

# BALLISTIC, CRUISE MISSILE, AND MISSILE DEFENSE SYSTEMS: TRADE AND SIGNIFICANT DEVELOPMENTS, JULY-OCTOBER 1996

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## CONTENTS

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### AFGHANISTAN

*with:*  
Pakistan, 138

### AFRICA

*with:*  
Ukraine, 138

### AUSTRALIA

*with:*  
Russia and Thailand, 138  
United States, 138

### BELARUS

*with:*  
Russia, 138

### BOSNIA

Internal Developments, 139

### BRAZIL

Internal Developments, 139  
*with:*  
Russia and United States, 139  
United States, 140

### BULGARIA

*with:*  
Russia and United States,  
140

### CANADA

*with:*  
India, 140

### CHINA

Internal Developments, 140

*with:*  
India and Pakistan, 141  
Iran, 141  
Israel, 141  
Pakistan, 141  
Russia and Ukraine, 141  
United States, 142

### CYPRUS

*with:*  
Russia, United Kingdom, and  
United States, 142

### CZECH REPUBLIC

Internal Developments, 142

### EGYPT

*with:*  
Russia, 142  
United States, 142

### FINLAND

*with:*  
Russia, 143

### FRANCE

*with:*  
Russia, 143

### GERMANY

*with:*  
Italy, Netherlands, Turkey, and  
United States, 143

Ukraine, 143  
United States, 144

### GREECE

*with:*  
United States, 144

### HUNGARY

Internal Developments, 144

### INDIA

Internal Developments, 144  
*with:*  
Canada, 140  
China and Pakistan, 141  
Israel, 147  
Russia, 148  
Slovakia, 148

### IRAN

Internal Developments, 148  
*with:*  
China, 141  
Israel, Lebanon, and  
Syria, 149  
North Korea, 149  
North Korea and United  
States, 149  
Russia, 149

### IRAQ

Internal Developments, 150  
*with:*  
Israel, 152

### ISRAEL

Internal Developments, 152  
*with:*  
China, 141  
India, 147  
Iran, Lebanon, and Syria, 149  
Iraq, 152  
Syria, 153  
Turkey, 153  
United Kingdom, 153  
United States, 153

### ITALY

*with:*  
Germany, Netherlands,  
Turkey, and United  
States, 143

### JAPAN

*with:*  
United States, 155

### KUWAIT

*with:*  
United States, 155

### LEBANON

*with:*  
Israel, Iran, and Syria, 149

### MALAYSIA

*with:*  
Turkey, 156

- MISSILE TECHNOLOGY CONTROL REGIME (MTCR) DEVELOPMENTS, 156**
- NETHERLANDS**  
*with:*  
Germany, Italy, Turkey, and United States, 143
- NORTH ATLANTIC TREATY ORGANIZATION (NATO)**  
*with:*  
Russia, 157
- NORTH KOREA**  
Internal Developments, 157  
*with:*  
Iran, 149  
Iran and United States, 149  
Pakistan and Taiwan, 157  
Syria, 157
- NORWAY**  
*with:*  
Russia, Ukraine, and United States, 157
- PAKISTAN**  
*with:*  
Afghanistan, 138  
China, 141  
India and China, 141  
North Korea and Taiwan, 157
- RUSSIA**  
Internal Developments, 158  
*with:*  
Australia and Thailand, 138  
Belarus, 138-139  
Brazil and United States, 139  
Bulgaria and United States, 140  
China and Ukraine, 141  
Cyprus, United Kingdom, and United States, 142  
Egypt, 142  
Finland, 143  
France, 143  
India, 148  
Iran, 149  
NATO, 157
- Norway, Ukraine, and United States, 157  
Singapore, 160  
United Arab Emirates, 160  
United States, 160
- SINGAPORE**  
*with:*  
Russia, 160
- SLOVAKIA**  
*with:*  
India, 148
- SOUTH KOREA**  
Internal Developments, 161
- SYRIA**  
*with:*  
Israel, 153  
Israel, Iran, and Lebanon, 149  
North Korea, 157
- TAIWAN**  
Internal Developments, 161  
*with:*  
North Korea and Pakistan, 157  
United States, 161
- THAILAND**  
*with:*  
Australia and Russia, 138
- TURKEY**  
*with:*  
Germany, Italy, Netherlands, and United States, 143  
Israel, 153  
Malaysia, 156  
United States, 162
- UKRAINE**  
Internal Developments, 162  
*with:*  
Africa, 138  
China and Russia, 141  
Germany, 143  
MTCR, 156  
Norway, Russia, and United States, 157  
United States, 162
- UNITED ARAB EMIRATES**  
*with:*  
Russia, 160
- UNITED KINGDOM**  
*with:*  
Cyprus, Russia, and United States, 142  
Israel, 153  
MTCR, 156
- UNITED STATES**  
Internal Developments, 163  
*with:*  
Australia, 138  
Brazil, 140  
Brazil and Russia, 139  
Bulgaria and Russia, 140  
China, 142  
Cyprus, Russia, and United Kingdom, 142  
Egypt, 142  
Germany, 144  
Germany, Italy, Netherlands, and Turkey, 143  
Greece, 144  
Iran and North Korea, 149  
Israel, 153  
Japan, 155  
Kuwait, 155  
MTCR, 156  
Norway, Russia, and Ukraine, 157  
Russia, 160  
Taiwan, 161  
Turkey, 162  
Ukraine, 162
- WASSENAAR ARRANGEMENT, 163**

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## OVERVIEW

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During the July-October 1996 period, United Nations Special Commission (UNSCOM) inspectors were yet again prevented from examining sites suspected of containing information and materials associated with **Iraq's** prohibited ballistic missile program. In July, it was feared that prohibited materials, including objects that looked like Scud ballistic missiles were removed from a suspect location while the **Iraqis** delayed the inspectors *en route*. According to UNSCOM Chief Rolf Ekeus, **Iraq** conceals banned weapons and materials by transporting them around on trucks and railway cars prior to inspections. Iraq continued to obstruct UNSCOM despite Prime Minister Tariq Aziz's agreement with Ekeus in June to provide unconditional access to all sites the commission wants to inspect. In late August, Ekeus traveled to Baghdad with a U.N. Security Council declaration demanding that **Iraq** provide his inspectors with unrestricted access to military installations in their search for banned materials. Ekeus departed from **Iraq** with assurances that future searches would not be blocked. However, in its semi-annual report to the U.N. Security Council in October, UNSCOM accused Baghdad of "systematically concealing" prohibited weapons and stated that **Iraq** still had to account fully for all of its banned weapons, items, and capabilities in its ballistic missile program.

Also in the Middle East, the joint **Israeli-U.S.** Arrow-2 anti-tactical ballistic missile (ATBM) program made significant headway in July when the Arrow-2 successfully intercepted a Scud-type missile armed with a dummy chemical warhead over the Mediterranean Sea. Encouraged by the successful test, the **Israeli** government may exclude Arrow-2 funding from planned defense budget cuts. Future launches of the Arrow-2 will test the missile's interception capabilities against different targets at various altitudes. The **Israeli** Air Force is scheduled to receive at least 50 Arrow-2 missiles by February 1998, according to **Israeli** sources.

In East Asia, there were indications in October that **North Korea** was preparing for a test flight of the 1,000 km-range No-dong-1 ballistic missile and that **Iranian** officials would be present at the test-site. The **United States** reacted by sending reconnaissance aircraft to monitor the test area and demanding that **North Korea** cancel the test.

In South Asia, **Pakistan** reportedly received blueprints

and equipment from **China** to build an M-11 missile factory in Tarwanah, and there were conflicting reports as to whether the facility will be capable of producing complete missile systems or just their components. Construction of the facility began in 1995. In a related development, the **China** National Precision Machinery Import and Export Corporation may have supplied **Pakistan** with guidance technology as well as chemicals to manufacture solid fuel. In response, the **Indian** Ministry of Defence's 1996 annual report stressed the need for **India** to deploy the Prithvi ballistic missile and to develop the projected 2,500 km-range Agni IRBM in order to counter missile threats in the region. According to the report, advanced weapons in **China** and **Pakistan** and Beijing's missile sales to Islamabad compelled **India** to "remain on guard." The report said that New Delhi will preserve its options to deploy missiles as warranted by national security requirements. Abdul Kalam, director general of **India's** Defence Research and Development Organisation (DRDO), said operational testing of the Agni could begin as soon as the government gave the go-ahead. DRDO officials said the next phase of the IRBM project will involve developing facilities for missile production and an emphasis on operations and extensive exercises.

During a **Missile Technology Control Regime (MTCR)** seminar held during the summer in Washington, D.C., foreign policymakers and specialists from 12 member states and seven non-MTCR countries exchanged ideas on how to impede the transshipment of missile technology. This gathering was followed in October by the 1996 MTCR Plenary Meeting in Edinburgh, **United Kingdom**, where members agreed on steps that could be taken to improve the regime's effectiveness in restricting regional missile proliferation in South Asia and the Persian Gulf. The members also agreed to encourage key non-MTCR transshippers to adhere to regime guidelines, and to give them "practical assistance" in implementing transshipment controls on missile technology. Although the **United States** has judged **Ukraine's** export control policies to be in line with the MTCR, Kiev's inventory of Scud-B missiles prohibits a needed American endorsement for **Ukraine** to join the regime. **Ukraine** is reportedly not prepared to accept the American position that new members must give up their offensive missiles before joining the regime. Meanwhile,

**U.S.** Assistant Secretary of Defense Harold Smith said Washington does not favor a **Ukrainian** suggestion to convert SS-24 ICBMs into space launch vehicles. Smith said the ICBMs are “too expensive to maintain” and should be destroyed. But Stanislav Konyukhov, chief designer at **Ukraine’s** Pivdenmash, said **Ukraine** is not considering destroying its SS-24 ICBMs.

Controversy continued to surround **U.S.** National Intelligence Estimate 95-19 (NIE 95-19) after the General Accounting Office (GAO) released a report which said the estimate was flawed. In November 1995, NIE 95-19 asserted that the **United States** will not be threatened by a new ballistic missile for the next 15 years. According to the GAO, the NIE failed to provide clear judgments, did not identify the basis for its conclusions, and did not examine worst-case scenarios for future missile developments abroad. The GAO said several assumptions were incorrectly presented as fact-based judgments, including the NIE’s assertion that the **MTCR** will “significantly limit” international missile sales and that no country that possesses ICBMs will sell them. The report also contested the NIE’s conclusion that “three unidentified countries” will not attempt to produce long-range ballistic missiles, as well as its estimate that it takes five years to develop an ICBM.

*Wyn Bowen and Kimber Cramer*

**NOTE:**

*A date marked with an “\*” indicates that an event was reported on that date; a date without an “\*” is the date when an event actually occurred.*

*The numbers listed in parentheses following the bibliographic references refer to the identification number of the document in the CNS Missile Database from which the news summaries are abstracted. Because of the rapidly changing nature of the subject matter, **The Nonproliferation Review** is unable to guarantee that the information reported herein is complete or accurate, and disclaims liability to any party for any loss or damage caused by errors or omissions.*

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## AFGHANISTAN

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### AFGHANISTAN WITH PAKISTAN

10/2/96

The Russian newspaper *Nezavisimaya Gazeta* reported that 15 nuclear-capable Scud missiles that were seized by the Taliban militia in Kabul, Afghanistan, could be transported to Pakistan. The missiles are said to be "more-or-less in battle readiness." In the late 1980s, the Soviet Union delivered the missiles to the Najibullah regime in Afghanistan. The Taliban have acquired an unknown number of short-range Luna-M tactical missiles, "which may also fall into the hands of Islamabad."

*Indian Express*, <http://express.india-world.com/ie/10/3/96> (6538).

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## AFRICA

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### AFRICA WITH UKRAINE

10/24/96

Ukraine's ambassador to South Africa, Leonid Guryanov, offered African countries Ukrainian space technology to monitor weather cycles and explore marine resources. Guryanov told delegates at an international trade show that Ukraine was a world famous producer of "certain types of space equipment which is of the highest technological level." Guryanov said many opportunities existed for African countries to use Ukrainian space technology and SLVs to explore the sea shelf and monitor the Earth. According to Guryanov, there was room for greater trade between Ukraine and African countries, including trade in military-related items. Guryanov added that prospects were good for Ukraine to use its rocket and missile building potential in Africa for peaceful and military purposes.

Reuter, 10/24/96; in Executive News Service, 10/25/96 (6668).

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## AUSTRALIA

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### AUSTRALIA WITH RUSSIA AND THAILAND

7/3/96\*

United Communications of Thailand has "taken a 50 percent stake" in a project to construct a satellite launch center at Gunn Point, located north-east of Darwin in Australia's Northern Territory. United Communications plans to buy an interest in Australia's Space Transportation Systems to conduct an \$8 million study to determine the feasibility of building the center, which will be used primarily to launch Russian Proton SLVs. The \$500 million (A\$630) center's equatorial location would increase the Proton's payload capacity for launching communications satellites into geostationary transfer orbit. If the go-ahead is given for the launch center to be built, the Australian government will provide A\$126 million to improve infrastructure in the Northern Territory.

*Flight International*, 7/3/96-7/9/96, p. 21 (6466).

### AUSTRALIA WITH UNITED STATES

8/26/96\*

Australian Defense Minister Ian McLachlan rejected, "on the grounds of cost," a proposal "in the short term" to purchase U.S.-manufactured BGM-109 Tomahawk cruise missiles to arm Australia's new Collins-class submarines.

Australian Broadcasting Corporation Online WWW (Internet), 8/26/96; in FBIS-EAS-96-166, 8/26/96 (6519).

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## BELARUS

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### BELARUS WITH RUSSIA

8/29/96\*

According to the Belarusian Ministry of Defense's press office, S-300 missile crews from the country's 15th Air Defense Brigade departed for Russia to participate in a "tactical and field firing exercise" scheduled to commence in early 9/96. The exercise will be commanded by Lieutenant General Valeryy Kastenka, commander of the Belarusian Air Defense Troops, at the Russian Air Defense Troops testing ground at Ashuluk near Astrakhan. This will be the first large-scale exercise of the National Air Defense Troops.

Belapan (Minsk), 8/29/96; in FBIS-SOV-96-169, 8/29/96 (6542).

9/7/96

Belarusian President Aleksandr Lukashenka arrived in Moscow for an unscheduled meeting with Aleksandr Lebed, secretary of Russia's Security Council, to discuss the removal of Russian missile units from Belarus. According to the Russian Security Council press service, Russian Defense Minister Igor Rodionov was also present at this "working meeting."

Belapan (Minsk), 9/16/96; in FBIS-SOV-96-181, 9/16/96 (6497). Itar-Tass (Moscow), 9/9/96; in FBIS-SOV-96-176, 9/9/96 (6497).

9/13/96

Viktar Sheyman, secretary of state at the Belarusian Security Council, met with Aleksandr Lebed to examine issues related to the withdrawal of Russia's Strategic Rocket Forces (SRF) from Belarus. Lebed noted the importance of establishing an implementation procedure to insure that the last 18 Topol ICBMs are transferred from Belarus to Russia by the end of 1996, under the terms of a bilateral agreement between the two countries. Aleksandr Barkhatov, Lebed's press secretary, said Russia and Belarus agreed that nothing could stop "normal implementation" of this agreement. According to unnamed sources affiliated with Lebed, the establishment of a regional air-defense system was also scheduled to be discussed during the meeting.

Belapan (Minsk), 9/16/96; in FBIS-SOV-96-181, 9/16/96 (6497). Andrey Surzhanskiy, Itar-Tass (Moscow), 9/13/96; in FBIS-SOV-96-179, 9/13/96 (6497).

9/22/96

Russian Public TV reported that Belarusian President Lukashenka said Russia had agreed to partly fund the Belarusian air defense forces. Lukashenka said that he and Russian Defense Minister Igor Rodionov

reached the agreement during the former's trip to Moscow on 9/7/96. The Russian Defense Ministry did not confirm Lukashenka's statement.

OMRI Daily Digest, 9/23/96 (6540).

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## BOSNIA

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### INTERNAL DEVELOPMENTS

10/1/96

Russian Battalion troops from the Implementation Force (IFOR) in Bosnia confiscated hand grenades and 16 SA-12 missiles from Bosnian Muslims in Zvornik, according to "sources close to IFOR." SRNA in Belgrade reported that inhabitants of the neighboring villages of Malesic, Kozluk, and Kiseljak heard two explosions on 10/1/96. An anonymous official from the Bosnian Serb Republic Interior Ministry in Zvornik said the explosions "could have been caused by the destruction of explosive devices confiscated from the Muslims."

SRNA (Belgrade), 10/2/96; in FBIS-EEU-96-193, 10/2/96 (6611).

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## BRAZIL

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### INTERNAL DEVELOPMENTS

7/22/96\*

According to Brazilian Space Agency (AEB) President Luiz Gylvan Meira Filho, Brazil's annual space budget totals between \$120 million and \$130 million. AEB receives approximately 50 percent of this budget to develop the Veiculo Lancador de Satellites (VLS) SLV, the Alcantara Launch Center (CLA), and Brazil's data collection satellites, including the SCD-1 and SCD-2. Approximately one-third of AEB's annual budget is spent on the VLS. After Brazil finishes testing its subsystems within "the next few months," the VLS will either be prepared for launch or undergo a "major redesign." The VLS will probably not be launched until 1997, and the rocket's program managers will iden-

tify a more specific launch date in 8/96. The four-stage VLS is designed to launch a 150 kg satellite to an altitude of 750 km. Four VLS "flight models" are being constructed as part of the rocket's "demonstration program." The rocket's first payload will be Brazil's SCD-3 satellite. Although the VLS project currently does not require infusions of new technology "from anywhere," AEB's acquisition of rocket technology from overseas is no longer a problem because of Brazil's membership in the MTCR.

Peter B. de Selding, *Space News*, 7/22/96-7/28/96, p. 22 (6462).

8/4/96\*

The Brazilian government plans to "resuscitate" the country's weapons industry for exports by improving its technological quality, as well as for guaranteeing basic supplies to the Brazilian Armed Forces. The principal focus of this resuscitation will be Imbel, a public company created in 1975 and connected to the Army Ministry and Avibras Aerospace Industry, a private company based in Sao Jose dos Campos. Avibras' principal export is the truck-mounted Astros-2 artillery rocket system. Avibras also rents its "precision laboratories" for other companies to test products. By keeping Imbel operational, the Brazilian Armed Forces hope to avoid another Engesa situation. Engesa ceased operations in 1995 after the armed forces reduced equipment orders from the company. Brazil's loss of defense trade with Iran and Iraq also contributed to the demise of Engesa.

Sonia Mossri, *Folha De Sao Paulo* (Sao Paulo), 8/4/96, p. 17; in FBIS-LAT-96-153, 8/4/96 (6471).

8/29/96

Brazilian President Fernando Henrique Cardoso said Brazil will launch the first prototype of the VLS "in the next few months" from CLA in the northeastern state of Maranhao. Cardoso said Brazil was "entering [a] cycle favorable to research and construction of technology in the area of space development." Cardoso made his remarks during a ceremony to unveil a 10-year Brazilian space program. During the ceremony, Strategic Affairs Secretary Ronaldo Sardenberg said the ability to plan, build, and

launch satellites will be "an important step in the definition of Brazil in the next century." Brazil hopes CLA's equatorial location will allow the country to profit in the commercial space launch market. Rockets launched from equatorial locations require less fuel to orbit satellites because they benefit from the effect of the Earth's centrifugal forces. Four development flights of the VLS are planned from CLA before the rocket is declared operational. The VLS project has been delayed at various stages over the past 15 years by financial problems and an embargo by the leading industrialized countries. Prior to 10/95, the MTCR countries restricted the transfer of rocket technology to Brazil because of proliferation concerns.

William Schomberg, *Reuter*, 8/29/96; in Executive News Service, 8/30/96 (6672). *Flight International*, 9/11/96-9/17/96, p. 45 (6672).

### BRAZIL WITH RUSSIA AND UNITED STATES

7/22/96\*

Although the Brazilian government has already decided to open CLA to "international use," it has not decided whether the center will be offered for use by a Russian rocket in order to compete directly with the European Space Agency's (ESA) Ariane SLV, which is launched from Kourou in French Guiana. The government still needs to consider several factors, including the daily costs of operating CLA and the political implications of competing directly with ESA. CLA costs approximately \$12 million to operate annually. If CLA were upgraded to handle a "big launch vehicle," significant extra resources would be needed. CLA currently has two pads for launching sounding rockets. One of these pads is being upgraded for use by the VLS. AEB has invited other countries to launch their rockets from CLA because the center will be too expensive to operate if it is used only to launch satellites for domestic purposes. The agency is currently working on the legal aspects of establishing a 15-year lease arrangement with a foreign launch provider.

Peter B. de Selding, *Space News*, 7/22/96-7/28/96, p. 22 (6462).

**BRAZIL WITH UNITED STATES**

**7/8/96\***

A U.S. Commerce Department trade mission will visit Brazil between 11/4/96 and 11/10/96 to discuss SLVs and other space-related technologies. U.S. industry and government representatives with an interest in trading or setting up partnerships with Brazil are being invited to participate in the mission. In 1995, Brazil imported \$584 million worth of U.S. aerospace products, and it has been predicted this figure will rise by the year 2000.

Patrick Seitz, *Space News*, 7/8/96-7/14/96, p. 2 (6468).

**BULGARIA**

**BULGARIA WITH RUSSIA AND UNITED STATES**

**9/13/96\***

The Bulgarian army possesses eight nuclear-capable SS-23 (OTR-23/9M714 'Oka') ballistic missiles. Although the SS-23 missiles are not nuclear-armed, nuclear warheads could have been transferred to Bulgaria from the Soviet Union in 40 minutes during the Cold War. According to Vasil Lyutskanov, the SS-23 missiles belong to Bulgaria and not Russia, and they should not be destroyed as some countries have suggested. During Bulgarian President Zhelyu Zhelev's first trip to the United States, American experts were invited to inspect the SS-23 missiles "to clarify the issue on the spot." Twelve months later, American experts inspected the missiles, and U.S. ambassador to Sofia Hugh Kenneth Hill was shown documents "proving Bulgarian ownership of the eight missile complexes."

Vasil Lyutskanov, *Trud* (Sofia), 9/13/96, p. 10; in FBIS-EEU-96-179, 9/13/96 (6534).

**CANADA**

**CANADA WITH INDIA**

**10/15/96**

The Canadian Space Agency (CSA) and the Indian Space Research Organisation (ISRO) signed a Memorandum of Cooperation (MOC) regarding the peaceful use of outer space for commercial and scientific purposes. According to CSA President W. M. MacEvans, Canada does not subscribe to the US view that India's SLV program was "oriented towards [the] launch of missiles." MacEvans did not exclude the possibility that Canada might eventually use India's Polar Satellite Launch Vehicle (PSLV) or Geo-Synchronous Satellite Launch Vehicle (GSLV). MacEvans added that India and Canada shared an interest in using space to generate economic, scientific, and technological benefits. ISRO Chairman K. Kasturirangan said Canada and India identified a number of areas for cooperation. MacEvans and Kasturirangan said the agreement covered the commercial use of space technology, an area in which CSA has more experience and could help ISRO. Kasturirangan said the MOC was the result of a series of talks between Canada and India, and reflected the view shared by both countries that space systems and technologies should be used to serve mankind.

*Indian Express*, www.indiaworld.com/ie, 10/16/96 (6597).

**CHINA**

**INTERNAL DEVELOPMENTS**

**4/4/96\***

China's Naval Engineering Institute recently completed development of a guided-missile simulation-training system. The system is a result of China's focus, since 1990, on incorporating computer-based technology into strategic units such as the People's Liberation Army's (PLA) Second Artillery Corps,

which is China's strategic missile forces unit, and the PLAN's (PLA-Navy) missile-related forces. The simulation-training system is a computerized, multimedia, multitasking system that enables personnel to program complex combat scenarios, to respond, and then to display the results. The article notes that the use of this technology will save the PLA "millions of yuan" in training costs.

Yang Zhenbo, *Keji Ribao* (Beijing), 4/4/96, p. 2; in FBIS-CST-96-009, 4/4/96 (6560).

**9/9/96\***

An investigation is expected to be completed by 11/30/96 into the 8/96 failure of a Chinese launch vehicle that was carrying a U.S.-made communications satellite. China Great Wall Industry Corp., China's commercial launch service provider, is conducting the investigation. Three panels will investigate the failure: the Investigation Oversight Committee, led by Senior Technical Advisor for the China Aerospace Corp. (CASC) Ren Xinmin; the Failure Investigation Committee, led by Xie Guangxuan, consultant for the committee of science and technology at CASC; and the Failure Analysis Team, led by Fan Shihe, chief designer of the Long March-3 rocket.

*Space News*, 9/9/96-9/15/96, p. 12 (6679).

**10/96**

An International Astronautical Federation (IAF) group toured Chinese space facilities. They learned that China's secret "Project 921," which has been under development by the Ministry of Defense since 1992, is slated to launch two astronauts into space in 1999, celebrating the People's Republic of China's fiftieth anniversary. An unmanned orbital test flight is set for 1998. China has also discussed plans for launching a space station into orbit in 2020. The Chinese Long March-3 (LM-3) is capable of launching 5,000 kg into low orbit, and the upgraded LM-3A can launch 6,900 kg. The LM-3B with liquid strap-on boosters could launch 11,500 kg into low orbit. The IAF group also learned that China is designing an oxygen/hydrogen first stage. China has developed two smaller oxygen/hydrogen upper stage versions, and "believes it has the technology to develop an oxygen/hydrogen rocket engine comparable to the European Vulcain used on the Ariane 5 and Japanese LE-7 used on the H-2." China

is also currently conducting research on large kerosene/hydrogen engines. In late 10/96, a Long March-2D (LM-2D) is expected to launch an FSW-2 satellite from the Jiuquan launch site in the Gobi desert. The FSW-2 is equipped with a camera system that will be used for military reconnaissance and remote sensing. The LM-4 is currently receiving three significant upgrades. The launch vehicle is now capable of launching two payloads into space after the development of a twin-satellite launch system. The first flight of this system will "simultaneously launch the new FY-1C polar orbit weather satellite and a 400 kg magnetospheric research spacecraft" in late 1997 or early 1998. Development is also underway on the third stage of the LM-4. By giving it restart capabilities, the LM-4 will be able to place medium-size payloads (1,000-1,500 kg) into highly elliptical orbits. China hopes to make this system operational by 1998. In addition, the LM-4 is expected to have a larger payload capacity for future missions.

*Aviation Week & Space Technology*, 10/21/96, p. 22 (6680). China News Digest, <http://www.cnd.org:800>, 10/14/96. (6680).

#### CHINA WITH INDIA AND PAKISTAN

7/11/96

Indian Foreign Minister Kumar Gujral told the Indian parliament about evidence that Pakistan had obtained Chinese-made M-11 ballistic missiles.

*Defense News*, 7/15/96, p. 2 (6539).

#### CHINA WITH IRAN

9/3/96

Iran confirmed that an agreement had been concluded with China regarding the acquisition of "heavy and light arms." Unconfirmed reports stated that the deal includes missile launchers, missiles, warplanes, support ships, armored trucks, and transport vehicles. The \$4.5 billion deal was discussed on Iranian Defense Minister Mohammed Foruzandeh's recent visit to China during a meeting with Minister of Defense Chi Haotian. The agreement is expected to be completed in 12/96 and to be paid for with hard currency and oil over a period of five years.

*Washington Times*, 9/4/96, p. A12. IRIB Television Network (Tehran), 9/3/96; in FBIS-NES-96-

173, 9/3/96 (6567).

#### CHINA WITH ISRAEL

8/6/96

Hong Kong customs officials announced that, in 5/96, they found a Sidewinder (AIM-9) short-range air-to-air missile-launcher and two undeclared 700 kg "fighter-training" bombs among the cargo of a China-owned Dragonair shipment from the China National Aero-Technology Import-Export Corporation (CATIC) to Israel. China was returning the launcher and the bombs to Israel after reverse-engineering the U.S. technology. The case against Dragonair for false declaration opened on 9/3/96. Dragonair pled guilty to avoid an investigation into CATIC, and was fined \$80,000. The launcher and the bombs are now the property of the Hong Kong Customs Department, to be used at its training school.

Bruce Gilley, *Far Eastern Economic Review*, 9/5/96, pp.15-16 (6573).

#### CHINA WITH PAKISTAN

4/29/96

Hong Kong customs authorities seized 200 boxes of ammonium perchlorate originating in Xian, China, and bound for Pakistan's Space and Upper Atmosphere Commission (SUPARCO). The shipper, China Ocean Shipping, will appear in court in 12/96 when the case against it for false declaration reopens. The case began on 9/16/96.

Bruce Gilley, *Far Eastern Economic Review*, 10/3/96, p. 20 (6675).

8/25/96

U.S. intelligence officials have concluded that Pakistan is "using blueprints and equipment supplied by China" to build a medium-range missile factory in Tarwanah, a suburb of Rawalpindi. Some analysts say that the factory is a "turnkey" facility capable of constructing entire M-11 missile systems complete with two missile stages, rocket motors, solid-fuel, and guidance systems. Others contend that the facility may produce only M-11 components, and Pakistan will still need to import certain technology, including steel for the bodies of rocket motors and guidance systems. Pakistan may be able to produce major components of the M-11 within two years. There are also reports that

the China National Precision Machine Import & Export Corporation supplied Pakistan with such sophisticated equipment as gyroscopes, accelerometers, and on-board computers, and that Pakistan has already acquired "sufficient quantities of key solid fuel ingredients," such as hydroxy-terminated poly-butadiene (HTPB), fine aluminum powder, ammonium perchlorate, aziridine and RDX to build a missile. U.S. officials have known about the facility since last year, when construction of the factory allegedly began. A recently released U.S. National Intelligence Estimate (NIE) on China's missile-related assistance to Pakistan describes the facility and its purpose. The document states that Pakistan may have developed nuclear warheads which could be fitted on M-11 missiles. U.S. officials say that China and Pakistan may have signed a secret deal a decade ago regarding Chinese assistance in the construction of a Pakistani missile factory, as well as the transfer of approximately three dozen completed M-11 missiles. China's alleged assistance to Pakistan would violate its pledge to observe the provisions of the MTCR, and the United States could impose sanctions on certain exports to China such as electronics, military goods, and space-related equipment.

R. Jeffrey Smith, *Washington Post*, 8/25/96, p. A1 (6621). Hong Kong AFP, 8/27/96; in FBIS-NES-96-167, 8/27/96 (6621). Pravin Sawhney, *Asian Age* (Delhi), 8/27/96; in FBIS-NES-96-168, 8/27/96 (6621). Farhan Bokari, *Defense News*, 8/2/96-8/8/96, p. 58 (6621).

#### CHINA WITH RUSSIA AND UKRAINE

9/96

Chinese engineers attempted to steal SS-18 ICBM blueprints from the Yuzhnoye missile plant in Ukraine. China has been attempting to acquire missile technology from Russia and Ukraine in an effort to improve its ballistic missile fleet. The U.S. intelligence community is concerned that Chinese efforts to purchase components of the SS-18 "could bolster its capabilities in areas such as guidance and MIRV warheads." China currently has seven to 12 Dong Feng-5 (DF-5) ICBM missiles, which are capable of reaching the United States, and 10 DF-4s, which can reach Moscow. Chinese officials say that acquisition of SS-18 technology would improve their space launch systems.

Joseph C. Anselmo, *Aviation Week & Space Technology*, 10/21/96, p. 23 (6596).

## CHINA WITH UNITED STATES

10/30/96\*

A U.S. federal grand jury is investigating whether McDonnell Douglas exercised proper regard for the end-use of factory-sized, metal-shaping machine tools in a sale to the China National Aero-Technology Import-Export Corporation (CATIC) Group. If the grand jury determines that McDonnell Douglas knew that CATIC might divert the machine tools for military use, then the Justice Department may bring formal criminal charges against the company for knowingly violating U.S. export control laws. The machine tools were a \$5 million side agreement reached in early 1994 as part of a \$1.6 billion deal for 40 commercial MD-90 Trunkliner aircraft, half to be built in the United States and half to be built in China. According to the export license, which the United States reviewed in summer 1994, the machine tools were to be delivered to an as-yet-unconstructed machine tool center in Beijing for use in building the aircraft. The dual-use concern with metal-shaping machine tools is that, in addition to shaping aircraft "skins" (the craft's outer metal surface), they are also useful in shaping missile skins. With the dual-use concern in mind, the Commerce Department approved the export license in 9/94 with the requirement that McDonnell Douglas monitor strictly the shipments of the machine tools and progress on the Beijing tool center. In early 1995, four shipments of machine tools arrived in China. According to the export license, all the shipments were to go to Beijing, and two of them did. The other two, however, went directly to Shanghai. It is not clear why McDonnell Douglas did not bring this to the attention of the Commerce Department. By 3/95, it was clear that the Beijing tool center was not going to be built and, in the same month, McDonnell Douglas discovered that China had placed several pieces of the equipment in a newly constructed building at a military facility in Nanchang, 800 mi from Beijing, and only 375 mi from Shanghai. Among other things, the Nanchang facility produces cruise missiles. McDonnell Douglas notified the Commerce Department, which suspended the license in

4/95 and opened an investigation in 11/95. Because of its complexity, the Commerce Department referred the case to the Justice Department. The Justice and Commerce Departments' main concern is that, since the diverted machine tools were shipped directly to Shanghai, CATIC had probably planned the diversion from the beginning. McDonnell Douglas's silence regarding the Shanghai deliveries might have indicated that it was aware of the impending diversion, but, to ensure the success of the main Trunkliner deal, chose to overlook it. Toward the end of the Trunkliner negotiations, CATIC implied that the machine tool side agreement would have "a big influence" on the success of the deal as a whole. Traditionally, Boeing has dominated the Chinese commercial aircraft market; therefore, success of the Trunkliner deal was important to McDonnell Douglas.

Jeff Gerth and David E. Sanger, *New York Times*, 10/30/96, p. A1 (6636).

## CYPRUS

### CYPRUS WITH RUSSIA, UNITED KINGDOM, AND UNITED STATES

9/96

According to unnamed sources, the U.S. and the U.K. sought to stop the Greek Cypriot National Guard from acquiring the Russian S-300 anti-missile system. Unnamed military sources attribute the American and British opposition to fears that the acquisition of the S-300 and "the completion of the military airport in Paphos, which will be accompanied by the permanent presence of the Greek Air Force in Cyprus," will significantly alter the balance of power on the island by destroying Turkey's current air advantage. The same sources have suggested these steps may trigger a Turkish preemptive strike to prevent achievement of these goals. According to unnamed "informants," the National Guard's purchase of the S-300 will proceed as planned, despite efforts by "third parties" to block it.

Ioannis Kharalambidhis, *I Simerini* (Nicosia), 9/18/96, p. 1; in FBIS-WEU-96-182, 9/18/96 (6485). Ioannis Kharalambidhis, *I Simerini*

(Nicosia), 9/5/96, p. 18; in FBIS-WEU-96-173, 9/5/96 (6485). Makarios Dhrousiotis, *O Filevtheros* (Nicosia), 9/18/96, p. 1; in FBIS-WEU-96-182, 9/18/96 (6485).

## CZECH REPUBLIC

### INTERNAL DEVELOPMENTS

7/25/96

The Czech news media reported that the Czech Republic eliminated the last of the SS-23 "Spider" (OTR-23/9M 714 Oka) ballistic missiles it acquired from the Soviet Union. The Czech Republic announced in 1994 that it would eliminate its 24 SS-23 missiles and 4 SS-23 launchers.

*Post-Soviet Nuclear & Defense Monitor*, 7/31/96, p. 3 (6527).

## EGYPT

### EGYPT WITH RUSSIA

8/14/96\*

Egypt is contemplating the acquisition of S-300PMU-1 anti-tactical ballistic-missile (ATBM) systems from Russia. According to sources in the Middle East, Egypt is seeking to increase both its ATBM and tactical ballistic missile capabilities.

*Flight International*, 8/14/96-8/20/96, p. 21 (6484).

### EGYPT WITH UNITED STATES

9/25/96\*

Egypt plans to purchase tactical missiles, aircraft, and fighter-aircraft upgrades worth \$246 million from the U.S. Department of Defense.

*Flight International*, 9/25/96-10/1/96, p. 4 (6474).

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## FINLAND

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### FINLAND WITH RUSSIA

7/24/96\*

Finland is acquiring the Buk-M1 air defense system from Russia and will send approximately 30 anti-aircraft specialists, primarily from the Helsinki Air Defense Regiment and the Armed Services Materiels Institute, to Russia for training. Finland will receive the system as partial payment for the Soviet Union's debt to Helsinki that Russia inherited. Russia will not ship the Buk-M1 until after 11/96, when the training program is to be completed. The Buk-M1 will replace the Pechora defense system that Finland currently deploys to defend Helsinki.

*Helsingin Sanomat* (Helsinki), 7/24/96, p. A5; in FBIS-WEU-96-169, 7/24/96 (6494).

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## FRANCE

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### FRANCE WITH RUSSIA

7/96

The French government helped facilitate the establishment of a Franco-Russian venture called Starsem to market Russia's Soyuz SLV and Europe's Ariane SLV. Starsem will handle commercial and industrial operations for Soyuz SLVs, which will be marketed to launch small satellites into low and medium orbits. The French firms Aerospatiale and Arianespace have 35 and 15 percent shares in Starsem, respectively. The Russian Space Agency (RKA) and Russia's Samara State Research and Production Space Center each have a 25 percent stake. Samara is one of Russia's principal space organizations and is responsible for space station components, orbital capsules, spy satellites, and SLVs. Starsem will be based in the Suresnes suburb of Paris, France. According to Francois Calaque, managing director of Aerospatiale's space business unit and president of Starsem, a number of companies have shown an interest in Soyuz despite having already

signed launch contracts with other firms. Calaque said these firms have anxieties about the credibility of certain SLVs, a problem which the Soyuz does not have. Calaque said that, on average, Starsem intends to conduct five commercial launches every 12 months by the turn of the century. Calaque said Starsem will primarily use the Russian-operated Baikonur Cosmodrome in Kazakstan, and will only launch occasionally from the Plesetsk Cosmodrome in northern Russia. Officials representing French industry and government said they were confident Starsem will not steal business from the Ariane SLV. Calaque said Starsem will not launch Earth observation satellites for European governments unless all of the governments involved agree. At some point, Starsem will seek to manufacture and launch Earth observation spacecraft, as well as participate in the international space station project. RKA's Viktor Kouznetsov will serve as deputy chairman of Starsem. Starsem's final incorporating documents are expected to be filed in Paris in early 8/96, after which Aerospatiale and Arianespace will order Starsem's first Soyuz SLV at an estimated price of \$20 million.

Peter B. de Selding, *Space News*, 7/22/96-7/28/96, pp. 4, 19 (6667). *Aviation Week & Space Technology*, 7/22/96, p. 17 (6667).

9/18/96\*

The French firm Thomson-CSF AirSys is collaborating with Russia's Fakel missile design company to "develop a vertical launch system for the VT-1 supersonic missile used in its Crotale Naval New Generation (CNNG) weapon." Although initial design work on the system has begun, officials from AirSys said the project was still a cooperative venture and a formal agreement between the two companies had not been signed. Fakel will provide assistance for the design of the ejection and tilt sections of the new system, using cold-launch technology that has not been introduced previously in the West. The project will involve the development of a gas generator to "propel the missile above the launch ship's superstructure before it is set on course and its launcher activated." Because the launch system will be "more compact and safer to use," AirSys claims it will constitute an improvement on similar sys-

tems under development by other companies, which require ignition to take place inside canisters on board the ship itself. No figures on the entry into service or cost of the system were made available.

*Jane's Defence Weekly*, 9/18/96, p. 11 (6531).

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## GERMANY

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### GERMANY WITH ITALY, NETHERLANDS, TURKEY, AND UNITED STATES

9/4/96\*

U.S. Army Colonel Daniel Montgomery, program executive officer for air and missile defense, said the Netherlands and Turkey are interested in participating in the Medium Extended Air Defense System (MEADS) program with the U.S., Italy, and Germany. Because it is not clear whether Turkey and the Netherlands are interested in a financial investment in the program, and because the current participants believe the program needs to advance before new participants are accepted, the countries may participate initially as observers. MEADS has faced problems because of France's withdrawal from the program and the lack of strong support from the U.S. Congress. Despite this lack of support, the U.S. Army expects Congress to approve a \$56.2 million request for the MEADS program in Fiscal Year 1997 funds. A trilateral NATO agency has been created to administer the MEADS program from Huntsville, Alabama, and a competition is underway between two teams led by Raytheon/Hughes and Lockheed Martin, respectively, as part of the MEADS definition/validation phase.

Barbara Starr, *Jane's Defence Weekly*, 9/4/96, p. 4 (6557).

### GERMANY WITH UKRAINE

8/23/96

The Ukrainian Defense Ministry said the German government has set aside DM3.5 million to finance the destruction of five nuclear missile silos in Ukraine by the end of 1996. The funds were allocated under the terms of a Ukrainian-German protocol. Ger-

many has given Ukraine DM3.1 million over the past two years to develop environmentally sound technologies for destroying missile silos. Ukraine is scheduled to destroy 36 percent of its missile silos over the next seven years.

Raisa Stetsyura, *Itar-Tass* (Moscow), 8/23/96; in FBIS-SOV-96-166, 8/23/96 (6469).

## GERMANY WITH UNITED STATES

10/23/96\*

Under an agreement with the U.S. firm Lockheed Martin Vought Systems, the German company Dasa LFK-Lenkflugkoerpersysteme will develop a Patriot PAC-3 air-defense system for Germany. The PAC-3 missile will be developed by Daimler-Benz Aerospace and LFK, while Siemens AG will be responsible for system integration and launcher equipment. According to German industry sources, the PAC-3 will include local content, but the extent of U.S. industry involvement has yet to be decided. The German government created a funding plan for the PAC-3 program in its five-year budget. Germany wants to deploy PAC-3 to replace its current Patriot inventory within 12 months of the first U.S. PAC-3 unit equipped. The United States completed the PAC-3's critical design review earlier in 1996 and plans to equip its first unit with the missile by Fiscal Year 1999. At the German Air Defense School at Fort Bliss, Texas, a German Patriot launcher has already been outfitted with a PAC-3 missile enhanced launcher electronics system.

*Jane's Defence Weekly*, 10/23/96, p. 11 (6648).

## GREECE

### GREECE WITH UNITED STATES

8/96\*

The Greek government asked if it can purchase 40 Army Tactical Missile System (ATACMS) battlefield-support missiles, with launching assemblies and support equipment, from the U.S. Army at a cost of \$60 million. ATACMS is produced by Lockheed Martin Vought Systems. In addition, the Greek government asked the U.S. Air Force

for 84 Texas Instruments AGM-88B high-speed anti-radiation missiles (HARM) and 50 Hughes/Raytheon AIM-120B Advanced Medium-Range Air-to-Air Missiles (AMRAAM) worth a total of \$90 million.

*Jane's International Defense Review*, 8/96, p. 13 (6529).

## HUNGARY

### INTERNAL DEVELOPMENTS

8/3/96\*

According to Brigadier General Nandor Gruber, head of the Hungarian Defense Ministry's Defense Management Main Department, Scud missile warheads cannot be destroyed in Hungary, and they will have to be dismantled abroad.

*Baltic Times*, 8/1/96-8/7/96, p. 7 (6591). Peter Matyuc, *Nepszabadsag* (Budapest), 8/3/96, pp. 1, 4; in FBIS-EEU-96-152, 8/3/96 (6591).

## INDIA

### INTERNAL DEVELOPMENTS

7/16/96

Indian Defence Minister Mulayam Singh Yadav said India's self-reliance in defense production is one of the government's top priorities. By 2005, India's 10-year self-reliance plan aims for 70 percent of the country's weapons requirements to be met domestically. Currently, the Defence Research and Development Organisation (DRDO) meets 30 percent of India's defense needs, according to DRDO officials.

Vivek Raghuvanshi, *Defense News*, 7/29/96-8/4/96, p. 46 (6663).

Early 8/96

The DRDO requested the Indian cabinet's approval to begin initial operational testing of the projected 2,500 km-range Agni IRBM.

Vivek Raghuvanshi, *Defense News*, 8/26/96-9/1/96, p. 14 (6690).

8/2/96

Indian Prime Minister Deve Gowda approved the Technology Vision 2020 plan developed by the Technology Information Forecasting and Assessment Council (TIFAC). The plan is designed to promote domestic development of technology in key industrial sectors. In the defense sector, the plan calls for development of high-integrity, real-time software engineering and fusion; modeling and simulation; smart structures; aircraft propulsion; guidance and control; materials and process technologies; signature control; aerodynamics and microelectronics for use in strategic industry; and electronic warfare systems. The plan emphasizes the need to increase India's self-reliance in high-technology weapon systems and defense equipment because of problems the country has experienced in acquiring high-technology from the West. India is a target of Western export control restrictions such as those embodied in the MTCR. The plan did not say how much the program would cost, and it is unclear how the government intends to finance it. TIFAC's plan outlines the current state of technology in India, the government's goals over the next 25 years, and the short- and long-term strategies that will be implemented to accomplish these objectives. To develop the plan, TIFAC spent two years collecting suggestions from 500 experts in industry, government, academia, and the scientific community. TIFAC is an independent institution that was established in 1988 to assess future technologies in fields of particular significance for India, and to monitor India's critical industries.

Vivek Raghuvanshi, *Defense News*, 8/19/96-8/25/96, p. 9 (6687).

8/7/96

DRDO Director General Abdul Kalam gave the Professor Y. Nayudamma Memorial Lecture on Technology Vision at the Indian Institute of Chemical Technology, organized by the Andhra Pradesh Academy of Sciences. Kalam said that by 2005 India would be indigenously producing 70 percent of its military equipment, in contrast to the current 30 percent. Kalam said India's Vision 2020 program envisaged the growth of the country in all areas "from farming to missile technology." According to Kalam, a hi-tech

gallium foundry will be built over the next five years to supply materials needed for the manufacture of India's missiles, aircraft, and other defense equipment. S. L. Nacharyulu, director of the Defence Metallurgical Research Laboratory (DMRL), said that construction had already begun on the gallium arsenide foundry, which is a joint venture between DMRL and the Semi Conductor Complex of Chandigarh. Kalam said India intends to invest in critical technologies and components in order to meet future needs, including "a city-based defense laboratory to develop [a] supercomputer of one gigaflops capacity."

*Indian Express* (Delhi), 8/8/96, p. 9; in FBIS-NES-96-155, 8/8/96 N/A (6602). *Hindu* (Madras), 8/8/96, p. 5; in FBIS-NES-96-155, 8/8/96 (6602).

### 8/8/96

Abdul Kalam requested permission from the prime minister to conduct further development flights of the Agni IRBM. Kalam said there was no chance that India would cancel the project. The two-stage Agni completed prototype testing in 1995.

*Indian Express* (Delhi), 8/8/96, p. 9; in FBIS-NES-96-155, 8/8/96 (6602). *Washington Times*, 8/10/96, p. A7 (6602).

### 8/15/96

Deve Gowda said India would continue developing the short-range Prithvi missile and the Agni IRBM, which the United States has criticized because it believes these programs could increase tensions in South Asia. According to Gowda, India has made headway in its tank, fighter aircraft, and missile programs, including the 250 km-range (140 mi) Prithvi and the 2,500 km-range (1,400 mi) Agni missiles. Gowda said these programs would proceed according to "the earlier determined policy." Gowda said he wanted to assure the Indian people that the country's security needs would be his foremost priority and the Prithvi and Agni programs would continue. Abdul Kalam said India will deploy the Agni IRBM once the government gives the official go-ahead. General Shankar Roy Choudhary, Indian army chief of staff, did not comment when asked if and when the Prithvi missile would be deployed. Indian Foreign Minister Inder Kumar Gujral denied that India would begin testing the Agni IRBM

again after a two-year lull.

Reuter, 8/19/96; in Executive News Service, 8/19/96 (6662). Nelson Graves, Reuter, 8/15/96; in Executive News Service, 8/15/96 (6662). John F. Burns, *New York Times*, 8/17/96, pp. A1, A3 (6662). B. R. Srikanth, *Asian Age* (Delhi), 8/21/96, p. 4; in FBIS-NES-96-163, 8/21/96 (6662). Michael Batty, Reuter, 8/21/96; in Executive News Service, 8/21/96 (6662).

### 8/19/96

The Indian Defence Ministry's 1996 annual report stated that India would continue its missile programs in response to stockpiling by other countries in the region. The report stressed the need for India to keep open its option to deploy the Prithvi ballistic missile and to develop the Agni IRBM in order to counter new missile threats in the region. According to the report, advanced weapons in China and Pakistan and Beijing's sale of missiles to Islamabad compelled India to "remain on guard." The report said New Delhi will keep its options open on deploying missiles as warranted by India's national security requirements. The report emphasized that India must make adequate provisions to counter missile proliferation in the region, despite international pressure regarding its ballistic missile and nuclear weapons programs. According to the report, India must modernize existing conventional weapons and indigenously develop new weapon systems. The report said the Indian Army intends to procure improved multi-barrel rocket launchers. Also, the Integrated Guided Missile Development Project (IGMDP) is making headway and a number of domestically designed corvettes, frigates, missile boats, and survey ships are being built for the Indian Navy. These boats include the most modern communications, propulsion, surveillance, and weapons systems.

Reuter, 8/19/96; in Executive News Service, 8/19/96 (6662). Vivek Raghuvanshi, *Defense News*, 8/26/96-9/1/96, p. 14 (6606).

### 8/20/96-8/21/96

The Nishant unmanned aerial vehicle (UAV), India's first indigenously developed unmanned surveillance aircraft, completed successful flight tests at Kolar, near Bangalore, according to an announcement by the Indian Defence Ministry. The Nishant is designed to conduct reconnaissance of battlefields, including target acquisition. The

Defence Ministry said the test flights demonstrated the UAV's ability to navigate accurately to designated target points for extended missions of several hours to carry electro-optic and photographic payloads. The UAV is being developed jointly by several DRDO laboratories "with the aeronautical development establishment." The ministry said that several significant milestones were reached during the flight tests. The Nishant is scheduled to enter service with the Indian Army in 1998.

*Washington Times*, 8/24/96, p. A7 (6526). *Hindu International Edition*, 8/31/96, p. 16 (6558).

### 8/20/96

Abdul Kalam said the first phase of developmental testing for the Agni had been completed and operational testing could begin as soon as the government gave the go-ahead. The Agni was last tested in 2/94, when it traveled 1,400 km and landed in the Bay of Bengal. Future tests of the 21 m tall, 19 MT Agni will focus on achieving the missile's projected range of 2,500 km. Deve Gowda's government has "in principle" accepted the DRDO's request for \$16.6 million to finance another five flight tests of the Agni. According to senior DRDO officials, the next phase of the project will involve developing facilities for missile production and an emphasis on operations and extensive exercises. Two of Agni's three previous tests were successful, and cost a total of \$11.6 million. A single Agni launch costs \$3.3 million. According to Indian defense scientists, DRDO must test the Agni another six to eight times to perfect the missile's accuracy. DRDO officials said the nuclear-capable Agni can carry a one-ton payload and has a terminal accuracy of 300 m. The Agni consists of a modified Prithvi ballistic missile fitted on top of an SLV-3 satellite launching rocket. According to Indian sources, the Agni project was designated a "technology demonstrator" in response to U.S. missile nonproliferation concerns and pressure. India's All-party Standing Committee on Defence said the government should "expeditiously" re-evaluate the Agni program in response to South Asia's evolving security environment. India is concerned about Pakistan and China, who are modernizing their armed forces at a rapid rate and cooperating in the missile and nuclear fields.

Indian defense chiefs believe the Agni's 2,500 km-range is a significant deterrent against Chinese aggression. According to a report released by the committee, India needs the Agni to counter the threat from Pakistan and China.

Vivek Raghuvanshi, *Defense News*, 8/26/96-9/1/96, p. 14 (6690). Rahul Bedi, *Jane's Defence Weekly*, 9/11/96, p. 21 (6690).

### 8/22/96

*United News* of India quoted Indian Defence Ministry sources as saying that India intends to begin manufacturing three missile systems in 1997. These include the medium-range Akash (Sky) SAM, the short-range Trishul (Trident) SAM, and the third-generation Nag (Serpent) anti-tank missile.

*Washington Times*, 8/24/96, p. A7 (6523).

### 8/26/96\*

Deve Gowda said India will maintain its missile programs and added that the country's IGMDP is proceeding as planned. Gowda said the technology involved has been tested successfully and the decision to operationalize missile systems will be made in the future.

M. D. Nalapat, *Times of India* (Bombay), 8/26/96, p. 11; in FBIS-NES-96-167, 8/26/96 (6500).

### 8/26/96\*

India allocated the largest share of its 1997 space budget, for the period 4/1/96 through 3/31/97, to its satellite launch program, including development of the Geosynchronous Satellite Launch Vehicle (GSLV). The GSLV is designed to launch communications satellites weighing up to 2,500 kg into geosynchronous transfer orbits. The first launch of the rocket is scheduled for 1997 or 1998. The GSLV has a budget of Rs2 billion in 1997, up from Rs1.4 billion in 1996. In 1997, India's project to develop a cryogenic upper stage for the GSLV will receive Rs490 million, down from Rs530 million in 1996. India's Polar Satellite Launch Vehicle project will receive Rs840 million in 1997, while the Vikram Sarabhai Space Center, a space technology research and development facility at Thiruvananthapuram in southern India, will receive Rs840 million. ISRO's Liquid Propulsion Systems Centre (LPSC), which develops auxiliary propulsion systems for satellites and SLVs, and cryogenic and liq-

uid stages for SLVs, will receive Rs236 million. Indian space scientists said ISRO will begin competing commercially in the near future by marketing ground-station equipment, launches of low-Earth-orbit satellites, satellite testing services, and remote-sensing data. Yogendra Alagh, Indian minister of state for science and technology, told parliament that India will launch six additional satellites by 2000, the first of which is scheduled to be put into orbit in late 1996. The first two development launches of the GSLV will be used to orbit experimental communications satellites. The GSAT-1 will be launched in 1997-98, and the GSAT-2 will be launched in "1989-99" [1998-99].

Vivek Raghuvanshi, *Space News*, 8/26/96-9/1/96, p. 9 (6652).

### 9/2/96\*

The DRDO plans to strengthen the country's defense capabilities and to develop a "parallel subsystems manufacturing base" by marketing 1,500 technologies developed specifically for the Indian government. Senior DRDO scientists have identified a number of sophisticated technologies with commercial spin-offs, such as the Slotted Waveguide Array (used in ship-, air-, and land-based radar systems), which has potential as a civilian navigational aid. DRDO's decision to market these technologies is an element of its Atmabodh plan, which is designed to streamline the organization and to assess the market potential of DRDO technologies. Although DRDO established a marketing organization called C-TECH in 1992 to assess this potential, the group has made little progress. According to one DRDO official, the successful sale of Indian defense technology will require the government to provide concessions, permission for exports, and long-term order guarantees. DRDO officials said major progress had been made in the development of a defense technology base, including manufacturing and technical expertise. According to scientists, India continues to confront difficulties in acquiring spare parts. DRDO experts said the government is increasingly aware that India desperately needs to become self-sufficient in the production of sophisticated defense technology and missile systems. According to scientists, the Atmabodh project will con-

centrate on improving India's ability to meet domestically the current and projected needs of the armed forces, including the development of critical systems and technologies that it does not have access to on the international market. The scientists revealed that, as part of DRDO's Component Development program, India developed approximately 25 critical technologies that Western countries have prevented India from acquiring. According to the scientists, India has been denied access by the MTCR states to approximately 150 items and technologies critical to its space and missile programs. The DRDO's self-reliance implementation council supports India's current systems by developing domestic sources for vital spare parts and the upgrades needed for capability enhancements and service-life extensions. In addition, the program reduces India's reliance on importing defense items from abroad. The program's future emphasis will shift to the development of electronic and information warfare technology.

Vivek Raghuvanshi, *Defense News*, 9/2/96-9/8/96, p. 25 (6664).

### 9/12/96

Abdul Kalam said India will conduct one or two more tests of the 250 km-range version of the Prithvi surface-to-surface missile (SSM) before the end of 1996. Kalam did not specify exactly when the test(s) would take place. The DRDO tested the 250 km-range Prithvi on 1/27/96. India is developing this version for the air force. The DRDO has conducted 14 successful tests of the Prithvi SSM, "including two flight trials of the 150 km-range variant." The Indian Army ordered 75 of these missiles, production of which is currently underway. Kalam said the Indian government had not yet taken a decision on the Agni IRBM and added that "we have to decide on using it and how to use it." The DRDO has tested the Agni on three occasions.

Dinesh Kumar, *Times of India* (Bombay), 9/13/96, p. 1; in FBIS-NES-96-180, 9/13/96 (6598).

### 9/26/96

ISRO conducted the 14th and final test of an indigenously designed, 1 MT cryogenic engine at LPSC in Mahendra Giri, Tamil Nadu. The 1 MT engine is a sub-scale version of the 7.5 MT engine to be used in the third

stage of the GSLV. During the successful two-minute test, the engine used liquid oxygen and liquid nitrogen as required for the working version of the engine.

Gayatri Chandrashekar, Doordarshan Television Network (Delhi), 10/7/96; in FBIS-NES-96-197, 10/7/96 (6590). All India Radio Network (Delhi), 10/7/96; in FBIS-NES-96-197, 10/7/96 (6590).

### 10/9/96\*

Military planners in India are considering a significant doctrinal shift that has been influenced by the potential nuclear capabilities of Pakistan and India and the integration of ballistic missiles into the Indian artillery. As a result, the Indian artillery is being re-oriented away from providing combat support for infantry and armored vehicles towards performing direct support and counter-bombardment duties, and "independent operational taskings." India's Field Artillery uses Soviet-designed, 20.4 km-range, 122 mm-caliber BM-21 Grad multiple rocket launchers (MRL) for counter-battery and general support purposes. The DRDO has developed the 40 km-range, 12 barrel, 212 mm-caliber, Pinaka MRL, which is undergoing final user trials and will probably enter service in 1997. India produces ammunition for the Grad and manufactures a 100 kg warhead for the Pinaka rocket. India is currently developing a high-explosive fragmentation warhead and a cluster submunition for the Pinaka. The 150 km-range Prithvi SS-150 SSM is the Field Artillery's longest-range system. The Prithvi has a 1,000 kg payload capability and will equip the newly established 333 Missile Group at Secunderabad. The proposed organization of the 333 Missile Group includes: a missile group headquarters; a meteorological troop; a survey troop; a communications battery; a support sub-group with warhead-change vehicles and missile reloads; and a SSM sub-group with a command post, four Prithvi launchers, missile reload vehicles, a survey section, and a meteorological section. The Field Artillery has attached a high priority to procuring UAVs. India's UAV command posts will be located with the divisional and/or corps counter-bombardment command posts. Because the Indian government has not attached a high priority to acquiring artillery locating radars, the Field Artillery plans to acquire better means for target analysis and standardiza-

tion of maps and computer-based C2 systems.

Pravin Sawhney, *Jane's Defence Weekly*, 10/9/96, p. 35 (6609).

### INDIA WITH:

**Canada, 140**  
**China and Pakistan, 141**

### INDIA WITH ISRAEL

#### 7/30/96

Indian Air Force Chief Satish Kumar Sareen arrived in Israel for discussions with air force officials and representatives from the defense industry. India has begun talks with Israel on a range of upgrade packages for its armed forces. If the negotiations are successful, the resulting deal would end India's reliance on Russian technology and hardware. A deal with India could provide Israeli industry with more than \$400 million worth of contracts to supply sub-systems and technology to upgrade New Delhi's Russian-designed weapon systems. According to Indian sources, the Indian Air Force asked the Tamam division of Israel Aircraft Industries Ltd. to install new integrated tactical inertial navigation and Global Positioning Systems on board its Mirage 2000H and MiG-27M aircraft. Also, the Indian Navy is currently negotiating the purchase of 12 Barak SAMs from the Israeli firm Rafael. The missiles will be fitted on board the warship INS Delhi, which is being built at Mazagon Dock in Bombay. Abdul Kalam visited Israel on 6/29/96 to examine the potential for integrating Israeli technology into India's 20-30-year-old military plants. Israel and India established diplomatic relations in 1992, but the two countries have cooperated on nuclear and defense projects for over three decades, according to Indian and Israeli sources.

Pakistan Link, <http://www.kaiwan.com/~pakistan>, 8/9/96 (6604). Vivek Raghuvanshi, *Defense News*, 8/5/96-8/11/96, pp. 3, 18 (6665).

#### 10/96

According to officials in Jerusalem and New Delhi, Israel was close to concluding negotiations to participate in India's military modernization program. Indian officials said the groundwork was being laid for the Israeli and Indian defense ministers to discuss potential areas for cooperation. According to these

officials, India will try to conclude agreements with Israel on weapons and technology transfer. However, one official in New Delhi said Israeli-Indian relations will be restricted to the "purchase of select equipment with technology transfer." According to P. R. Kumaraswamy, an Indian citizen conducting research at Hebrew University's Truman Institute, conclusion of the talks would allow New Delhi to evaluate Israeli requests to get involved in India's modernization program. A number of Israeli defense firms have marketed defense equipment in India. This equipment has included command, control, and communications systems, electronic countermeasures, radar, and satellite navigation aides. Israel Aircraft Industries and Silver Arrow are competing to sell UAVs to India. Kumaraswamy said the appointment of a defense attaché to the Indian embassy in Tel Aviv will strengthen the military relationship between India and Israel. According to diplomats, since India established complete diplomatic relations with Israel in 1992, the two countries have conducted defense cooperation talks in secret. Both countries have denied that such cooperation has occurred. Kumaraswamy doubted that Israel would be granted contracts for a "significant portion" of India's modernization program because Western firms and new players like South Africa are competing for bids, especially for MiG upgrades. Close ties between India and Russia are an additional obstacle in the way of Israel's expansion into the Indian market. Kumaraswamy said Russia had a considerable advantage, because India hopes to reschedule its estimated \$12-15 billion defense debt to Russia. According to Kumaraswamy, India's close ties with the Muslim world are a further factor working against Israeli interests. Indian experts acknowledge that certain characteristics of Israeli foreign policy make India uncomfortable, including Israel's campaign against Islamic fundamentalism and its close defense relationship with China, which has strong defense ties with Pakistan.

Steve Rodan and Vivek Raghuvanshi, *Defense News*, 10/21/96-10/27/96, p. 27 (6653).

## INDIA WITH RUSSIA

7/96

Defense officials in India and Russia worked to strengthen their bilateral relationship and to negotiate a package of proposals covering weapons technology transfer and the joint production of aircraft. The officials plan to have the package ready for approval by 11/15/96. According to officials, the three-year program could begin in 1997, if approved. Officials in Moscow said Russia may license ordnance technology and aircraft for joint production with India. Co-production of defense equipment would suit the plans of India's new United Front government to strengthen the country's defense industry.

Vivek Raghuvanshi, *Defense News*, 7/29/96-8/4/96, p. 46 (6663).

7/22/96

Rosvoorouzhnie spokesman Valery Pogrebenkov said Russia has solid arms trade links with India, which is one of Russia's two principal customers. Data maintained by Rosvoorouzhnie, the state-run arms export agency, indicates that Russia produced 70 percent of the equipment used by India's armed forces, including 12 Tunguska anti-aircraft systems, 10 MiG-29 fighter aircraft, and 400 MiG-21 fighter aircraft. Moscow and New Delhi have signed military contracts worth \$2 billion, and \$7 billion worth of upgrades are planned through 2000. A senior Rosvoorouzhnie official said co-production was a new element in Russia's relationship with India and could prove very profitable. The official did not specify the type of technology that would be involved. According to Indian officials, a plan under negotiation calls for general military cooperation, including personnel exchanges for training purposes, information exchange, joint military exercises, technology transfer, and the joint production of certain defense equipment. Indian officials said Russia is ready to grant India licenses to produce fighter aircraft and ordnance systems, which could involve the transfer of technology for anti-missile systems, air-defense systems, Su-30 aircraft, ammunition, torpedoes, and other support equipment for land-, sea-, and air-based weapon systems.

Vivek Raghuvanshi, *Defense News*, 7/29/96-8/4/96, p. 46 (6663).

## INDIA WITH SLOVAKIA

10/96

On a two-day trip to Slovakia, Indian President S. D. Sharma obtained a pledge from Slovakian Prime Minister Vladimir Meciar that his country would not sell arms to Pakistan. Because Slovakia inherited most of Czechoslovakia's defense industry following the country's breakup, the Indian delegation was interested in cementing defense links between the two countries "in the matter of spare-parts and equipment." Kuchar, director general of the Political Section of the Slovak Republic's Foreign Ministry, said his country understood India's defense needs and that India was a reliable partner. Sharma's visit produced an agreement to increase scientific and technological cooperation between India and Slovakia, which was signed by Maqbood Dar, India's minister of state in the Union Home Ministry, and Eva Slavkovska, Slovakia's minister of education. The five-year agreement is renewable for three-year periods and provides for the exchange of scientific and technological information, and the establishment of a joint committee to facilitate scientific cooperation. A group of business representatives traveling with Sharma reached agreement with the Slovak Chamber of Commerce on six proposals, including three involving the joint marketing and manufacture of chemicals and pesticides.

Harish Khari, *Hindu*, <http://www.webpage.com/hindu>, 10/11/96 (6603).

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## IRAN

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### INTERNAL DEVELOPMENTS

8/20/96

Iranian President Akbar H. Rafsanjani inaugurated Isfahan's Alloy Steel Complex, which was built by Iranian experts and engineers. The complex is expected to produce 30,000 tons of various types of alloy steel each year. The steel will be used in the defense, aircraft, ship-building, heavy machinery, oil, and gas industries, as well as in construction materials, pipe, moulding, and spring production. Rafsanjani said the Iranian De-

fense Industries Organization (DIO) recognized the need for an alloy steel plant during the war with Iraq, "when some countries refused to sell alloy steel to Iran." Rafsanjani said destroyed artillery and tank scraps will be salvaged from battlefields to be converted to steel in the plant. He added that an additional alloy steel plant is being built in Iran's southern province of Yazd.

*Iran Business Digest*, <http://www.neda.net/ibd>, 8/22/96 (6556).

9/9/96\*

Iranian sources revealed that Iran has initiated a new ballistic missile program code-named the Zelzal ("Earthquake"). Pentagon officials who track Iranian weapons programs said that, although they are aware of Zelzal, Iran's intentions and achievements in missile development "remain unclear." Since 1991, the Zelzal program has produced the solid-fuel Zelzal-1 missile with a range of 100-150 km, and the solid-fuel Zelzal-2 missile with a range of 350-400 km. Both Zelzal-1 and Zelzal-2 "bear some resemblance to known Chinese missiles." Most recently, engineers from Iran's Revolutionary Guard Corps used technology from Russia, China, North Korea, and Germany to design the Zelzal-3 ballistic missile. The Revolutionary Guard Corps is designing the Zelzal-3 to "meet specific Iranian military requirements." The Zelzal-3 is designed to have a range of 1,000-1,500 km and will be capable of striking Israel. Iran hopes to have a prototype available for a test launch by 1998. The Zelzal-3 resembles North Korea's No-dong missile. However, the No-dong is believed to use liquid fuel, while the Zelzal program is based on solid-fuel technology that Iran received from Germany and China. Also, while the No-dong-1 has a range of 1,000 km, and the No-dong-2 has a range of 1,500 km, the range of the Zelzal-3 falls between these two missiles. Although Iranian sources said a major ballistic missile test launch was scheduled in Iran on 8/16/96, these reports have not been confirmed. The Zelzal program is managed by the Self-Sufficiency Department of the Revolutionary Guard, which also oversees several research-and-development facilities throughout Iran, including the factories in Isfahan and Tabriz where the Zelzal-1 and Zelzal-2 are produced. The majority of the

research and development for the Zelzal program is being conducted by the Defense Technology and Science Research Center (DTSRC), a unit of Iran's Defense Industries Organization. DTSRC's main facility is located in Karaj, near Tehran. DTSRC develops guidance systems, propellants, and solid- and liquid-fuel engines, and also conducts "aerodynamics and wind-tunnel studies." The Zelzal program has also been supported by a computer research center in the Lavizan military district north of Tehran and by a missile test facility in the suburbs of Semnan. The Iranian sources report that several problems have delayed the development of the Zelzal-3, including the casting of large, solid-fuel rocket motors, and the manufacture of composites needed for the re-entry vehicle. Chinese experts have been providing assistance in the development of guidance systems and solid-fuel technology for the Zelzal-3, while Russian experts are believed to be providing assistance with the design of the Zelzal. Russian experts are also conducting theoretical classes on composites at DTSRC, Sharif University, Amir Kabir University, and the Science and Industry University. The Iranian sources say that Iran's design of the Zelzal-3 calls for a "rustic" missile, which uses simple guidance components that have been purchased from German and Swiss companies. The Zelzal-3 has a circular error probable (CEP) of 4 km. Information is not available on possible payloads for the Zelzal-3. Iran could develop a radiological warhead using spent nuclear fuel from its U.S., Chinese, and Russian reactors, or it could produce warheads using the biological warfare agents the U.S. Central Intelligence Agency has claimed Iran is producing.

*Iran Brief*, 9/9/96, pp. 1-2 (6520). *Iran Brief*, 10/1/96, p. 3 (6520).

### 9/22/96

The deputy commander of the Naval Forces of the Islamic Republic of Iran in charge of coordination, Second Rear Admiral Mohammed Husayn Shafi'i, told a group of correspondents that Iran is currently working on the design and construction of a destroyer, which will be armed with anti-submarine, anti-surface, and anti-aircraft systems, as well as a missile-equipped heli-

copter. The 1,000 MT, 88 m-long destroyer will be capable of 30 knots. According to the Iranian newspaper *Jomhuri Islami*, Shafi'i said Iran is "conducting research on land, sea and air missiles."

*Resalat* (Tehran), 9/23/96, p. 1; in FBIS-NES-96-191, 9/23/96 (6521). *Washington Post*, 9/24/96, p. 14 (6521).

### IRAN WITH:

#### China, 141

#### IRAN WITH ISRAEL, LEBANON, AND SYRIA

### 8/13/96

Israel's Chief of Staff Lt. General Amnon Shahak informed the Foreign Affairs and Defense Committee of Israel's parliament that Lebanon-based Hezbollah guerrillas may possess 1,000 unguided rockets, most of which were airlifted from Iran via Damascus Airport in Syria. Thirty of the rockets were reported to be Iranian-produced 240 mm-caliber models with a range of 40 km, sufficient to reach the Israeli coastal cities of Haifa and Acre. Some Israeli officials believe the 240 mm-caliber rockets will be launched from more secure sites north of the Israeli-occupied "security zone" in southern Lebanon. Although Lebanese sources were unable to confirm that Hezbollah possessed 240 mm-caliber rockets, the guerrillas have warned they possess longer-range systems. Hezbollah's reported stockpile of 1,000 unguided rockets consists primarily of 120 mm-caliber and 127 mm-caliber models with a maximum range of 22 km, which would allow the guerrillas to hit towns and settlements on Israel's northern border, but not major urban areas. Hezbollah has not launched any Katyusha rockets into northern Israel since 4/27/96, after possibly exhausting its arsenal by launching 750 rockets into northern Israel and the "security zone" earlier in the month. Shahak said that Hezbollah has never possessed as much weaponry before and the guerrillas pose "a significant threat" to Israel.

James Bruce, *Jane's Defence Weekly*, 8/21/96, p. 3 (6475).

### IRAN WITH NORTH KOREA

### 10/16/96\*

Japanese news agency, Jiji, and NHK television reported that North Korea is planning to test-launch a 1,000 km-range No-dong-1 missile into the Sea of Japan. According to Jiji, representatives from the Iranian military were present at the proposed launch site, apparently to observe the missile's performance prior to purchase. There are reports that Iran assisted North Korea with the funding of its No-dong-1 program, and expects to receive 150 No-dong-1s, along with manufacturing equipment, when the program is finished. In 3/96, Commander-in-Chief of U.S. Central Command General Binford Peay stated that Iran was building tunnels along its coast for either the storage or launching of No-dong-1 missiles.

Reuter, 10/16/96 (6561). Nicholas D. Kristof, *New York Times*, 10/22/96, p. A11 (6561).

### IRAN WITH NORTH KOREA AND UNITED STATES

### 6/12/96

The U.S. published its imposition of sanctions against North Korean and Iranian entities for their violation of the U.S. Arms Export Control Act and the Missile Technology Control Regime (MTCR). The sanctions, effective from 5/24/96 to 5/24/98, prohibit U.S. businesses and government entities from engaging in missile-technology-related exports with: Changgwang Credit Company (North Korea), the Ministry of Defense Armed Forces Logistics (Iran), and the State Purchasing Office of Iran.

*Federal Register*, Vol. 61, No. 114, 6/12/96, p. 29785. Pak Tu-sik, *Choson Ilbo* (Seoul), 6/30/96, p. 1; in FBIS-EAS-96-127 (6569).

### IRAN WITH RUSSIA

### 8/27/96

Mehdi Safari, Iran's ambassador to Russia, said that Russia had agreed to help Iran produce and launch the country's first satellite within the next three years. Safari did not comment on the purpose or type of satellite but said that an agreement had been signed, "according to which the technology to build a satellite will be transferred to Iran in three stages."

*Washington Report On Middle East Affairs*, 10/96, p. 31 (6555).

## IRAQ

### INTERNAL DEVELOPMENTS

7/1/96

UNSCOM chief Rolf Ekeus told a news conference in Kuwait City that Iraq may be concealing between six and 16 long-range ballistic missiles capable of delivering conventional, biological, or chemical warheads. Ekeus said Iraq claimed it destroyed the missiles in 1991, but had failed to provide evidence proving this. According to Ekeus, UNSCOM was concerned that Iraq continued to conceal prohibited items and to give the commission false information. Ekeus emphasized that UNSCOM will increase its scrutiny of Iraq if Baghdad does not cooperate. During his visit to Kuwait, Ekeus met with the Emir of Kuwait, Jabir al-Ahmad al-Sabah, Prime Minister Sa'd al-'Abdallah al-Sabah, and several other officials, to discuss recent developments concerning Iraq's WMD program.

*Washington Times*, 7/2/96, p. A12 (6616). Kuna (Kuwait), 7/1/96; in FBIS-NES-96-128, 7/1/96 (6616). Sulayman al-'As'usi, MBC Television (London), 7/1/96; in FBIS-NES-96-128, 7/1/96 (6616). *Al-Quds Al-'Arabi* (London), 7/2/96, p. 15; in FBIS-NES-96-129, 7/2/96 (6616). Reuter, 7/1/96; in Executive News Service, 7/2/96 (6616).

7/96

In an interview with the *Washington Times*, General Wafiq al-Sammara'i, former head of Iraqi external military intelligence who defected to Syria in 11/94, said Iraq possessed approximately 40 Scud SSMs, and not six to 16 as the United Nations Special Commission (UNSCOM) had estimated. Al-Sammara'i said Iraq's Special Security Apparatus purchased 50 flatbed trucks in 7/96 to move physical evidence away from areas where UNSCOM inspectors might discover it. UNSCOM spokesman Ewen Buchanan said the United Nations knew Iraq was using flatbed trucks to conceal banned material. According to al-Sammara'i, Iraq would remain a threat even if UNSCOM eliminated all of its prohibited weapons because the country would retain the manufacturing facilities for them. Al-Sammara'i said he was part of

the Iraqi opposition movement before he defected to Damascus from Iraq. A U.S. government official said that al-Sammara'i was not a central figure in the Iraqi opposition movement and that he was attempting to build a future for himself. However, the official admitted that al-Sammara'i was one of numerous Iraqis the U.S. government consulted about weapons information and that he was "in a position to know a lot of things." The official added that there was a great amount of uncertainty over exactly what Iraq was hiding. In an interview with the London-based *Al-Majallah* newspaper, al-Sammara'i said Iraq might be able to conceal Scud missiles by burying them in containers after detaching sensitive components because "it is not possible to scan the entire territory for radioactivity" using satellites. Al-Sammara'i said many of Iraq's missiles are armed with chemical or biological warheads. Al-Sammara'i told the newspaper that the Soviet Union exported approximately 1,000 Scud missiles to Iraq and the range of these missiles was increased from 300 to 600 km to produce a modified version known as Al-Hussein. According to al-Sammara'i, Iraq later indigenously produced these missiles and their engines. Al-Sammara'i said Iraq's possession of a small number of long-range missiles confirmed Saddam Hussein's desire to possess biological weapons. According to al-Sammara'i, Iraq will be capable of producing long-range missiles once UNSCOM inspectors have been withdrawn from the country for a prolonged period. Al-Sammara'i added that the regime's relations with the Western firms that provided Iraq with WMD-related technology and materials "are essentially there." He added that the Iraqi regime would resume these contacts once the necessary funds became available.

Paige Bowers, *Washington Times*, 7/31/96, p.15 (6617). Ghalib Darwish, *Al-Majallah* (London), 7/28/96-8/3/96, pp. 30-31; in FBIS-NES-96-149, 8/3/96 (6617). Nicole Tannuri, MBC Television (London), 7/7/96; in FBIS-NES-96-131, 7/7/96 (6617).

7/7/96

Wafiq al-Sammara'i told London-based MBC television that Iraq's 40 Al-Hussein missiles are armed with conventional, chemical, and bacteriological warheads, and that Iraq possessed 250 biological shells. He added that

UNSCOM inspectors had approached him more than once, and that the Iraqi opposition movement will do anything "to rescue the region from all these dangers and from despotism."

Paige Bowers, *Washington Times*, 7/31/96, p. A15 (6617). Nicole Tannuri, MBC Television (London), 7/7/96; in FBIS-NES-96-131, 7/7/96 (6617).

7/14/96\*

During an interview in London, Iyad 'Allawi, secretary-general of the Iraqi National Accord Movement, said the Iraqi government continues to hide long-range SSMs and WMD. 'Allawi said Iraq has 13 missiles mounted on board trucks that continually move around Iraq. 'Allawi speculated that a recent dispute between Iraq and U.N. weapons inspectors may have occurred because they had acquired information about one of these missiles. According to the National Accord Movement's military members, Iraq's missiles can be armed with nuclear and biological warheads. 'Allawi said Saddam Hussein is hiding Iraq's missiles for three reasons: to defeat internal military rebellion; to deter or to attack other countries in the region; and to preserve Saddam's remaining mass destruction weapons. According to 'Allawi, the National Accord Movement believes the U.N. inspectors have not found all of Iraq's WMD. 'Allawi said that Iraq may be hiding documents on WMD at locations in Iraq, including houses, and that Saddam is trying to buy time to conceal additional weapons. According to 'Allawi, Iraq's access to weapons technologies could be restricted further if neighboring countries were briefed on Iraq's WMD documents and allowed to examine the remaining weapons threat. 'Allawi said Kuwait, Dhahran, and Riyadh should be more involved because they are vulnerable to Iraq's missiles, while France, the United Kingdom, and the United States are not.

Ghalib Darwish, *Al-Majallah* (London), 7/14/96-7/20/96, pp. 33-34; in FBIS-NES-96-138, 7/17/96 (6582).

7/16/96

UNSCOM inspectors in Iraq were stopped on the road to Saddam Hussein International Airport because they had entered a "presidential area." The team was attempting to

inspect a suspected weapon storage site near the airport, which UNSCOM had first attempted to access in 6/96. Iraq's oil minister, Lieutenant General Mohammed Rasheed, accompanied the team and was allowed to proceed through road blocks but only after the UNSCOM inspectors were delayed for over two hours. It is feared that the Iraqis moved prohibited materials from the suspect site during the delay. According to Rolf Ekeus, Iraq conceals weapons and related materials by transporting them around on railway cars and trucks when UNSCOM inspectors are about to arrive at a suspect site.

UPI, 8/23/96; in Executive News Service, 8/26/96 (6660). Evelyn Leopold, Reuter, 8/22/96; in Executive News Service, 8/26/96 (6660).

#### 7/17/96

Rolf Ekeus said Iraq refused to allow U.N. weapons inspectors to search an installation near Baghdad on 7/16/96. The inspectors had planned to look for remnants and documentation from Iraq's missile and chemical and biological weapons programs at the installation. On 6/22/96, Ekeus and Tariq Aziz, Iraq's deputy prime minister, agreed that U.N. inspectors would be given unconditional access after they were denied entry to several Iraqi sites. According to Ekeus, Iraq claimed it had dismantled all of its prohibited weapons but had failed to present any evidence to prove this.

*New York Times*, 7/18/96, p. A5 (6583).

#### 7/18/96

UNSCOM inspectors called off their mission after they were refused access to the installation near Baghdad for 60 hours. In response, U.N. Security Council President Alain Dejammet ordered Nizar Hamdoon, Iraq's delegate to the United Nations, to account for his country's actions for the second time in a week.

*New York Times*, 7/18/96, p. A5 (6583). *New York Times*, 7/20/96, p. A4 (6583).

#### 7/19/96

The U.N. Security Council ordered Iraq to grant UNSCOM unrestricted access to its weapons facilities. Iraq claimed the inspectors were not obstructed from searching the facility near Baghdad, and they were only barred from using a presidential highway to reach it. Rolf Ekeus said the United Nations

had established a special mission to study the techniques used by Iraq to hide weapons.

*New York Times*, 7/20/96, p. A4 (6583). *New York Times*, 7/23/96, p. A4 (6583).

#### 7/22/96

Nikita Smidovich, a Russian ballistic missile expert, and his team of 34 UNSCOM inspectors departed from Iraq.

*New York Times*, 7/23/96, p. A4 (6583).

#### 8/23/96

The Security Council issued a statement in support of Ekeus and his weapons inspectors prior to a scheduled visit to Baghdad. Ekeus will be accompanied by Nikita Smidovich who led most of the teams that have been in standoffs with the Iraqis. The statement said Iraq must provide UNSCOM with "immediate, unconditional and unrestricted access to any and all areas, facilities, equipment, records and means of transportation which they wish to inspect, and Iraqi officials whom they wish to interview." According to the statement, the Security Council was very concerned that Iraq had failed repeatedly to meet its obligations under the terms of the U.N. resolutions related to the 1990-91 Gulf War. Ekeus said he did not believe Iraq's claim to have destroyed the missile, chemical, biological, and nuclear items that remain unaccounted for. The Security Council warned Baghdad that only complete compliance with its weapons obligations would result in the lifting of sanctions that were imposed on Iraq after the 1990-91 Gulf War.

UPI, 8/23/96; in Executive News Service, 8/26/96 (6660). Evelyn Leopold, Reuter, 8/23/96; in Executive News Service, 8/26/96 (6660). Evelyn Leopold, Reuter, 8/22/96; in Executive News Service, 8/26/96 (6660).

#### 8/26/96

Rolf Ekeus traveled to Baghdad with a Security Council declaration demanding that Iraq provide U.N. weapon inspectors with unrestricted access to military installations in their search for prohibited materials. UNSCOM inspectors complained previously that Iraq prevented them from searching several installations and disrupted interviews on weapons issues. According to U.N. officials, the first series of confrontations reached a crisis point when Iraqi anti-aircraft guns tracked a

U.N. helicopter in an effort to prevent it from inspecting a suspect installation.

AFP (Paris), 8/28/96; in FBIS-NES-96-169, 8/28/96 (6658).

#### 8/28/96

Rolf Ekeus departed from Baghdad and told reporters in Bahrain he had received assurances that Iraq would not block future searches. Ekeus said he discussed helicopter operations and the movement of inspectors with the Iraqis, as well as measures "on how to proceed with interviews." According to Ekeus, UN ballistic missile and chemical and biological weapon experts will travel to Iraq in 9/96 to test Baghdad's pledge to refrain from hindering the activities of UNSCOM.

AFP (Paris), 8/28/96; in FBIS-NES-96-169, 8/28/96 (6658).

#### 9/96

'Abd-al-Baqi al-Sa'dun, a member of the Regional Command of the 'Aflaqite [Ba'th] Party in Iraq, said the Iraqi regime had positioned long-range missiles with chemical warheads in Diyala Governorate in order to launch them against Kuwait "if Iraq faces a direct threat from the U.S." The missiles are mounted on trucks and are constantly on the move to avoid U.S. air-strikes. Al-Sa'dun made these remarks at a private meeting of leading figures of the regime's party in al-Basrah and al-Nasiriyah Governorates. Al-Sa'dun added that during the war with Iran, Iraq had a similar plan to launch missiles armed with chemical warheads against Tehran if Iranian forces reached Baghdad. According to sources from the Islamic revolution mujahedin in al-Basrah, trailers carrying surface-to-surface missiles set up camp north of al-'Amarah along with the 130th Artillery Brigade. The sources said Republican Guard armored units and several missile launchers had been deployed in the Gulf area in Umm Qasr District, and some units had been moved to Sanam Mountain on Iraq's border with Kuwait.

Voice of Rebellious Iraq (Clandestine), 9/16/96; in FBIS-NES-96-182, 9/16/96 (6546).

#### 9/3/96

The Security Council voted to maintain economic sanctions against Iraq after Rolf Ekeus reported that Baghdad had given the com-

mission "conscientiously misleading statements" on the concealment and movement of documents related to its proscribed weapons programs. According to Ekeus, Iraq's Deputy Prime Minister Tariq Aziz admitted that Iraq had concealed and moved documents. Ekeus informed the council he was not satisfied that Iraq had disclosed everything about its long-range missiles, its chemical and biological weapons programs, and the related documentation.

Anthony Goodman, Reuter, 9/3/96; in Executive News Service, 9/4/96 (6659).

#### 10/11/96

Rolf Ekeus submitted UNSCOM's semi-annual report on Iraq's missile and WMD programs to the U.N. Security Council. According to the report, Iraq has still not fully accounted for all of its banned weapons, items, and capabilities in its ballistic missile program. U.S. intelligence officials said they concurred with this assessment of Iraq's missile program. UNSCOM accused Iraq of "systematically concealing" proscribed weapons. In recent months, Iraq prevented U.N. weapons inspectors on several occasions from inspecting suspected weapons-related installations under control of Iraq's Special Republican Guard. According to the report, U.N. inspectors were delayed while unidentified items, including "objects resembling Scud ballistic missiles," were removed from these installations on trucks. In 7/96, UNSCOM inspectors saw a convoy of trucks leave a Special Republican Guard installation carrying what the Iraqis admitted looked like prohibited Scud missiles. According to the report, Iraq did not allow UNSCOM to inspect the objects in question. The report said UNSCOM "continues to believe that limited but highly significant quantities (of arms) may remain, as Iraq has not been able to account for a number of proscribed missiles and certain high-quality chemical warfare agents." The report said UNSCOM had destroyed 48 operational missiles, six mobile missile launchers, 14 conventional warheads, and other equipment. However, the report said Iraq's policies and actions of concealment had impeded the rapid implementation of UNSCOM's objectives. Ekeus said he thought most of Iraq's missiles had been found, although the accounting pro-

cess had not been completed.

Evelyn Leopold, Reuter, 10/11/96; in Executive News Service, 10/15/96 (6657). R. Jeffrey Smith, *Washington Post*, 10/12/96, p. A25 (6657). *Washington Times*, 10/12/96, p.A8 (6657).

#### 10/21/96

At the end of a three-day trip to Baghdad, Ekeus said Iraq did not provide any new information on its weapons programs. However, Ekeus said the Iraqis agreed to discuss the issue of prohibited weapons that remain unaccounted for. According to Ekeus, UNSCOM had neutralized Iraq's ballistic missile program, but had yet to account for "hopefully not more than 16 missiles." Ekeus met with senior Iraqi officials in Baghdad, including Deputy Prime Minister Tariq Aziz, Foreign Minister Mohammed Saeed al-Sahaf, presidential advisor General Saadi Tu'ma Abbas, and Oil Minister Mohammed Rasheed, who previously headed Iraq's Military Commission. According to UNSCOM Deputy Chief Charles Duelfer, Iraq's disclosures since its 6/96 pledge to provide the commission with unrestricted access to suspected weapons sites have been "flawed and incomplete." Baghdad submitted nine letters to UNSCOM in an attempt to clarify these issues.

Hassan Hafidh, Reuter, 10/21/96; in Executive News Service, 10/21/96 (6656). Leon Barkho, Reuter, 10/20/96; in Executive News Service, 10/21/96 (6656). *Washington Times*, 10/22/96, p.12 (6656).

#### IRAQ WITH ISRAEL

##### 9/3/96

After a series of meetings with Israeli Defense Minister Yitzhak Mordechai, the Israeli defense establishment determined there was a low probability that Iraq would attack Israel with Scud missiles. This conclusion was based on repeated declarations by Saddam Hussein that Iraq does not possess Scud missiles or launchers. If Iraq launched Scuds at Israel, this would prove that Saddam Hussein had lied about his missile capabilities to the U.N., and would damage his chances of improving his status within the international community. An unnamed "senior defense establishment source" said Iraq was capable of firing Scud missiles but "the assessment is that this capability is very low." According to the source, Israeli intelligence

is monitoring the situation in Iraq and the Israeli Air Force is on normal alert status. The Israeli defense establishment instituted "a series of technical steps" to ensure that Israel will not be taken by surprise in the event of a Scud missile attack, according to a senior Israeli defense official. Also, Israel now has direct access to data from U.S. satellites to provide early warning of any missile attack. The direct line from the satellite sensor will increase Israel's warning time if Iraq launches Scud missiles against Israel. Israel had been denied direct access to this information in the past. During the 1990-91 Gulf War, Israel received early warning information on Iraqi missile launches from U.S. satellites via Washington, where the data was stored and then transmitted through normal communications channels. This process was time consuming.

Eytan Rabin and Amnon Barzilay, *Ha'aretz* (Tel Aviv), 9/4/96, p. A1; in FBIS-NES-96-172, 9/4/96 (6522).

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## ISRAEL

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#### INTERNAL DEVELOPMENTS

##### 7/96\*

Rafael's Moab missile is designed to be part of the Israeli Boost-phase Intercept System (IBIS), which is intended to intercept theater ballistic missiles (TBMs) shortly after launch using missiles mounted on board UAVs flying at high altitudes. The Moab will have a range of 100 km when fired from an altitude of 50,000 ft and a range of 80 km when fired from 30,000 ft. The Moab will be based on Rafael's Python-4 air-to-air missile, but will incorporate a new booster to accelerate the round to a velocity of 1.5-2 km/s. Sources at Rafael said that existing technology has been taken to its limits to develop a system capable of destroying TBMs at a reasonable cost. Because the speeds of engagement will be kept just below the aeroheating threshold, the Moab will not need a protective cap and it will not be necessary to cool the infrared seeker or dome. Costs will be kept down because the Moab locks onto its target after launch and does not require a datalink. Pro-

duction of the Arrow anti-tactical ballistic missile system recently took priority over the Moab project. The U.S. Ballistic Missile Defense Organization is currently giving the Israeli firm Wales further funding to initiate a "risk-mitigation effort for IBIS as a whole." This decision resulted from a recent U.S.-Israeli agreement on ballistic missile defense. Wales will produce prototypes of critical subsystems for demonstration, including components of the UAV, Moab, search-and-track sensors, and the related command, control, communications, and intelligence systems.

*Jane's International Defense Review*, 7/96, p. 5 (6584).

### 7/11/96

Doron Rotem, general manager of Tamam, a division of Israel Aircraft Industries' (IAI) Electronics Group, announced that the company is looking to export electro-optical systems and payloads developed by the Tadiran Systems Division, which IAI purchased on 6/16/96. Products offered will include a wide range of sensors and observation systems for UAVs, helicopters, aircraft, and other platforms. The acquisition of Tadiran provides Yehud-based Tamam with products such as long-range standoff systems, the Moked family of payloads used on the Pioneer UAV, and the Night Targeting System used on the U.S. Marine Corps AH-1W Cobra attack helicopter. In 1995, more than 60 percent of Tamam's \$120 million total product sales came from exports of electro-optic products. Tadiran's annual sales of electro-optic products since 1990 have totaled approximately \$5 million.

*Defense News*, 7/29/96, p. 40 (6473).

### ISRAEL WITH:

**China, 141**

**India, 147**

**Iran, Lebanon, and Syria, 149**

**Iraq, 152**

### ISRAEL WITH SYRIA

#### 8/19/96

Israeli Channel Two television reported that Syria tested a Scud-C missile several weeks earlier with the objective of confirming the Syrian Army's ability to perform an operational launch. According to Channel Two,

the 600 km-range Scud-C can carry a payload of 500 kg and is capable of attacking heavily populated areas in Israel. The station reported that Syria has 20 Scud-C launchers, hundreds of Scud-C missiles, and the capability to manufacture them. An Israeli military spokeswoman said she was not aware of any Syrian missile tests. According to Israeli Prime Minister Benjamin Netanyahu, Syria is attempting to produce Scud missiles indigenously instead of buying them from foreign suppliers. Netanyahu said Syrian-produced Scuds have the same capabilities as those produced elsewhere. Avihu Bin Nun, former commander of the Israeli Air Force, said Syria's missile tests were routine. Israeli Cabinet Secretary Dani Nave said Syria's Scud-C missiles do not affect the strategic balance because the Scud-C program dates back several years.

Reuter, 8/19/96; in Executive News Service, 8/20/96 (6618). Sami Aboudi, Reuter, 8/20/96; in Executive News Service, 8/20/96 (6618). Colleen Siegel, Reuter, 8/20/96; in Executive News Service, 8/20/96 (6618). Avi Lipschitz, IDF Radio (Tel Aviv), 8/21/96; in FBIS-NES-96-163, 8/21/96 (6618). Kinda Jayoush, Reuter, 8/21/96; in Executive News Service, 8/21/96 (6618). Reuter, 8/19/96; in Executive News Service, 8/21/96, (6618).

### ISRAEL WITH TURKEY

#### 8/96

The election of a Muslim government in Turkey threatened to derail approximately \$1 billion worth of defense contracts between Turkey and Israel. David Ivry, director general of the Israeli defense ministry, postponed a visit to Turkey at which he was scheduled to sign a cooperation agreement between the Israeli and Turkish defense industries. Israel is now reconsidering any transfer of advanced weaponry because of the Turkish government's moves to forge a closer relationship with Iran. In addition, Israel's election of a right-wing government could affect future defense cooperation between the two countries. Prior to the election of the new government in Turkey, Israeli-Turkish relations had improved to the point where the Israeli air force was conducting training exercises in Turkish airspace. In addition, Turkey had awarded the Israeli firm Rafael a \$50 million contract for Popeye stand-off missiles. Also, Israel and Turkey were discuss-

ing the sale of Rafael's Python-4 infrared guided missiles and upgrading Turkey's Northrop F-5 aircraft. Israel is currently working out the financial details of a \$600 million contract to upgrade the Turkish Air Force's McDonnell Douglas F-4 Phantom aircraft. The Turkish armed forces, particularly the air force, support the establishment of closer ties with Israel.

*Flight International*, 8/28/96-9/3/96, p. 8 (6576).

### ISRAEL WITH UNITED KINGDOM

#### 10/2/96\*

Senior officials from the Israeli firm Rafael and the Israeli defense ministry held secret talks with their counterparts in the United Kingdom. As a result of these talks, Rafael may be hired as a subcontractor for the production of the U.K.'s cruise missile of the future. Rafael previously lost a bid to develop and supply the missile itself. Rafael offered the British Ministry of Defence an advanced version of its Popeye air-to-surface missile, which is operational in both Israel and the United States. In part, Rafael failed to win the contract because it did not sign a production and cooperation agreement with a British company before the winner was announced. During the talks, it was agreed that British Aerospace (BAe), which won the cruise missile contract, would draw up a comprehensive framework for industrial cooperation with Rafael. As part of the plan, Rafael may receive contracts to develop and supply assemblies, which could be worth around 18 percent of the deal. In addition, Rafael will market its products in Europe and other countries with the assistance of BAe, and both firms will cooperate in related fields. The Israeli and U.K. representatives discussed several new projects during the talks. Officials from the U.K. expressed their dissatisfaction regarding the "lack of balance in defense exports between the two countries," claiming that Israel sold eight times as much weaponry to the U.K. than it bought over the past two years.

Sharon Sade, *Ha'aretz* (Tel Aviv), 10/2/96, p. A10; in FBIS-NES-96-193, 10/2/96 (6650).

### ISRAEL WITH UNITED STATES

#### 7/14/96

Israeli Prime Minister Benjamin Netanyahu said Israel and the United States had agreed

“to develop and implement an early warning system in Israel against ballistic missiles.” Netanyahu made his comments on his return from a trip to the United States. Netanyahu also announced that Israel and the United States had set a date for the joint development of the Nautilus laser system designed to intercept Katyusha-type rockets.

Qol Yisra'el (Jerusalem), 7/14/96; in FBIS-NES-96-136, 7/14/96 (6586).

### 7/16/96

Benjamin Netanyahu told his cabinet about the agreement under which Israel will obtain data from U.S. satellites to provide early warning of ballistic missile launches against Israel. According to Netanyahu, U.S. President Bill Clinton said Israel should be linked to the U.S. satellite system by the end of 1996.

Qol Yisra'el (Jerusalem), 7/14/96; in FBIS-NES-96-136, 7/14/96 (6586). Government Press Office (Jerusalem), 7/16/96; in FBIS-NES-96-138, 7/16/96 (6586).

### 8/12/96\*

The U.S.-Israeli project to develop a portable, high-energy laser for destroying short-range artillery rockets was accelerated when Israel contributed \$22 million and pledged another \$7.5 million in funding for the project. The U.S. Congress pledged additional funds in the next fiscal year. The Israeli funds will finance the initial costs of an \$89 million contract that was awarded to TRW Inc. by the U.S. Army in 7/96 for the development and testing of a single Tactical High-Energy Laser (THEL) demonstrator. THEL is planned as a follow-on to the stationary U.S.-Israeli Nautilus system.

Joseph C. Anselmo, *Aviation Week and Space Technology*, 8/12/96, p. 31 (6619). *Flight International*, 7/10/96-7/16/96, p. 20 (6619). *Jane's Defence Weekly*, 7/10/96, p. 3 (6619). *Flight International*, 7/31/96-8/6/96, p. 18 (6619).

### 8/19/96\*

The U.S. firm Lockheed Martin Electronics and Missiles initiated a joint venture with Israel's Rafael to market the AGM-142 “precision guided air-to-ground missile.” The Israeli Air Force already deploys a version of the AGM-142 called Popeye. Lockheed Martin and Rafael have equal stakes in the new venture which is called Precision Guided Systems US (PGSUS), a limited liability com-

pany. Lockheed Martin and Rafael are considering production of a 2,500 lb Have Lite version of the AGM-142 for use on board U.S. F-16 and F/A-18 fighter aircraft, and a Popeye-2 version to equip fighter aircraft from other countries. Israeli F-4 and F-15 fighters and U.S. B-52H bombers are already fitted with the standard 3,000 lb version of the missile. In 1988, Lockheed began producing approximately 10 percent of all AGM-142 missiles under license from Rafael. The U.S. Air Force also designates the AGM-142 as the Have Nap.

James T. McKenna, *Aviation Week & Space Technology*, 8/19/96, p. 88 (6477).

### 8/20/96

The joint U.S.-Israeli Arrow-2 anti-tactical ballistic missile (ATBM) successfully intercepted a Scud-type missile, equipped with a dummy chemical warhead that had been launched from a ship in the Mediterranean Sea. According to Israeli Defense Ministry officials, the Arrow-2 was fired from an Israeli airbase south of Tel Aviv, four minutes after the target missile was launched. The Arrow-2 “tracked, struck and destroyed a Scud-type target missile” over the Mediterranean Sea. Video footage showed that the Arrow-2 traveled for most of its flight at a speed of approximately Mach 5, and Israeli officials said the missile accelerated to a “closing velocity” of eight times the speed of sound. The Arrow-2 intercepted the target “just under 30 km at a range of 50 km from the launch site.” The test represented the first time a missile has been intercepted at such speeds and altitudes. The Green Pines radar system was used to track the Arrow-2 and the target missile. This was the third test launch of the Arrow-2. However, it was the first of four launches in which the Arrow-2 will attempt to intercept actual targets. The Arrow-2's homing sensors are designed to detect the target and direct the interceptor missile to within range of its fragmentation warhead. According to Pam Rogers, spokesperson for the U.S. Army air and missile defense program, “metal hit metal” during the test. Following the successful launch, officials from the U.S. and Israel disagreed on the future development of this joint U.S.-Israeli program. Joseph Butler, U.S. manager of the Arrow project,

said that he wanted to “consider skipping several tests” and to focus instead on “developing an entire operational anti-missile defense system.” Butler said little remained to be proved about the missile's capability and, after one more successful test, the program could focus on the entire system. However, Israeli defense sources were skeptical about speeding up the program, despite the intention of Israeli officials to complete the Arrow-2 system by 2000. An Israeli defense source said that one or two launches would not be sufficient to complete this stage of the Arrow-2 program. Butler said future launches of the Arrow-2 will test the missile's interception capabilities against different targets at various altitudes. The next launch of the Arrow-2 may take place in 11/96. If this test is successful, the U.S.-Israeli Arrow-2 team may focus efforts on the entire system.

Steve Rodan, *Washington Times*, 8/21/96, p. A12 (6512). Barbara Opall, *Defense News*, 9/2/96, p. 24 (6512). *Jane's Defence Weekly*, 8/28/96, p. 19 (6512). *Flight International*, 9/4/96-9/10/96, p. 32 (6512). Barbara Opall, *Defense News*, 7/22/96, p. 6 (6512). Steve Rodan, *Defense News*, 8/26/96-9/1/96, p. 4 (6533).

### 8/26/96\*

The U.S. Congressional Budget Office suggested in its annual report that \$3.5 billion could be saved over six years if the United States ended its funding for Israel's Arrow ATBM program, and terminated the Navy Upper Tier anti-missile system and the space-based Brilliant Eyes tracker.

James R. Asker, *Aviation Week & Space Technology*, 8/26/96, p. 19 (6481).

### 8/28/96

Israeli Arrow program officials told U.S. Army Lieutenant General Lester Styles, director of the U.S. Ballistic Missile Defense Organization (BMDO), that the Arrow's systems and the warhead's fuzing mechanism functioned properly during the test on 8/20/96. Israel Defense Minister Yitzhak Mordechai said the launch puts Israel “in the global front of technological know-how.” Encouraged by the successful test, the Israeli government may exclude the Arrow-2's funding from budget cuts and has designated the system as a high priority for prototype development, according to Israeli sources. IAI is beginning advance production of the

Arrow-2 at its Lod production facility and plans to commence serial production by 8/97. According to Israeli sources, the Israeli Air Force should receive at least 50 Arrow-2 missiles by 2/98.

Steve Rodan, *Washington Times*, 8/21/96, p. A12 (6512). Barbara Opall, *Defense News*, 9/2/96, p. 24 (6512).

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## ITALY

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### ITALY WITH:

Germany, Netherlands, Turkey, and United States, 143

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## JAPAN

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### JAPAN WITH UNITED STATES

7/96\*

The United States will supply the Japanese Defense Agency (JDA) with data from its missile warning satellites as an incentive for Japan to participate in a joint anti-missile warning system. The U.S. Department of Defense (DOD) wants Japan to participate in a theater missile defense (TMD) system, which the United States suggested in 1995 following North Korea's launch of a No-dong-1 ballistic missile into the Sea of Japan. According to officials in Tokyo, Japan would have to spend ¥1 trillion—20 percent of the country's annual defense budget—to fully deploy such a system. Beyond this financial aspect, Japan will need to consider the fact that some advanced TMD technologies have yet to be proven, China opposes U.S.-Japanese TMD cooperation, and the risk that TMD technologies might proliferate to countries such as China, South Korea, and Russia.

*Indian Defence Review*, 7/96-9/96, p. 77 (6608).

7/17/96

The U.S. DOD informed Congress that it plans to enhance Japan's SM-2 Block II Standard SAMs to the Block III configura-

tion.

*Flight International*, 7/17/96-7/23/96, p. 14 (6470).

8/7/96-8/8/96

Officials from the Japanese Foreign Ministry and the JDA were scheduled to meet with officials from the U.S. DOD in Washington, D.C., to discuss the proposed TMD system. The working-level meeting is the sixth in a series held since the TMD project was initiated by the Clinton administration in 1993. The first meeting occurred in 12/93, and the most recent meeting took place in Tokyo in 3/96. The JDA allocated 440 million yen for TMD research and development under the fiscal year (FY) 1996 national budget. Japan has not yet decided if it will join the TMD project, but will probably make a decision in FY 97, according to JDA officials. Although the United States possesses the technology to intercept ballistic missiles at high altitudes, it requires the "support of its allies to deploy the system." The U.S. DOD does not expect a final decision from Japan until "well into 1997."

Kyodo (Tokyo), 8/5/96; in FBIS-EAS-96-151, 8/5/96 (6514). *Wall Street Journal*, <http://interactive6.wsj.com>, 8/16/96 (6514).

9/19/96

U.S. Defense Secretary William Perry asked a Japanese delegation in Washington for a quick decision on the TMD system, describing it as a good opportunity for the two countries to cooperate. Japan's 4th Air Depot currently has six SAM units equipped with Patriot missiles. Each Patriot unit is assigned to a specific air-defense sector, and the 4th Air Depot coordinates all six with other elements of Japan's air-defense system. Although Japan does not have enough SAM groups to defend the entire country, units could be moved from less dangerous sectors to the main battle area in a future conflict. The Japanese Air Self-Defense Force (JASDF) is fielding Patriot Advanced Capability-2 (PAC-2) product improvements in response to the evolving threat.

Kyodo (Tokyo), 0/21/96; in FBIS-EAS-96-185, 9/21/96 (6666). Lt. Col. Hisashi Kasahara, *Air Defense Artillery*, 7/96-8/96, pp. 26-29 (6666).

9/20/96

JDA Director General Hideo Usui said Japan

would decide in the summer of 1997 whether to participate in the TMD system with the United States. Although Usui said Japan needed a TMD system to maintain its security, he added that the project would cost too much. The estimated cost of the TMD system would probably exceed the ¥25.15 trillion allocated for Japan's defense budgets in the midterm defense program for fiscal years 1996-2000.

Kyodo (Tokyo), 0/21/96; in FBIS-EAS-96-185, 9/21/96 (6666). Lt. Col. Hisashi Kasahara, *Air Defense Artillery*, 7/96-8/96, pp. 26-29 (6666).

Late 10/96\*

Officials from the U.S. and Japanese foreign and defense ministries met in Tokyo to examine the technical aspects of the proposed TMD system. The next round of talks is scheduled for early 1997. According to JDA official Tatsuo Yamamoto, the next subject for discussion will be Japan's TMD requirements. The U.S. firm Lockheed Martin and the Japanese firms Mitsubishi Heavy Industries and Kawasaki Heavy Industries would be the most likely contractors for the TMD system.

Gwen Robinson, *Financial Times*, <http://www.ft.com/archive>, 10/30/96 (6651).

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## KUWAIT

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### KUWAIT WITH UNITED STATES

9/30/96

Kuwaiti Minister of Defense Ahmad al-Hamud al-Sabah signed a contract for the construction of a facility to "build, set up, and maintain" U.S. Patriot "missile launching pads at various sites" in Kuwait. The contract was signed with "the representative of the company that will be carrying out the project." The Kuwaiti Ministry of Defense did not provide details about the contract or the firm that will implement it.

Kuna (Kuwait), 9/30/96; in FBIS-NES-96-191, 9/30/96 (6530).

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## LEBANON

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### LEBANON WITH:

Iran, Israel, and Syria, 149

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## MALAYSIA

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### MALAYSIA WITH TURKEY

8/17/96

Turkish Prime Minister Necmettin Erbakan announced that Turkey and Malaysia may cooperate in the "fields of military electronics industry, optical equipment, ammunition production, and missile systems." Erbakan made this remark in a statement issued after meeting Malaysian Prime Minister Mahathir bin Mohammed in Kuala Lumpur.

TRT Television Network (Ankara), 8/17/96; in FBIS-EAS-96-161, 8/17/96 (6517).

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## MISSILE TECHNOLOGY CONTROL REGIME (MTCR) DEVELOPMENTS

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7/96

The United States hosted an MTCR Seminar on Transshipment Issues in Washington, D.C. The seminar was attended by foreign policymakers and specialists from 12 MTCR member states and seven non-MTCR countries. During the seminar, a "productive exchange of ideas on how to impede proliferators' misuse of transshipment" took place. The participants identified a number of issues for potential future deliberation.

White House Press Release, <http://library.whitehouse.gov>, 11/12/96 (6674).

9/96

U.S. officials said Ukraine's inventory of Scud-B missiles prohibits a needed U.S. en-

dorsement for Ukraine to join the MTCR. Ukraine has been attempting to join the 28-member regime for several years. Ukrainian membership will probably be discussed at a 10/96 meeting of the member states in Edinburgh, United Kingdom. In late 9/96, U.S. officials said that although Ukraine's export policies are in line with MTCR guidelines, its arsenal of Scud-B missiles is not. According to a U.S. State Department official, Ukraine has so far "not been prepared to accept" the U.S. position that new members must give up their offensive missiles before joining the regime. U.S. officials are optimistic that Ukraine will eventually sacrifice its Scud-B missiles in order to join the MTCR. By joining the MTCR, Ukraine would prove its commitment to nonproliferation and gain opportunities to cooperate with the West in the commercial space launch market. In 1994, Ukraine agreed to bring its missile export policy in line with MTCR guidelines. U.S. officials said they are willing to allow Ukraine to maintain its missile production facilities to develop SLVs.

Jeff Erlich, *Defense News*, 9/30/96-10/6/96, p. 46 (6669).

9/19/96

The Clinton administration's National Science and Technology Council released a fact sheet on U.S. National Space Policy. According to the fact sheet, MTCR guidelines are not designed to hinder national or international space programs unless they contribute to delivery systems for weapons of mass destruction. However, the United States will "retain a strong presumption of denial against exports of complete SLVs or other Category I components." In addition, the United States will continue its policy of "not supporting the development or acquisition of SLV systems in non-MTCR states." The United States "will not encourage new SLV programs" in MTCR member states which raise questions from a proliferation and economic standpoint, "but will consider the transfer of MTCR-controlled items to these countries." The United States could consider extra safeguards for such exports "where appropriate." According to the fact sheet, any exports would continue to be subject to the non-transfer measures included in the Strategic Arms Reduction Treaty (START) and

the Intermediate-Range Nuclear Forces (INF) Treaty. The United States will continue to work to restrict the proliferation of advanced space technology to unapproved destinations. When initiating space-related technology development and transfer agreements with other nations, U.S. executive departments and agencies will take into account whether such nations promote fair and free trade in the commercial space sector.

The White House, National Science And Technology Council, <http://www.whitehouse.gov/WH/EOP/OSTP/NSTC>, 9/19/96 (6686).

9/25/96

Volodymyr Horbulin said Ukraine "retains the right to develop missiles with a range of up to 500 km for its own purposes." According to Horbulin, this range limit does not violate the INF Treaty. Horbulin said Kiev will honor its international obligations, but Ukraine's security interests could result in a "review of certain accords."

*Uryadovyy Kuryer* (Kiev), 9/24/96, p. 2; in FBIS-SOV-96-188, 9/24/96 (6670). Itar-Tass (Moscow), 9/25/96; in FBIS-SOV-96-188, 9/25/96 (6670).

10/7/96-10/11/96

During the 1996 MTCR Plenary Meeting in Edinburgh, United Kingdom, the partners supported U.S. initiatives to follow up on the success of the meetings. The partners agreed to "be proactive in encouraging" key non-MTCR transshippers to adhere to the MTCR Guidelines and Annex, and to give them "practical assistance" to implement transshipment controls on missile technology. The member states agreed on steps that could be taken to improve the regime's effectiveness in restricting missile proliferation in South Asia and the Persian Gulf. In addition, the partners agreed to increase the transparency of the regime's objectives and activities, and to pursue dialogues with non-MTCR countries to encourage their voluntary adherence to the regime's guidelines.

White House Press Release, <http://library.whitehouse.gov>, 11/12/96 (6674).

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## NETHERLANDS

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### NETHERLANDS WITH:

Germany, Italy, Turkey, and United States, 143

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## NORTH ATLANTIC TREATY ORGANIZATION

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### NATO WITH RUSSIA 7/96

In an interview with Denmark's *Berlingske Weekendavisen*, Danish Defense Minister Hans Haekkerup said NATO and Russia could counter the threat posed by unpredictable countries that might possess "missile technology, biological warfare materiel, and a nuclear capability" by "jointly building up a missile defense system." Haekkerup added that NATO could "certainly use some of the high-tech items" that Russia produces.

Gennadi Kulbitsky, *Itar-Tass* (Moscow), 9/22/96; in FBIS-WEU-96-185, 9/22/96 (6532). Jens Maigard, *Berlingske Weekendavisen* (Copenhagen), 7/19/96-7/25/96, p. 6; in FBIS-WEU-96-167, 7/25/96 (6532).

### 8/25/96

German Defense Minister Volker Ruehe was quoted in Germany's *Bild Am Sonntag* as saying that NATO-Russian cooperation in the future could include the "development of a joint defense system against new threats—against long-range missiles carrying weapons of mass destruction, for instance." Ruehe said this system would be directed against "blackmailing attempts and nuclear terrorism from the South—threats from Islamic fundamentalism, for example." According to Ruehe, this would demonstrate that NATO expansion was not directed against Russia, and there was an opportunity to establish a "special partnership" between the alliance and Russia.

Gennadi Kulbitsky, *Itar-Tass* (Moscow), 9/22/96;

in FBIS-WEU-96-185, 9/22/96 (6532). F. Weckbach-Mara, *Bild Am Sonntag* (Hamburg), 8/25/96, pp. 2-3; in FBIS-WEU-96-167, 8/25/96 (6532).

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## NORTH KOREA

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### INTERNAL DEVELOPMENTS

#### 9/25/96

South Korea's Unification Ministry issued a statement saying that North Korea produces approximately 100 Scud-B and -C ballistic missiles annually, and has exported approximately 400, primarily to the Middle East. According to the statement, between 1980 and 1993, arms exports accounted for approximately 30 percent (\$20.4 billion) of all North Korean exports, and Scud sales are now about \$500 million annually. The ministry also said North Korea has exported missile production facilities and technology to Syria and Iran.

Reuter, 9/25/96 (6677).

#### 10/16/96\*

Japanese news agency, Jiji, and NHK television reported that North Korea is planning to test-launch a 1,000 km-range No-dong-1 missile into the Sea of Japan. Clues that a test-launch was imminent were provided by a U.S. satellite which tracked the movement of a No-dong-1 launch platform from an assembly plant to a position on the country's east coast. Defense officials in Japan noted that all preparations for the launch have been made, including the repositioning of North Korean vessels in the Sea of Japan to monitor the missile in its terminal phase. Although similar indications were picked up in 7/96 without an ensuing launch, the U.S. responded to these new developments by sending an RC-135 reconnaissance aircraft from Kadena Air Base in Okinawa to monitor the region. The No-dong-1 has been under development since 1993, and "some experts believe that it will be deployed in the coming months."

Reuter, 10/16/96 (6561). Nicholas D. Kristof, *New York Times*, 10/22/96, p. A11 (6561).

### NORTH KOREA WITH:

Iran, 149  
Iran and United States, 149

### NORTH KOREA WITH PAKISTAN AND TAIWAN

#### 3/96

Two hundred barrels of ammonium perchlorate shipped from North Korea were detained in Taiwan en route to Pakistan's Space and Upper Atmosphere Commission (SUPARCO).

Bruce Gilley, *Far Eastern Economic Review*, 10/3/96, p. 20 (6675).

### NORTH KOREA WITH SYRIA

#### 9/12/96

Customs officials seized 18 cargo containers that had arrived at Hong Kong's Kwai Chung Container Terminal on 8/22/96 from North Korea, and which were bound for Syria. On 9/16/96, a search of the containers' contents found howitzer guns and spare parts. The *Iran Brief* reported that North Korea intended to have the guns' optics upgraded at a French-built munitions plant in Syria and returned to North Korea, as an offset for past deliveries of Scud-C missiles. Conventional weapons transfers between North Korea and Syria are not illegal, but countries shipping weaponry through Hong Kong must notify the Trade Department. The Trade Department had no notice documentation. Customs has not yet opened all of the containers, and it is "not impossible" that the remaining containers may contain "parts for Scud missiles."

Ng Kang-Chung and John Flint, *South China Sunday Morning Post* (Hong Kong), 9/15/96, p. 1; FBIS-CHI-96-180 (6676). Glenn Schloss and Simon Beck, *South China Morning Post* (Hong Kong), 9/17/96, p. 3; in FBIS-CHI-96-181 (6676). *Iran Brief*, 10/1/96, p. 6. *Jane's Defence Weekly*, 10/2/96, p. 15 (6676). Glen Schloss and Stella Lee, *South China Morning Post* (Hong Kong), 9/16/96, p. 3; in FBIS-CHI-96-180 (6676).

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## NORWAY

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### NORWAY WITH RUSSIA, UKRAINE, AND UNITED STATES

7/22/96\*

The U.S. firm Space Systems/Loral of California has placed an order with the joint Norwegian-Russian-Ukrainian-U.S. Sea Launch Co. for five unspecified satellite launches to be made between late 1998 and 2001. The companies did not release financial details of the contract. The Boeing-led Sea Launch venture has now secured orders for 15 launches, including 10 from Hughes Space and Communications. Sea Launch intends to use Ukrainian Zenit rockets to launch satellites from a converted offshore oil platform. The platform will be located in the Pacific Ocean, and the first launch is scheduled to take place in 6/98. Sea Launch's first payload will be a HS-702 model satellite, Hughes' Galaxy 11 communications satellite. In late 8/96, Sea Launch is scheduled to start building facilities at its home port. This project is expected to cost \$20 million and reach completion by 10/97. The plan entails: remodeling existing buildings to be used as offices, storage, and warehouse space; building two new structures for processing spacecraft; and modifying a 333 m-long pier "to accommodate the Sea Launch command vessel ship and launch platform." On 7/26/96, the United States and Ukraine signed an agreement to launch satellites on board Ukrainian Zenit SLVs. The parties signed two contracts: the "Global Launch" program will involve the launch of 36 communication satellites on board three Zenit SLVs, and the "Sea Launch" program will begin operation in 1998.

*Space News*, 7/22/96-7/28/96, p. 16 (6496).  
*Space News*, 8/12/96-8/18/96, p.2 (6496). Unian (Kiev), 7/27/96; in FBIS-SOV-96-146, 7/27/96 (6465).

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## PAKISTAN

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**PAKISTAN WITH:**  
**Afghanistan, 138**

**China, 141**  
**China and India, 141**  
**North Korea and Taiwan, 157**

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## RUSSIA

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### INTERNAL DEVELOPMENTS

7/15/96

Two strategic nuclear-powered submarines from Russia's Northern Fleet test launched RSM-40 (SS-N-8 "Sawfly") and RSM-54 (SS-N-23 "Skiff") SLBMs. The missiles were launched from the Barents Sea. The warheads hit their pre-designated targets in the Pacific Ocean and on the Kamchatka peninsula. According to sources at the Russian Defense Ministry, the missiles were taken out of long-term storage for the exercise.

Andrey Yurkin, Itar-Tass World Service (Moscow), 7/15/96; in FBIS-SOV-96-137, 7/15/96 (6489). Vasilii Belousov, Itar-Tass (Moscow), 7/15/96; in FBIS-SOV-96-137, 7/15/96 (6489).

7/25/96

The Russian Defense Ministry announced that Russia's Strategic Rocket Forces (SRF) launched an ICBM from the Plesetsk testing range near Arkhangelsk on 7/25/96. The missile hit its target with "a high degree of precision." The test was part of Russia's program to develop the new Topol-M ICBM. General Igor Sergeyev, SRF commander-in-chief, said the project was initiated in 1993 and its first stage was completed in 1995. According to Sergeyev, the project was in its final stages and the trials had been a success. Russian Deputy Defense Minister Andrey Kokoshin said the launch demonstrated that enterprises of the military industrial complex could cooperate effectively and that they will initiate serial production of the new missile. Kokoshin said a government resolution had laid the groundwork for this cooperation to ensure that the "necessary material basis" existed for the missile to be produced. Kokoshin said the missile would form the "nucleus of Russia's strategic missile troops in the foreseeable future." The test was the third launch of the Topol-M despite funding problems.

Anatoliy Yurkin, Itar-Tass (Moscow), 7/25/96;

in FBIS-SOV-96-145, 7/25/96 (6600).

8/14/96

Mikhail Gerasov, deputy director of Moscow's USA-Canada Institute, said that production of Russia's new Topol-M ICBM had not yet begun, making its deployment in 1997 doubtful. According to officials in Moscow, a lack of funding will probably delay indefinitely Russia's deployment of the Topol-M, despite several successful tests of the missile. The Russian Defense Ministry had planned to operationalize 10 solid-fuel Topol-M ICBMs by the end of 1997. According to Gerasov, Russia's 1996 defense budget did not include funds for Topol-M production and there was a two-year delay in fulfilling the missile program. Some U.S. Congressmen and officials from the U.S. Department of Defense believe the Topol-M program—an enhanced version of the road-mobile SS-25 ICBM—is evidence that Russia is hedging on the issue of START II ratification, which the Russian parliament is currently considering. Russian national security advisor Aleksandr Lebed and others in the Russian government support the Topol-M program. Russian officials view retention of a credible nuclear force as guaranteeing continued status as a superpower, particularly when Moscow cannot afford to acquire new advanced conventional weapons. Since 12/94, the Topol-M has been tested successfully on three occasions from the Mirny testing grounds at Arkhangelsk in northern Russia, most recently on 7/25/96. Although the Russian Defense Ministry intended to conduct 20 test launches of the Topol-M over the past two years, officials said funding problems had slowed the testing program.

Pyotr Yudin, *Defense News*, 8/19/96, pp. 1, 18 (6605). Susanne M. Schafer, *Washington Times*, 8/25/96, p. A7 (6605).

8/22/96\*

Russian President Boris Yeltsin issued a decree titled, "On Monitoring the Export From the Russian Federation of Equipment, Materials, and Technologies Used in the Creation of Missile Weapons." The decree established an export-control list for equipment, materials, and technologies that can be used in the development and production of missiles. The

list is subject to alteration or adjustment. Requests to export items included on the list will need to be approved by the Russian government after examination by experts. Yeltsin directed the government "to bring normative acts into line with this edict" following Moscow's adherence to the "Agreement on the Nonproliferation of Space Rocket Technologies" and "with a view to complying with Russia's obligations on the non-proliferation of rocket systems" capable of delivering WMD.

*Rossiyskiye Vesti* (Moscow), 8/22/96, p. 1; in FBIS-SOV-96-164, 8/22/96 (6548).

### 8/23/96

General Eugene Habiger, commander-in-chief of the U.S. Strategic Command, said Russia's nuclear force will fall to START II levels by 2005, regardless of Russian intentions, because of a lack of funds to pay for modernization. Habiger said Russia is currently working on four nuclear systems, but only the work on a single-warhead SS-27 ICBM is proceeding smoothly. Without providing details, Habiger said Russian projects to develop a submarine-launched nuclear missile, a nuclear-missile-firing submarine, and a nuclear armed cruise missile were among the less successful projects. He said that even if these projects were successful, the Russians would not have the capability, the money, or the resources "to bring up their force structure... that's going to just run out of shelf life or capability."

Jim Adams, Reuters, 8/23/96 (6488). Pyotr Yudin, *Defense News*, 8/19/96, pp. 1, 18 (6605). Susanne M. Schafer, *Washington Times*, 8/25/96, p. A7 (6605).

### 10/96

The Russian Navy was scheduled to launch its first satellite on board the Shtil booster. The Shtil is a converted SS-N-23 "Skiff" SLBM. The Skiff became operational in 1986. The Shtil was scheduled to launch the 70 kg Kompas research satellite into a 400 km, circular, 78 degree inclination orbit from a Northern Fleet nuclear submarine located in the Barents Sea. In 6/95, the Shtil launched a 105 kg German re-entry capsule during a sub-orbital flight.

*Flight International*, 7/3/96-7/9/96, p. 21 (6536).

### 10/29/96

During a training exercise of the Northern Fleet, Russia's naval strategic nuclear forces successfully tested an SLBM from a strategic guided missile submarine under the command of Captain First Class Anatoliy Yevtodyev. The exercise was conducted under the leadership of the Russian defense minister, and the command to launch the SLBM was transmitted via military satellite from Moscow. The test was considered a "presidential launch" because the "nuclear briefcase" was used in the command-and-control process.

Vladimir Gundarov, *Krasnaya Zvezda* (Moscow), 10/4/96; in FBIS-SOV-96-194, 10/4/96 (6601).

### 10/3/96

Russia launched an RS-12M Topol-class ICBM from the Plesetsk testing range. The missile successfully hit its target. General Igor Sergeev said problems in the armed forces had not interfered with the SRF's ability to preserve "their combat capacity at a proper level" and to carry out their duties. Sergeev said that if sufficient funding were made available, the RS-12M and the updated Topol-M ICBM could guarantee the security of Russia's strategic nuclear deterrent "at the beginning of the next century." Russia also test launched two 3,000 km-range nuclear-capable air-launched cruise missiles (ALCM). According to Major General Vasily Maloshitskiy, deputy head of the long-range air force's combat training department, both ALCMs hit their targets. The missile launches were part of Redut-96, a series of exercises designed to review the combat capabilities of all kinds of troops, fleets, and military districts, and to "practice management of the Russian Armed Forces." According to Maloshitskiy, Russian Prime Minister Viktor Chernomyrdin observed the exercises from the missile-launch control center at the general headquarters of the Russian Armed Forces.

Vladimir Gundarov, *Krasnaya Zvezda* (Moscow), 10/4/96; in FBIS-SOV-96-194, 10/4/96 (6601). Andrey Galkin, Itar-Tass (Moscow), 10/3/96; in FBIS-SOV-96-194, 10/3/96 (6601). Sergey Ostanin, Itar-Tass (Moscow), 10/3/96; in FBIS-SOV-96-194, 10/3/96 (6601).

### 10/3/96

The Russian Government Presidium considered the LIBTON program, which was estab-

lished jointly by the Ministry of the Economy and the Ministry of Atomic Energy to create a complex in Russia "for the extraction and production" of rare metals, including beryllium, lithium, niobium, and tantalum. Beryllium is used in the production of guidance systems for rockets and spacecraft, ceramics in the electronics industry, light alloys for aerospace equipment, and nuclear munitions. After the dissolution of the Soviet Union, the production facilities for many of these rare metals were located outside Russia in Estonia, Kazakstan, Ukraine, and Uzbekistan. The objective of the LIBTON program is to establish an autonomous production complex for these rare metals in Russia based on the Chita mining and enrichment combine. Prime Minister Viktor Chernomyrdin approved the program, which will run through 2012 at a cost of R6.6 trillion. The Russian federal exchequer and the Ministry of Atomic Energy will each fund 20 percent of the program; the Chita Oblast Administration will fund 10 percent of the program, and the remaining 50 percent will be funded through commercial investment.

Vladimir Kucherenko, *Rossiyskaya gazeta* (Moscow), 10/4/96; in FBIS-SOV-96-194, 10/4/96 (6614).

### 10/16/96\*

The SRF prepared a solid-fuel Start-1 SLV to launch the first satellite from the new Svobodny cosmodrome in the Far Eastern Amur region of Russia. The rocket is scheduled to place the Zeya small demonstration satellite into orbit in 12/96. Moscow's Institute of Thermal Technology converted an SS-25 "Sickle" ICBM to produce the Start-1 SLV, which also incorporates hardware from the SS-20 ballistic missile. STC Complex is marketing four- and five-stage versions of the Start-1 SLV.

*Flight International*, 10/16/96-10/22/96, p. 25 (6588).

### 10/28/96\*

The Moscow-based firm Granit, which produces anti-aircraft missile systems and electronics, was selected to pioneer a Russian effort to set up multinational arms production and export firms. Granit will receive a license allowing it to export arms independently of Rosvoorouzhenie, Russia's state-run arms export agency. At present,

Rosvoorouzhnie handles 90 percent of Russia's arms exports, which were worth \$2.7 billion in 1995. According to Russian Prime Minister Viktor Chernomyrdin, the Russian government is willing to spend R50 billion (\$9.2 million) to help Granit through the transition process. Chernomyrdin said Granit was a perfect choice for the "core of a joint venture" because it imports most of the spare parts that it uses from neighboring CIS countries. According to Rosvoorouzhnie data, Granit will be one of 16 Russian firms licensed to export arms if the project proceeds. Along with Moscow-based MiG aircraft manufacturer VPK MAPO, Granit will be the second Russian firm to develop, manufacture, and export its own products. According to critics in Russia and other CIS countries, lack of funding is the primary obstacle to Moscow's plan to establish new defense giants.

Pyotr Yudin, *Defense News*, 10/28/96-11/3/96, p. 4 (6654).

**RUSSIA WITH:**

- Australia and Thailand, 138**
- Belarus, 138**
- Brazil and United States, 139**
- Bulgaria and United States, 140**
- China and Ukraine, 141**
- Cyprus, United Kingdom, and United States, 142**
- Egypt, 142**
- Finland, 143**
- France, 143**
- India, 148**
- Iran, 149**
- NATO, 157**
- Norway, Ukraine, and United States, 157**

**RUSSIA WITH SINGAPORE**

**9/4/96\***

According to regionally based intelligence sources, defense officials from Singapore are interested in purchasing Russia's S-300 (SA-10 "Grumble") air-defense system. The S-300 is a ground-based, solid-fuel, short-range theater defense missile system comparable to the U.S. Patriot. In early 1993, Russia briefed Singapore on the OTR-21/9M79 Tochka (SS-21 "Scarab") surface-to-surface missile (SSM). The single warhead SS-21 is a

solid-fuel, mobile, short-range ballistic missile. Because the SS-21 has an estimated range of 150 km and a maximum payload capability of 482 kg, it falls below the MTCR's 300 km and 500 kg parameters. No country in Southeast Asia currently possesses SSMs, even short-range types like the SS-21. The unpublicized 1993 meeting between defense officials from Russia and Singapore was the first of its kind between the countries because of the latter's staunch anti-communism and its alignment with the United States during the Cold War. Singapore's defense ministry did not respond to inquiries about contacts with Moscow. Russia has attempted to establish new markets for its defense products in Southeast Asia since the late 1980s.

*Jane's Defence Weekly*, 9/4/96, p. 3 (6655).

**RUSSIA WITH UNITED ARAB EMIRATES**

**7/24/96\***

The UAE purchased the 300 mm-caliber Smerch multiple launch rocket system from Russia. According to Middle Eastern diplomatic sources in Moscow, the UAE purchased one Smerch battery, which includes the Vivariy automated fire-control system, six 9T234-2 loader-transporter vehicles, and six 9A52-5 transloader vehicles with 12-tube launchers. The UAE made an undisclosed payment to Russia and is awaiting delivery from the Splav manufacturing plant in Tula. Although Russia offered the full range of rockets for the Smerch system, the UAE has yet to choose a specific type of projectile. The contract does not specify where UAE personnel will be trained to operate the Smerch system, but this will probably take place in Russia.

*Jane's Defence Weekly*, 7/24/96, p. 3 (6577).

**RUSSIA WITH UNITED STATES**

**10/7/96\***

The U.S. firm McDonnell Douglas successfully conducted the first test launch and powered flight of an MA-31 aerial target at the U.S. Naval Air Warfare Center's test ground at Point Mugu, California. Representatives from McDonnell Douglas, the U.S. Navy, and the Russian missile manufacturer Zvezda-Strela modified an X-31A supersonic anti-ship/anti-radar missile to create the MA-31.

Zvezda-Strela's X-31A has been used by the Russian Air Force since 1988. In 5/95, McDonnell Douglas was awarded a \$4.7 million contract to assess four different aerial targets with an option to acquire up to 20. According to John Reilly, manager of the MA-31 program, Russian participants received approximately \$1.7 million of the total \$4.7 million. The U.S. Navy needs a supersonic sea-skimming missile to test ship-based missile defense systems. According to Reilly, the X-31A possessed the desired capabilities. Reilly said this unprecedented project began in 1993 and constituted the first time this type of military-industrial cooperation had taken place between the United States and Russia.

*Defense News*, 10/7/96-10/13/96, p. 21 (6689).

**10/23/96\***

Two U.S. firms have selected Russia's NK-33 liquid-oxygen/kerosene engine to power re-usable SLVs. Kistler Aerospace of Kirkland, Washington, wants to use the NK-33 in its K-1 re-usable SLV, while Kelly Space and Technology of San Bernardino, California, wants to use the engine in its Eclipse Astroliner sub-orbital spaceplane. The U.S. firm Aerojet is modifying and marketing the NK-33, which was developed originally to power Russia's N1 Moon rocket.

Tim Furniss, *Flight International*, 10/23/96-10/29/96, p. 23 (6599).

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**SINGAPORE**

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**SINGAPORE WITH:**

- Russia, 160**

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**SLOVAKIA**

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**SLOVAKIA WITH:**

- India, 148**

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## SOUTH KOREA

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### INTERNAL DEVELOPMENTS

6/5/96\*

The 1/96 issue of *Kukbang Kwa Kisul* reported that South Korea's accession to the MTCR would not adversely affect its export of missile technology, and would in fact boost its access to advanced technologies, that could be "grafted" to indigenous projects. On 4/17/96, a magazine entitled *Chugan Maeyong* editorialized that the U.S.-ROK memorandum on missile control, which prohibits South Korea from developing missiles with ranges beyond 180 km, is a "stumbling block" to South Korean aerospace advances. Currently, South Korea is developing a two-stage rocket. The first stage is 3.57 m in length and weighs 0.71 tons, while its second stage measures 7.47 m and weighs 1.22 tons. Fuel accounts for 396 kg of the first stage and 580 kg of the second, and 150 kg comprises the payload. The first stage burns for 6.7 seconds with an average of 23.4 tons of thrust. At 7 seconds the stages separate and the second stage burns for 20.2 seconds with 8.7 tons of thrust. At 60 seconds, approximately 73.4 km in altitude, the nose fairing separates. The rocket reaches maximum velocity in 28.2 seconds. The Korea Aerospace Research Institute (KARI) manages the two-stage program, particularly engine development, while a number of agencies and firms contribute to specific aspects of the project, including: the Korea Research Institute of Standards and Science (payload design), the Agency for Defense Development (launch equipment and test facilities), Korea Explosives (engines), Samsung Aerospace, Hankook Tire Mfg., Korea Fiber Glass (composite and heat-resistant materials), Doowon Heavy Industries (airframe and launcher), Ace Antenna (communications), Danam Ind. (payload electronics), and Seoul National University (research). Cho Kwang-nae, chief of KARI's medium-rocket group, indicated in the 4/17/96 *Chugan Maeyong* article that a three-stage follow-on to the two-stage rocket would not be difficult. As early as 4/

14/93, *Chugan Maeyong* reported that a three-stage rocket would be operational by 1999. A 10/11/95 article, also in *Chugan Maeyong*, identifies the program's ultimate goal: to launch of a 500-700 kg payload into a 600-800 km orbit by 2009.

*FBIS Special Memorandum: ROK Rocket Development*, 6/5/96 (6574).

10/2/96\*

South Korea has developed a dry-tuned gyroscope (DTG), which will "soon be commercialized." The Korea Institute for Defense Analysis and the Special Automatic Control Research Center of Seoul National University jointly designed and assembled the gyroscope; Daewoo Heavy Industries (South Korea) processed its constituent parts, and the Special Automatic Control Research Center tested it. The gyroscope operates at 14,000 revolutions per minute, has a 5 cm diameter, and a 5 cm height. Only seven countries have produced such gyroscopes, and transfer of the technology is generally restricted. Professors from Seoul National University that participated in the DTG's development are: Yi Chang-kyu, the project chair (Electronic Engineering department), Yi Tong-nyon (Material Engineering department), Kim Yong-hyop (Aerospace department), and Chong Hyon-kyo (Electric Engineering department). Yi said that next they "will develop an ultra-mini gyroscope with a diameter and height of less than 1 cm."

*Mael Kyongje Sinmun* (Seoul), 10/2/96, p. 16; in *FBIS-EAS-96-194* (6681).

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## SYRIA

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### SYRIA WITH:

**Iran, Israel, and Lebanon, 149**

**Israel, 153**

**North Korea, 157**

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## TAIWAN

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### INTERNAL DEVELOPMENTS

9/11/96\*

Taiwanese military officials disclosed the army's plan to test its first surface-to-surface missile by the end of the year. Military sources say that the "Sky Halberd" has been developed so that Taiwan's military forces will have first-strike capabilities. The program is based on the Model-2 "Sky Bow" missile. Sources estimate the missile's range to be approximately 300 km. The Chungshan Institute of Science and Technology produces the missile. The guidance system can use Global Positioning System (GPS) technology, but to take advantage of the GPS, Taiwan will need access to a satellite.

Lu Chao-Lung, *Chung-Kuo Shih-Pao* (Taipei), 9/11/96, p. 1; in *FBIS-CHI-96-180* (6642).

### TAIWAN WITH:

**North Korea and Pakistan, 157**

### TAIWAN WITH UNITED STATES

8/22/96\*

According to Taiwanese military sources, U.S.-built Patriot missiles will be a crucial part of Taiwan's missile defenses. By 10/96, the United States will deliver three Patriot systems, and from 2/97 until 6/98, they will be deployed by the Taiwanese Army's Aviation Logistics Department. The General Staff Headquarters is working on the purchase of applicable mobile equipment from the United States that would include an integrated phased-array radar capability to upgrade the present Patriot system. To date, the United States has not agreed to sell this technology.

*Chung-Kuo Shih-Pao* (Taiwan), 8/22/96, p. 1; in *FBIS-CHI-96-165* (6644).

### THAILAND WITH:

**Australia and Russia, 138**

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## TURKEY

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### TURKEY WITH:

**Israel, 153**  
**Germany, Italy, Netherlands, and United States, 143**  
**Malaysia, 156**

### TURKEY WITH UNITED STATES

**11/6/96\***

Turkey will purchase 72 Army Tactical Missile System (ATACMS) missiles worth \$48 million from the U.S. firm Lockheed Martin Vought Systems. The U.S. Congress approved the transaction earlier in 1996; this is the first sale of ATACMS outside the United States. Lockheed Martin will deliver all the missiles to Turkey by 4/98. Turkey already has 12 Multiple Launch Rocket System (MLRS) launchers, which can be used to launch ATACMS missiles. Turkey is expected to eventually purchase up to 120 ATACMS missiles at a cost of \$130 million.

*Flight International*, 11/6/96-11/12/96, p. 17 (6649).

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## UKRAINE

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### INTERNAL DEVELOPMENTS

**7/2/96-7/3/96**

The SAM and radiotechnical troops of Ukraine's Air Defense (PPO) Forces conducted the first test firings of S-300 and S-125 air-defense systems in Ukraine at the State Aviation Firing Range in Crimea. An S-300 system destroyed a target over the Black Sea, which had traveled between 80 and 85 km at an altitude of 800 meters and a speed of 900 km/h. The S-300 intercepted the target at a range of 67 km. According to Lieutenant General Oleksandr Stetsenko, Ukraine's deputy minister of defense and commander of the PPO Forces, the S-300 was expected to have a maximum interception range of 50 km. During the second test, two S-125 mis-

siles were fired separately at a second target. The first missile hit the target at a range of 40 km. When the target caught fire and began to fall, the second missile completely destroyed it. According to Stetsenko, the air-defense missiles and radar installations were manufactured in Ukraine. The missile targets used during the exercise had small radar signatures and flew at a low altitude. The air-defense personnel "demonstrated good combat proficiency and teamwork" during the exercises and the weapon systems "operated in stable fashion." A Buk air-defense system was also scheduled to be tested, but Stetsenko said this was postponed because enough material had been collected for analysis. According to Stetsenko, the exercise demonstrated that live firings of SAM systems could be conducted in Ukraine. In addition, the exercises proved the effectiveness of Ukraine's air-defense systems and the need to develop an air-defense firing range in Crimea. Stetsenko added that past test firings of the S-300 and S-125 systems only occurred in Kazakstan. The next exercises at the State Firing Range in Crimea are scheduled for fall 1996. During these exercises, "all of the types of weaponry in the PPO Forces are planned to be used." The fall 1996 drills will focus on "ensuring the fulfillment of the chief mission of the troops—covering the entire territory of the nation." The State Firing Range will be equipped with "everything necessary" in the near future. In response to a question regarding Ukraine's agreement to use practice ranges in Russia, Stetsenko said the Ukrainians had been denied fuel. According to Stetsenko, lack of fuel made it expensive to conduct live firings outside Ukraine. Stetsenko said that in addition to assembling and testing S-125 and S-300 systems, a Ukrainian plant is "working on a new missile."

Ruslan Tkachuk, *Narodna Armiya* (Kiev), 7/9/96, p. 1; in FBIS-UMA-96-158-S, 7/9/96 (6693). Intelnews (Kiev), 7/8/96; in FBIS-TAC-96-008, 7/8/96 (6693).

### UKRAINE WITH:

**Africa, 138**  
**China and Russia, 141**  
**Germany, 143**  
**MTCR, 156**  
**Norway, Russia, and United States, 157**

### UKRAINE WITH UNITED STATES

**7/96**

The U.S. firm Rockwell and Ukraine's NPO Yuzhnoye signed an agreement to provide launch services on board the three-stage Tsyklon SLV. The Tsyklon was developed from the first and second stages of the SS-9 ICBM, with a third stage added specifically to launch satellites. The Space Systems Division of Rockwell will provide sales, marketing, and payload integration for the rocket. The Tsyklon can launch 2,000 kg payloads "at an inclination of 82.5 degrees to a circular orbital altitude of 1,500 km," or payloads weighing up to 3,600 kg "with a launch inclination of 73.5 degrees to an altitude of 200 km." According to Flight International, the Tsyklon is capable of launching 1,360 kg payloads into low- or medium-Earth orbits. Robert Minor, president of Rockwell's Space Systems Division, said the Tsyklon has an excellent reliability record. The SLV has a 97 percent success rate. Minor added that the agreement with Yuzhnoye was "vital for possible future cooperation." Tsyklon is significantly larger than both versions of the Lockheed Martin Launch Vehicle and Orbital Sciences' Pegasus and Taurus vehicles. Rockwell officials said they do not plan to request permission to launch the Tsyklon in the United States. According to the officials, Rockwell is satisfied with launching the rocket from the Baikonur Cosmodrome in Kazakstan and the Plesetsk Cosmodrome in northern Russia.

Bruce A. Smith, *Aviation Week & Space Technology*, 7/29/96, p. 19 (6671). *Flight International*, 7/31/96-8/6/96, p. 5 (6671). Ben Iannotta, *Space News*, 8/5/96-8/11/96, pp. 10-11 (6671).

**7/26/96**

U.S. Assistant Secretary of Defense Harold Smith told a press conference in Dnepropetrovsk, Ukraine, that the United States was not in favor of Ukraine's suggestion to convert SS-24 ICBMs into SLVs. Smith said that the ICBMs are "too expensive to maintain" and should be destroyed. Smith also said that four U.S. firms were currently developing cost-effective ways to destroy these ICBMs. He added that the United States would welcome a Ukrainian decision to destroy the ICBMs and would be willing to provide assistance for Kiev to do this. According

to Stanislav Konyukhov, chief designer at Ukraine's Pivdenmash, the optimum method to recycle SS-24 ICBMs is to convert them into SLVs. Konyukhov added that Ukraine had not considered destroying its SS-24 ICBMs.

Uniar (Kiev), 7/27/96; in FBIS-SOV-96-146, 7/27/96 (6465).

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## **UNITED ARAB EMIRATES**

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**UNITED ARAB EMIRATES WITH:**

**Russia, 160**

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## **UNITED KINGDOM**

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**UNITED KINGDOM WITH:**

**Cyprus, Russia, and United States, 142**  
**Israel, 153**  
**MTCR, 156**

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## **UNITED STATES**

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### **INTERNAL DEVELOPMENTS**

**9/12/96**

An unclassified report published by the U.S. General Accounting Office (GAO) stated that National Intelligence Estimate 95-19 (NIE 95-19)—which concluded that the United States will not be threatened by a new ballistic missile for the next 15 years—was flawed. NIE 95-19 reported that “no country other than the major declared nuclear powers will develop or otherwise acquire a ballistic missile in the next 15 years that could threaten the contiguous 48 states or Canada.” The Congressional report stated that NIE 95-19’s conclusion “was worded with clear, 100 percent accuracy.” However, the GAO said NIE 95-19 “failed to give clear judgments, did not

identify the basis for its conclusions, and did not explore worst-case scenarios for future missile developments among foreign nations.” According to the GAO, the NIE’s level of certainty was exaggerated, “based on the caveats and the intelligence gaps noted in NIE 95-19.” According to the GAO, the NIE did not identify its “critical assumptions.” Defense analysts define critical assumptions as “debatable premises” used to support arguments and the validity of assessments. The GAO said five assumptions were incorrectly presented as “fact-based judgments.” Among them was the NIE’s assertion that the MTCR will “significantly limit” international missile sales and no nation that possesses ICBMs will sell them. The GAO contested the NIE’s basis for concluding that “three unidentified countries” will not attempt to produce long-range ballistic missiles and that it takes five years of flight testing to develop an ICBM. The GAO identified the NIE’s conclusion that a seaborne cruise missile attack against the United States was feasible but not very likely as another unsupported premise. Congressman Floyd D. Spence, chairman of the House National Security Committee, requested the GAO report and said it questioned the Clinton administration’s “sanguine attitude” regarding the increasing missile threat to the U.S. Congressman Curt Weldon said the GAO report supported the Republican assertion that the administration had “politicized the intelligence process.” However, the GAO did not consider whether the NIE was manipulated to support the Clinton administration’s missile defense policy. The current defense authorization bill, which is expected to be enacted soon, requires that an independent intelligence review be conducted to investigate the objectivity of the NIE’s findings. The CIA did not cooperate with the GAO and made no remarks about the report.

Bill Gertz, *Washington Times*, 9/12/96, p. A7 (6685).

**UNITED STATES WITH:**

**Australia, 138**  
**Brazil, 140**  
**Brazil and Russia, 139**  
**Bulgaria and Russia, 140**  
**China, 142**  
**Cyprus, Russia, and United**

**Kingdom, 142**  
**Egypt, 142**  
**Germany, 144**  
**Germany, Italy, Netherlands, and Turkey, 143**  
**Greece, 144**  
**Iran and North Korea, 149**  
**Israel, 153**  
**Japan, 155**  
**Kuwait, 155**  
**MTCR, 156**  
**Norway, Russia, and Ukraine, 157**  
**Russia, 160**  
**Taiwan, 161**  
**Turkey, 162**  
**Ukraine, 162**

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## **WASSENAAR ARRANGEMENT**

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**7/12/96**

Representatives from over 30 nations concluded negotiations on the Wassenaar agreement to control the trade in conventional weapons and dual-use technology. The agreement is designed to prevent weapons from reaching countries like Iran and Libya where they could prove destabilizing. In 12/95, 28 countries agreed on an outline for this agreement to replace the Coordinating Committee on Multilateral Export Controls (COCOM), which was created by the West during the Cold War to prevent the transfer of arms and military technology to Communist countries. According to a U.S. official, the new system would become mandatory before the end of 1996, with voluntary information exchange beginning on 9/1/96.

*New York Times*, 7/13/96, p. 2 (6547).