

National Intelligence Council

Foreign Missile Developments and the Ballistic Missile Threat to the United States Through 2015

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Preface

Congress has requested that the Intelligence Community produce annual reports on ballistic missile developments. We produced the first report in March 1998 and an update memorandum in October 1998 on the August North Korean launch of its Taepo Dong-1 space launch vehicle (SLV). Our 1999 report is a classified National Intelligence Estimate, which we have summarized in unclassified form in this paper.

This year we examined future capabilities for several countries that have or have had ballistic missiles or SLV programs or intentions to pursue such programs. Using intelligence information and expertise from inside and outside the Intelligence Community, we examined scenarios by which a country *could* acquire an ICBM by 2015, including by purchase, and assessed the *likelihood* of various scenarios. (Some analysts believe that the prominence given to missiles countries "could" develop gives more credence than is warranted to developments that may prove implausible.) We did not attempt to address all of the potential political, economic, and social changes that could occur. Rather, we analyzed the level of success and the pace countries have experienced in their development efforts, international technology transfers, political motives, military incentives, and economic resources. From that basis, we projected *possible* and *likely* missile developments by 2015 independent of significant political and economic changes. Subsequent annual reports will be able to account for such changes.

Our projections for future ICBM developments are based on limited information and engineering judgment. Adding to our uncertainty is that many countries surround their ballistic missile programs with secrecy, and some employ deception. Although some key milestones are difficult to hide, we may miss others. For example, we may not know all aspects of a missile system's configuration until flight testing; we did not know until the launch last August that North Korea had acquired a third stage for its Taepo Dong 1.

We took into account recommendations made in July 1998 by the Commission to Assess the Ballistic Missile Threat to the United States and incorporated the results of several academic and contractor efforts, including politico-economic experts to help examine future environments that might foster ICBM sales and missile contractors to help postulate potential ICBM configurations that rogue states could pursue.

Key Points

We project that during the next 15 years the United States most likely will face ICBM threats from Russia, China, and North Korea, probably from Iran, and possibly from Iraq. The Russian threat, although significantly reduced, will continue to be the most robust and lethal, considerably more so than that posed by China, and orders of magnitude more than that potentially posed by other nations, whose missiles are likely to be fewer in number--probably a few to tens, constrained to smaller payloads, and less reliable and accurate than their Russian and Chinese counterparts.

We judge that North Korea, Iran, and Iraq would view their ICBMs more as strategic weapons of deterrence and coercive diplomacy than as weapons of war. We assess that:

- North Korea *could convert* its Taepo Dong-1 space launch vehicle (SLV) into an ICBM that could deliver a light payload (sufficient for a biological or chemical weapon) to the United States, albeit with inaccuracies that would make hitting large urban targets improbable. North Korea is *more likely to weaponize* the larger Taepo Dong-2 as an ICBM that could deliver a several-hundred kilogram payload (sufficient for early generation nuclear weapons) to the United States. Most analysts believe it could be tested at any time, probably initially as an SLV, unless it is delayed for political reasons.
- Iran *could test* an ICBM that could deliver a several-hundred kilogram payload to many parts of the United States in the last half of the next decade using Russian technology and assistance. Most analysts believe it could test an ICBM capable of delivering a lighter payload to the United States in the next few years following the North Korean pattern.

--Analysts differ on the likely timing of Iran's first test of an ICBM that could threaten the United States--assessments range from *likely before 2010 and very likely before 2015* (although an SLV with ICBM capability probably will be tested in the next few years) to *less than an even chance* of an ICBM test by 2015.

- Iraq *could test* a North Korean-type ICBM that could deliver a several-hundred kilogram payload to the United States in the last half of the next decade depending on the level of foreign assistance. Although less likely, most analysts believe it *could test* an ICBM that could deliver a lighter payload to the United States in a few years based on its failed SLV or the Taepo Dong-1, if it began development now.

--Analysts differ on the likely timing of Iraq's first test of an ICBM that could threaten the United States--assessments range from *likely before 2015, possibly before 2010* (foreign assistance would affect capability and timing) to *unlikely before 2015*.

- By 2015, Russia will maintain as many nuclear weapons on ballistic missiles as its economy will allow but well short of START I or II limitations.
- By 2015, China is likely to have tens of missiles capable of targeting the United States, including a few tens of more survivable, land- and sea-based mobile missiles with smaller nuclear warheads--in part influenced by US technology gained through espionage. China tested its first mobile ICBM in August 1999.

Sales of ICBMs or SLVs, which have inherent ICBM capabilities and could be converted relatively quickly with little or no warning, could increase the number of countries able to threaten the United States. North Korea continues to demonstrate a willingness to sell its missiles. Although we judge that Russia or China are unlikely to sell an ICBM or SLV in the next fifteen years, the consequences of even one sale would be extremely serious.

Several other means to deliver weapons of mass destruction to the United States have probably been devised, some more reliable than ICBMs that have not completed rigorous testing programs. For example, biological or chemical weapons could be prepared in the United States and used in large population centers, or short-range missiles could be deployed on surface ships. However, these means do not provide a nation the same prestige and degree of deterrence or coercive diplomacy associated with ICBMs.

The proliferation of medium-range ballistic missiles (MRBMs)--driven primarily by North Korean No Dong sales--has created an immediate, serious, and growing threat to US forces, interests, and allies, and has significantly altered the strategic balances in the Middle East and Asia. We judge that countries developing missiles view their regional concerns as one of the primary factors in tailoring their programs. They see their short- and medium-range missiles not only as deterrents but also as force-multiplying weapons of war, primarily with conventional weapons, but with options for delivering biological, chemical, and eventually nuclear weapons. South Asia provides one of the most telling examples of regional ballistic missile and nuclear proliferation:

- Pakistan has Chinese-supplied M-11 short-range ballistic missiles (SRBMs) and Ghauri MRBMs from North Korea.
- India has Prithvi I SRBMs and recently began testing the Agni II MRBM.
- We assess these missiles may have nuclear roles.

Foreign assistance continues to have demonstrable effects on missile advances around the world, particularly from Russia and North Korea. Moreover, some countries that have traditionally been recipients of foreign missile technology are now sharing more amongst themselves and are pursuing cooperative missile ventures.

We assess that countries developing missiles also will respond to US theater and national missile defenses by deploying larger forces, penetration aids, and

countermeasures. Russia and China each have developed numerous countermeasures and probably will sell some related technologies.

Discussion

Introduction

The worldwide ballistic missile proliferation problem has continued to evolve during the past year. The proliferation of technology and components continues. The capabilities of the missiles in the countries seeking to acquire them are growing, a fact underscored by North Korea's launch of the Taepo Dong-1 in August 1998. The number of missiles in these countries is also increasing. Medium- and short-range ballistic missile systems, particularly if armed with weapons of mass destruction (WMD) warheads, already pose a significant, threat to US interests, military forces, and allies overseas. We have seen increased trade and cooperation among countries that have been recipients of missile technologies from others. Finally, some countries continue to work toward longer-range systems, including ICBMs.

We expect the threat to the United States and its interests to increase over the next 15 years. However, projecting political and economic developments that could alter the nature of the missile threat many years into the future is virtually impossible. The threat facing the United States in the year 2015 will depend on our changing relations with foreign countries, the political situation within those countries, economic factors, and numerous other factors that we cannot predict with confidence.

- For example, 15 years ago the United States and the Soviet Union were superpower adversaries in the midst of the Cold War, with military forces facing off in central Europe and competing for global power. Today, by contrast, the differences that separated the two countries during that period have been replaced by differences expected between modern nation states.
- Iraq is another example; 15 years ago it shared common interests with the United States. Since Iraq's invasion of Kuwait in 1990, Washington and Baghdad have been in numerous military and diplomatic conflicts.
- Finally, we do not know whether some of the countries of concern will exist in 15 years in their current state or as suppliers of missiles and technology.

Recognizing these uncertainties, we have projected foreign ballistic missile capabilities into the future largely based on technical capabilities and with a general premise that relations with the United States will not change significantly enough to alter the intentions of those states pursuing ballistic missile capabilities. Future annual reports will be able to take account of any contemporary information that alters our projections.

The Evolving Missile Threat in the Current Proliferation Environment

The new missile threats confronting the United States are far different from the Cold War threat during the last three decades. During that period, the ballistic missile threat to the United States involved relatively accurate, survivable, and reliable missiles

deployed in large numbers. Soviet--and to a much lesser extent Chinese--strategic forces threatened, as they still do, the potential for catastrophic, nation-killing damage. By contrast, the new missile threats involve states with considerably fewer missiles with less accuracy, yield, survivability, reliability, and range-payload capability than the hostile strategic forces we have faced for 30 years. Even so, the new systems are threatening, but in different ways.

First, although the majority of systems being developed and produced today are short- or medium-range ballistic missiles, North Korea's three-stage Taepo Dong-1 SLV demonstrated Pyongyang's potential to cross the 5,500-km ICBM threshold if it develops a survivable weapon for the system. Other potentially hostile nations could cross that threshold during the next 15 years. While it remains extremely unlikely that any potential adversary could inflict damage to the United States or its forces comparable to the damage that Russian or Chinese forces could inflict, emerging systems potentially can kill tens of thousands, or even millions of Americans, depending on the type of warhead, the accuracy, and the intended target.

Classification of Ballistic Missiles by Range

Short-range ballistic missile (SRBM)	Under 1,000 km
Medium-range ballistic missile (MRBM)	1,000 to 3,000 km
Intermediate-range ballistic missile (IRBM)	3,000 to 5,500 km
Intercontinental-range ballistic missile (ICBM)	Over 5,500 km

Second, many of the countries that are developing longer-range missiles probably assess that the *threat* of their use would complicate American decision-making during crises. Over the last decade, the world has observed that missiles less capable than the ICBMs the United States and others have deployed can affect another nation's decision-making process. Though US potential adversaries recognize American military superiority, they are likely to assess that their growing missile capabilities would enable them to increase the cost of a US victory and potentially deter Washington from pursuing certain objectives. Moreover, some countries, including some without hostile intent towards the United States, probably view missiles as a means of providing an independent deterrent and war-fighting capabilities.

Third, the probability that a WMD-armed missile will be used against US forces or interests is higher today than during most of the Cold War. Ballistic missiles, for example, were used against US forces during the Gulf war. More nations now have longer-range missiles and WMD warheads. Missiles have been used in several conflicts over the past two decades, although not with WMD warheads. Nevertheless, some of the regimes controlling these missiles have exhibited a willingness to use WMD.

Thus, acquiring long-range ballistic missiles armed with WMD will enable weaker countries to do three things that they otherwise might not be able to do:; deter, constrain, and harm the United States. To achieve these objectives, these WMD-armed weapons need not be deployed in large numbers; with even a few such weapons, these

countries would judge that they had the capability to threaten at least politically significant damage to the United States or its allies. They need not be highly accurate; the ability to target a large urban area is sufficient. They need not be highly reliable, because their strategic value is derived primarily from the threat (implicit or explicit) of their use, not the near certain outcome of such use. Some of these systems may be intended for their political impact as potential terror weapons, while others may be built to perform more specific military missions, facing the United States with a broad spectrum of motivations, development timelines, and resulting hostile capabilities. In many ways, such weapons are not envisioned at the outset as operational weapons of war, but primarily as strategic weapons of deterrence and coercive diplomacy.

The progress of countries in Asia and the Middle East toward acquiring longer-range ballistic missiles has been dramatically demonstrated over the past 18 months:

- Most notably, North Korea's three-stage Taepo Dong-1 SLV has inherent, albeit limited, capabilities to deliver small payloads to ICBM ranges. Although the Taepo Dong-1 satellite attempt in August 1998 failed, North Korea demonstrated several of the key technologies required for an ICBM, including staging. As a space launch vehicle, however, it did not demonstrate a payload capable of surviving atmospheric reentry at ICBM ranges. We judge that North Korea would be unlikely to pursue weaponizing a three-stage Taepo Dong-1 as an ICBM, preferring instead to pursue the much more capable Taepo Dong-2, which we expect will be flight tested this year, unless it is delayed for political reasons.
- Pakistan flight-tested its 1,300 km range Ghauri missile, which it produced with North Korean assistance. (Pakistan also flight-tested the Shaheen I SRBM.)
- Iran flight-tested its 1,300 km range Shahab-3--a version of North Korea's No Dong, which Iran has produced with Russian assistance.
- India flight-tested its Agni II MRBM, which we estimate will have a range of about 2,000 km.
- China conducted the first flight test of its DF-31 mobile ICBM in August 1999; it will have a range of about 8,000 km.

Many of these countries probably have considered ballistic missile defense countermeasures. Historically, the development and deployment of missile defense systems have been accompanied by the development of countermeasures and penetration aids by potential adversaries, either in reaction to the threat or in anticipation of it. The Russians and Chinese have had countermeasure programs for decades and are probably willing to transfer some related technology to others. We expect that during the next 15 years, countries other than Russia and China will develop countermeasures to Theater and National Missile Defenses.

Threat Availability Before "Deployment"

Emerging long-range missile powers do not appear to rely on robust test programs to ensure a missile's accuracy and reliability--as the United States and the Soviet Union did during the Cold War. Similarly, deploying a large number of long-range missiles to dedicated, long-term sites--as the United States and the Soviet Union did--is not

necessarily the path emerging long-range missile powers will choose. In many cases, a nation may decide that the ability to threaten with one or two long-range missiles is sufficient for its doctrinal or propaganda needs. China, for example, has only about 20 ICBMs; its doctrine requires only that it be able to hold a significant portion of an aggressor's population at risk.

With shorter flight test programs--perhaps only one test--and potentially simple deployment schemes, the time between the initial flight test and the availability of a missile for military use is likely to be shortened. Once a missile has performed successfully through its critical flight functions, it would be available for the country to use as a threat or in a military role. Thus, we project the year for a first flight test rather than the projected date for a missile's "deployment" as the initial indication of an emerging threat. Moreover, using the date of the first projected flight test as the initial indicator of the threat recognizes that emerging long-range missile powers may not choose to deploy a large number of missiles and that an adversary armed with even a single missile capable of delivering a WMD-payload may consider it threatening. Using the first flight test results in threat projections a few years earlier than those based on traditional definitions of deployment, which may not apply as well to the emerging threats.

Potential ICBM Threats to the United States

We project that during the next 15 years the United States most likely will face ICBM threats from Russia, China, and North Korea, probably from Iran, and possibly from Iraq, although the threats will consist of dramatically fewer weapons than today because of significant reductions we expect in Russian strategic forces.

- The Russian threat will continue to be the most robust and lethal, considerably more so than that posed by China, and orders of magnitude more than that posed by the other three.
- Initial North Korean, Iranian, and Iraqi ICBMs would probably be fewer in number--a few to tens rather than hundreds or thousands, constrained to smaller payload capabilities, and less reliable and accurate than their Russian and Chinese counterparts.
- Countries with emerging ICBM capabilities are likely to view their relatively few ICBMs more as weapons of deterrence and coercive diplomacy than as weapons of war, recognizing that their use could bring devastating consequences. Thus, the emerging threats posed to the United States by these countries will be very different than the Cold War threat.

North Korea

After Russia and China, North Korea is the most likely to develop ICBMs capable of threatening the United States during the next 15 years.

- North Korea attempted to orbit a small satellite using the Taepo Dong-1 SLV in August 1998, but the third stage failed during powered flight; other aspects of the flight, including stage separation, appear to have been successful.
- If it had an *operable* third stage and a reentry vehicle capable of surviving ICBM flight, a converted Taepo Dong-1 SLV *could* deliver a light payload to the United States. In these cases, about two-thirds of the payload mass would be required for the reentry vehicle structure. The remaining mass is probably too light for an early generation nuclear weapon but could deliver biological or chemical (BW/CW) warfare agent.
- Most analysts believe that North Korea *probably will* test a Taepo Dong-2 this year, unless delayed for political reasons. A two-stage Taepo Dong-2 could deliver a several-hundred kilogram payload to Alaska and Hawaii, and a lighter payload to the western half of the United States. A three-stage Taepo Dong-2 could deliver a several-hundred kilogram payload anywhere in the United States.
- North Korea is much *more likely* to weaponize the more capable Taepo Dong-2 than the three-stage Taepo Dong-1 as an ICBM.

Iran

Iran is the next hostile country most capable of testing an ICBM capable of delivering a weapon to the United States during the next 15 years.

- Iran *could test* an ICBM that could deliver a several-hundred kilogram payload to many parts of the United States in the latter half of the next decade, using Russian technology and assistance.
- Iran *could pursue* a Taepo Dong-type ICBM. Most analysts believe it could test a three-stage ICBM patterned after the Taepo Dong-1 SLV or a three-stage Taepo Dong-2-type ICBM, possibly with North Korean assistance, in the next few years.
- Iran is *likely to test* an SLV by 2010 that--once developed--could be converted into an ICBM capable of delivering a several-hundred kilogram payload to the United States.
- Analysts differ on the likely timing of Iran's first flight test of an ICBM that could threaten the United States. Assessments include:

--*likely* before 2010 and *very likely* before 2015 (noting that an SLV with ICBM capabilities will *probably be tested within the next few years*);

--no more than an *even chance* by 2010 and a *better than even chance* by 2015;

--and *less than an even chance* by 2015

Iraq

Although the Gulf war and subsequent United Nations activities destroyed much of

Iraq's missile infrastructure, Iraq could test an ICBM capable of reaching the United States during the next 15 years.

- After observing North Korean activities, Iraq *most likely would pursue* a three-stage Taepo Dong-2 approach to an ICBM (or SLV), which could deliver a several-hundred kilogram payload to parts of the United States. If Iraq could buy a Taepo Dong-2 from North Korea, it *could have a launch capability* within months of the purchase; if it bought Taepo Dong engines, it *could test* an ICBM by the middle of the next decade. Iraq probably would take until the end of the next decade to develop the system domestically.
- Although much less likely, most analysts believe that if Iraq were to begin development today, it *could test* a much less capable ICBM in a few years using Scud components and based on its prior SLV experience or on the Taepo Dong-1.
- If it could acquire No Dongs from North Korea, Iraq *could test* a more capable ICBM along the same lines within a few years of the No Dong acquisition.
- Analysts differ on the likely timing of Iraq's first flight test of an ICBM that could threaten the United States. Assessments include *unlikely* before 2015; and *likely* before 2015, possibly before 2010--foreign assistance would affect the capability and timing.

Russia

Russia's strategic offensive forces are experiencing serious budget constraints but will remain the cornerstone of its military power. Russia expects its forces to deter both nuclear and conventional military threats and is prepared to conduct limited nuclear strikes to warn off an enemy or alter the course of a battle.

- Russia currently has about 1,000 strategic ballistic missiles with 4,500 warheads.
- Its strategic force will remain formidable through and beyond 2015, but the size of this force will decrease dramatically--well below arms control limits--primarily because of budget constraints.
- Russia will maintain as many strategic missiles and associated nuclear warheads as it believes it can afford, but well short of START I or II limitations.

--If Russia ratifies START II, with its ban on multiple warheads on ICBM, it would probably be able to maintain only about half to the weapons it could maintain without the ban.

- We judge that an unauthorized or accidental launch of a Russian strategic missile is highly unlikely so long as current technical and procedural safeguards are in place.
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China

Chinese strategic nuclear doctrine calls for a survivable long-range missile force that can hold a significant portion of the US population at risk in a retaliatory strike.

- China's current force of about 20 CSS-4 ICBMs can reach targets in all of the United States.
- Beijing also is developing two new road-mobile, solid propellant ICBMs.

--It conducted the first flight test of the mobile DF-31 ICBM in August 1999; we judge it will have a range of about 8,000 km and will be targeted primarily against Russia and Asia.

--We expect a test of a longer range mobile ICBM within the next several years; it will be targeted primarily against the United States.

- China is developing the JL-2 SLBM, which we expect to be tested within the next decade. The JL-2 probably will be able to target the United States from launch areas near China.
- By 2015, China will likely have tens of missiles targeted against the United States, having added a few tens of more survivable land- and sea-based mobile missiles with smaller nuclear warheads--in part influenced by US technology gained through espionage.

China has had the technical capability to develop multiple RV payloads for 20 years. If China needed a multiple-RV (MRV) capability in the near term, Beijing could use a DF-31-type RV to develop and deploy a simple MRV or multiple independently targetable reentry vehicle (MIRV) ¹ for the CSS-4 in a few years. MIRVing a future mobile missile would be many years off.

- China is also significantly improving its theater missile capabilities and is increasing the size of its SRBM force deployed opposite Taiwan.
- We assess that an unauthorized launch of a Chinese strategic missile is highly unlikely.

Foreign assistance

Foreign assistance continues to have demonstrable effects on missile advances around the world. Moreover, some countries that have traditionally been recipients of foreign missile technology are now sharing more amongst themselves and are pursuing cooperative missile ventures.

- Russian missile assistance continues to be significant.
- China continues to contribute to missile programs in some countries.
- North Korea may expand sales.

Moreover, changes in the regional and international security environment--in particular, Iran's Shahab-3 missile test and the Indian and Pakistani missile and nuclear tests--probably will fuel missile and WMD interests in the region.

Sales of ICBMs or SLVs, which have inherent ICBM capabilities, could further increase the number of countries that will be able to threaten the United States with a missile strike. North Korea continues to demonstrate a willingness to sell its missiles and related technologies and will probably continue doing so, perhaps under the guise of selling SLVs. In the past, we judged that political conditions made the sale of a Russian or Chinese ICBM unlikely and that the geopolitical situation would not change enough for either to decide that the sale of an ICBM would be in its national interest. We have not detected the transfer of a complete ICBM by Russia or China, nor do we have any information to indicate either plans to transfer one. Projecting the likelihood of such a transfer 15 years into the future is very uncertain, driven in part by unpredictable future economic conditions, how Moscow will perceive its position vis-à-vis the West, and future Russian and Chinese perceptions of US ballistic missile defenses. As we attempt to project the politico-military-economic environment for that period, we continue to judge it unlikely that Moscow or Beijing would decide that the financial and perhaps strategic inducements to sell a complete ICBM, SLV, or the technologies tantamount to a complete ICBM, would outweigh the perceived political and economic risks of doing so. ²

Warning Times and our Ability to Forecast Missile Development and Acquisition

In our 1998 annual report, we stated we had high confidence that we could provide warning five years *before deployment* that a potentially hostile country was trying to *develop and deploy* an ICBM. Because countries of concern could threaten to use ballistic missiles following limited flight-testing and before a missile is *deployed* in the traditional sense, we broadened our warning in the 1998 update memorandum to encompass the first successful flight test as the beginning of an "initial threat availability."

Our ability to provide warning for a particular country is depends highly on our collection capabilities. For some countries, we have relatively large bodies of evidence on which to base our assessments; for others, our knowledge of the programs being pursued is limited. Our monitoring and warning about North Korea's efforts to achieve an ICBM capability constitute an important case study on warning. In 1994, we were able to give five years warning of North Korea's efforts to acquire an ICBM capability. At that time, the Intelligence Community judged that:

- The Taepo Dong-1 was a two-stage, medium-range missile that could be tested in 1994 and deployed as early as 1996.
- The Taepo Dong-2 was a larger two-stage missile that would provide P'yongyang and other countries the potential to deliver nuclear weapons to parts of the United States, and biological and chemical weapons further. The Community

judged that the Taepo Dong-2 flight test program would begin within a few years of 1994 with initial deployment in 2000 or later.

Thus, the Intelligence Community warned that North Korea was pursuing an ICBM capability and would flight test an ICBM (the Taepo Dong-2) in the mid- to late 1990s. When North Korea did not flight test either Taepo Dong missile until 1998, and then used the Taepo Dong-1 as a space launch vehicle, it became clear that the Intelligence Community had:

- Overestimated that North Korea would begin flight testing the Taepo Dong-1 and Taepo Dong-2 missiles years earlier than turned out to be the case.
- Projected correctly the timing of a North Korean missile with the potential to deliver payloads to the ICBM range of 5,500-km.
- Underestimated the capabilities of the Taepo Dong-1 by failing to anticipate the use of the third stage.

North Korea demonstrated intercontinental-range booster capabilities roughly on the timetable projected in 1994, but with a completely unanticipated vehicle configuration. The Intelligence Community had expected North Korea to achieve an ICBM-range capability initially with the two-stage Taepo Dong-2, not the Taepo Dong-1 with an unguided third stage. North Korea's use of the Taepo Dong-1 with a third stage as a space launch vehicle was completely unexpected. Until the flight test, the Intelligence Community was unaware of the third stage and the intended use of the Taepo Dong-1 as a space launch vehicle.

Detecting or suspecting a missile development program and projecting the timing of the emerging threat, although difficult, are easier than forecasting the vehicle's configuration or performance with accuracy. Thus, we have more confidence in our ability to warn of efforts by countries to develop ICBMs than we have in our ability to describe accurately the missile configurations that will comprise that threat, especially years prior to flight testing. Furthermore, countries practice denial and deception to hide or mask their intentions--for example, testing an ICBM as a space launch vehicle.

We continue to judge that we may not be able to provide much warning if a country purchased an ICBM or if a country already had an SLV capability. Nevertheless, the initiation of an SLV program is an indicator of a potential ICBM program. North Korea and other countries, such as Iran and an unconstrained Iraq, could develop an SLV booster, then flight-test it as an ICBM with a reentry vehicle (RV) with little or no warning. Thus, we consider space launch vehicles, especially in the hands of countries hostile to the United States, to have significant ballistic missile potential.

We also judge that we may not be able to provide much, if any, warning of a forward-based ballistic missile or land-attack cruise missile (LACM) threat to the United States. Moreover, LACM development can draw upon dual-use technologies. We expect to see acquisition of LACMs by many countries to meet regional military requirements.

Space Launch Vehicle (SLV) Conversion

Nations with SLVs could convert them into ICBMs relatively quickly with little or no chance of detection before the first flight test. Such a conversion would include the development of a reentry vehicle (RV). A nation could try to buy an SLV with the intent to convert it into an ICBM; detection of the sale should provide a few years of warning before a flight test, although we are not confident that we could detect a covert sale. Finally, many SLVs would be cumbersome as converted military systems and could not be made readily survivable, a task that in many cases would be technologically and economically formidable.

Countries might mask their ICBM developments as SLV programs. They could test the complete booster and in most cases the guidance system, which would have to be reprogrammed to fly a ballistic missile trajectory. They could not mask a warhead reentry under the guise of a space launch. Nevertheless, they could develop RVs and maintain them untested for future use, albeit with significantly reduced confidence in their reliability.

- If the country had Russian or Chinese assistance in a covert development effort, it could have relatively high confidence that the RV would survive and function properly.
- If a country developed an untested RV without foreign assistance, its confidence would diminish, but we could not be confident it would fail. Significant amounts of information about reentry vehicles are available in open sources. A low performing RV with high flight stability would be a logical choice for developing an ICBM RV with minimal, or no, testing. The developing country could have some confidence that the system would survive reentry, although confidence in its proper delivery of the weapon would be lower without testing.

Alternative Threats to the United States

Several other means to deliver WMD to the United States have probably been devised, some more reliable than ICBMs that have not completed rigorous testing and validation programs. The goal of an adversary would be to move the weapon within striking distance without a long-range ICBM. Most of these means, however, do not provide the same prestige and degree of deterrence or coercive diplomacy associated with long-range missiles, but they might be the means of choice for terrorists.

Forward-Based Threats

Several countries are technically capable of developing a missile-launch mechanism to use from forward-based ships or other platforms to launch SRBMs and MRBMs, or land-attack cruise missiles against the United States. Some countries may develop and deploy a forward-based system during the period of the next 15 years.

A short- or medium- range ballistic missile could be launched at the United States from a forward-based sea platform positioned within a few hundred kilometers of US territory. If the attacking country were willing to accept significantly reduced accuracy for the missile, forward-basing on a sea-based platform would not be a major technical hurdle.

The reduced accuracy in such a case, however, would probably be better than that of some early ICBMs. The simplest method for launching a ship-borne ballistic missile would be to place a secured TEL onboard the ship and launch the missile from its TEL. If accuracy were a major concern, the missile and launcher would be placed on a stabilization platform to compensate for wave movement of the ocean, or the country would need to add satellite-aided navigation to the missile.

A concept similar to a sea-based ballistic missile launch system would be to launch cruise missiles from forward-based platforms. This method would enable a country to use cruise missiles acquired for regional purposes to attack targets in the United States.

- A country could launch cruise missiles from fighter, bomber, or commercial transport aircraft outside US airspace. US capability to detect planes approaching the coast, and the limited range of fighter and bomber aircraft of most countries, probably would preclude the choice of military aircraft for the attack. Using a commercial aircraft, however, would be feasible for staging a covert cruise missile attack, but it still would be difficult.
- A commercial surface vessel, covertly equipped to launch cruise missiles, would be a plausible alternative for a forward-based launch platform. This method would provide a large and potentially inconspicuous platform to launch a cruise missile while providing at least some cover for launch deniability.
- A submarine would have the advantage of being relatively covert. The technical sophistication required to launch a cruise missile from a submarine torpedo or missile tube most likely would require detailed assistance from the defense industry of a major naval power.

Non-Missile WMD Threats to the United States

Although non-missile means of delivering WMD do not provide the same prestige or degree of deterrence and coercive diplomacy associated with an ICBM, such options are of significant concern. Countries or non-state actors could pursue non-missile delivery options, most of which:

- Are less expensive than developing and producing ICBMs.
- Can be covertly developed and employed; the source of the weapon could be masked in an attempt to evade retaliation.
- Probably would be more reliable than ICBMs that have not completed rigorous testing and validation programs.
- Probably would be more accurate than emerging ICBMs over the next 15 years.
- Probably would be more effective for disseminating biological warfare agent than a ballistic missile.
- Would avoid missile defenses.

The requirements for missile delivery of WMD impose additional, stringent design requirements on the already difficult technical problem of designing such weapons. For example, initial indigenous nuclear weapon designs are likely to be too large and heavy for a modest-sized ballistic missile but still suitable for delivery by ship, truck, or even

airplane. Furthermore, a country (or non-state actor) is likely to have only a few nuclear weapons, at least during the next 15 years. Reliability of delivery would be a critical factor; covert delivery methods could offer reliability advantages over a missile. Not only would a country want the warhead to reach its target, it would want to avoid an accident with a WMD warhead at the missile-launch area. On the other hand, a ship sailing into a port could provide secure delivery to limited locations, and a nuclear detonation, either in the ship or on the dock, could achieve the intended purpose. An airplane, either manned or unmanned, could also deliver a nuclear weapon before any local inspection, and perhaps before landing. Finally, a nuclear weapon might also be smuggled across a border or brought ashore covertly.

Foreign non-state actors, including some terrorist or extremist groups, have used, possessed, or are interested in weapons of mass destruction or the materials to build them. Most of these groups have threatened the United States or its interests. We cannot count on obtaining warning of all planned terrorist attacks, despite the high priority we assign to this goal.

Recent trends suggest the likelihood is increasing that a foreign group or individual will conduct a terrorist attack against US interests using chemical agents or toxic industrial chemicals in an attempt to produce a significant number of casualties, damage infrastructure, or create fear among a population. Past terrorist events, such as the World Trade Center bombing and the Aum Shinrikyo chemical attack on the Tokyo subway system, demonstrated the feasibility and willingness to undertake an attack capable of producing massive casualties.

Immediate Theater Missile Threats to US Interests and Allies

The proliferation of MRBMs--driven primarily by North Korean No Dong sales--has created an immediate, serious, and growing threat to US forces, interests, and allies in the Middle East and Asia, and has significantly altered the strategic balances in the regions.

- Iran's flight test of its Shahab-3, which is based on the No Dong, and Indian and Pakistani missile and nuclear tests may fuel additional interest in MRBMs.
- Pakistan has M-11 SRBMs from China and Ghauri MRBMs from North Korea; we assess both may have a nuclear role.
- India has Prithvi I SRBMs and recently began testing the Agni II MRBM; we assess both may have a nuclear role.

We judge that countries developing missiles view their regional concerns as one of the primary factors in tailoring their programs. They see their short- and medium-range missiles not only as deterrents but also as force-multiplying weapons of war, primarily with conventional weapons but with options for delivering biological, chemical, and eventually nuclear weapons.

Penetration Aids and Countermeasures

We assess that countries developing ballistic missiles would also develop various

responses to US theater and national defenses. Russia and China each have developed numerous countermeasures and probably are willing to sell the requisite technologies.

- Many countries, such as North Korea, Iran, and Iraq probably would rely initially on readily available technology --including separating RVs, spin-stabilized RVs, RV reorientation, radar absorbing material (RAM), booster fragmentation, low-power jammers, chaff, and simple (balloon) decoys--to develop penetration aids and countermeasures.
- These countries could develop countermeasures based on these technologies by the time they flight test their missiles.

Foreign espionage and other collection efforts are likely to increase. China, for example, has been able to obtain significant nuclear weapons information from espionage, contact with scientists from the United States and other countries, publications and conferences, unauthorized media disclosures, and declassified US weapons information. We assess that China, Iran, and others are targeting US missile information as well.

Footnotes

1. An MRV system releases multiple RVs along the missile's linear flight path, often at a single target; a MIRV system can maneuver to several different release points to provide targeting flexibility.

2. The sale of an ICBM is prohibited by the START Treaty.