NORTH KOREA AND CUBA: JOINED EFFORTS?

By Manuel Cereijo

Biological Weapons Program

North Korea continues to have the scientists and facilities for producing biological products and microorganisms. The North has the ability to produce traditional infectious biological warfare agents or toxins and biological weapons. Acting on orders of Kim Il-sung, in November 1980 North Korea accelerated the development of biological weapons, organizing research institutions and plants with specialists from other countries. North Korea has been pursuing research and development related to biological warfare since the 1960s. Pyongyang's resources presently include a rudimentary (by Western standards) biotechnology infrastructure that is sufficient to support the production of limited quantities of toxins, as well as viral and bacterial biological warfare agents. In the early 1990s, an open press release by a foreign government referred to applied military biotechnology work at numerous North Korean medical institutes and universities dealing with pathogens such as anthrax, cholera, and plague. North Korea possesses a sufficient munitions-production infrastructure to accomplish weaponization of BW agents. North Korea acceded to the Biological Weapons Convention (BWC) in 1987. Biological warfare has not received the same attention as chemical or nuclear warfare. This could be because North Korea lacks the technical expertise or because the difficulty in controlling biological warfare makes it a less desirable option. North Korea realizes that biological weapons are as dangerous to its own forces as they are to South Korean or US forces, and the North's limited medical services would make the agents more lethal. Therefore, using biological agents is not a likely option. However, if North Korea did choose to employ biological weapons, it probably could use agents like anthrax, plague, or yellow fever against water and food supplies in the South's rear area.

The work done at the National Defense Research Institute and Medical Academy (NDRIMA) included studies of disease pathogens such as anthrax, cholera, bubonic plague, smallpox, yellow fever and others. Since early 1990s, North Korea and Cuba have maintained a secret, but constant exchange of scientists and technology.

Chemical Weapons Program

In 1954 the Soviet Union and China transferred certain special technologies as well as chemical agents and means of protection against them captured from the Japanese and Kuomintang during World War II to the Korean People's Army [KPA]. The next five years were marked by the swift development of the DPRK chemical industry. Despite the fact that the country possessed considerable deposits of natural raw materials, it proved to be a rather difficult task to create domestic capacities for producing chemical weapons. In 1964 the DPRK concluded a contract with Japan for deliveries of agricultural chemicals. Under their guise, components came into the country initially for synthesis of tabun and mustard gas, and a later chlorine and phosphorus-containing organic compounds were imported.

North Korea's chemical warfare program is believed to be mature and includes the capability, since 1989, to indigenously produce bulk quantities of nerve, blister, choking and blood chemical agents as well as a variety of different filled munitions systems. North Korea is believed to possess a sizable stockpile of chemical weapons, which could be employed in offensive military operations against the South. North Korea has also devoted considerable scarce resources to defensive measures aimed at protecting its civilian population and military forces from the effects of chemical weapons. Such measures include extensive training in the use of protective masks, suits, detectors, and decontamination systems. Though these measures are ostensibly focused on a perceived threat from U.S. and South Korean forces, they could also support the offensive use of chemical weapons by the North during combat. North Korea has yet to sign the Chemical Weapons Convention (CWC) and is not expected to do so in the near-term, due to intrusive inspection and verification requirements mandated by the agreement.

North Korea maintains a number of facilities involved in producing or storing chemical precursors, agents, and weapons. North Korea has at least eight industrial facilities that can produce chemical agents; however, the production rate and types of munitions are uncertain. Presumably, sarin, tabun, phosgene, adamsite, prussic acid and a family of mustard gases, comprising the basis of KPA chemical weapons, are produced here. North Korea has the capability to produce nerve gas, blood agents, and the mustard-gas family of chemical weapons. North Korea and Cuba started cooperation in this field in the 1970s, while Cuba was involved in the wars in Africa.

In the assessment of US intelligence services, their reserves, accommodated in perhaps half a dozen major storage sites and as many as 170 mountain tunnels, are at least 180 to 250 tons, with some estimates of chemical stockpiles run as high as 5,000 tons. In May 1996 ROK Foreign Minister Yu Chong-ha reported to the National Assembly that it was estimated that North Korea possessed approximately 5,000 ton of biological and chemical weapons. Given the extensive production facilities, this later estimate may constitute the low end of the actual stockpile.

North Korea is capable of producing and employing chemical weapons that virtually all the fire support systems in its inventory could deliver, including most of its artillery pieces, multiple rocket launchers (including those mounted on CHAHO-type boats), and mortars. Some bombs the Air Force employs also could deliver chemical agents, as could the FROG or the SCUD missile.

Chemicals could increase the impact of a surprise attack. If the North should use this option, it would have an advantage over forward-deployed South Korean and US forces. Nonpersistent chemical agents also could be used to break through defensive lines or hinder a South Korean counterattack's momentum. Persistent chemical agents could be used against fixed targets in the rear areas, such as command and control elements, major lines of communications, or logistic depots.

Not only do these weapons enhance North Korea's offensive capabilities, but this chemical capability could deter South Korea or the United States from using chemicals during

hostilities. In any attack on the South, Pyongyang could use chemical weapons to attack forces deployed near the DMZ, suppress allied airpower, and isolate the peninsula from strategic reinforcement. North Korean military units conduct regular NBC defensive training exercises in preparation for operations in a chemical environment. North Korea has chemical defense units at all levels of its force structure. These units are equipped with decontamination and detection equipment. North Korean military personnel have access to individual protective masks and protective suits.

Since 1990, Pyongyang has placed high priority on military and civilian chemical defense readiness. It has mandated operational training in chemical environments as an integral part of armed forces training and is trying to equip all military forces, including reserves, with full protective gear. In addition, the leadership has required broad segments of the population to engage periodically in simulated chemical warfare drills. Pyongyang has emphasized building and installing collective protection equipment at military production and civilian alternate wartime relocation sites, directing that the entire population be issued protective masks.

Command and Control

North Korea's military command, control, and communications system consists of extensive hardened wartime command facilities, supported by redundant communication systems, which are believed to be largely separate from systems supporting other sectors. A modernized telecommunications infrastructure will greatly increase the regime's ability to perform both peacetime and wartime management tasks, and as in any country, could provide critical backup for military communication systems if necessary. There are over 30 villas for Kim Jong-Il scattered at mountains and beaches of superb scenic beauty, known as "palaces." It was Kim Il-sung who began building villas at places of scenic beauty. Those built in the '50s and '60s were exclusively for Kim Il-sung. In the '70s, when Kim Jong-il began emerging as his successor, villas started being built exclusively for Kim Jong-il. Since the death of Kim Il-sung in '94, both Kim Il-sung villas and Kim Jong-il villas have been used exclusively as Kim Jong-il "palaces." Facilities are impressive and include banquet halls, fishing sites, horse-riding grounds and hunting sites, on areas as large as many Western estates. Thousands of resident personnel are charged with their management and upkeep. It is estimated that more than US$2.5 billion was spent for the construction of the aforementioned facilities.

"Kangdong Palace" and "Dukchun Palace" were built in the suburbs of Pyongyang after the death of Kim Il-sung, at a cost of over US$150 million. Kim Jong-Il spends about 10 days or more at the palaces in an average month. He uses them for rest with his family and enjoying luxurious parties with his close officials, and sometimes uses them as his office when conducting inspections of military units or industrial sites. North Korea currently is modernizing its aged telecommunications infrastructure to improve the speed and quality and expand the capacity of both domestic and international communications.

A fiber-optic cable linking Pyongyang and Hamhung was complete by early 1995, with construction from Pyongyang to Kangwon, North Hamgyong, and South Pyongan Provinces almost complete by midyear. In 1995, North Korea acquired digital Chinese switching

equipment for Chongjin, Najin, and Hamhung. Large quantities of new and used telephones from a number of countries increased the number of telephones to 3.7 per 100 persons by 1993.

The current emphasis in the modernization program is on upgrading communications supporting the Najin-Sonbong Free Trade Zone in northeast North Korea. A large communications center at Najin will be the focal point; it will be equipped with digital switching and other modern equipment and will offer modern communication services to businesses operating in the zone. Vastly improved communications between the Free Trade Zone and other countries will include fiber-optic cable and a digital microwave relay link between Pyongyang, Najin, and Vladivostok, with a shorter link between Najin and Hunchun, China. Additional plans for the Free Trade Zone include construction of a satellite earth station, as well as communication center branches, in the zone.

North Korean military personnel have been receiving training at the Bejucal electronic base in Cuba, since 1999.

Nuclear Weapons Program

Current Status

In early October of 2002, Assistant Secretary of State James Kelley informed North Korean officials that the United States was aware that North Korea had a program underway to enrich uranium for use in nuclear weapons. Initially North Korea denied this, but later confirmed the veracity of the US claim. In confirming that they had an active nuclear weapons program, they also declared the Agreed Framework nullified.

The Agreed Framework signed by the United States and North Korea on October 21, 1994 in Geneva agreed that:

- North Korea would freeze its existing nuclear program and agree to enhanced International Atomic Energy Agency (IAEA) safeguards
- Both sides would cooperate to replace the D.P.R.K.'s graphite-moderated reactors for related facilities with light-water (LWR) power plants.
- Both countries would move toward full normalization of political and economic relations.
- Both sides will work together for peace and security on a nuclear-free Korean peninsula.
- And that both sides would work to strengthen the international nuclear non-proliferation regime.

Prior to the establishment of the Agreed Framework, intelligence sources believe that North Korea could have extracted plutonium from their reactors for use in nuclear weapons-perhaps enough for one or two nuclear weapons. Aluminum rods, necessary for the enrichment of uranium, according to some intelligence sources, have been provided by Planta Mecanica, in Cuba.

Nevertheless, it is unclear whether it has actually produced or possesses nuclear weapons due to difficulties in developing detonation devices.

History

North Korea maintains uranium mines with four million tons of exploitable high-quality uranium. In the mid-1960s, it established a large-scale atomic energy research complex in Yongbyon and trained specialists from students who had studied in the Soviet Union. Under the cooperation agreement concluded between the USSR and the DPRK, a nuclear research center was constructed near the small town of Yongbyon. In 1965 a Soviet IRT-2M research reactor was assembled for this center. From 1965 through 1973 fuel (fuel elements) enriched to 10 percent was supplied to the DPRK for this reactor.

In the 1970s it focused study on the nuclear fuel cycle including refining, conversion and fabrication. In 1974 Korean specialists independently modernized Soviet IRT-2M research reactor in the same way that other reactors operating in the USSR and other countries had been modernized, bringing its capacity up to 8 megawatts and switching to fuel enriched to 80 percent. Subsequently, the degree of fuel enrichment was reduced. In the same period the DPRK began to build a 5 MWe research reactor, what is called the "second reactor." In 1977 the DPRK concluded an agreement with the International Atomic Energy Agency [IAEA], allowing the latter to inspect a research reactor which was built with the assistance of the USSR.

The North Korean nuclear weapons program dates back to the 1980s. In the 1980s, focusing on practical uses of nuclear energy and the completion of a nuclear weapon development system, North Korea began to operate facilities for uranium fabrication and conversion. It began construction of a 200 MWe nuclear reactor and nuclear reprocessing facilities in Taechon and Yongbyon, respectively, and conducted high-explosive detonation tests. In 1985 US officials announced for the first time that they had intelligence data proving that a secret nuclear reactor was being built 90 km north of Pyongyang near the small town of Yongbyon. The installation at Yongbyon had been known for eight years from official IAEA reports. In 1985, under international pressure, Pyongyang acceded to the Treaty on the Non-Proliferation of Nuclear Weapons (NPT). However, the DPRK refused to sign a safeguards agreement with the International Atomic Energy Agency (IAEA), an obligation it had as a party to the Nuclear Non-Proliferation Treaty.

In July 1990 The Washington Post reported that new satellite photographs showed the presence in Yongbyon of a structure which could possibly be used to separate plutonium from nuclear fuel.

In a major initiative in July 1988, South Korean President Roh Tae Woo called for new efforts to promote North-South exchanges, family reunification, inter-Korean trade, and contact in international forums. Roh followed up this initiative in a UN General Assembly speech in which South Korea offered for the first time to discuss security matters with the North. Initial meetings that grew out of Roh's proposals started in September 1989. In September 1990, the first of eight prime minister-level meetings between North Korean and South Korean officials took place in Seoul, beginning an especially fruitful period of dialogue. The prime ministerial talks resulted in two major agreements: the Agreement on Reconciliation, Nonaggression, Exchanges, and Cooperation (the "basic agreement") and the Declaration on the Denuclearization of the Korean Peninsula (the "joint declaration").

In late 1991 North and South Korea signed the Agreement on Reconciliation, Non-aggression, Exchanges and Cooperation and the Joint Declaration on the Denuclearization of the Korean Peninsula. The Joint Declaration called for a bilateral nuclear inspection regime to verify the denuclearization of the peninsula. The Declaration, which came into force on 19 February 1992, states that the two sides "shallnot test, manufacture, produce, receive, possess, store, deployor use nuclear weapons," and that they "shall not possess nuclear reprocessing and uranium enrichment facilities." A procedure for inter-Korean inspection was to be organized and a North-South Joint Nuclear Control Commission (JNCC) was mandated with verification of the denuclearization of the peninsula.

On 30 January 1992 the DPRK also signed a nuclear safeguards agreement with the IAEA, as it had pledged to do in 1985 when acceding to the Nuclear Non-Proliferation Treaty. This safeguards agreement allowed IAEA inspections to begin in June 1992. In March 1992, the JNCC was established in accordance with the joint declaration, but subsequent meetings failed to reach agreement on the main issue of establishing a bilateral inspection regime.

When North Korean Deputy Prime Minister Kim Tal-Hyon visited South Korea for economic talks in July 1992, President Roh Tae Woo announced that full North-South Economic Cooperation would not be possible without resolution of the North Korean nuclear issue. There was little progress toward the establishment of an inspection regime, and dialogue between the South and North stalled in the fall of 1992.

The North's agreement to accept IAEA safeguards initiated a series of IAEA inspections of North Korea's nuclear facilities. This promising development was halted by the North's refusal in January 1993 to allow special inspections of two unreported facilities suspected of holding nuclear waste. Ignoring the South-North Joint Declaration of the Denuclearization of the Korean Peninsula, North Korea refused IAEA inspections and operated nuclear reprocessing facilities, making the world suspicious of its nuclear intentions.

Lack of progress on implementation of the denuclearization accord triggered actions on both sides that led to North Korea's March 12, 1993, announcement of its withdrawal from the Nuclear Non-Proliferation Treaty (NPT). The North's threat to withdraw from the Nuclear Non-Proliferation Treaty (NPT) brought North-South progress to an abrupt halt. Tensions ran high on the Korean Peninsula as the confrontation between North Korea and the United States deepened.

The UN Security Council on 11 May 1993 passed a resolution urging the DPRK to cooperate with the International Atomic Energy Agency (IAEA) and to implement the 1991 North-South denuclearization accord. It also urged all member states to encourage the DPRK to respond positively to this resolution and to facilitate a solution.

The US responded by holding political-level talks with the DPRK in early June 1993 that led to a joint statement outlining the basic principles for continued US-DPRK dialogue and North Korea's "suspending" its withdrawal from the NPT. A second round of talks was held July 14-19, 1993, in Geneva. The talks set the guidelines for resolving the nuclear issue, improving U.S.-North Korean relations, and restarting inter-Korean talks, but further negotiations deadlocked.

Following the DPRK's spring 1994 unloading of fuel from its five-megawatt nuclear reactor and the resultant US push for UN sanctions, former President Carter's visit to Pyongyang in June 1994 helped to defuse tensions and resulted in renewed South-North talks. A third round of talks between the US and the DPRK opened in Geneva on July 8, 1994. However, the sudden death of North Korean leader Kim Il Sung on July 8, 1994 halted plans for a first ever South-North presidential summit and led to another period of inter-Korean animosity. The talks were recessed upon news of the death of North Korean President Kim Il Sung, then resumed in August. These talks concluded with the Agreed Framework.

Under the framework agreement, the North would freeze and eventually dismantle its existing suspect nuclear program, including the 50 MW and 200 MW graphite-moderated reactors under construction, as well as its existing 5 MW reactor and nuclear fuel reprocessing facility. In return, Pyongyang would be provided with alternative energy, initially in the form of heavy oil, and eventually two proliferation-resistant light water reactors (LWR). The two 1,000 MW light-water nuclear reactors would be safer and would produce much less plutonium, in order to help boost the supply of electricity in the North, which is now in a critical shortage. The agreement also included gradual improvement of relations between the US and the DPRK, and committed North Korea to engage in South-North dialogue.

A few weeks after the signing of the Agreed Framework, President Kim loosened restrictions on South Korean firms desiring to pursue business opportunities with the North. Although North Korea continued to refuse official overtures by the South, economic contacts appeared to be expanding gradually.

A close examination by the IAEA of the radioactive isotope content in the nuclear waste revealed that North Korea had extracted about 24 kilograms of Plutonium. North Korea was supposed to have produced 0.9 gram of Plutonium per megawatt every day over a 4-year period from 1987 to 1991. The 0.9 gram per day multiplied by 365 days by 4 years and by 30 megawatts equals to 39 kilograms. When the yearly operation ratio is presumed to be 60 percent, the actual amount was estimated at 60% of 39 kilograms, or some 23.4 kilograms. Since 20-kiloton standard nuclear warhead has 8 kilograms of critical mass, this amounts to mass of material of nuclear fission out of which about 3 nuclear warheads could be extracted.

Estimates vary of both the amount of plutonium in North Korea's possession and number of nuclear weapons that could be manufactured from the material. South Korean, Japanese, and Russian intelligence estimates of the amount of plutonium separated, for example, are reported to be higher -- 7 to 22 kilograms, 16 to 24 kilograms, and 20 kilograms, respectively -- than the reported US estimate of about 12 kilograms. At least two of the estimates are said to be based on the assumption that North Korea removed fuel rods from the 5-MW(e) reactor and subsequently reprocessed the fuel during slowdowns in the reactor's operations in 1990 and 1991. The variations in the estimates about the number of weapons that could be produced from the material depend on a variety of factors, including assumptions about North Korea's reprocessing capabilities -- advanced technology yields more material -- and the amount of plutonium it takes to make a nuclear weapon. Until January 1994, the Department of Energy (DOE) estimated that 8 kilograms would be needed to make a small nuclear weapon. Thus, the United States' estimate of 12 kilograms could result in one to two bombs. In January 1994, however, DOE reduced the

estimate of the amount of plutonium needed to 4 kilograms--enough to make up to three bombs if the US estimate is used and up to six bombs if the other estimates are used.

On 22 April 1997, U.S. Defense Department spokesman Kenneth Bacon officially stated, "When the U.S.-North Korea nuclear agreement was signed in Geneva in 1994, the U.S. intelligence authorities already believed North Korea had produced plutonium enough for at least one nuclear weapon." This was the first time the United States confirmed North Korea's possession of plutonium.

In accordance with the terms of the 1994 framework, the US Government in January 1995 responded to North Korea's decision to freeze its nuclear program and cooperate with US and IAEA verification efforts by easing economic sanctions against North Korea in four areas through:

- Authorizing transactions related to telecommunications connections, credit card use for personal or travel-related transactions, and the opening of journalists' offices;
- Authorizing D.P.R.K. use of the U.S. banking system to clear transactions not originating or terminating in the United States and unblocking frozen assets where there is no D.P.R.K. Government interest;
- Authorizing imports of magnesite, a refractory material used in the U.S. steel industry--North Korea and China are the world's primary sources of this raw material; and
- Authorizing transactions related to future establishment of liaison offices, case-by-case participation of U.S. companies in the light water reactor project, supply of alternative energy, and disposition of spent nuclear fuel as provided for by the agreed framework, in a manner consistent with applicable laws.

Smooth implementation of the 1994 agreed framework was obstructed for a time by North Korea's refusal to accept South Korean-designed LWR model reactors. US and DPRK negotiators met for three weeks in Kuala Lumpur, Malaysia, and on June 12, 1995, reached an accord resolving this issue. North Korea agreed to accept the decisions of the Korean Peninsula Energy Development Organization (KEDO) with respect to the model for the LWRs and agreed that KEDO would select a prime contractor to carry out the LWR project. The KEDO executive board announced that it had selected the South Korean-designed Ulchin 3-4 LWR as the reference model for the project and that a South Korean firm would be the prime contractor. The South Korean prime contractor would be responsible for all aspects of the LWR project including design, manufacture, construction, and management. In this Kuala Lumpur accord to the 1994 Geneva agreed framework, the DPRK also agreed to negotiate directly with KEDO on all outstanding issues related to the LWR project. On December 15, 1995, KEDO and the DPRK signed the Light Water Reactor Supply Agreement. KEDO teams have also made a number of trips to North Korea to survey the proposed reactor site; in the spring of 1996, KEDO and the DPRK began negotiations on implementing protocols to the supply agreement.

Pyongyang is cooperating with Korean Peninsula Energy Development Organization, whose leading members are South Korea, the United States and Japan. KEDO has reached an agreement on the provision of the light-water nuclear reactors by 2003, and, in return, North Korea has frozen its nuclear program. South Korea, which has promised to bear the lion's share of the

reactor project cost estimated at US$4.5 billion, is asking the United States to put up at least a symbolic amount. The US administration, however, has said it can make no contribution to the construction cost as Congress has not appropriated the necessary budget. An official in Seoul, however, said that South Korea cannot drop its demand simply because of domestic problems in the United States. The US Congress has been delaying approval of the cost for the reactor project. South Korean officials said the U.S. refusal to share the reactor cost would make it difficult for them to obtain approval from the National Assembly for the South Korean share.

Since the conclusion of the Supply Agreement in December 1995, six related protocols have come into effect and three rounds of expert-level negotiations have produced solid results. The ROK power company, Korea Electric Power Corporation (KEPCO), is the prime contractor for this project and has as its responsibility the design, manufacture, procurement, construction and management of the reactors. On 19 August 1997 KEDO and North Korea held a groundbreaking ceremony to begin construction of two light-water reactors.

In October 2002, North Korean officials acknowledged the existence of a clandestine program to enrich uranium for nuclear weapons that is in violation of the Agreed Framework and other agreements.

Missiles: North Korea

Name	Stages	Propellant	Range (km)	IOC	Inventory	Type	Body Dia. (m)	Comments
Scud-B	1	liquid	280-330	1981	100?	SRBM	0.885	
Hwasong-5	1	liquid	280-330	1984	150?	SRBM	0.885	Derivative of Scud-B
Hwasong-6	1	liquid	500-700	1989	250?	SRBM	0.885	Derivative of Scud-C
No-dong	1	liquid	1,350-1,500	1999	12-36	MRBM	1.3	Also flown by Iran (Shahab-3) and Pakistan (Ghauri II)
Taep'o-dong-1 Paeutudan-1	2	liquid	2,000-2,200	2000	0	MRBM	1.3	Indigenously developed system with performance similar to the Soviet SS-4

NKSL-1/Taep'o-dong-1	3	liquid + solid	2,200-2,672 or 2,200-2,896	1998 (ILC)	0	M/IRBM	1.3	Satellite launch variant of the Taep'o-dong-1. Basis for the design of Iran's Shahab-4
Taep'o-dong-2	2	liquid	3,500-3,750 6,400-6,700 7,000 8,000-12,000	N/A	0	LRICBM LRICBM LRICBM FRICBM	2.2	This is a hypothetical advance on the Taep'o-dong-1. North Korea is not believed to currently possess a functional version of this missile, but both North Korea and Iran (Shahab-5) are believed to be working towards a missile with these capabilities.
NKSL-X-2/Taep'o-dong-2	3	liquid + solid	4,000-4,300	N/A (ILC)	0	LRICBM	2.2	This is a satellite launch variant of the hypothetical Taep'o-dong-2 model that may be under development. Basis for the design of

Iran's Shahab-6. It would probably have a similar performance to the Soviet SS-5

No-dong / Shahab-3
Range-Payload to Throwweight Trade-offs

Stages	Payload		Range		Country
	kg	Pounds	km	Miles	
One-Stage	1,158	2,553	1,350	839	Iran
	760	1,676	1,500	932	Pakistan

Official figures

Taep'o-dong-1 / Shahab-4
Range to weight Defenition

Stages	Payload		Range	
	kg	Pounds	km	Miles
Two-Stage	1,000	2,205	2,000	1,243
	750	1,654	2,200	1,367
Three-Stage	500	1,103	2,475	1,538
	380	838	2,672	1,660
	290	640	2,896	1,800

Estimates based on limited data

Taep'o-dong-2 / Shahab-5
Range-Payload to Throwweight Trade-offs

Stages	Payload		Range	
	kg	Pounds	km	Miles
Two or Three Stage variant	1,000	2,205	3,500	2,175
	750	1,654	3,750	2,330
	570	1,257	4,000	2,486
	500	1,103	4,100	2,548
	420	926	4,248	2,640
	403	889	4,264	2,650

Improved Taep'o-dong-2B / Shahab-5B/6
Range to weight Defenition

Stages	Payload		Range	
	kg	Pounds	km	Miles
Three-Stage	610-490	1,345-1081	5470	3,399
	570-480	1,257-1058	5,500	3,418
	490-440	1,080-970	5,632	3,500
	290-330	640-728	6,000	3,728

390	860	4,300	2,672

Estimates based on limited data

	230-270	505-595	6,200	3,853
	170-220	375-485	6,400	3,977
	100-150	221-331	6,700	4,163

Preliminary Estimates based on limited data (March 2002)

Taep'o-dong-3 / Shahab-5B / 6
Range to weight Defenition

Stages	Payload		Range	
	kg	Pounds	km	Miles
Three-Stage	1,200-1,220	2,646-2,690	5,470	3,399
	1,130-1,200	2,492-2,646	5,500	3,418
	900-1,040	2,492-2,646	5,500	3,418
	700	1,544	6,000	3,728
	550-540	1,213-1,191	6,200	3,853
	390-420	860-926	6,400	3,977
	270-290	595-640	6,700	4,163

Preliminary Estimates based on limited data (March 2002)

Taep'o-dong-4 / Shahab-7 Concepts
Range to weight Defenition

Stages	Payload		Range	
	kg	Pounds	km	Miles
Three-Stage	1,030	2,271	9,000	5,593
	810	1,786	10,000	6,214
	480	1,054	12,000	7,457
	100	221	15,000	9,321

Preliminary Estimates based on a conceptual model for the system

NOTES:

SRBM - Short Range Ballistic Missile < 1,000 km
MRBM - Medium Range Ballistic Missile 1,000-2,500 km
IRBM - Intermediate Range Ballistic Missile 2,500-3,500 km
LRICBM - L Limited Range Intercontinental Ballistic Missile 3,500-8,000 km

DR. MANUEL CEREIJO

This Week - ABC News
Sunday, October 5, 2003
Host: George Stephanopoulos

Excerpts of Transcript by ABC News

[1]10:45:10 GEORGE STEPHANOPOULOS (ABC NEWS)
Did you have anything else in mind though, not discovering a void, but did you, what did you think might be a surprise?

[1]10:45:17 DAVID KAY (SPECIAL ADVISOR, IRAQI WMD SEARCH)
You know, George, what I had in mind is I'm rarely gifted in having 1300 very bright and dedicated people who can use all of the technology that the US, the UK and the Australians can put there. We're inside the country. I know in that country we're going to find remarkable things about their weapons program. I would contend we've already found things that if they had been known last December, January, February, you would have had headlines in all the papers who now pick on the sentence "not yet found weapons," **trumpeting North Korean missiles going to Cuba, clandestine labs in the biological program. There's a whole host of stuff we have found.**

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