999.

### Missile

South Korea has confirmed that North Korea has at least four missile factories and 10 missile bases. Further, North Korea is building additional bases and there is speculation that North Korea has eight missile plants and over 12 bases, the official said. According to the official, missile factory no. 26 in Kanggye (Jagang Province) manufactures missile parts, factory no. 118 in Kaechon (South Pyongan Province) produces launch engines, factory no. 125 at Mt. Hyongje in Pyongyang assembles missile parts, and an additional factory in Mangyongdae-ri, Pyongyang, develops explosive compounds. In addition, a North Korean defector has confirmed missile factory locations in Kangso, (Nampo, South Pyongan Province). Further, the official said that the 10 missile bases are located at Mt. Kanggamchan (Jungsan, South Pyongan Province), Mayangdo (Sinpo, South Hamkyong Province), Paekun-ri (Kusong, North Pyongan Province), Rodong-taepodong (Hwadae, North Hamkyong Province), Chonggang-up (Huchang, Jagang Province), Okpyong (Munchon, Kangwon Province), Jiha-ri (Ichon, Kangwon Province), and the three Pyongyang metropolitan areas of Sangwon-kun, Oryu-ri and Chunghwa-kun. Further, two additional bases are under construction in Tocksong County (South Hamgyong Province) and Yongo-tong (South Hamgyong Province). The South Korean official noted that North Korea has trained missile development experts since the establishment of its National Defense University in 1965. Apparently, North Korea recently told a delegation from a Middle Eastern country that missile factory no. 125 is an assembly line for Scud-B missiles. The official added, "North Korea is currently capable of producing more than 100 Scud-type missiles a year."

Yonhap (Seoul), 25 March 1999, in FBIS Document FTS19990324002145, 24 March 1999; *Hangyore* (Seoul) [Online], <<http://www.hani.co.kr>>, 25 March 1999, in FBIS Document FTS19990324002145, 25 March 1999.

A US spy satellite has confirmed that North Korea has deployed Nodong ballistic missiles. The missiles have been deployed near the North Korea-China border. The satellite photos indicate that the Nodong launchers have been vehicle mounted. The Nodong missiles have a range of 1,000-1,300 km, and are capable of striking Japan.

AFP, 28 March 1999.

North Korea conducted a combustion test for a rocket engine in early May 1999. Observers suspect that the engine tested was for the Taepodong-2 ballistic missile, an updated version of the missile that North Korea tested in August 1998. A US reconnaissance satellite detected heat signatures from the engine test. It is assumed that the purpose of the test was to ensure that the engine would combust smoothly and generate propulsion strong enough to enable the Taepodong-2 missile to develop sufficient range and speed. South Korean and US intelligence analysts believe that the Taep'o-dong-2 could have a maximum range of 4,000-6,000 km. Furthermore, North Korea may have developed sufficient competence after the August 1998 Taep'o-dong launch to develop larger ballistic missiles.

*Asahi Shimbun* (Tokyo), 24 June 1999, in FBIS Document 19990623001649, 24 June 1999.

On 15 June 1999, undisclosed Japanese government sources said that North Korea has started preparations for launching a Taepodong ballistic missile with a range of more than 1,500 km in July or August 1999. Information from US reconnaissance satellites and South Korean government sources indicates that North Korea is expanding construction on its missile launching facilities.

*Nihon Keizai Shimbun* (Tokyo), 16 June 1999, in FBIS Document FTS19990615001749, 15 June 1999.

## PAKISTAN

### Nuclear

The Pakistani press reported on 11 March 1999 that the Pakistani Commerce Division has issued a statutory regulatory order to control the export of nuclear technology to foreign countries. The new order states that nuclear technology cannot be transferred to

any other country without a "no objection certificate" from the Pakistani Atomic Energy Commission. The new restrictions apply to nuclear substances, radioactive material, equipment, arms, ammunition, explosive ingredients, complete rocket and unmanned aerial vehicle systems, and the parts for all aforementioned items.

Ansar Abbasi, *Dawn* [Online], <<http://www.dawn.com>>, 11 March 1999.

According to an article in the *Kashmir Times*, neither India nor Pakistan has performed "one-point safety" tests on nuclear warheads to reduce the chances of accidental detonation during fabrication, installation, or flight.

Praful Bidwai, *Kashmir Times*, 15 March 1999, in FBIS Document FTS19990317000472, 15 March 1999.

As the September 1999 deadline for signing the Comprehensive Test Ban Treaty (CTBT) approaches, the Pakistani government has attempted to convince domestic critics of the treaty's "non-discriminatory" nature. Pakistani Foreign Minister Sartaj Aziz told the country's National Assembly on 18 March 1999 that Pakistan "could sign the CTBT even before September 1999 in conditions free of coercion and pressure." Aziz said that there are "certain misconception that signing the CTBT will either cap [Pakistan's nuclear] program and some newspaper comments went to the extent [of saying] it will roll back our program." He explained that the CTBT only calls for halting nuclear test explosions, which Pakistan has already declared a moratorium on. The CTBT would formalize that moratorium but place "no restrictions on a country's nuclear program, including production of further weapons."

Amit Baruah, *The Hindu* [Online], <<http://www.webpage.com/hindu>>, 27 March 1999.

US Marine Corps General Anthony Zinni briefed Pakistani Army Chief General of Staff Pervez Musharraf on conditions for resuming military ties on a 21 April 1999 visit to Islamabad. Indian military and political leaders were also informed through the US Embassy in New Delhi on the conditions for resuming US military ties. Those conditions included signing the CTBT, a ban on fissile material production, implementation of clear

export controls, and an exercise of strategic restraint. The phased plan called for reciprocal visits, military exercises, officer education, troop training and strategic planning activities. US military officials stressed the plan would not involve equipment provided through the US foreign military sales program, but the last phase of re-engagement could involve limited technology sharing.

Barbara Opall-Rome, *Defense News*, 10 May, 1999, p. 28; *Indian Express* [Online], <<http://www.expressindia.com>>, 6 May 1999.

In early May 1999, US government nuclear intelligence analysts concluded that Pakistan produced enough heavy water to start up and operate the unsafeguarded plutonium production reactor at Khushab. Officials said there was no information, classified or unclassified, to substantiate allegations that Pakistan diverted heavy water supplied under International Atomic Energy Agency (IAEA) safeguards by China to Pakistan's power reactor at the Karachi Nuclear Power Plant (Kannup). China has denied any heavy water diversion to Khushab. According to information compiled by the US Central Intelligence Agency (CIA), the 50-MWt Khushab reactor was constructed in the 1990s with Chinese assistance. In 1997, US officials said the reactor was nearly completed, but lacked enough heavy water to operate. By May 1998, the Khushab reactor had gone critical and was being operated to generate plutonium for Pakistan's nuclear weapons program. In May 1999, US officials said it was likely that Pakistan mastered the engineering process for heavy water production during Khushab's construction and dedicated the output from an indigenous heavy water plant to the production reactor. A source said the engineering process for the most common heavy water production technology, employing hydrogen sulfide (H<sub>2</sub>S), was nearly identical to that used in standard petrochemical refineries. If Pakistan were to build a heavy water plant in an industrial location adjacent to a petrochemical complex, it would be difficult to detect using conventional satellite surveillance.

Mark Hibbs, *NuclearFuel*, 10-17 May 1999, pp. 1,10-11.

Pakistan has set up a command structure to address nuclear attacks. The command structure would be headed by the chairman of the Joint Chiefs of Staff Committee, General Pervez Musharraf, and would decide in consultation with the prime minister whether or not to counterattack in the event of a nuclear attack. In the event of an enemy missile attack, Pakistan would have an estimated six to eight minutes to respond.

*Khabrain* (Islamabad), 13 May 1999, in Lexis-Nexis [Online], <<http://web.lexis-nexis.com>>, 16 May 1999.

Pakistan nuclear scientist A.Q. Khan said on 11 May 1999 that Pakistan had achieved a major breakthrough in its nuclear weapons program by enriching uranium up to 96.4 percent U-235.

*BBC*, 13 May 1999, in Lexis-Nexis [Online], <<http://www.lexis-nexis.com>>, 13 May 1999.

According to government officials, Pakistan has decided to equip its navy with a nuclear capability. The naval nuclear capability would be kept under the central command and control system. There would be four components to this system: development, control, strategic force command, and a secretariat of the three armed service commands through the governing body of the National Command Authority.

*Jang* (Rawalpindi), 18 May 1999, in Lexis-Nexis [Online], <<http://web.lexis-nexis.com>>, 20 May 1999.

Chairman of the Pakistan Atomic Energy Commission Ishfaq Ahmad said that a major amount of uranium and other chemical substances used in the preparation of nuclear bombs and other nuclear arms was obtained from district Lukki Marwat of North-West Frontier Province (NWFP). He said Pakistan has acquired every kind of nuclear technology and that it had gathered enough data to continue its work in the future. Ahmad said the Chagai site was established in 1981 and Pakistan had nuclear capability in 1984. He said, "we have every kind of modern weapon and no government created any hurdles in this regard."

*Nawa-I-Waqt* (Rawalpindi), 19 May 1999, in FBIS Document FTS19990520000490, 19 May 1999.

### Missile

According to a report published in *Current Science*, Pakistan's Ghauri missile is the North Korean Nodong missile, "probably supplied to Pakistani on a turnkey basis by North Korea." The Nodong missile is a single-stage liquid fuelled missile with a range of 950-1,020 km and capable of carrying a 700-1,000 kg warhead. The report warned that if North Korea were to supply Pakistan with its two-staged Taepodong missile, which has a range of between 1,900-2,100 km, Pakistan would have the ability to strike all of India. The report also indicated that the Ghauri missile was derived from the Russian Scud-B missile. S. Chandrashekar from the Indian Institute of Management said that Pakistan's Ghauri missile is probably kerosene-based and that its total fuel load equaled thirteen tons.

*Indian Express* [Online], <<http://www.expressindia.com>>, 4 March 1999.

The Ghauri (Hatf-5) and Shaheen (Hatf-4) ballistic missiles were displayed for the first time at the Pakistan Day parade in Islamabad on 23 March 1999. The Ghauri missile, developed by the Kahuta Research Laboratories, has a range of 1,500 km and was tested on 6 April 1998. The Shaheen had not been tested at the time of the parade, and was developed by the National Development Complex (NDC). The Shaheen can reportedly be launched from both mobile and static launchers. Dr. Samar Mubarakmand, the NDC director, said that the Shaheen has a range of 750 km and could carry a payload of 1,000 kg. He said that the Shaheen is a solid-fuel missile and is highly accurate due to its terminal guidance system.

*The Hindu* [Online], <<http://www.webpage.com/hindu>>, 24 March 1999.

Pakistan test-launched its Ghauri-2 (Hatf-6) ballistic missile on 14 April 1999 and its Shaheen-1 surface-to-surface missile on 15 April. Pakistani officials said that the two missile tests concluded a "series of flight tests involving solid and liquid fuel rocket motor technologies." An official statement released by the Pakistani Foreign Office said that the missile tests were "part of the research and development of Pakistan's indigenous missile program," which was a part of

Pakistan's "policy of maintaining deterrence in the interest of our security." The statement also said that the latest missile tests would contribute to the Hatf-2 and -3 missile programs. Unnamed official Pakistani sources said that a second, more advanced Shaheen missile with a 2,300-km range was "ready and waiting to be tested."

*CNN* [Online], <<http://cnn.com>>, 15 April 1999; Umer Farooq, *Jane's Defence Weekly*, 21 April 1999, p. 3.

On 6 June 1999, the *Indian Express* newspaper reported that US Stinger surface-to-air missiles (SAMs) have been deployed by "Pakistani intruders" in the Kargil sector of Kashmir. The paper reported that in 1994 to 1995, the US Central Intelligence Agency (CIA) attempted to recover all the Stinger missiles supplied to Afghan guerillas during the Soviet-Afghan war. The CIA estimated 120 Stinger missiles were "missing." *Indian Express* reported that the Stinger missiles were used by the "Pakistani intruders" to shoot down a Mi-17 military helicopter.

Manvendra Singh, *Indian Express* [Online], <<http://www.indian-express.com/>>, 7 June 1999.

## SOUTH KOREA

### Nuclear

South Korea and Russia have initialed an agreement to upgrade an extant 1994 protocol on cooperation in peaceful uses of nuclear energy. The agreement calls for both states to cooperate in the use of peaceful nuclear energy. It also places restrictions on transferring nuclear materials to third countries and delineates other obligations in the transfer of nuclear technology. Both countries also agreed to resume a joint steering committee meeting on cooperation in the development of laser and nuclear fusion, as well as other nuclear-related technologies.

Yonhap (Seoul), 8 April 1999, in *Inquisit* [Online], <<http://www.inquisit.com>>, 8 April 1999.

On 13 April 1999, South Korea ratified the Comprehensive Test Ban Treaty.

*Korea Herald* [Online], <<http://www.koreaherald.co.kr>>, 14 April 1999.

On 22 April 1999, South Korea agreed in principle that the repayment of support funds for the construction of light-water re-

actors in North Korea would be made through the KEDO. Consequently, South Korea will provide \$3.22 billion for the project as a grant rather than a loan. During talks with the United States in early April 1999, South Korea agreed to vague provisions stating that repayment of the loan would be guaranteed after consultation by the executive member countries of KEDO, not by KEDO itself. Earlier, South Korea had demanded loan repayment guarantees from KEDO. A US official criticized South Korea's policy and said "this posture of being reluctant to give up repayment of the loan while pursuing a sunshine policy toward North Korea is inconsistent." The KEDO loan agreement has to be ratified by the South Korean National Assembly.

*Tong-a Ilbo* (Seoul), 23 April 1999, in FBIS Document FTS19990423001945, 23 April 1999.

On 7 May 1999, South Korea's government announced that it would issue \$330 billion in government bonds to cover South Korea's contribution for the construction of light-water nuclear reactors in North Korea. The government also stated that if the domestic economy improved, it would cancel the bond issuance and instead impose a 3 percent surcharge on electricity bills.

Shin Jong-rok, *Chosun Ilbo* (Seoul) [Online], <<http://www.chosun.com>>, 7 May 1999.

### Missile

On 26 April 1999, South Korean Vice Defense Minister Ahn Byung-kil announced that the United States has agreed to let South Korea develop private-use space projectiles without limits on range or payload. In addition, Ahn said, the United States is close to allowing South Korea to develop missiles with a range of 300 km and payload of 500 kg, which would effectively end the 1979 agreement that restricts South Korean missiles to a 180-km range. However, the two parties are divided on how to formalize the agreement. Ahn said, "Seoul is trying to conclude the agreement through a letter of intent, while Washington is calling for a more formal memorandum of understanding." At a meeting of the South Korean defense committee of the National Assembly, some officials called for building missiles with ranges up to 700 km. Ahn also denied reports that the United

States had protested the 10 April 1999 missile launch by South Korea. He said, "no prior consultations were required with respect to the test-firing because the missile's range fell short of the 180 km, the limit set by the U.S." The spokesperson for North Korea's Foreign Affairs Ministry criticized the United States for supporting the development of South Korea's missile program. He said such support was hostile to North Korea and could harm current missile talks with the United States.

*Korea Times* [Online], <<http://www.koreatimes.co.kr>>, 27 April 1999; Yoo Yong-won, *Chosun Ilbo* [Online], <<http://www.chosun.com>>, 27 April 1999; Jangsoo Seo, *JoongAng Ilbo* [Online], <<http://www.joongang.co.kr>>, 27 April 1999.

Seoul's *Sisa Journal* reported that South Korea conducted a ballistic missile test on 10 April 1999. According to the report, South Korea's Agency for Defense Development (ADD) test fired "Hyonmu," a 300 km-range missile on the west coast of the country. As the missile was partially fueled, it flew only 50 km. The report further stated that South Korea manufactured a prototype of a 300 km-range missile several years ago and conducted flight-tests secretly.

Yi Chong-hun, *Sisa Journal*, 29 April 1999, p.14, in FBIS Document FTS19990426000865, 29 April 1999.

On 3 May 1999, a high-ranking South Korean official reaffirmed that Seoul has no plans to join the US-led theater missile defense (TMD) program. The official said that "at this stage, [South Korea has] neither an intention nor ability to take part in the TMD plan, which requires a huge sum of investment and up-to-date technology." According to officials at South Korea's Defense Ministry, skepticism is arising in Seoul about whether the TMD plan would be able to effectively intercept short-range North Korean missiles. The Defense Ministry officials also underlined the huge cost of the planned TMD.

Jun Kwan-woo, *Korea Herald* [Online], <<http://www.koreaherald.co.kr>>, 4 May 1999.

Russia's Aviation and Space Agency has offered to launch satellites for South Korea and has proposed "an entire package of co-

operation ideas" to South Korean space officials. The package reportedly included proposals to jointly develop telecommunications and Earth-monitoring satellites, data sales from Russia's Earth-monitoring satellites, and an offer to use Russia's Glonass global navigation system, which has already been offered to the European Union. Yulrae Cho, South Korea's science attaché in Moscow, confirmed South Korea's interest in acquiring Russian optical and launch technologies. He also suggested that South Korea would like to acquire some "basic theoretical knowledge" about spacecraft design and launch vehicles, as long as it would not violate international bans on missile technology proliferation. He stated it would take several years for any significant accomplishments in South Korean-Russian space relations. Cho also said that South Korean industry is currently actively cooperating with the Russian space industry.

Simon Saradzhyan, *Space News*, 14 June 1999, pp. 1, 36.

## TAIWAN

### Nuclear

On 17 March 1999, Taiwan's Atomic Energy Council (AEC) granted licenses for the construction of the first and second units of the fourth nuclear plant to the Taiwan Power Company (Taipower). Each unit will have a production capacity of 1.35 million kilowatts. The first and second units are expected to become operational by June 2004 and June 2005, respectively. The new units will bring Taiwan's gross installed nuclear power generating capacity to 7.8 million kilowatts, "about one third of the island's total installed [electricity production] capacity."

Maubo Chang, Taiwan Central News Agency, 17 March 1999, in FBIS Document FTS19990317001025, 17 March 1999.

### Missile

Taiwan is planning to increase its indigenous missile program budget by \$600 million for the next fiscal year. The money is likely to be used to modify the anti-ship Hsiung Feng 2 missile to produce a version with cruise missile capabilities. Such a capability would allow Taiwan to launch pre-emptive strikes against China's land-based missile sites.

Taiwanese military sources suggest that the Tien Ma (Sky Horse) surface-to-surface missile program will be revived, with similar pre-emptive strike capabilities. Taiwan has already purchased the Modified Air Defense System (MADS) or Patriot-T, which is an improved US Patriot high-to-medium surface-to-air missile. According to a US Department of Defense report, Taiwan cannot exclusively rely on an active missile defense system to deter China. By 2005 China will have an overwhelming advantage in offensive missiles.

Bryan Bender and Robert Karniol, *Jane's Defence Weekly*, 10 March 1999, p. 4.

On 23 March 1999, Taiwan's Air Force Major General Wang Chih-ke said that Taiwan would acquire a US-built long-range early warning system to increase its air-defense capability against China. He added that the budget had been set for the planned acquisition. Earlier, *Liberty Times* reported that the radar system would cost an estimated 26 billion Taiwanese dollars (\$785.7 million) and would be operational within six years. The system will be used to track aircraft and missiles. The report added that Taiwan's current military radar systems can only track aircraft movement within a range of 600 km.

*China Times* [Online], <<http://www.chinatimes.com>>, 24 March 1999.

According to Taiwan's Defense Minister Tang Fei, Taiwan would have to spend approximately \$9.23 billion over the next decade to build and deploy a low-altitude missile defense system. The defense system would have the capability to destroy 70 percent of all missiles launched against Taiwan. Tang said it is important for Taiwan to begin the foundation work for joining the US-led theater missile defense system.

Taiwan Central News Agency, 24 March 1999, in FBIS Document FTS19990324001145, 24 March 1999.

Taiwan's *China Times* reported that Taiwan will buy or build Aegis-equipped guided missile destroyers. Taipei plans to purchase four such ships at about \$800 million each. The Taiwan Defense Ministry declined to comment on the report. Meanwhile, Taiwanese military authorities have approved plans to dredge the Tsoying harbor by an addi-

tional 20 meters and build four additional piers to accommodate the 8,000-ton vessels.

*China Times* [Online], <<http://www.chinatimes.com.tw>>, 18 May 1999.

## THAILAND

### Nuclear

According to Kriangsak Bhadrakom, the director-general of the Office of Atomic Energy for Peace (OAEP) and secretary of the Nuclear Safety Committee (NSC), the Ongkharak nuclear research reactor project in Thailand should be reviewed by both the US Oak Ridge Laboratory and the International Atomic Energy Agency (IAEA). The US company General Atomic, which is constructing the reactor, has not requested a safety guarantee from the US Nuclear Regulatory Commission (NRC) because the latter cannot give guarantees abroad. The OAEP has decided that General Atomic needs to seek reviews from Oak Ridge and the IAEA before it begins construction. Both reviews will be submitted to the NSC to verify that safety standards for the project are approved before any construction begins.

Kamol Sukin, *The Nation* (Bangkok), 28 April 1999, in FBIS Document FTS19990427001948, 28 April 1999.

## VIETNAM

### Missile

According to Asian intelligence sources, North Korea has sold modified Scud ballistic missiles to Vietnam. It is believed that the missiles are Scud-C variants. North Korea's Scud-C has a range of 550 km and can carry a 770 kg payload. The missile also uses an improved guidance system. Vietnam's former vice defense minister, Nguyen Thoi Bung, oversaw the purchase during his December 1996 visit to North Korea. The deal for the Scud-C included two *Sang-o*-class submarines and a number of man-portable air-defense systems believed to be the SA-16 Gimlet.

Robert Karniol, *Jane's Defence Weekly*, 14 April 1999, p. 17.

## EUROPE

### ARMENIA

#### Missile

According to an Azerbaijani Ministry of Foreign Affairs statement released on 3 June 1999, the defense ministers of Russia and Armenia signed a deal on delivery of eight Chinese-built Typhoon missiles to Armenia during their joint visit to China in summer 1998. Chinese Deputy Foreign Minister Wang Yingfan denied knowledge of the closure of the deal and explained that though the number of Chinese arms exporting firms is limited and their activity is strictly controlled by the government, Chinese law does not require arms exporting firms to receive government approval for each transaction.

Statement by the Foreign Affairs Ministry of the Republic of Azerbaijan, 3 June 1999.

### ESTONIA

#### Nuclear

The Riigikogu (Estonia's parliament) ratified the Comprehensive Test Ban Treaty on 21 June 1999.

Interfax, 21 June 1999.

### RUSSIA

#### Nuclear

According to Mr. Yamato, a member of the Japan Nuclear Cycle Development Institute (JNC) board of directors, and Mr. Tsutomu Imamura, deputy director-general of the Science and Technology Agency (STA), Japan and Russia are in the process of concluding an agreement on disposition of plutonium from dismantled nuclear weapons. According to the 3 April 1999 issue of *Nihon Keizai Shimbun*, the STA has already sent the Russian Ministry of Atomic Energy a plan for cooperation in carrying out this agreement. Under the agreement, the JNC will assist Russia in remodeling the core of the BN-600 fast breeder reactor (FBR) at the Beloyarsk nuclear power plant so that it can be loaded with mixed-oxide (MOX) fuel. The primary objective is to help Russia burn a total of

20,000 kg of excess plutonium in the BN-600 reactor by 2020 and reduce the proliferation risk by converting weapons-grade plutonium removed from dismantled Russian nuclear weapons into fuel for nuclear power stations.

*Atoms in Japan*, April 1999, p. 10; *BBC Soviet Union Economic*, 5 April 1999; Vladimir Solntsev, ITAR-TASS, 5 February 1999; *Nikkan Kogyo Shimbun*, 24 February 1999.

On 20 April 1999, Japan announced a plan to offer Russia about \$35 million in aid to dismantle 50 deteriorating nuclear-powered submarines of the latter's Pacific Fleet. A Japanese Foreign Ministry official said that the submarines "are weather-beaten and in serious condition, which may affect Japan's environment." Specifically, the aid would go towards removing spent nuclear-fuel rods from the submarines and scrapping the submarine hulls.

*Daily Yomiuri* [Online], <<http://www.yomiuri.co.jp>>, 21 April 1999.

On 21 April 1999 the Strategic Rocket Forces (SRF) launched the first converted RS-20 [NATO designation SS-18 'Satan'] booster rocket, the Dnepr-1, from the Baykonur cosmodrome. The Dnepr-1 was carrying a British research satellite. The SRF has about 180 RS-20 missiles that are scheduled for destruction by 2002 if the START-2 Treaty is ratified. About 150 missiles can be converted into boosters for launching communications satellites weighing up to 4,000 kg. Kosmotras, an international space company, ordered the launch as part of the Russian-Ukrainian Dnepr program. ITAR-TASS reported that Russia and Ukraine could launch between four and eight Dnepr boosters per year, if they gain access to the international launch vehicle market. In an interview with ITAR-TASS on 21 April, Deputy Commander-in-Chief of the Russian Strategic Rocket Forces Vladimir Nikitin stated that the successful launch indicated that all Russian ICBMs removed from service should be converted into commercial space boosters rather than destroyed.

Nikolay Novichkov, ITAR-TASS, 21 April 1999.

The Security Council of the Russian Federation conducted a closed meeting to discuss the status and the prospects of the nuclear

deterrent forces. Reports were made by Defense Minister Igor Sergeev and Minister of Atomic Energy Yevgeniy Adamov. At a subsequent briefing the secretary of the Security Council, Vladimir Putin, reported that the council adopted three documents. One covers the development and security of the nuclear weapons complex (i.e. development, production, and testing of nuclear warheads); another is a concept for the use of nuclear weapons, including tactical nuclear weapons; the third document, said Putin, was so secret that even its title could not be disclosed. He stressed that Russia would continue "to abide by all obligations it had undertaken" in the area of arms control and international security. Press reports suggested that in the view of the breakdown of the START-2 ratification process, the Security Council decided to extend the service life of RS-20 [NATO designation SS-18 'Satan'] heavy ICBMs, retain eight nuclear powered Delta-3 ballistic missile submarines previously slated for decommissioning, and buy eight Tu-160 and three Tu-95 heavy bombers from Ukraine. The Security Council also reportedly decided to develop a new, low-yield nuclear warhead and to develop a capability to ensure the reliability of Russian nuclear weapons within the framework of the Comprehensive Test Ban Treaty. Considerable attention was devoted to the safety and security of Russian nuclear weapons design, production, and storage facilities.

Interfax, 29 April 1999; Ilya Bulavinov and Ivan Safronov, *Kommersant-Daily*, 30 April 1999; Igor Korotchenko, *Nezavisimaya gazeta*, 30 April 1999, p. 2; *Rossiyskaya gazeta*, 30 April 1999, p. 2; Pavel Felgengauer, *Segodnya*, 6 May 1999, pp. 1, 2.

Specialists at the Russian Ministry of Atomic Energy (Minatom) disagree with the conclusions reached in the 18 May 1999 report of the Committee on Upgrading Russian Capabilities for Controlling Highly Enriched Uranium and Plutonium of the US National Research Council, Interfax reported on 20 May 1999. Minatom officials particularly dispute the conclusion in the report that the threat of diversion of nuclear materials from Russian facilities is now greater than previously estimated. The officials argued that Russian facilities storing nuclear mate-

rials meet international standards, and claimed that US specialists who have visited these sites have declared that the materials stored there are subject to a "high level of security." Minatom's press service also told Interfax that "in recent years there has not been a single confirmed leak of nuclear materials from Russia." Minatom officials said the only exception was the shipment of "contraband" plutonium to Germany, an apparent reference to the August 1994 Munich case. The Minatom officials hastened to add that they are grateful for the financial assistance provided by the United States Department of Energy through the Materials Protection, Control, and Accounting Program.

Interfax, 20 May 1999.

On 3 June 1999, at 18:20 hours Moscow time, Russia conducted a flight test of its RS-12M2 Topol-M [NATO designation SS-27 'Sickle'] ICBM, the seventh such test since December 1994. The missile was launched from the Yuzhnaya-1 launch pad at the Plesetsk Cosmodrome (Arkhangelsk Oblast) and hit its target at the Kura test range in Kamchatka after 23 minutes and 48 seconds. The two sites are approximately 9,000 km apart. The launch was unprecedented in that it tested a "lateral anti-missile maneuver," the main object of which was to simulate avoiding anti-missile defense systems. Colonel General Vladimir Yakovlev, commander-in-chief of Russia's Strategic Rocket Forces, explained: "Problems have now arisen with the 1972 Russian-US ABM [Anti-Ballistic Missile] Treaty, and therefore we have been obliged to incorporate into our new missiles the potential to overcome anti-missile defense systems." In addition, it was the first time that the missile was equipped with the "terminator" navigation system. The "terminator" system uses the Glonass satellite navigation system, enabling the missile to "know" its exact position throughout its flight and communicate that information back to the ground.

Yuriy Golotyuk, *Izvestiya*, 5 June 1999, p. 1.

From 21 to 26 June, the Russian armed forces conducted what was described as the largest military command-staff exercise of the past 10 years, with the final stage of the exer-

cise featuring simulated nuclear strikes by air-launched cruise missiles against Europe and the United States. Code-named Zapad-99 (West-99) the exercise involved extensive cooperation between Russian and Belarusian forces, while Kazakhstani military officers attended as observers. The Russian forces involved included all of the armed services, with up to 50,000 troops taking part. According to Russian Defense Minister Igor Sergeev, the purpose of the exercises was to "work out one of the provisions of the Russian military doctrine—the use of nuclear weapons in the case when all other methods of organizing defense have been exhausted." While Russian Ministry of Defense officials denied any direct link between the exercise and NATO's air campaign against Serbia, claiming that the exercise had been planned in December 1998, several aspects of Zapad-99 were designed to test possible countermeasures to the tactics used by NATO against Serbia. The exercise included simulated nuclear strikes beginning on 26 June, when two Tu-95 MS Bear-H bombers from the 22nd Guards Heavy Bomber Division flew near Iceland on a simulated cruise missile launch mission, reportedly with the United States as the target. The same day two Tu-160 Blackjack bombers flew down the coast of Norway, reportedly in a simulated nuclear strike against continental Europe. These strikes apparently ended the exercise, indicating that Defense Ministry planners believe that escalation to limited nuclear strikes might successfully terminate a conflict. No cost figures for the exercise have been released, but the Russian press has speculated that the cost could run into the billions of rubles, and may have exhausted the training budget for the year. According to Defense Minister Sergeev, similar exercises may be held every two years in the future.

Dmitriy Litovkin and Roman Fomishenko, *Krasnaya zvezda*, 13 July 1999, p. 2; Aleksandr Babakin, *Rossiyskaya gazeta*, 26 June 1999, p. 2; Interfax, 22 June 1999; Michael R. Gordon, *New York Times*, 10 July 1999, p. A1; Interfax, 9 July 1999; Yuriy Golotyuk, *Izvestiya*, 29 June 1999, p. 2; Vladimir Georgiyev, *Nezavisimaya gazeta*, p. 2; Ivan Safronov, *Kommersant*, 10 July 1999, p. 2; Aleksandr Koretskiy, *Segodnya* [Online], <<http://home.eastview.com>>, 2 July 1999; Anatoliy Yurkin, ITAR-TASS, 28 June 1999; Nikolay Karpov, *Delovoy vtornik*, No. 24, 13 July 1999, p. 2.

### Missile

Interfax reported on 8 March 1999 that Russia intends to equip its Tupolev Tu-160, Tu-95MS, and Tu-22M2 strategic bombers with "precision cruise missiles that cannot be detected by radar." The cruise missiles have a range between 3,000 and 5,000 km. According to experts from the Air Force Main Staff, plans to equip bombers with stealth cruise missiles capable of carrying nuclear or conventional charges is the "most important modernization program for the Russian Air Force."

Interfax, 8 March 1999.

According to reports prepared by US and Israeli intelligence agencies, ballistic missile and nonconventional weapons technology and expertise continue to flow from Russia to Iran, Iraq, and Syria. Israeli Prime Minister Benjamin Netanyahu is expected to lodge a formal complaint over Russian military aid to Iran, Iraq, and Syria during his upcoming meeting with Russian Prime Minister Yevgeny Primakov.

Eytan Rabin, *Ma'ariv* (Tel Aviv), 12 March 1999, p. 4, in FBIS Document FTS19990312000642, 12 March 1999.

Israeli Prime Minister Benjamin Netanyahu announced in Moscow on 22 March 1999 that Israel and Russia have agreed to an initiative to create a jointly administered mechanism to combat the flow of nonconventional weapons technology and expertise from Russia to Iran. Israeli Foreign Minister Ariel Sharon and Russian Foreign Minister Igor Ivanov are expected to head a committee to discuss how the mechanism will be established and function.

Danna Harman, *Jerusalem Post* [Online], <<http://www.jpost.com>>, 23 March 1999.

According to unconfirmed reports, the Russian government or parties within Russia are believed to have supplied elements of between six and ten Russian-built S-300PM [NATO designation SA-10b 'Grumble'] surface-to-air missile (SAM) systems to air defense units of the Yugoslav Air Force before the launch of NATO air campaign. According to an unidentified high-ranking Serbian military source, S-300 missiles without their self-propelled transporter-launchers were

shipped into Serbia in early 1999, concealed in railway cars carrying scrap iron. It is believed that up to 20 missiles may have entered into Serbia in this fashion. The high-ranking source noted that the MAZ-7910, which houses the Flap Lid B radar vehicle/command post, was difficult to deliver clandestinely and added that the delivery of the 36D6 Clam Shell target designation and tracking radar, which is a part of the S-300 SAM system, was interrupted by NATO bombings. However, Yugoslav engineers claimed to have successfully modified the existing P-15M (Squat Eye) radar and PVR-11 (Side Net) height-finder systems to be paired with older-generation S-300 missiles. It is believed that the S-300s were deployed in the Banat plains of Vojvodina, 10 km east of Pancevo. Serbian sources claimed that the Serbian units failed to launch the S-300 because NATO aircrafts covering the F-16s bombing the Pancevo refinery detected radar emissions from the Serbian launch site and eventually destroyed the intended S-300 launch site, killing several Yugoslav officers. Following this, the Serbs withdrew the remaining S-300s to underground tunnels in the Rakovica suburb south of Belgrade. The Russian Foreign Ministry dismissed the reports of the alleged supply of the S-300 systems to the Serbs as "speculations."

Zoran Kusovac, *Jane's Defence Weekly*, 4 August 1999, p. 4; Interfax, 13 August 1999; ITAR-TASS, 2 August 1999.

## UKRAINE

### Nuclear

Ukrainian authorities on 19 May 1999 arrested four Russian citizens of Armenian descent who were attempting to smuggle 20 kg of "enriched uranium ore" to Western Europe, *Fakty i Kommentarii* reported on 22 May 1999. Colonel Vasyl Vartsaba, head of the Transcarpathian directorate for fighting organized crime, said that the suspects, residents of the Krasnoyarsk and Stavropol regions of Russia, had brought the uranium to Ukraine in December 1998, hoping to find a buyer. They originally hoped to sell it for \$60,000/kg, which would have netted them \$1.2 million, but later reduced their asking price to \$35,000/kg. After several weeks of searching for a buyer, they made a deal in

the town of Berehovo (located near the Ukrainian-Hungarian border) to sell 2 kg of the uranium. When one of the suspects met with the buyer to complete the deal, carrying the uranium in a sports bag, he was arrested at the Berehovo bus station. The police believe that the smuggler was planning to market the uranium in Western Europe. After his arrest, the suspect told the police that another 18 kg of uranium was buried outside a house in nearby village, and it was subsequently recovered. The material was sent to Uzhorod State University for analysis, where physicists said it was "enriched uranium ore." The level of enrichment was not specified. According to the report, the uranium "is known to have been stolen at a radioactive materials recycling facility in Krasnoyarsk." This information comes from police interrogation of one of the suspects. If this report is accurate, the facility involved is probably the Mining and Chemical Combine in Zheleznogorsk (formerly known as Krasnoyarsk-26), which is located in Krasnoyarsk Kray. Other sources, however, report that the material involved is low-enriched uranium metal suitable for making fuel for RBMK-type reactors. The material's properties and origin may be clarified by a second examination by the Kiev Institute of Nuclear Research, the main expert organization consulted by Ukrainian authorities in nuclear smuggling cases. The suspected smugglers will be charged with violating Section 1 of Article 228-2 of the Ukrainian Criminal Code, and could receive up to five years in prison if convicted.

Yaroslav Halas, *Fakty i Kommentarii*, 22 May 1999; Oleksandr Ilchenko, *Segodnya* (Kiev), 21 May 1999, pp. 1-3; Aleksey Breus, *Nucleonics Week*, 27 May 1999, pp. 15-16.

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## LATIN AMERICA

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### BRAZIL

#### Missile

Ukrainian Minister of Foreign Affairs Boris Tarasyuk announced on 28 April 1999 that Ukraine will use Brazil's Alcântara aerospace

facility to launch satellites into orbit. Ukraine plans to carry out its first launches from Alcântara in the next two years. A formal agreement for space cooperation was scheduled to be signed in May 1999 when Brazilian Minister for Special Projects and Affairs Ronaldo Sardenberg visits Kiev. Brazil's Infraero, Italy's Fiat-Avia, and Ukraine's Yuzmash and Yuzhnoye firms are expected to collaborate in marketing Alcântara's space launch services. Tarasyuk also discussed possible Ukrainian-Brazilian cooperation on uranium enrichment and reactor construction during his visit.

*Correio Brasiliense* (Brasilia), 29 April 1999, in Lexis-Nexis [Online], <<http://www.lexis-nexis.com>>, 4 May 1999.

Five military officers and 13 civilians are the first to complete a two-year course in liquid propulsion technology for rockets at Brazil's Aeronautical Technology Institute (ITA). The course was administered by 30 experts from the Moscow Aviation Institute in conjunction with the ITA. Aluzio Weber, director of Brazil's Aerospace Technical Center (CTA), said that "this is the first step towards developing, in Brazil, rockets run on liquid propellant." Brazil reportedly plans to develop liquid-fueled space launch vehicles to complement its solid-fueled Satellite Launch Vehicle (Veículo Lançador de Satélites-VLS).

Virginia Silveira, *Gazeta Mercantil* (São Paulo), 3 June 1999, in FBIS Document FTS19990603001829, 3 June 1999.

## CUBA

### Nuclear

On 12 May 1999, members of the Intergovernmental Russo-Cuban Commission for Trade, Economic, Scientific and Technical Cooperation, met in Moscow to discuss completion of Cuba's Juragua nuclear power plant as well as other matters. Russian and Cuban officials reportedly agreed to form a joint venture that will seek international partners to finance construction of two VVER-40 reactors at Juragua. The project is estimated to cost up to \$700 million to complete.

*Nuclear News*, July 1999, p. 51.

## VENEZUELA

### Missile

The Dutch defense firm Signaal has won a contract from the Venezuelan Ministry of Defense (MoD) to integrate fire-control operations of Barak-1 surface-to-air missiles purchased from Israel with Venezuela's existing anti-aircraft artillery. Signaal will supply its Flycatcher Mk2 all-weather fire-control radar system to coordinate operations between the two systems. The Flycatcher Mk2 system is reportedly capable of identifying and tracking up to four targets simultaneously at a maximum range of 20 km.

Patrick J. O'Donoghue, *Vheadline*, 26 May 1999, in FBIS Document FTS19990526001956, 26 May 1999.

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## MIDDLE EAST AND AFRICA

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## ANGOLA

### Missile

Unconfirmed intelligence reports state that Jonas Savimbi's National Union for the Total Independence of Angola (UNITA) rebel group may have received more than 20 Russian-built FROG-7 artillery rockets, and three Mi-25 Hind military helicopters from Ukraine. According to the reports, UNITA may take delivery of an additional seven Mi-25 helicopters from Ukraine.

*Mail & Guardian* (Johannesburg), 19 March 1999, in FBIS Document FTS199903360001092, 19 March 1999.

## EGYPT

### Nuclear

According to media sources in Cairo, the US government has reportedly offered Egypt \$200 million in exchange for delaying its nuclear power program. Sources say that the US government offered to assign US companies to build non-nuclear power stations, which would cost \$200 million and would be paid by the US Exports Bank as a non-returnable loan. The Egyptian sources also say

that the United States agreed to finance stations for the BOT system [likely to mean "Build-Operate-Transfer" processed] and the generation of electricity by use of wind and solar energy, in return for Egypt's postponement of its nuclear program. There is no report on the Egyptian government's response to the US offer. However, Egypt's electricity ministry has asked Canada and Germany to supply it with small nuclear reactors with capacities between 100,000kW and 150,000kW and a life span of 50 years. These reactors are known for their safety levels at comparably lower prices than their US counterparts.

'Adil al-Jawhari, *Al-Mustaqillah* (London), 22 June 1999, p.6, in FBIS Document FTS19990624000932, 22 June 1999.

### Missile

On 11 March 1999, US Secretary of Defense William Cohen announced the Clinton administration's approval of a \$3.2 billion military assistance package requested by Egypt. Pending congressional approval, the package will provide Egypt with an eight-missile fire unit of Patriot PAC-3 surface-to-air missiles, 24 F-16 fighter aircraft, and 200 M-1A1 tank kits to be assembled in Egypt. The tank kits and F-16 aircraft will be delivered over the next two years. The Patriot missile system will not be delivered for several years, however, as it is still undergoing testing in the United States. Following the announcement, Cohen met with Israeli Prime Minister Benjamin Netanyahu to assure him that the United States remains "committed to Israel's qualitative edge in military capability to protect its people."

Linda D. Kozaryn, American Forces Press Service [Online], <<http://www.defenselink.mil/news>>, 11 March 1999; John Diamond, *Washington Times*, 12 March 1999, p. 15.

## IRAN

### Nuclear

Russian Minister of Atomic Energy Yevgeniy Adamov informed Interfax that Iran has officially offered to expand its cooperation with Russia on the peaceful use of nuclear energy and explore the possibility of building a second unit at the Bushehr nuclear power plant. Adamov said that both sides should carefully study the feasibility

of constructing a second reactor at the Bushehr nuclear power plant. He added that Russia had not yet decided on this offer. Russia is continuing the work on the first block, which "is going actively enough, strictly in line with the contract," Adamov said.

Interfax, 8 May 1999, in FBIS Document FTS19990508000294, 8 May 1999.

After Iranian President Mohammad Khatami's five-day state visit to Saudi Arabia, Iran and Saudi Arabia issued a joint statement. The Saudi news agency SPA reports that the two countries "expressed their support for turning the Middle East into a zone free from weapons of mass destruction, including nuclear weapons, expressing their absolute belief that Israel's policy, based on producing and stockpiling types of weapons of mass destruction and its non-compliance with international laws and treaties poses a real and serious threat to peace and security in the region."

SPA (Riyadh), 19 May 1999 in *BBC* [Online], <<http://www.bbc.co.uk>>, 19 May 1999.

The Czech daily *Mlada fronta Dnes* reported on 19 May 1999 that Czech government officials do not intend to block the sale of components to Iran for its Bushehr nuclear power plant despite US pressure to cancel the sale. However, Michael Zantovsky, chairman of the Czech government's Foreign Affairs, Defense, and Security committee, said that the proposed sale should be studied "very carefully" but that cooperation with Iran should not be ruled out. Zantovsky also said that he would ask Deputy Premier Egon Lansky for more information about the sale. Premier Milos Zeman has not made a clear statement on the issue. According to the 24 May issue of the *Iran Report*, Zeman stated that "Iran is not Iraq" to justify the sale of nuclear reactor components to Iran. According to Lansky, money is the deciding factor. The total amount of the contracts is worth approximately \$200 million, and Iran is also recruiting Czech scientists to work in the Bushehr nuclear power plant. Representatives from the Czech firm Skoda met with members of the Atomic Energy Organization of Iran and the Russian Ministry of Atomic

Energy to discuss the sale of "cooling and ventilation equipment and a steam turbine," among other items. The Czech government was expected to decide on whether to proceed with the sale on 9 June 1999.

*CTK* (Prague), 19 May 1999, in FBIS Document FTS19990519001110, 19 May 1999, *CTK* (Prague), 19 May 1999, in FBIS Document FTS19990519000090, 19 May 1999; Bill Samii, *Iran Report* [Online], <<http://www.rferl.org/iran-report>>, 24 May 1999; *CTK* (Prague), 7 June 1999, in FBIS Document FTS19990607000384, 7 June 1999.

### Missile

The New Jersey Justice Department said that Daniel Malloy, president and part owner of the New Jersey-based International Helicopter Inc., admitted he shipped missile and military jet parts to Iran between January 1996 and September 1997. The shipments were first made to Joseph Balakrishna Menon in Singapore, owner of Heli-World Aviation, Ltd., who then sent them to Iran. Spare parts for the Northrop F-5 fighter, the Pratt and Whitney TF30 military jet engine, the Grumman F-14A fighter and 100 batteries for the Hawk surface-to air missile were shipped, according to the Justice Department report. Malloy is to pay more than two million dollars in fines and serve between five and 10 years in prison for the illegal exports. Malloy admitted to falsely declaring the shipments to US Customs as "commercial aircraft parts." Malloy had not registered as an exporter with the State Department. US Customs and Defense Logistics Agency officials began scrutinizing Malloy's activities when in February 1997 he ordered 20 missile batteries from a Missouri company that could only be used for the AIM-54 Phoenix missile on the F-14A. In the 1970s, the United States sold Phoenix-equipped jets to Iran.

Agence France Presse, 4 March 1999.

According to Japanese officials, North Korean technicians assisted with the production of Iran's Shahab-3 ballistic missile. The North Koreans reportedly used the same equipment used to produce the Nodong ballistic missile. The Shahab-3, which was tested in 1998, can reach targets in Israel, Saudi Arabia, and Southern Russia. Iranian officials reported that only Iranian technicians

and equipment were involved in production of the missile.

*Iran Times* (Washington, DC), 5 March 1999, in TAAS (Tokyo), 25 February 1999.

The *Iran Brief* reports that in February 1999, Iranian Defense Minister Ali Shamkhani said that Iran's Shahab-3 ballistic missile is "fully operational." A top secret US intelligence report indicates that Iranian President Mohammed Khatami has ordered the production of 15 Shehab-3 missiles, to be deployed in underground bunkers near Khorramabad, Iran. According to sources familiar with the report, Iran is expected to flight test its 2,000 km-range Shehab-4 ballistic missile by 2002, several years earlier than originally anticipated. The Shehab-4 is believed to be based heavily on the Russian R-12 [NATO designation SS-4 'Sandel'] intermediate-range ballistic missile. Shamkhani has said that the Shehab-4 "will have no military purpose" and is "intended to carry satellites into orbit." Shamkhani has also said that the Shehab-4 will use the same RD214 engines that are used in the R-12. In October 1998, Russia's Energomash and Khrunichev firms delivered RD214 engines to Iran.

*Iran Brief* (Bethesda, MD), 8 March 1999, pp. 4-5.

According to US government officials familiar with classified US intelligence reports, Iran test-launched a short-range ballistic missile from a barge in the Caspian Sea in 1998. The missile is believed to have been liquid-fueled and may have been based on Russian sea-launched ballistic missile designs. Western analysts believe that Iran could equip cargo ships with sea-launched ballistic missiles to directly threaten the United States or Middle Eastern countries such as Israel.

*Iran Brief* (Bethesda, MD), 8 March 1999, pp. 1-3.

IRNA reported that Iran has successfully tested a surface-to-air missile (SAM) named Sayyad-1. Quoting Keyvan Khosravi, the spokesman of the Iranian Ministry of Defense and Armed Forces Logistics, IRNA reports that the missile successfully destroyed a target drone at the desired altitude. Khosravi added that the missile, which is named after army commander Lieutenant-

General Ali Sayyad Shirazi who was killed on 10 April 1999, is designed and constructed by the Aerospace Industries Organization, an affiliate of the Iranian Defense Ministry.

IRNA (Tehran) [Online], <<http://www.irna.com>>, 14 April 1999.

Grigoriy Rapota, general director of Russia's Rosvoorouzhenie arms export agency, said on 21 April 1999 that the company has committed itself under the provisions of the Gore-Chernomyrdin Commission to end all military-technical cooperation with Iran by the end of 1999. Rapota declared that "as a state company, Rosvoorouzhenie strictly observes the law and therefore has no right to sign new contracts (with Iran)." He added that the company would resume arms sales to Iran once the ban on such transactions is lifted.

Interfax (Moscow), 21 April 1999, in FBIS Document FTS19990421000619, 21 April 1999.

The Tel Aviv-based *Ha'aretz* newspaper reported on 20 June 1999 that Iranian President Mohammed Khatami is seeking to open a secret dialogue with the Israeli government aimed at improving relations between the two countries through the implementation of confidence-building measures. Unidentified senior British government officials said that they received the Iranian request and relayed it to Israeli leaders. The British sources said that Khatami's two major suggestions were: "a regional agreement among all Middle Eastern countries possessing ground-to-ground missiles not to launch a pre-emptive missile attack on another country that is a party to the agreement;" and "a bilateral agreement regarding the disarmament of long-range ballistic missiles with non-conventional warheads, to be followed by a treaty in which both sides would undertake not to develop long-range missiles for military purposes, but solely for the launching of satellites into space." On 21 June 1999, the Islamic Republic News Agency (IRNA) carried a story describing the *Ha'aretz* report as "baseless."

Sharon Sadeh, *Ha'aretz* (Tel Aviv) [Online], <<http://www3.haaretz.co.il/eng/>>, 20 June 1999; IRNA (Tehran) [Online], <<http://www.irna.com>>, 21 June 1999.

The Islamic Republic of Iran Air Force (IRIAF) recently unveiled two new laser-guided air-to-surface missiles, which were built under Project ASSR-67, at Tactical Air Base 1 in Mehrabad, Iran. The Sattar-1, which reportedly has a 20-km range, closely resembles a combination of the US-built HAWK surface-to-air missile and the AIM-54 Phoenix air-to-air missile. The Sattar-2, which is reportedly designed and manufactured by Iran, is equipped with a Paveway-type search sensor and has a 30-km range. The two missiles are apparently for use by Iranian F-4E and F-5E fighter aircraft.

Homa Farmehr, *Jane's Defence Weekly*, 30 June 1999, p.18.

## IRAQ

### Nuclear

The *New Yorker* magazine reported on 28 March 1999 that US and British intelligence officials believe that Iraq paid Russian Prime Minister Yevgeny Primakov \$800,000 in November 1997 for "strategic materials from Moscow to build up its nuclear weapons stockpile." The report claimed that "while it was not clear how Primakov was identified, the intelligence officials say it was traceable to the Russian Prime Minister." The report quoted former head of the UN Special Commission on Iraq (UNSCOM) Rolf Ekeus as saying "Russia is hopeless now. It is clear that Russia is not making a serious effort to control events. [Iraqi President Saddam Hussein] will get a bomb, because these material are floating in. Every day, they are more advanced."

Reuters, 28 March 1999.

According to the London-based *Foreign Report*, the Iraqis have accelerated their hunt for components to develop nonconventional weapons and ballistic missiles while Western intelligence agencies have been preoccupied with the crisis in the Balkans. Iraq's chemical and biological warfare programs could be resumed within the next nine months and its nuclear weapons program could be resumed within the next 18 months. Iraq's nuclear weapons program has reportedly been helped by Russian scientists employed by the Iraqi government and the Iraqis have tried to purchase parts for ballis-

tic missiles in Eastern Europe.

Douglas Davis, Jewish Telegraphic Agency (London), [Online] <http://www.jta.org>, 3 June 1999.

Iraq accused Iran on 11 June of firing three long-range, surface-to-surface missiles at a base of the Iranian opposition group, Mujaheddin-i Khalq Organization (MKO), located deep inside Iraq. Iraq has threatened to retaliate for this attack. An MKO spokesman said that three Scud-B missiles landed on their base, approximately 110 km north-east of Baghdad, and another Scud exploded in mid-air. He said that the missiles were launched by the Iranian Revolutionary Guard Corps from the Iranian city of Bakhtaran (western Iran), approximately 700 km from the MKO base. The leader of the Iranian opposition sent a letter to the Secretary General of the United Nations, Kofi Annan, accusing Iraq of the attack.

*Al-Khaleej* (Dubai) [Online], <<http://www.alkhaleej.co.ae>>, 12 June 1999.

On 15 June 1999 in the Bavarian High Court, German engineer Karl-Heinz Schaab confessed to illegally selling blueprints for a gas ultra-centrifuge to Iraqi buyers in September 1989. He said that the Iraqis paid DM100,000 for the plans in sales totaling DM980,000. Schaab also said that he knew the blueprints could be used to produce weapons-grade uranium in militarily significant quantities. According to Schaab, a colleague, Bruno Stemmler, acquired the plans that were subsequently sold to Iraqi businessmen in Vienna, Austria. Schaab added that he met with Iraqi scientists in Baghdad on five occasions. The court found Schaab guilty of treason on 29 June, and sentenced him to five years in prison.

Robert Jaquet, *Süddeutsche Zeitung* (Munich) [Online], <<http://www.sueddeutsche.de>>, 16 June 1999; AFP (Munich), 16 June 1999, in *Taz, die tageszeitung* [Online], <<http://www.taz.de>>, 16 June 1999; AP (Munich), 14 June 1999, in Lexis-Nexis [Online], <<http://web.lexis-nexis.com>>, 14 June 1999; Deutschlandfunk Network (Cologne), 29 June 1999, in FBIS Document FTS19990629000348, 29 June 1999.

### Missile

On 10 March 1999, the Russian arms export agency Rosvoorouzhenie denied sending any anti-aircraft systems to Iraq, and added

that it has not aided Iraq in the modernization or maintenance of its air defenses. Deputy Head of Rosvoorouzhnie's anti-aircraft systems exports division Sergey Kulakov said at a 10 March Moscow news conference that all contacts with Iraq were suspended once the United Nations imposed sanctions on the country. Kulakov did say, however, that Rosvoorouzhnie has supplied arms to Iran in quantities that the Russian government permits. Vladimir Svetlov, director general of the Fakel Design Bureau, said that in his opinion all Iraqi air defenses were destroyed during the 1990-91 Gulf War. Svetlov said that Fakel has no business with Iraq, even though Iraq has sought contacts with his company. "If Iraq had Russian anti-aircraft systems, NATO pilots would not find flying over [Iraq] so easy," he said.

Interfax, 10 March 1999, in Lexis-Nexis [Online], <<http://web.lexis-nexis.com>>, 11 March 1999.

Unidentified Middle Eastern sources have indicated that Ukraine and Iraq signed a secret military cooperation agreement in November 1998. The agreement, which would be in violation of UN sanctions against Iraq, allegedly provides for the export of Ukrainian industrial equipment to Iraq in exchange for Iraqi oil. The agreement was reportedly signed by the chief executives of two Ukrainian arms companies, a senior Iraqi diplomat, and representatives of an Iraqi arms firm. According to the Middle Eastern sources, the tractor engines, trucks, heavy vehicles, generators, tires, gears, and electrical circuitry that Ukraine reportedly plans to ship to Iraq could be used to overhaul missile launchers and upgrade tanks. The sources also suggested that the agreement could be a model for future military cooperation pacts between Ukraine and Iraq once UN sanctions against Iraq are lifted.

Foreign Report (London), 20 April 1999, in FBIS Document FTS19990421001682, 20 April 1999.

## ISRAEL

### Nuclear

A draft bill under consideration by the US Senate Armed Forces Committee could ban Israeli scientists from working at US nuclear laboratories. The bill, introduced by Senate Intelligence Committee chair-

man Richard Shelby, labels Israel as a "sensitive" country, thus banning its scientists from working at US nuclear laboratories. A Senate Armed Forces Committee spokesperson said that the Department of Energy (DOE) includes Israel on its list of sensitive countries because it has not signed the Treaty on the Non-Proliferation of Nuclear Weapons (NPT). Other Middle Eastern states listed as "sensitive" by the DOE include Iran, Iraq, Libya, Sudan, and Syria.

Ran Dagoni, *Globes* (Tel Aviv) [Online], <<http://www.globes.co.il>>, 4 May 1999.

### Missile

According to the Tel Aviv-based *Globes* newspaper, Israel is requesting US financial and political support to develop a new missile defense system known as Boost Phase Launcher Intercept (BPLI). BPLI is described as a refinement of the Israeli Boost Phase Intercept System (IBIS), and envisions using unmanned aerial vehicles (UAVs) to destroy enemy ballistic missile launchers as they attempt to fire missiles at Israel. The UAVs would be equipped with infrared guided missiles that would detect the heatsignature of an initial missile launch and destroy the launcher. BPLI differs from the earlier IBIS concept, which involved destroying ballistic missiles after they were launched and not the launchers themselves. US Department of Defense officials estimate that the development cost of the BPLI could reach \$500 million over four to five years, with the cost of deployment reaching up to \$1 billion.

Ran Dagoni, *Globes* (Tel Aviv) [Online], <<http://www.globes.co.il>>, 23 March 1999.

On 20 March 1999, the Israeli navy took delivery of the first of three *Dolphin*-class submarines from the German Ministry of Defense. The 1,700-ton diesel-electric submarine has 10 torpedo tubes capable of firing torpedoes, missiles, mines, and decoys. A senior Israeli military source said that the *Dolphin* submarines will "create a new era" for Israeli navy strategy. The first *Dolphin* is scheduled to be piloted to Israel later in 1999, with the second boat scheduled to be

commissioned by the end of 1999 and the third in 2000.

Amnon Barzilai, *Ha'aretz* (Tel Aviv) [Online], <<http://www3.haaretz.co.il/eng/>>, 30 March 1999.

Based on a report published by the Jaffee Center for Strategic Studies at Tel Aviv University, *Ha'aretz* defense correspondent Amnon Barzilai reports that Israel has developed a third generation of Jericho surface-to-surface missiles. The information, which according to Barzilai is based on foreign reports, adds that the original Jericho missile had a range of 1,500 km.

Amnon Barzilai, *Ha'aretz* (Tel Aviv) [Online], <<http://www3.haaretz.co.il/eng/>>, 12 April 1999.

Following his 27 April 1999 meeting with Chinese leaders in Beijing, Israeli President Ezer Weizman said that Russian missile sales to Syria pose a greater threat to Israel than Chinese weapon sales to Iran. According to Weizman, Syria's Russian-supplied ballistic missiles pose the greatest military threat to Israel.

*Ha'aretz* (Tel Aviv) [Online], <<http://www3.haaretz.co.il/eng/>>, 28 April 1999.

The Israel Defense Forces (IDF) General Staff has held a series of meetings to reassess the threats facing Israel. Distant states such as Iran and Iraq that are developing long-range ballistic missiles and weapons of mass destruction (WMD) are now considered to be the primary security threat. These states were previously considered a secondary threat, less dangerous than the prospect of a large conventional war with Israel's immediate neighbors. Israeli planners believe that the threat posed by distant WMD and missile-armed states jeopardizes Israel's existence, and is likely to grow in the future.

Ze'ev Schiff, *Ha'aretz* (Tel Aviv), 5 May 1999, p. B1, in FBIS Document FTS19990507001392, 5 May 1999.

The future of Israel's Moav air-to-air missile appears uncertain due to disagreements in Israel's defense establishment over the system's merits. The Moav is designed for use by unmanned aerial vehicles (UAVs) to intercept and destroy enemy ballistic missiles during their vulnerable boost phase. In late 1998, Israeli defense establishment offi-

cials agreed to move to the second phase of the Moav's development and allocated funding for it. However, Major General Yitzhak Ben Israel, head of the Israeli Defense Ministry's weapons development authority, decided against proceeding with the project. Ben Israel's decision, which went against official Defense Ministry policy, was based on his opinion that the Moav project faced too many technical hurdles to be successful. Due to Ben Israel's action, the Defense Ministry failed to submit a formal request for US funding and the United States thus has not allocated any funds for the Moav project in its 2000 budget.

Reuven Pedatzur, *Ha'aretz* (Tel Aviv) [Online], <<http://www3.haaretz.co.il/eng/>>, 25 May 1999.

The US Army Space and Missile Defense Command (SMDC) and US defense contractor TRW have reached a tentative agreement to restructure their contract for development of the US-Israeli Tactical High Energy Laser (THEL). TRW told the SMDC in late May 1999 that it intended to pull out of the project effective 1 June 1999 due to disputes over liability for cost over-runs. Under the original contract, TRW was liable for 100 percent of the cost over-runs. Under the new contract the liability will be split with TRW assuming half the burden and the US and Israeli governments liable for the remaining 50 percent. These terms will be in effect until the THEL achieves its first intercept of a target, following which TRW's liability will be reduced to 25 percent of the total with the rest shared between the United States and Israel. TRW has agreed to provide "a technical data package, a 'predictive avoidance analysis' year 2000 certification and additional data reports" not included under the terms of the original contract. The United States and Israel have spent a combined \$130.8 million on the THEL project, which is designed to provide Israel with a laser system for destroying artillery rockets launched at the country from positions in Lebanon. TRW has spent \$21.5 million on the project, which is expected to cost another \$50 million to complete.

Michael C. Sirak, *Inside the Pentagon*, 2 June 1999, p. 1.

According to Israeli Defense Ministry Director-General Ilan Biran, the Arrow anti-missile system will be on display at the Paris Air Show even though it is not for sale. "The Arrow system is not for sale," Biran said, denying that Turkey and India may be negotiating with the United States and Israel to purchase it. Biran added that Israel hoped to deploy the system between the end of 1999 and the beginning of 2000. Speaking at the event, Israeli Defense Minister Moshe Arens said on 13 June 1999 that the Arrow system could be used to protect not just Israel, but also Jordan, Turkey, and the West Bank from regional ballistic missile threats. Arens said that he has discussed such a possibility with US Secretary of Defense William Cohen and expects the United States to grant Israel approval to sell the Arrow system to other countries. The Paris Air Show marked the debut of the Etrog Zahav (Golded Citron) command-and-control system produced by Israel's Tadiran defense firm. The system is used to manage operations of the Arrow system.

Heidi Gleit, *Jerusalem Post* [Online], <<http://www.jpost.co.il/>>, 8 June 1999; Amnon Barzilai, *Ha'aretz* (Tel Aviv) [Online], <<http://www3.haaretz.co.il/eng/>>, 14 June 1999.

On 15 June 1999, US defense manufacturer Raytheon and Israel Aircraft Industries (IAI) announced they had signed an agreement for joint development of an unmanned aerial vehicle (UAV) based on IAI's Harpy UAV. Israeli Ministry of Defense Director-General Ilan Biran said that the new UAV, dubbed Cutlass, "can serve for hunting down ballistic missile launchers, and for suppressing enemy air-defense systems." Marketing efforts for the Cutlass will reportedly focus primarily on the US military.

Dror Marom, *Globes* (Tel Aviv) [Online], <<http://www.globes.co.il/>>, 15 June 1999.

At the June 1999 Paris Air Show, Israel Aircraft Industries announced that its MABAT division is developing a "next generation" version of its Gabriel anti-ship cruise missile. The new missile will reportedly have over-the-horizon range and, according to MABAT manager Yitzhaq Nisan, "will be

able to penetrate any naval defense system known today."

Arye Egozi, *Yedi'to Aharonot* (Tel Aviv), 15 June 1999, p.5, in FBIS Document FTS19990627001132, 15 June 1999.

Israel Air Force (IAF) Commander-in-Chief Major-General Eitan Ben-Eliahu said that the IAF has successfully completed a three-year initiative to develop means to counter the threat posed to Israel by surface-to-surface missiles. Ben-Eliahu said that the IAF package of measures includes pilot training, force exercises, and "adapting our command-and-control system to run this sort of mission." According to Ben-Eliahu, the IAF conducted training scenarios to combat missile attacks from countries directly bordering Israel and from more distant countries.

Arieh O'Sullivan, *Jerusalem Post* [Online], <<http://www.jpost.com/>>, 28 June 1999.

## JORDAN

### Nuclear

On 13 June 1999, Jordanian King Abdullah and Bahraini Amir Shaykh Hamad Bin Isa Al Khalifa issued a joint communiqué, which "stressed the need to pressure Israel to join the [Treaty on the Non-Proliferation of Nuclear Weapons] and to bring Israeli nuclear establishments into the international inspection and monitoring system."

*Petra* (Amman) [Online], <<http://accessme.com/Petra/>>, 13 June 1999.

## LEBANON

### Nuclear

Lebanese security agents have arrested two men, Fu'ad 'Abduh al-Shuwayri and Butrus Michael Najim, who were allegedly attempting to sell 6 kg of uranium to Syrian nationals with close connections to Iran. Al-Shuwayri told interrogators that he developed a friendship with Syrian national Makram Sukkariyah. While visiting Sukkariyah's Damascus home, al-Shuwayri met Suhayl Lurba, and an engineer known only as Ahmad. Ahmad allegedly told al-Shuwayri that he possessed 6 kg of a radioactive substance, which he would like to sell to people linked with Hezbollah or Iran for \$210 million. Later, al-Shuwayri, Sukkariyah, and Najim met at Lurba's Damascus home.

At Lurba's home, Najim met 'Ali Nayazi Dandash who reportedly had close links with Tehran, and offered to sell him a sample of the uranium. Dandash agreed and Najim then contacted Ahmad to obtain a uranium sample. Najim said that he provided Dandash with the sample in a glass tube wrapped in black adhesive tape. Dandash took the sample to Tehran and returned to Lebanon 45 days later. Upon his return, Dandash told Najim that he would buy the uranium and gave him the glass tube and a check for \$5 million, drawn on the Iran Exports Bank in Beirut, as a down payment. Najim said that before his arrest, Dandash gave him a second check for 400 billion Iranian riyals. Al-Shuwayri and Najim also said that when Dandash returned the glass tube containing the sample to them, the uranium had been replaced by a charcoal-like substance.

*Al-Nahar* (Beirut), 18 March 1999, in FBIS Document FTS19990318001196, 18 March 1999.

In his opening remarks to the eighth gathering of Mediterranean news agencies in Beirut, Anwar al-Khalil, the Lebanese minister of information, stated, "what greater threat can there be in the region than the insistence of the Zionist regime [Israel] on continuing its program of producing nuclear weapons and [weapons] of mass destruction." He asked the participants of the gathering to decide on ways to alleviate the nuclear threats to the region coming from Israel.

IRNA (Tehran) [Online], <<http://www.irna.com>>, 24 June 1999.

## LIBYA

### Nuclear

In March 1998, Russia's Atomenergoexport company and Libya signed an \$8 million deal for partial overhauling of the Tajura nuclear research center near Tripoli. The Tajura nuclear center has a Soviet-built 10-MW research reactor and a staff of 750. The Libyan nuclear program lacks technical expertise, finances, and the support of foreign suppliers. However, this is expected to change with Russian involvement. Libya's Soviet-era plans to purchase an 800-MW nuclear power

station from Russia for \$4 billion may also be revived.

*Foreign Report* (London), 22 April 1999, in Inquisit [Online], <<http://www.inquisit.com>>, 22 April 1999.

### Missile

Russia is planning to sell S-300 surface-to-air missiles (SAM) to Libya. According to Yuri Rodin-Sofa, the president of Oboronitelynyye Sistemy [Defense Systems], the firm that produces the missiles, "since the lifting of the United Nations sanctions against Tripoli, Libya has been placed at the top of the list [of potential buyers]." He added that a proposed comprehensive air-defense package for Libya will be based on S-300PMU-1 and S-300PMU-2 SAM systems. The report in *Al-Hayat* adds that Rosvoorouzhnie, Russia's principal arms export intermediary company, will handle the weapon sales to Libya.

*Al-Hayat* (London), 24 April 1999, p. 6.

## SAUDI ARABIA

### Nuclear

A delegation of Saudi Arabian government officials, led by Prince Sultan Bin-'Abd-al-'Aziz, toured Pakistani nuclear facilities and the ballistic missile development facility on 7 May 1999. The Saudi delegation was accompanied by Pakistani Prime Minister Nawaz Sharif and other Pakistani government officials. The visitors went to the Kahuta research center and the center of nuclear research and the missile and nuclear weapons programs led by A.Q. Khan. Khan briefed Sultan on uranium enrichment processes.

*Al-Sharq-al-Awsat* (London), internet version, 9 May 1999, in FBIS Document FTS19990509000652, 9 May 1999.

In an interview with *Al-Sharq al-Awsat*, Saudi Arabia's Crown Prince Abdullah defended the right of Iran to arm itself. "Iran has every right to develop its defense capabilities for its security without harming others, we also do the same. All countries follow the same policy, then why only Iran is singled out here without mentioning others. Why don't you ask about the Is-

raeli armament and its unlimited weapons development program. If people intentionally neglect such a development they have to review it." According to an article in the *Tehran Times*, "The crown prince even scolded those who target Iran with baseless, vitriolic propaganda, all the while willfully ignoring the immense thermo-nuclear, biological, and chemical arsenals that Israel has amassed illegally."

Reuters (Riyadh), 1 June 1999, in *CNN* [Online], <<http://www.cnn.com>>, 2 June 1999; *Tehran Times* (Tehran) [Online], <<http://www.tehrantimes.com>>, 4 June 1999.

## SOUTH AFRICA

### Nuclear

On 28 April 1999, Russia and South Africa signed an agreement on the formation of a joint intergovernmental committee on trade and economic cooperation, and on the development of mining, and a declaration of cooperation in nuclear energy. This declaration provides for the initiation of contacts between the two countries regarding developing modular helium nuclear reactors. These reactors are considered to be among the safest.

Interfax, 28 April 1999.

The German company HTR GmbH (a joint venture made up of Siemens and Asea Brown Boveri) signed a licensing and cooperation deal with South African energy company Eskom. The deal would give Eskom the right to use high-temperature reactor technology in the construction of small-scale, high-temperature, 100-MW nuclear reactors in South Africa.

SAPA, 11 May 1999, in FBIS Document FTS19990511001423, 11 May 1999.

Nozipho Joyce Mxakato-Diseko, South Africa's permanent representative to the Comprehensive Test Ban Treaty Organization (CTBTO), and CTBTO chairman Wolfgang Hoffman signed South Africa's facilities agreement under the terms of the Comprehensive Test Ban Treaty (CTBT) on 21 May 1999. Signing the agreement brings South Africa into full compliance with the CTBT, making it the first country to reach such status. Construction can now begin in

South Africa of five stations to monitor the ban on nuclear explosions in the region.

SAPA, 21 May 1999, in ANC Daily News Briefing [Online], <<http://www.anc.org.za>>, 21 May 1999.

### Missile

South Africa is reportedly increasing its efforts to sell arms to the Gulf states of the Middle East. George Tait, a spokesman for South Africa's state-owned Denel defense firm, said that Saudi Arabia is anxious to buy surface-to-air missiles and G-6 artillery from South Africa. According to South African Defense Minister Joe Modise, Saudi Arabia is also interested in purchasing unmanned aerial vehicles from South Africa. Speaking at the International Defense Exposition (IDEX) '99 in Abu Dhabi, United Arab Emirates, Tait said that negotiations were underway to sell some of the same systems to Kuwait and Qatar in contracts that could be worth "several millions" of dollars.

SAPA, 16 March 1999, in ANC Daily News Briefing [Online], <<http://www.anc.org.za>>, 16 March 1999.

## SYRIA

### Nuclear

Russian Minister of Atomic Energy Yevgeny Adamov and Ibrahim Osman, director of the Syrian Commission for Atomic Energy, signed an agreement on 18 May 1999 for Russian-Syrian cooperation on peaceful uses of nuclear energy. The agreement provides for cooperation in nuclear energy, science and technology, and commerce for the next 10 years. On 19 May, Osman signed an agreement with the Russian government for the construction of two nuclear reactors in Syria that would be used for peaceful purposes. The agreement was concluded within the framework of the Comprehensive Cooperation Agreement, which the two countries signed in 1997.

IRNA (Tehran), 19 May 1999; *Al-Bayan* (Dubai), 23 May 1999, p. 24, in FBIS Document FTS19990530000096, 23 May 1999.

## TURKEY

### Missile

Turkey and Israel are to start implementing their joint project to produce the Popeye air-to-surface missile. The Israeli-designed

missiles will be produced in Turkey under the direction of an Israeli company. This project will begin immediately after obtaining agreement from the two countries's finance ministries, and will cost approximately \$200 million.

*Al-Khaleej* (Dubai) [Online], <<http://www.alkhaleej.co.ae>>, 10 June 1999.

### Nuclear

Bulgarian customs agents at the Dunav Most checkpoint on the Bulgarian-Turkish border arrested a Turkish citizen on 29 May 1999 after they found a lead container with uranium in his car. According to customs spokesperson Roumyana Kroumova, the suspect was driving a Toyota Corina from Turkey to Chisinau (the capital of Moldova), when his nervousness attracted the suspicion of customs officers at the Bulgarian border crossing. When the officers searched the car, suspecting that the driver might be a drug courier, they found "a certificate for the purchase of uranium 235," and a 2.4 kg lead container with "uranium 235." The report is not clear about the quantity of uranium seized. It says that the exact amount of uranium in the container is unknown, but that "expectations are that it contains the standard 10 g." It also does not specify the level of enrichment of the uranium. Specialists later measured "weak radioactive emissions through the lead walls of the container." The suspect, Uskan Hanifi, a Turkish citizen of Kurdish extraction, told police that he had originally purchased the uranium in Moldova and then taken it to Turkey in an attempt to sell it. After failing to market the material in Turkey, he was driving it back to Moldova at the time of his arrest.

BTA (Sofia), 29 May 1999, in FBIS Document FTS19990529000729, 29 May 1999.

## UNITED ARAB EMIRATES

### Nuclear

The United Arab Emirates (UAE) Minister of Information and Culture Shaykh Abdullah bin Zayed Al-Nahyan, during his visit to Pakistan in May, stated that Pakistan could contribute to the Middle East peace process through their nuclear capabilities. "Islamabad's nuclear capabilities can serve as a catalyst and Pakistan can play a key role in putting tremendous pressure on Israel to

vacate the occupied territories and restore the rights of Palestinians."

Zulfikar Raja, *Gulf News* (Dubai), [Online] <http://www.gulf-news.co.ae>, 27 May 1999.

On 25 May 1999, UAE Minister for Information and Culture Shaykh Abdullah Bin Zayid Al Nuhayyan met with Pakistani nuclear scientist Abdul Qadeer Kahn at A. Q. Khan Research Laboratories in Rawalpindi. Zayid was interested in obtaining Pakistani help in the nuclear field. Khan replied: "Pakistan would not present the atomic bomb or a missile on a platter but could train UAE manpower."

*Pakistan* (Islamabad), 26 May 1999, in Lexis-Nexis [Online], <<http://web.lexis-nexis.com>>, 27 May 1999; *Karachi Jasarat*, 26 May 1999, in FBIS Document FTS19990527000106, 28 May 1999.