SWP Comments

Stiftung
Wissenschaft und
Politik

German Institute
for International and
Security Affairs

Missile Defense in and for Europe?

Sascha Lange / Oliver Thränert

The United States' plan to place parts of its Missile Defense System in European countries, pursuant to bilateral agreements, has triggered a major political controversy in Germany. However, important technical and strategic questions have been left out of this discussion. For example, to what extent is Europe really at risk of a missile attack from Iran (as the U.S. claims)? How would the planned missile defense system protect Europe?

According to the official statements of the U.S. Missile Defense Agency, the planned stationing of ten Ground Based Interceptor missiles (GBI) in Poland and the installation of the corresponding X-band radar system in the Czech Republic serve multiple objectives: (1) protection of foreign-based Early Warning and Surveillance radars for space; (2) the improvement of the protection of the U.S. homeland through the development of additional and more effective systems for the early interception of missiles that originate in the Middle East and are aimed at America; (3) the extension of this protection to allies and friends; and (4) the demonstration of international support for American defense initiatives.

Is there a Threat from Iranian Missiles?

The planned stationing of elements of the American missile defense system in Europe is primarily justified as a response to Iranian attempts to either acquire or develop intercontinental ballistic missiles (ICBM) with a range of more than 5500 kilometers. Such missiles would also present a potential threat to Europe. Presently, U.S. intelligence agencies estimate that Teheran could have such missiles by 2015.

There is no doubt that the Iranian leadership is willing to build long range ballistic missiles. But to what extent is Iran truly capable of carrying out this military-political plan?

To begin with, missiles are not weapons of mass destruction until they carry nuclear warheads. Presently, the UN Security Council, with the cooperation of Germany, is trying to redirect Teheran from the nuclear path by means of sanctions and incentives. If these efforts succeed, the nature of the threat from Iranian missiles would be perceived quite differently.

The State of Iranian Missile Development. Presently, Iran possesses numerous artillery

Sascha Lange is a researcher, Dr. Oliver Thränert is head of the European and Atlantic Security Research Unit of SWP

rockets with a range of up to 70 kilometers. In addition, it has short range missiles—mostly developed using the Soviet SCUD missile from the 1960s as a model—with a range of up to 500 kilometers.

In this range, Iran is now in the early stages of developing solid fuel propellant systems. The advantage of this type of propulsion system, in contrast to liquid fuel systems, is that the missiles do not require time-consuming fueling, but rather are always "ready to go" and thus can be launched more quickly. Additionally, the brisker acceleration makes them harder to defend against.

Teheran also has several—presumably less than 50—SHAHAB-3 liquid fuel medium range missiles, whose range is estimated to be 1300 kilometers. There are so far only a few of the more advanced SHAHAB-3A missiles, which have a streamlined entry vehicle and improved guidance system, an extended burn time for the propulsion stage and a range of less than 1500 kilometers.

What developments are to be expected from Iran and its missile systems in the coming years, and is it realistic to assume that Teheran will possess intercontinental ballistic missiles by 2015? An increase in the performance of ballistic missiles is technically very complex and requires a great deal of skill and experience. Particularly, to build long range missiles, Iran would need to master the extremely complicated multi-stage technology. Moreover, Iran's arsenal of missiles is based not on "home grown" development but rather on weapons systems that rely heavily on the construction and engineering expertise of third parties. In the past few years, Iran has closely cooperated with North Korea. In addition, Iran has received—and perhaps still receives—support from Russian and Chinese experts.

Development Options. Iran's highest-performing missiles, the various versions of the SHAHAB-3, are based on the North Korean Nodong missiles. The Nodong is based on an early Soviet model. Russian experts supposedly helped upgrade the Nodong into the SHAHAB-3. This system has now reached its maximum potential and cannot be stretched further to develop longer range missile versions.

Iran has two options for creating long range missiles: (1) it could import complete Taepodong missiles from North Korea (for information regarding their operational readiness, see the next paragraph). This seems very unlikely for two reasons. The production capability for Taepodong missiles can be assumed to be very limited and the current UN sanctions in effect against North Korea would make it very difficult for Pyongyang to export these missiles; or (2) similar to what Pyongyang did when developing its Taepodongs using several Nodong engines, try to bundle multiple rocket engines of the SHAHAB-3. In any event, it is doubtful that Iran is capable of achieving the required, and considerable, advance in technical engineering, development and production quality. Thus far, only a few countries have been able to master multi-stage missile technology. Even countries that are more technically advanced than Iran, such as Israel and India, have had significant difficulties making reliable missiles with such complex technology.

Neither Iran nor North Korea has thus far been able to demonstrate that they have mastered multi-stage missile technology. Pyongyang carried out a test with the Taepodong-1 in 1998 and another with the Taepodong-2 in 2006. Neither test, however, could be deemed a complete success. In the first case, only the first two of the three stages worked; but that nevertheless resulted in a flight range of over 4000 kilometers. The test of the Taepodong-2 ended in an explosion after barely 45 seconds.

Pakistan has had more success. On the basis of apparently close cooperation with China in the 1990s, the two stage solid fuel missile SHAHEEN-2, with a range of just under 2400 kilometers, was constructed. This system has, thus far, completed two test flights (in 2004 and 2005). Nevertheless, it seems very possible that the SHAHEEN-2

could be further developed and placed into service. An even longer range system would take a long time to develop, but it is not impossible. Teheran is unlikely to get any benefit from the Pakistani advances because there is no cooperation between the two countries on missile technology.

Perspectives. Against this background, there is good reason to doubt that Teheran will be able to send ballistic missiles all the way to central Europe anytime soon. The big unknown in this equation, however, is whether and to what extent Teheran will receive assistance from third parties in the future. But even if Iran were one day capable of building long range missiles, it still remains to be seen whether it will persist in its pursuit of nuclear weapons. Even if this were the case, Iran would also have to develop nuclear warheads that could be launched with ballistic missiles. Simple nuclear explosives are generally far too large and heavy for such purposes.

American Plans for Missile Defense in Europe

In spite of these uncertainties about the future of Iran's missile program, the U.S. uses Teheran's developments to legitimize its missile defense program (for the Russian position on the Americans' plans see SWP-Aktuell 23/07 "Russia and Missile Defense"). The U.S. Department of Defense has designed a wide array of missile defense systems. These can be put together modularly so that they can be more easily reassembled in order to adapt to changes from the supposed threat situation on the ground. Various sensors are used for early warning and surveillance, command centers then process the collected information and issue orders which are ultimately carried out by interceptor missiles.

In order to increase the probability of success, the Pentagon has implemented a multilayered concept so that incoming missiles can potentially be struck down during any of the three flight phases. In the first phase, known as the "boost phase", which lasts between two and five minutes, the missile is accelerating. The heat produced from the accelerating engine makes the missiles easy to identify with infrared sensors. During the second phase, known as the "midcourse phase", the missile (or its accelerated warhead) flies outside of the earth's atmosphere towards its intended target. At the beginning of this phase, which is the longest and can last between 15 and 25 minutes depending on the range of the missile, countermeasures can be deployed. In the final phase, known as the "terminal phase", which lasts less than one minute, the warhead reenters the earth's atmosphere and ultimately hits its target.

If the first attempt to defend against a missile fails, the American plans foresee the rest of the system coming into action. The effective and fast coordination of the geographically dispersed components is a technically daunting task, which until now has had very mixed results and has only been accomplished in bits and pieces. In addition, it is much easier to intercept ballistic missiles that have only a limited range. The higher the range, the faster the speed of the incoming missile, and therefore the more difficult it becomes to intercept.

A large radar station is supposed to be installed in the Czech Republic. In Poland, the U.S. plans to station 10 interceptor missiles. Construction on these sites is set to begin in 2008. Both of these components form part of the "midcourse phase" of missile defense. The radar functions in X-band, in order to enable high resolution, and thus greater accuracy, for the targeting of the interceptor missiles. The "Ground Based Interceptors" (GBI) are to be deployed as interceptor missiles. This type of interceptor has already been deployed in Alaska and California as protection against ballistic missiles that would come from across the Pacific Ocean. The radar and interceptor missiles are expected to begin limited operations in 2011 and be fully operational by 2013.

The GBI interceptor missiles are primarily intended to shoot down long range

missiles. In principle, it makes sense to also install this defense system in Europe because missiles from Iran flying in the direction of the U.S. would cross European territory and could be shot down during the midcourse phase.

The interceptor missiles designated for the deployment in Poland are however redesigned to target incoming missiles with enhanced flexibility. The drop of the GBI first stage will enable the "Kill Vehicle" (KV) to maneuver in an earlier phase of the trajectory, allowing for a quicker KV reaction which leads to a modified protection footprint. With this design change, it would be possible—in principle—to defend against west, central and north Europe-bound missiles from Iran. Thus, the missile defense system could protect wider parts of Europe. In addition to the GBI for the middle flight phase, Poland is also pushing for the installation of "Terminal High Altitude Area Defense" (THAAD), a defense system which targets missiles that are near or in the earth's upper atmosphere.

The potential damage that would result from a successful attempt to shoot down an incoming missile is relatively minor. The damage caused by an interception depends on the keep out altitude and the exact part at which the incoming missile is hit. In any event, falling debris would most certainly cause much less damage in comparison to an intact (nuclear!) warhead that was targeted on a large European city.

Given that the above-described missile defense systems have not yet been successfully tested as a whole, nothing definitive can be said about how effective they will be. It is clear, however, that the U.S., with the planned installation of components of the missile defense system, intends to protect not only itself but also Europe.

Conclusion

In light of the overstretching of the German military and the associated costs, missile defense for the protection of Europe today is not very high on the list of priorities. At the same time, the missile technology advances that have been made in a country such as Pakistan, highlight the risk that Iran (or other countries of the Middle East), in the long term, could threaten Europe with nuclear missiles. Such a threat would change the strategic environment for Europe. Efforts to create a missile defense in and for Europe would signal to Teheran that its missile projects can be thwarted with Western defense measures.

But missile defense can only be one of many elements of a broader policy. A further, important element is arms control. If the international community is able to verifiably secure the Iranian renunciation of nuclear weapons in the context of the Nuclear Non-Proliferation Treaty, the missile threat and the need for missile defense would be seen in a much different light.

SWP
Stiftung Wissenschaft und Politik
German Institute for International and Security Affairs

Ludwigkirchplatz 3–4
10719 Berlin
Telephone +49 30 880 07-0
Fax +49 30 880 07-100
www.swp-berlin.org
swp@swp-berlin.org

ISSN 1861-1761