LETTER OF AUGUST 2002. **MISSILE ARMS STATUS & DEVELOPMENT PROSPECTS IN THE THIRD WORLD COUNTRIES FOR THE PERIOD UP TO 2015**

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PIR ARMS CONTROL LETTERS

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Summary: *Today, over 20 countries in the Middle East, Asia, Africa and Pacific region possess short-range and medium-range missiles with conventional and chemical (most probably nuclear in case of Israel) warheads with a flight range of 80 to 700 km. Modifications are being done to increase the maximum range of the ballistic missiles, the impact accuracy, to develop new types of the warheads and to increase the endurance and reliability of the missile systems.*

An analysis of Third World countries' present-day missile programs allows a broader view on their capabilities in installing and mass-producing highly sophisticated and advanced ICBMs to use with conventional, chemical, biological or nuclear warheads.

The question is - do they pose a threat to global stability or are they merely protecting themselves from their neighbors?

Israel still refuses to sign the Treaty on the Non-Proliferation of Nuclear Weapons on the grounds of perceived potential threats from a number of Middle East countries. By enhancing its military-political cooperation with the United States, Tel-Aviv hopes to avoid opposition to the development of its nuclear program. Israeli leaders consider the problems of international security in the field of nuclear weaponry only from the point of view of their regional interests and they are not going to support any efforts by other countries in promoting nuclear disarmament until the establishment of such an order in the Middle East that would ensure sustainable security for Israel. In particular, Israel considers it possible to sign the treaty on the nonproliferation of weapons of mass destruction and means of their delivery only two years following the signing of peace treaties with all the Arab countries.

The nuclear missile potential of Israel, as estimated by foreign experts, ranks 6-th in the world after the United States, Russia, France, the United Kingdom and China. The Israeli defense forces have 12 U.S.-made "Lance" medium-range missile launchers and 17 Israeli "Jericho-1" medium-range missile launchers, which are deployed 4 km northwest of the town of Zechariah. The range of these missiles is 80 and 500 km respectively. The Jericho-1 ballistic missiles, with a range of up to 500 km, are currently being replaced with medium-range Jericho-2 ballistic missiles.

According to specialists, the Jericho-2 MRBM is a two-stage solid fuel ballistic missile with a launch weight of around 14 tons, an ultimate range of approximately 1400-1500 km, and a warhead weight of 800 to 1000 kg. The impact accuracy (circular error deviation) of this missile is within 0.75-0.85 km.

These missiles are to be replaced by 2010. The total number of medium-range tactical missiles and medium-range ballistic missiles may reach 20 during this period. This replacement is to be accompanied by flight tests of the upgraded version of Jericho-2 MRBM, also known as Jericho-2B.

According to estimates, the two-stage solid fuel ballistic missile Jericho-2B can deliver a 1000 kg

single releasable warhead a distance of approximately 3000 km with an impact accuracy of around 1 km. By 2010-2015 Israel will be capable of deploying up to 20 Jericho-2B launchers.

As of January 1, 2001, five flight tests of this missile were made. Flight ranges varied from 800 to 1450 km. All the test flights began at the Palmachim test range, located 22 km southwest of Tel-Aviv, and carried the missiles over the Mediterranean Sea. Based on the technology used by the Shavit, Next and Star-460 carrier rocket production, design work on the Jericho-3 ICBM can be completed by 2010. Most likely this ICBM will be a three-stage solid fuel ballistic missile with a launch weight of 28-32 tons, a total range of 5,000-7,550 km and with a warhead weight of 500-1,000 kg. The impact accuracy of this ICBM may lie within 1.4-1.6 km. Israel will be able to deploy from 2 to 4 Jericho-3 ICBM launchers. The Jericho-2, Jericho-2B and Jericho-3 ballistic missiles can be equipped with conventional explosive warheads, various types of chemical warheads, or with nuclear weapons with a blast power of 15-20 kilotons.

It is worth mentioning that in addition to missile production, Israel has developed both a R&D program and production base for its nuclear industry that enables it to manufacture weapons-grade plutonium, which allows it to develop and produce a limited number of nuclear weapons. As of January 1, 2001, Israel may have already produced about 60 nuclear weapons of up to 20 kilotons each. The main nuclear weapons production activities are carried out at the Dimona R&D Center of the Ministry of Defense, which is located in the Negev desert 120 km southeast of Tel-Aviv. It is not under IAEA control. According to estimates, the nuclear reactor of this center is capable of producing 10-15 kg of weapons-grade plutonium per year. By January 1, 2001, they may have already produced up to 340 kg of plutonium.

Iranian military and political leaders support the concept of deterring their regional enemies by threatening to conduct a missile strike on their major cities - expecting that this will deter states that are outside of the region and ensure Iranian predominance within the region. The Iranian missile program is the government's top priority in the modification and development of its armed forces. Work to create missile launch systems for ballistic missiles has been carried out since the early 1980s. Moreover, missile production is the most dynamically growing industry in the country.

The main efforts of the military-political leadership of the country are focused around the creation of one of the most powerful missile armories in the region by the year 2010-2015. The state positively refuses to adhere to the Missile Technology Control Regime. However, due to a relatively low level of R&D; the successful design, construction and implementation of serial production for the missiles depends largely on foreign assistance. That comes mostly from China and North Korea.

Today, the Iranian armed forces have 50-60 launchers for the Luna-M, Nazeat, Shaheen, Ohab, Fardj and Mushak short-range missiles, which have flight ranges varying from 20 to 200 km, as well as around 40 Scud-B, Scud-C and Shahab-3 medium-range missile launchers, of North Korean and/or local manufacture. They have flight ranges which vary from 300 to 1,000 km. The launchers are located near the towns of Hamadan and Isfahan. Since 1992, Iran has been working on its Shahab missile program, which is aimed at developing several types of liquid propellant ballistic missiles. As a result of cooperation with North Korea, Iran has developed the Shahab-3 MRBM, basing it on technical information about the Nodong-1 medium-range missile, which was obtained through a bilateral agreement with the North Koreans. According to foreign experts, the Shahab-3 MRBM is a one-stage liquid propellant ballistic missile with a launch weight of almost 20 tons and a total range of 1,200-1,300 km. The missile has a single releasable warhead, which weighs approximately 1,000 kg and has an impact accuracy of 1.9-2.1 km. By 2010, Iran will be able to deploy 16 to 20 launchers for these missiles.

In addition to these projects, Iranian specialists are working on the creation of the Shahab-4 MRBM, which is based on the North Korean Taepo Dong-1 missile. It will be a two-stage liquid propellant ballistic missile with a launch weight of 27-30 tons, the capability of delivering a single releasable warhead (1,110-1,200 kg) a distance of up to 2,200 km and with an impact error of approximately 2 km. It is expected that the first launchers for these missiles (2-6 units) will be added to the Iranian arsenal by 2010. By 2015, the Iranians may have up to 10 launchers. Answers to engineering problems solved during the design of Shahab-4 can be used in the development of the Shahab-5 ballistic missile, which may be similar to the North Korean MRBM Taepo Dong-2. According to estimates, the two-stage liquid propellant ballistic missile Shahab-5 will have a launch weight of 84-86 tons, a total range of 3,400-3,550 km and impact accuracy of 4 km. The first Shahab-5 MRBM launchers (2-4 units) might be added to Iran's arsenal by 2010 and their number might increase to 6 units by 2015.

Iranian MRBMs will be equipped with single releasable warheads with conventional explosives. However, according to Iranian specialists, these missiles can also be equipped with chemical warheads.

In **Iraq**, all activities linked to the creation of a missile arsenal and nuclear weapons have been suspended. In compliance with Resolution #687 of the UN Security Council, all detected ballistic missiles with a flight range of over 150 km, the launching facilities and any associated equipment were destroyed under the supervision of an international commission. The UN representatives inspected the missile production facilities, test ranges and R&D centers before December 1998. Currently, the Iraqi armed forces have around 50 Luna-M, Abbabil-50, Sahard-200 and Abbabil-100 short-range tactical missile launchers with missile flight ranges of 50 to 150 km. If the international arms control regime is weakened, a quick restoration of the Iraqi missile potential can be expected due to the resumption of the frozen missile programs. Using technology based on the Argentinean-Brazilian Condor-2 missile and local developments, Iraq may be able to create a promising medium-range ballistic missile by 2010. According to estimates, this may be a two-stage solid fuel ballistic missile with a launch weight of 84-86 tons, which will be capable of delivering single releasable warhead (750 kg) up to a distance of 2,000 km and with an impact error of roughly 1 km. Conventional explosives can be used in the warheads for this missile, as well as different types of chemical or nuclear weapons with a blast power of up to 15 -20 kilotons.

A status report and analysis of the Iraqi missile industry reveals that the first 2-4 launchers for these missiles can be added to Iraqi's arsenal by 2010 and from 8 to10 units by 2015.

The military-political leadership of **Saudi Arabia** has no intentions to create its own missile systems and does not plan to start either a missile R&D program or production activities. Under a 1988 agreement between Saudi Arabia and China, the Chinese supplied Saudi Arabia with Dong Feng-3 MRBMs with non-nuclear warheads and test launch equipment. The Dong Feng-3 MRBM with a non-nuclear warhead is a liquid propellant ballistic missile with a launch weight of around 65 tons and a single releasable warhead (1,500-2,000 kg). The total range of this missile is 3,000 km with an impact accuracy within 2,4 -2,5 km. In 1996, three missile launching facilities: Missile Base 511 - with 2 launchers - located in El-Kharip (90 km south of Riyadh), Missile Base 522 - with 2 launchers for Dong Feng-3 MRBM - located near Sulei'il (425 km south of Riyadh), and Missile Base 533 - with 1 launcher - located near Er-Rauda (280 km south-west of Sulei'il), were merged into a separate combat arm of the armed forces and the Missile Command center was established. By 2010, Saudi Arabia may acquire the more advanced Chinese Dong Feng-21 MRBM systems with conventional warheads. The Dong Feng-21 MRBM is a two-stage solid fuel ballistic missile with a launch weight of around 15 tons. The maximum range of this missile is 1,780-1,810 km with

a warhead weighing 740-760 kg. It has an impact accuracy of 1.5 km. It is expected that 4 to 6 launchers will be added to the Saudi Arabian arsenal by 2015.

Conventional explosives warheads are used for the Dong Feng-3 and Dong Feng-21 MRBMs. However, it is also possible to outfit the missiles with a chemical warhead.

The military-political leaders of **India** consider the threat of nuclear force as the principle strategic method to deter potential enemies in neighboring countries and other states immediately outside the Indian subcontinent from using WMD against India. India still refuses to join the Missile Technology Control Regime.

In the year 2000, the military-political leadership of India worked out the foundations of their nuclear strategy, which defined the principles to be used for the deployment of national nuclear deterrence forces. The cornerstone principles of this strategy are: never to be the first to use nuclear weapons, minimal deterrence (130-150 nuclear warheads in the national armed forces) and refusal to use a nuclear weapon against a non-nuclear country. Nuclear strikes are supposed to be conducted against large enemy administrative centers and military facilities.

Within the framework developed for the implementation of the national nuclear strategy, the military-political leadership of the country is planning to create several nuclear deterrence forces. This includes forces for ground-based, sea-based and air-based nuclear weapons. It also plans to create a reliable short-range control system for these weapons, a reconnaissance program, a missile early-warning system and arrangements for the storage and maintenance of the nuclear armaments.

Indian armed forces currently possess 12 ground-based Prithvi medium-range missiles launchers with conventional warheads and a flight range of 150-250 km. Power characteristics of these missile allow the installation of single warheads with a yield of 10-15 kilotons. The launchers are part of the 333-rd missile regiment, which is based near the town of Haidarabad.

In April 1999, the two-stage solid fuel ballistic missile Agni was successfully tested. It is capable of delivering a 10-15 kiloton nuclear warhead up to 2,500 km. According to estimates, the launch weight of the Agni MRBM is around 16 tons, with an impact accuracy of about 1 km. A solid fuel booster rocket is used as the first stage, and a liquid propellant rocket from the medium-range Prithvi missile is used as the second stage.

The power characteristics of the Agni MRBM allow outfitting it not only with a single releasable nuclear warhead, but also with a 1000-kg conventional explosives warhead or a chemical warhead. Presently, this missile is ready for serial production. According to the Indian Defense Minister, the Agni MRBM meets all the Indian defense requirements and will be added to the arsenal by 2005. By this time 1 or 2 Agni MRBM launchers may be deployed, and by 2015 their number may increase to 10-14. Further modifications of this missile may follow in order to increase its total range to 3,500 km.

Based on their experience with the Agni MRBM, Indian military-political leaders are pressing for the creation of the Surya ICBM with a flight range of 9,000-12,000 km. According to estimates, the Surya ICBM would probably be a three-stage ballistic missile with solid fuel rockets in the first and second stages and a liquid propellant rocket in the third stage.

The launch weight of the missile may reach 270-275 tons, with an impact error of around 2-2.8 km. The missile may have a 2,490-3,490 kg releasable front section with 2-3 nuclear warheads of 15-20 kilotons each. There are plans to use the second stage propellant engine of the Vikas booster rocket

during the development of this missile to increase its flight range. It is expected that the Surya ICBM will be added to the Indian armed forces deterrence arsenal by 2015. Two to 4 launchers may be deployed for this missile.

Based on the Prithvi medium-range tactical missile and under the Janush project the development of a Prithvi-3 sea-based ballistic missile with a range of 250 km is underway. The Prithvi-3 SLBM would be a one-stage liquid propellant ballistic missile with a launch weight of 4-4.4 tons, equipped with a 500 kg single releasable conventional or a 10-15 kiloton nuclear warhead. The impact accuracy of the missile may be less than 1 km. According to estimates, 2-3 such SLBM missiles may be produced by 2005 to be initially installed on a battleship. Once the Indian armed forces are in possession of an "Advanced Technology Vessel", the SLBM Prithvi-3 will be deployed on this SSBN. It is expected that by the end of 2015 India would have two such submarines equipped with 2-3 Prithvi SLBM each.

The Indian air force has 56 Jaguar fighter-bombers with a range of 1,400 km, 8 Su-30MK fighter-bombers with a range of 1,700 km and 35 Mirage-2000 fighter-bombers with a range of 1,400 km capable of carrying one 12 kiloton nuclear bomb each. It may be expected that by 2015 the Indian air force will have over 100 fighter-bomber aircraft equipped with nuclear bombs. The total number of carriers and nuclear weapons in the Indian deterrent forces may reach 130-150 by the end of the forecast period.

The Indian leaders view Pakistan and China as potential enemies who are capable of conducting a nuclear first-strike against India. The leadership believes that if were known that India would be able to unequivocibly destroy five major towns in Pakistan or ten in China if it were attacked, those levels of damage would be unacceptably high for the leaders of the aggressor country. Given the possibility that two-thirds of the Indian nuclear forces would be lost during the initial stages of a war, the Indian armed forces would require 130-150 nuclear charges and carriers (at least 45 for Pakistan and 90 for China). According to Indian specialists, it would take 10 years to put in place such an arsenal.

The **Pakistani** military-political leadership is working on a national military nuclear doctrine. While their doctrine is based on the principle of nuclear deterrence, it allows for the conducting of a preemptive nuclear strike in case of a threat to Pakistan's national security. Pakistani military-political leaders believe that once the nuclear forces have been formed, it would enable them to resolve both their political and military objectives, become a deterrent factor for a potential enemy and a means of retaliation.

Currently there are 6-12 Hatf-1 short-range tactical missile launchers in the Pakistani armed forces, with a flight range of 100 km. They form part of the 2-nd Artillery Division located near the village of Kharian and the 155-th Missile Regiment near the town of Sargodha. The latter also includes 6 Khatf-2 medium-range missile launchers with a range of 300 km that are modeled after the Chinese M-1 missile. The manufacturing of the one-stage liquid propellant Ghauri MRBM is almost complete. With a 680-710 kg warhead (conventional, chemical or nuclear (10-15 kilotons), the Ghauri MRBM has a total range of about 1,300 km. The first test flight took place in 1998. It is expected that by 2005 two Ghauri MRBM launchers will be deployed in the 2-nd Artillery Division, and that their number can double by 2010. Several sources quoted an announcement made by the Pakistani military command that, allegedly, the Ghauri missile is being produced using indigenous technology and production facilities. At the same time, there is information about the close cooperation between Pakistan, China and North Korea in the field of missile construction.. A comparative analysis of this missile's specifications has revealed that the Ghauri MRBM parameters

are very similar to those of the North Korean Nodong-1 ballistic missile.

In addition to the development of the Ghauri ballistic missile, Pakistan is working on the solid fuel Shaheen MRBM, which has a range of approximately 2,000 km. It is based on technology used in the Chinese Dong Feng-21 MRBM. According to estimates, the Shaheen MRBM may be a two-stage solid fuel ballistic missile with a launch weight of 15 tons and a single releasable warhead (800-1,800 kg) equipped with conventional explosives or 15 kiloton nuclear charges. The impact accuracy of a missile is estimated to be less than 1 km. The probable completion date for the design and engineering work on this missile is 2010. Deployment of 2-4 missiles is possible by the year 2015.

Pakistan views India as its most deadly enemy and believes that the potential for their forces to retaliate against an Indian strike by annihilating a minimum of 25 targets - including 4-5 major cities, important military premises, airfields with the nuclear weapon carriers, ballistic missile launchers, nuclear armament stores, major communication centers, etc. - is sufficient to deter India from launching an attack onto Pakistan. For this purpose, Pakistan plans to keep at least 45-60 nuclear weapons deployed on ballistic missiles and fighter-bomber aircrafts..

In late 80s North Korea launched a missile program, which had three main objectives:

- Scud medium-range missile modification;
- Development of the Nodong-1 medium-range tactical missile, which is based on modifications to the Scud using indigenous technology
- Development of the two-stage ballistic missiles Taepo Dong-1 and Taepo Dong-2

Scud medium-range missile modification entailed extending the missile's total range by means of using larger fuel tanks. There are currently 21 Luna-M short-range missile launchers in North Korea, with a flight range of 65 km, and 28 Scud-B and Scud-C missile launchers, whose maximum ranges are 300 km and 700 km respectively.

By the beginning of the 1990s, North Korea had developed a liquid propellant medium-range missile, the Nodong-1, which has a range of 1,000 km. The propellant engine of this missile is a four-chamber pack of Scud-type, one-chamber liquid propellant rockets. Conventional, chemical and nuclear warheads were all considered for these missiles. In 1992, pilot production of the Nodong-1 medium-range missile began, and there were plans to start mass production by the mid 1990s. However, this missile was not added to the North Korean arsenal due to changes in the opinion by the country's leadership on specifications for the missile's armaments. According to the leaders' new strategy, the Nodong-1 medium-range missile is to be regarded as an intermediary step in the way of the creation of a MRBM.

Based on the results of the Nodong-1 1991-1992 program, development of two new liquid propellant medium-range ballistic missiles, the Taepo Dong-1 and Taepo Dong-2, was moved into a separate program.

The Taepo Dong-1 two-stage ballistic missile is an upgraded version of the Nodong-1 medium-range missile. According to American and Russian specialists, the Nodong-1 medium-range missile is used as the first stage for this missile, and OTP-300 or OTP-600 medium-range missiles as the second stage. The launch weight of the Taepo Dong-1 MRBM is

27-28 tons and it has an impact accuracy of 2.8-3.0 km. The prototype for the first stage of the Taepo Dong-2 MRBM is the Chinese Dong Feng-3 liquid propellant ballistic missile, whereas the second stage was modeled after the Nodong-1 missile. According to estimates, the launch weight of the Taepo Dong-2 MRBM can reach 84.5-85.5 tons and have an impact accuracy of 3.8-4.0 km. The use of such a design may enable maximum ranges of up to 2,200 km for the Taepo Dong-1 MRBM, and 3,500 km for Taepo Dong-2 MRBM. The North Koreans plan to use 1,200-2,000 kg single warheads (conventional, chemical or nuclear with a 10-15 kiloton yield) for these missiles. It should be noted that if the weight of the Taepo Dong-2 MRBM warhead is reduced to 1,000 kg, its total flight range may conversely increase.

According to information obtained, North Korean specialists participated in the development of separable multiple warheads in China. Therefore, it is possible that the Taepo Dong missiles can be outfitted with MIRV nuclear warheads. The first flight test of the Taepo Dong-1 missile was made in 1998.

Although the Taepo Dong-2 MRBM is in its late developmental stage, it will not be ready for its first flight test until 2004. It is expected that it will be added to the country' arsenal by 2005. By this time, the North Koreans may have already deployed 4 to 6 launchers for the Taepo Dong-1 MRBM. In five years, this number can be increased to 14-16. Two to 4 Taepo Dong-2 MRBM launchers may be added to the arsenal by 2010 and this number may increase by an additional 2 units by 2015.

Further modifications to the two-stage Taepo Dong-2 MRBM may be aimed at increasing its total range by adding more propellant stages. One may expect that the modified MRBM Taepo Dong-2 will have Taepo Dong-2 ballistic missile as the first two stages, and the second stage of Taepo Dong-1 missile as the third stage. In this case, the ultimate range of the modified Taepo Dong-2 ballistic missile will be as much as 6,000 km.

The North Koreans' work in the area of missile design and engineering is being carried out in cooperation with Chinese scientists and other foreign experts. It is also being partly financed by Iran. The introduction of the Missile Technology Control Regime and other restrictions, undertaken by the world’s leading countries, has not yet stanched the proliferation of North Korean missile technology among Third World countries.

North Korea has become one of the main suppliers of missiles, with parameters beyond the restrictions imposed by the Missile Technology Control Regime. North Korea has close military and technical ties with Iran, Syria, Libya, Pakistan, Yemen and Egypt. In these countries, North Korean specialists are involved in the construction of missile facilities; delivery and installation of the equipment for the production and assembly of ballistic missiles; and in rendering technical assistance for mastering the missile technology.

According to **Turkish** leaders, their country is working on its medium-range missile arsenal. The rationale behind these activities is to strengthen Turkey's role as a leader in the region and among Muslim countries in general. It is also a measured response to the existence of missiles in the arsenals of its potential enemies. At the same time, taking into account the poor quality of local R&D, lack of production facilities for missile construction and a heavy reliance on imports, the Turkish government is taking steps to create a national network of labs and enterprises, and is preparing specialists in the field of missile armaments.

Presently the Turkish Army has available 12 U.S. ATACMS mod.1 medium-range missile launchers. The missile's flight range is around 190 km. They are now conducting R&D on a two-stage solid fuel medium-range ballistic missile. It will be capable of delivering an 800 kg single

warhead a distance of 2,000 km. According to estimates, the launch weight of this missile may vary between 14.5 and 15 tons, and it has an impact accuracy of about 1.5 km. There are plans to use conventional explosives for the missile payload. If the engineering phase of this MRBM is successfully completed according to Turkey's timetable, this MRBM may be ready to add to the Turkish arsenal by 2010. The Turkish armed forces may deploy 2-4 launchers for these missiles. According to the American experts, Turkey has the potential to do independent research work in the sphere of missile technology.

The results from an analysis and from assessments made concerning missile development in Third World countries reveal that by 2015, the total number of nuclear missile launchers deployed in Israel, Iran, Iraq, India, Pakistan, North Korea and Turkey will be somewhere around 45 to 70. Almost all Russian military and strategic facilities will be within striking range by these missiles.

However, how should one take into account traditional relationships and coalitions? Even though it is extremely difficult - if not impossible - to predict the future military and political situation in the world, it is unlikely that the above-mentioned countries will pose a threat to Russian national security.

The Iranian Tammuz-1, Shahab-4 and Shahab-5 MRBMs; the Pakistani Shaheen-2 MRBM; and the Indian Agni MRBM and Surya ICBM will all be able to reach Western Europe by 2015. According to estimates, these countries may deploy altogether 40-50 missile launchers.

United States territory may be within reach of ICBMs from such "states of concern" as Iran and Iraq by 2015, since launching ballistic missiles longitudinally over the North Pole toward US territories reduces the distance by over 10,000 km. In case North Korea succeeds in the creation of the modified three-stage Taepo Dong-2 MRBM, Hawaii and Alaska will be within striking distance by this missile. However, the number of modified Taepo Dong-2 MRBM launchers will be around 4 to 6.

In the assessing the missile programs of Third World countries, one has to take into account that ballistic missiles capable of such a relatively long flight distance; in the above-mentioned quantities; with the impact accuracy mentioned; and with conventional warheads are very inefficient armament systems when considering the relationship between the potential damage they can inflict and their cost. Even the massive use of ballistic missiles with conventional explosives by the Nazis during the World War II (which amounted to several thousand missiles) proved to be militarily non-efficient when one looks at the results. Therefore, it is obvious that the Third World countries are very much interested in obtaining nuclear technologies and in mastering nuclear weapons production. While there is the possibility of outfitting ballistic missiles with other types of weapons of mass destruction (chemical, bacteriological, radiological), their efficiency is much less than that of a nuclear weapon. Moreover, there are no indications of any full-scale experiments with these types of weapons, placed onto ballistic missiles, being conducted even in the highly developed countries. The technical side of this issue is by far more complicated.

All this confirms the vital importance of improving and increasing control over the observance of the Treaty on the Non-Proliferation of Nuclear Weapons.

The data above is based on information obtained from open sources. The characteristics of the missiles, available in these sources, are double-checked and are verified using known variables (i.e., the launch weight of the missiles, some of their structural specifics, the most probable types of fuel, throw weights and flight ranges) in standard ballistics calculations.

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