

Iran's Strategic Missiles

Yiftah S. Shapir

In mid-December 2005, it was reported that Iran had acquired eighteen BM-25 missiles from North Korea. According to the report, this missile has a range of 2,500 kilometers. A few weeks later, on January 17, 2006, Iran tested an advanced missile, possibly an improved version of the Shehab-3 missile. The acquisition and the test should be evaluated in light of Iran's ongoing efforts to obtain both long-range missiles and satellite launching capability.

The article below reviews developments regarding Iran's strategic missiles and assesses its future intentions in this area.¹ Iran's missile project is difficult to follow, both because publicly revealed information is unavailable and because reports in Iran's media are usually designed to glorify capabilities. The reports, in many cases exaggerated, are generally confusing and misleading, probably deliberately so. This is particularly evident in reports on many weapon systems, in which identical terms are used for different systems on the one hand, and identical weapon systems are referred to by different names on the other.²

Iran's Missile Arsenal

Scud B and C

During the Iran-Iraq War, Iran began using R-17 (Scud B) missiles, which it obtained from Libya. During the war Iran also received missiles from Syria, and later obtained Scud C missiles with extended range from North Korea. It is believed that Iran currently possesses about twenty launchers (amounting to three to five brigades), and about 300 Shehab-1 and Shehab-2 missiles (the Iranian terms for the Scud B and Scud C). These missiles are currently armed with conventional warheads only.

A more important element of North Korea's aid to Iran was the transfer of missile production technology. Today, many of the missiles in Iran's existing stockpile are locally produced, and it is likely that Iran has the ability to maintain a reasonable supply of missiles. Iran has also not hesitated to make operational use of its missiles. The most recent case was in April 2001, when a volley of between thirty and sixty missiles was fired in an attack on Mujahedin-e-Khalq bases in Iraq. Firing

JCSS Senior Research Associate and director of the Center's Middle East Military Balance Program

such a large number of missiles suggests that Iranian decision-makers are confident that they have a sufficient supply of missiles, and that Iranian industry is capable of renewing the supply if necessary.

Shehab-3

When the Iran-Iraq War ended, Iran began a joint project with North Korea that developed the missile referred to in Iran as the Shehab-3 and in North Korea as the Nodong.³ The Iranians were involved in the project from its outset at the beginning of the 1990s, and Iranian representatives were present at the first test launch of the Nodong in May 1993. Development continued, probably with Iranian financing and the participation of Iranian experts. It also appears that the missile developed in Iran is not identical to the North Korean Nodong; changes were introduced to adapt it to Iran's special requirements.

In 2001, Iran announced that the missile had entered mass production. This announcement, however, was presumably somewhat premature, since the development process continued and further launchings occurred in May and July 2002 and in July 2003. Apparently the Shehab-3 system eventually became operational, and it is now believed that Iran has five or six operation launchers and about twenty missiles. As in the case of the Shehab-1 and Shehab-2 missiles, it is not clear whether Iran is capable of producing all the components of the missile independently or whether it is dependent on an external supply of critical components.

In 2004, Iran carried out two additional tests of the Shehab-3 missile, after which it was announced that an advanced model of the missile had been developed. Photographs of the launch show a missile whose tip is completely different from that of the older model. According to various reports, the improved version (called here the Shehab-3M) has an extended launch range of about 1,500 kilometers. The shape of the tip probably indicates an ability to separate the reentry vehicle from the body and an improved ability to stabilize it during its entry into the atmosphere, which will improve its accuracy.

After the January 2006 test, the commander of the Revolutionary Guards, General Yahya Rahim Safavi, announced that Iran possessed a missile with a 2,000 kilometer range. At this point, it is unclear which missile was tested, whether it really has such a long range, and the extent to which the test was successful.

Shehab-4, Shehab-5, and Shehab-6

Already in the mid-1990s it was reported that Iran was developing more advanced models of the Shehab missile series. These missiles were capable of carrying heavier payloads for increasing distances: 2,000 kilometers, 2,500 kilometers, and even 4,000 kilometers. The missiles were referred to as the Shehab-4, Shehab-5, and Shehab-6, and a missile called Kosar was also mentioned. At the time Iranian spokespersons claimed that Iran had no intention of developing another ballistic missile for military use in addition to the Shehab-3. On the other hand, they emphasized that Iran planned to develop a satellite launcher and to launch its satellites independently.

No solid evidence about these missiles is available, and it is unclear whether the Iranians have advanced beyond the initial planning phase. The exception is the Shehab-4, which has apparently passed land engine tests conducted in Iran. This missile is considered the Iranian equivalent of North Korea's Paekdusan-1 (referred to in the West as the Taepodong-1).⁴ Calculations by Israeli researchers show that if the Shehab-4 has the same configuration as the Taepodong-1, i.e., it amounts to a Shehab-2 missile installed as a second stage on a Shehab-3 missile with the addition of a small solid fuel-powered satellite booster, then it is capable of carrying a satellite of up to 35 kilograms into outer space from a launching site near the city of Qom.⁵

Missiles Powered by Solid Fuel

Since June 2001, Iranian spokespersons have declared that Iran was developing a missile called the Fateh-110 or A-110, which was portrayed as a solid fuel-powered guided missile. This missile was initially considered an imported version of the Chinese M-11, but it appears to be a guided version of an older rocket called the Zelzal-2. According to various reports, the range of the new missile is 160-200 kilometers. Several Western experts are convinced that the Fateh-110 should not be classified as a missile. They believe that it lacks an effective guidance system, and at most has a stabilizing system.

In addition, Iranian spokespersons declared in mid-2005 that they had successfully tested "a solid fuel engine for the Shehab missiles," notwithstanding the technical impossibility of replacing a liquid fuel engine with a solid fuel engine in one specific missile. The technologies are very different and require a completely different missile design, including the navigational and guidance system. This is therefore an entirely different missile.

The technology required in order to manufacture a solid fuel missile with the size of the Shehab-3 in range and payload capacity is extremely complex. Very few countries in the world have such technology. Making such a missile requires special facilities, especially manufacturing processes that include extremely stringent quality control. However, this technology is likely to yield many advantages for Iran. Solid fuel missiles are easier to operate and maintain at the user level. They are easily prepared for launching, with much less time required than the time needed for preparing missiles powered by liquid fuel. Storage and maintenance of such missiles is also much simpler.

This technology has advantages that extend beyond its technical aspects. Calculations by Israeli researchers show that if Iranian industry is in fact capable of building a solid fuel engine with a 1.3-meter diameter (the diameter of the Shehab-3), it will be able to build a three-stage satellite launcher capable of putting a satellite of up to 170 kilograms into orbit (equal to the weight of the Iranian satellite Sinah-1, which was launched using a Russian launcher in October 2005).⁶

Iran's Strategic Requirements

Iran's various projects for developing long-range missiles and artillery rockets originated in the Iran-Iraq War. At that time, there was an urgent need to demonstrate an ability to inflict damage at long range deep into Iraqi territory. This ability was important mostly for propaganda, since the potential damage of these missiles, armed with conventional warheads, was relatively small. Hitting the enemy's main cities in wartime has extremely far-reaching strategic significance, however, as Israeli citizens experienced during the 1991 Gulf War.

Iran used missiles a few times after the war, mainly against the bases of dissident organizations that were deployed in Iraq. There too the use of missiles had an importance beyond the actual damage that they caused; it proved to these organizations that the long arm of Tehran could reach them. Another aspect of this weapon is deterrence: the main benefit of long-range ballistic missiles lies in their deterrent effect. The mere threat of damage to an enemy from a great distance deters it from action. Here is also where the missile project is linked to Iran's nuclear program. On the one hand, classic deterrence means threatening an enemy with unbearable punishment, up to total destruction. On the other hand, demonstrating an ability to

explode a nuclear device is not enough to deter an opponent. There is also a need to demonstrate the ability to launch the nuclear device into enemy territory.

Iran's efforts to obtain long range missiles have two aspects. One is Iran's image of itself as a regional power with a glorious past, including its periods as an empire. This image requires maintaining a large military force and symbols of political power. In this respect, the missiles represent the technological ability to exercise power. The other aspect is threat perception, as Iran's rulers see a threatening world surrounding them. The Iraqi threat, which was the main threat to Iran in the not-too-distant past, is gone, but the United States, regarded as the supreme enemy, is deployed around Iran's borders: in Iraq, Afghanistan, the new Central Asian republics, and the sea routes in the Persian Gulf.

Iran's rulers are also worried about the country's other neighbors. Even Pakistan, which cooperates with Iran on missiles and nuclear matters, is disturbing. Bilateral relations between the two countries have seen ups and downs in recent years. Furthermore, Pakistan, a declared nuclear country, is currently enjoying a honeymoon in its relations with the United States. Iran's relations with Turkey, a militarily strong country positioned on the opposite side of Iran from Pakistan, have also fluctuated. Turkey, a NATO member, is an ally of the United States, Iran's biggest enemy, and its avowed aspiration is to join the European Union.

This is where Iran's concept of Israel plays a role. On the one hand, there is no significant clash of interests between Iran and Israel. On the other hand, hostility to Israel has been and remains one of the important themes of the Islamic Revolution, one that the current Iranian regime will not forego and is heavily emphasized by Iranian president Mahmoud Ahmadinejad.

Mutual deterrence between Israel and Iran should be viewed in this light. This deterrence dialogue has continued since the beginning of the 1990s. Both sides have publicly threatened each other and demonstrated that they are capable of conducting operations at long range. From this perspective, it is possible to view Iran's efforts to obtain Shehab-3 missiles as a response to Israel's acquisition of F-15I airplanes. In other words, Iran regards Israel's purchase of F-15I planes as the acquisition of attack capability that threatens Iran, particularly its nuclear facilities. Development of the Shehab-3 is regarded as a means of deterring Israel from an attack on installations in Iran. One example of this position can be seen in the remark by General Safavi

following the most recent missile test: "We don't intend to attack any country, but if we are attacked, we are capable of responding effectively."

The question arises whether Iran needs ballistic missiles with longer ranges than those it already possesses. Iran's plans to build Shehab-4, Shehab-5, and Shehab-6 missiles with ranges of 4,000-5,000 kilometers has more than once been portrayed as a desire to attain the ability to threaten more remote countries, such as those in Western Europe, for example. It is difficult to regard this as a strategic need of Iran, unless we assume that these developments are merely a stage on the way to construction of an intercontinental ballistic missile that will enable Iran to threaten the North American continent.

All the publicly revealed data about Iran's long-range missile project is from American and Israeli intelligence sources. As such, the reports about these missiles are themselves part of a deterrence dialogue between Iran and the Western countries, mainly the US and Israel. In the course of this dialogue, there is a natural tendency to exaggerate the gravity of the threat, both on the Iranian side in order to make the threat seem worse, and on the other side, for reasons having to do with the internal political debate in both Israel and the US. The recent reports about BM-25 missiles, which originated with a German intelligence report, should be viewed in a similar context. This missile is a North Korean version of the Soviet SS-N-6 missile, which was a submarine-launched ground-to-ground missile with a 2,500-3,000 kilometer range, depending on the model. The Soviet Union decommissioned this missile in the 1970s.

If Iran has indeed acquired such missiles and if in fact it intends to use them as an operational ground-to-ground system rather than as boosters for its satellite program, this has grave strategic significance. This report, however, is odd in several respects. First, it is unclear how these missiles reached North Korea from Russia and why Russia did not act to prevent the export of these missiles. These exports would probably have poisoned Russia's relations with the US. Also noteworthy is the fact that the designation BM-25 is not familiar in the context in which it appears in this report; it is known in connection with tactical rocket launching systems.

Iran has conflicting aspirations. On the one hand, it wants to demonstrate its ability to deter operations against it. On the other hand, it wishes to temper the threat that its projects pose to the West. Iranian spokespersons have therefore denied any ambition whatsoever to threaten Europe and the North American continent. At the

same time, Iranian spokespersons have stressed their aspirations in a different direction, which constitutes the third aspect of Iran's missile development program: Iran's desire to build its own satellite and launch it independently. A plan to develop satellites has many advantages for Iran in both scientific development and future military capability. In addition, having an independent satellite launching capability constitutes a great propaganda asset, which provides a substantial concrete benefit in the international arena. Furthermore, the plan to launch satellites has international legitimacy and can be portrayed as a civilian program, in contrast to other projects that are purely military. It is therefore easier to obtain external aid for it, which is still essential for developing Iran's missile program.

Conclusion

It is reasonable to assume that the main reason for Iran's efforts to develop its missile program, in addition to the Shehab-3, is the desire to achieve an independent satellite-launching capability. It is obviously theoretically possible to convert a satellite launcher into a ballistic missile capable of launching several hundred kilograms at a range of several thousand kilometers. At the same time, the Iranians will not necessarily exploit this potential, since the strategic benefit that Iran can derive from the ability to utilize missiles with such a range as a threat (to Europe, for example) is not at all clear.

Finally, it is worthwhile paying attention to the timetables for these projects. It took ten years after Iran began its effort to develop Shehab-3 missiles before these missiles became operational. Reports about the Shehab-4, Shehab-5, and Shehab-6 missiles have been appearing for about a decade, and no test launch has been observed yet. Nor have the declarations about an independent satellite launch been fulfilled. Despite the great efforts invested in the missile program and the considerable technological capability existing in Iran, it appears that the country's industry finds it difficult to overcome the technical, and probably also economic, obstacles.

¹ The article will not deal with the wide variety of artillery rockets that Iran is also developing and manufacturing.

² For example, "Zelzal" was formerly a term used for a series of non-guided solid fuel artillery rockets. The title "Zelzal-3" was recently used for the Shehab-3 missile. In addition, in a parade in September 2005, obsolete Hawk ground-to-air missiles were exhibited under the name "Zelzal."

³ The name "Nodong" is a Western term; the Korean name for the missile is unknown.

⁴ Although it is unclear which missile was tested in January 2006, the assumption is that it was at most an improvement of an existing missile, not a new model.

⁵ Uzi Rubin, Ephraim Bashan, Gad Mayer, "A Satellite Today, Tomorrow an ICBM," <http://memonitor.com>.

⁶ Ibid.