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COMPROMISE IN THREAT ASSESSMENT

To the Editor-in-Chief,

Sir,

In May 2009, the New York based EastWest Institute (EWI), which also has officers in Moscow and Brussels, published an extensive and fairly detailed report headlined ''Iran's Nuclear and Missile Potential: A Joint Threat Assessment by U.S. and Russian Technical Experts.''

The depth and the amount of technical detail in the analysis, which relied on open-source information, leaves no doubt that the report has largely informed the Russian and U.S. presidents' decision to conduct a joint assessment of missile threats—unless of course further work will rely mostly on exchange of intelligence information.

The report's assessment of Iran's prospects for acquiring a nuclear weapon makes use of almost all the available information in this regard. Some of this information had previously surfaced in various IAEA reports, but was denied by Iranian officials. This includes:

- the discovery of Iranian documentation on how to turn uranium dioxide into uranium metal and then into hemispheres, which can only be useful for making a nuclear device;
- efforts to modify the payload section of the Shahab-3 missile to accommodate a nuclear warhead;
- attempts to develop special detonators for a nuclear device;
- plans for conducting underground tests and calculations of the kill radius of a nuclear detonation, etc.

The report cites various estimates of how soon Iran might built its first nuclear device, which range from one year to five. It also speculates on whether Iran would actually want to test its putative nuclear weapon or bypass that stage, making use instead of other countries' experience in building uranium devices. Expert estimates are based on the notion that a nuclear warhead for the Iranian ballistic missiles would weigh about 1,000 kilos. But the EWI report fails to take into account that nuclear warhead designs found quite a while ago in Iraq allow for a much smaller device. One such set of designs estimates the mass of the device at 415–868 kilos, and its diameter at 600–650 mm. The device would include a neutron trigger, a highly enriched uranium core (15–18 kg), a natural uranium reflector (100–250 kg), steel casing (50–200 kg), high explosive (250–500 kg) and some other components.

No indications have been found that Iran is actually working on such designs. But the schematics of similar projects are widely available from open sources. And Iran's research and engineering capability is greater than Iraq's was. So it cannot be ruled out that detailed designs for a nuclear device compact enough to be fitted onto ballistic missiles have already been developed by some Iranian facilities that are not part of the country's nuclear infrastructure and therefore not subject to IAEA inspections.

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The report and its technical addenda also contain a comprehensive and detailed analysis of the space and ballistic missile technology Iran has developed indigenously or acquired from other countries, primarily North Korea.

The document analyses the capability of the entire range of Iran's Shahab ballistic missiles (Shahab-1, Shahab-2, Shahab-3 and Shahab-3M), the solid-fuel Sejil missile, the Safir space launcher and its engines, as well as the North Korean Nodong-1, Taepodong-1 and Taepodong-2 missiles.

The assessment of the Shahab-3 and Shahab-3M range contained in the report's technical addendum is at variance with the separate calculations made by Russian experts. According to the report, the maximum range Shahab-3M can achieve with a 1000 kg payload is 1,100 km. The figure arrived at by Russian scientists is 1,500 km. The difference is probably due to the fact that instead of a set of four Scud-type engines, Shahab-3M uses a more advanced single-chamber liquid-fuel engine developed by the Iranians independently or jointly with North Korea.

For missiles of this type, reducing the payload by 1 kg translates into a range increase of roughly 1 km. That means that if the weight of the payload is cut to 500 kg, the Iranian missile's range could reach up to 2,000 km. And judging from the Iraqi warhead designs, building a 500 kg device that could be fitted onto a ballistic missile could well be within the Iranians' reach.

The report speculates that the Iranians may have used the vernier engine block from the Russian R-27 submarine launched ballistic missile for the upper stage of their Safir launcher, which put a 27 kg satellite into low earth orbit in February 2009. The R-27 vernier block is made up of two liquid-fuel rocket engines, with a maximum thrust of 3,000 kg. Each engine is an open layout unit with a turbopump. The propellant used is the same as for the main engine (nitrogen tetroxide and asymmetric dimethyl hydrazine). But it is not clear how the Iranians could have got hold of such an engine. One possibility is that they obtained a salvaged unit via North Korea, after an unsuccessful launch or emergency dump of an R-27 missile by a Soviet submarine. But there have been no events during either trials or exercise launches after which an undamaged engine could have been abandoned in the exclusion zone.

It is therefore more likely that the upper stage of Safir was fitted with the liquid-fuel main propulsion motor of the Soviet S-200 surface-to-air missile. The S-200 was developed in 1967 and exported in large numbers to several countries, including Syria (which received six batteries, with six missiles per battery plus spares), North Korea and, in 1990, Iran.

The report makes an entirely reasonable conclusion that, in its current shape, Safir cannot be used to deliver a nuclear warhead. Any such warhead would weigh far more than the satellite put into orbit in February. But the launcher could well be redesigned into an intermediate-range ballistic missile. If nothing else, the Iranians could use a Scud-type engine as its second stage, just like the North Koreans did in their Taepodong-1, or the main propulsion motor of the S-200.

In that case the missile could achieve a maximum range of 4,000 km with a 500 kg payload, Russian experts believe.

The test launch of Sejil, which uses a solid-fuel engine, has confirmed reports that Iran is developing the technology and manufacturing capability required to build an arsenal of solid-fuel missiles. The technology is very complex and expensive. It requires special chemistry, manufacturing processes, etc. There have been no indications to date that Iran's solid-fuel rocket stages or engines with a thrust of around 55 tons (first stage) or over 20 tons (second stage) were obtained from abroad. That means that Iranian scientists have achieved significant progress in solid-fuel intermediate-range missile technology, leaving behind their North Korean counterparts. Further proof of that came in September 2009, when Iran held another Sejil launch. With a payload of 500 kg, a missile of this class can have a range of up to 3,000 km.

There is little reason to believe that Iran will choose either the solid-fuel or liquid-fuel technology over the other. It will probably continue to develop and manufacture both types of ballistic missiles.

North Korea has also attempted to launch a vehicle into space using solid-fuel technology for the third stage of its launcher. It probably used the solid-fuel body and engines of the Soviet OTR-21 Tochka short-range ballistic missiles, which have been exported to many countries.

The EWI report also contains detailed assessments of how reliably Iranian ballistic missiles could potentially be intercepted by the 10 GBI anti-missiles with two-stage boosters, which the Bush administration wanted to station in Poland along with radar in the Czech Republic. Without dwelling on this part of the report, its conclusion appears entirely justified. The best-case scenario is that the 10 GBI interceptors could destroy no more than two Iranian ballistic missiles, i.e. not nearly enough to defend against a simultaneous launch of several missiles. The report is also fairly impartial in its analysis of the reasons behind Russia's concerns over the global ABM plans announced by the previous U.S. administration. The conclusions of this analysis almost entirely coincide with the earlier conclusions made by independent experts.

The analysis of the Iranian missile potential in the EWI report, written by a group of Russian and American experts with the participation of their German counterparts, is undoubtedly a truly significant international document, the first of its kind. It is entirely fit for the purpose of becoming the basic reference document during discussions on the joint assessment of missile threats, which the Russian and U.S. president have agreed to conduct.

But it also appears that there has been a certain level of compromise in the Russian and U.S. experts' joint assessment of the Iranian missile capability in this document. Earlier calculations by Russian specialists suggest that the report somewhat underestimates the performance of the Iranian propulsion systems and the range of Iranian ballistic missiles. The Iranian scientists are making steady progress in solid and liquid fuel missile technology, and the range of the Iranian missiles is continuously improving.

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